ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF REGIONAL AND LOCAL DEVELOPMENT STUDY

URBAN POOR RESIDENTS AND WATER ACCESSIBILITY: THE CASE OF ADDIS KETEMA SUBCITY

A THESIS SUBMITTED TO GRADUATE SCHOOLS OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE DEGREE OF MASTERS OF ARTS IN REGIONAL AND LOCAL DEVELOPMENT STUDIES (RLDS)

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JULY, 2007

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Acronyms

AAU	Addis Ababa University
AAWSA	Addis Ababa Water Supply and Sanitation Authority
CBO's	Community Based Organizations
CSA	Central Statistical Authority
DFID	Department for International Development
EWRMP	Ethiopian Water Resource Management Policy
FDRE	Federal Democratic Republic of Ethiopia
HC	House connection
HHs	Households
IDR	Institute of Development Research
M^3	Meter Cube
MDGs	Millennium Development Goals
MWR	Ministry of Water Resource
NBE	National Bank of Ethiopia
NGO's	Non-Governmental Organizations
NUPI	National Urban Planning Institute
PF	Public Fountains
RLDS	Regional and Local Development Studies
TWN	Third World Network
UFW	Unaccounted for Water
UN	United Nations
UNCHS	United Nation Center for Human Settlement
UNDP	United Nations Development Program
USA	United States of America
USD	United States Dollar
WHO	World Health Organization
WSSD	Water Service and Sanitation Development
WW II	World War Second
YCP	Yard Connection Private
YCS	Yard Connection Shared

Abstract

Addis Ababa although is the major urban center in Ethiopia, it has lower potable water and proper sanitation service even by sub-sharan standard. Lower income level is sited the major factor for this as the poor doesn't afford private water connections. An overview of urban poverty in Addis Ababa shows that the poor is not only inaccessible to private connection but also consumes less. AAWSA (2005), states that only 4 percent of Addis Ababa residents have house connection and consume 80-100 litters of water per person daily.

The research under the topic at hand explores water sources utilized and consumption level of low-income residents of Addis ketema Sub-city. For this purpose, 384 households from three kebels of the sub-city were selected for the survey. The result of the study shows that the urban poor use less convenient sources of water and also consume less than the minimum standard set by WHO.

The study found out that 232(60.42 percent) out 384 households earn monthly income of Birr 600.00 of these 65.94% households use water sources such as yard connection shared tabs, public fountains and water from vendors.The average households' consumption is 11.23 litters of water per day (by half lower than WHO's minumum satndard). The major factor attributed to such lower accessibility in both terms is mainly household income in the study area. Apart from this water problems such as frequent and sever interruption, unaffordable connection charges, expensive tariff and etc adversely affected the lives of the residents in general and the poor in particular.

Concerning policy issues urban water supply policy is neither formulated independently nor is addressed comprehensively in the existing water supply policy. The existing areas concerning the urban setting in the policy lacks pro poor elements in terms of enabling the poor to get access to private meter connection as well as to afford the tariff set for water supply in urban areas where the tariff bases on full cost recovery method and also is progressive.

Key words: water accessibility, distribution, supply and consumption, meter connection, household income, water sources and etc.

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CHAPTER ONE

Introduction

1.1. General Overview

Infrastructure services such as electricity, telecommunication, transportation and water and sanitation play a critical role in country's development and are directly and indirectly linked to living standard and economic growth. The development and maintenance of essential public infrastructure is an important ingredient for sustained growth and poverty reduction. Among others health and education, efficient water and sanitation services lay a suitable ground for a more productive and healthy society capable of contributing to sustainable economic growth.

To this end, most under developed countries are now striving to attain at least minimum level of infrastructure stock in both their rural and urban communities. Such an effort is mainly to improve peoples' access to these essential services especially of poor people due to the fact that poor provision of them hampers economic growth and adversely affect their endeavor towards poverty reduction goal. Until the 1990's most of these countries relied on public sector monopolies to both finance and operate their overall infrastructure service supply. The hitherto results therefore were inefficient and inequitable water distribution in most poor countries. This approach to water supply entails to the supply approach which later on gives on the demand approach. The demand approach, according to Mani (2000:21) mainly focused on the supply of water based on the demand and willingness to it.

The world is now almost into the seventh year since it has adopted the millennium declaration that was endorsed by 189 countries and translated in to a roadmap setting out goals to be reached by 2015. These goals include halving global poverty and hunger, protecting the

environment, improving health issues like maternal care, child mortality and HIV/AIDS and other epidemics and tackling illiteracy and discrimination against women.

Although world leaders endorsed millennium development goals (MDGs), vast majorities of people in the world now are suffering from multifaceted numerous problems. On the other hand progress towards the achievement of the goals is said to be inconsistent too slow or non-existent. The situation in Sub-Saharan Africa is no exception to this. UN Millennium Project (2006). In fact

> *Sub-Saharan Africa is the epicenter of crisis, with continuing food insecurity, a rise of extreme poverty, stunningly high child and maternal mortality, and large numbers of people living in slums, and a widespread shortfall for most of the MDGs.* UN *Millennium Project (2006).*

Such a situation in the world's significant part brought the leaders of nations to come to the same auspice to tackle the multi faceted problems of this part of the world by endorsing common target. Among others ***"protecting the environment"*** concerns about maintaining the world's environmental resources. According to UNFDP (2006) a considerable attention under this goal is given to realize the following issues in poor countries.

1 Provision of better water, sanitation and drainage services;
2 Enhancing access to decent and quality housing to eradicate slum and informal settlement;
3 preventing forests shrinking and carbon dioxide levels rising, in poor countries the world's concerns mainly about maintaining health and;
4 As well as targets have been set to reverse the loss of environmental resources and halve the proportion of people without safe drinking water and sanitation by 2015

such as affordable and decent quality housing forcing many more to live in informal settlements or slums. According to DFID (2006), just under a billion people currently live in a slum worldwide with a possible rise to almost 2 billion by 2020.

Low standard of living and higher informal settlements is considered as the basic factors for much lower access of people to water and sanitation services. Twort, A.G et al (1985) in their book entitled water supply explained the demand for adequate and safer water is mainly dependent on people's level of living which in turn encompasses their income and its sustainability. In addition the meager the housing condition and settlement pattern a country has, the lower the peoples access to water supply service.

1.2. Statement of the Problem

It is estimated that about 16 percent of the total population of Ethiopia currently live in urban areas, which has rendered it as one of the least urbanized country in sub-Saharan Africa. The rational behind this skimpy urban development in the country goes to its agrarian economic base.

NUPI (2003) in, urban development policy inception report, explained that introduction of modern government bureaucracy, transport systems, public services after WWII has brought gradual change in urbanization in Ethiopia. It was 3 percent in at the end of WW II which has doubled in 1960, 11 percent in 1994, 14 and 16 percents in 1998 and 2003 respectively. It is also projected to reach to 20 percent in 2020.

The change in the level of urbanization was accompanied by corresponding increases in the absolute number of urban residents. Accordingly, the sheer number of persons residing in urban areas has

increased from 4.3 million in 1984 to 7.4 million in 1994, which is estimated to have already reached 10.6 million in the year 2003 and projected to reach 20.0 million by the year 2020 NUPI (2003).

Despite this low level of urbanization, the country has one of the highest rates of urbanization even by the standards of developing countries, which is estimated at 5.4 percent during the inter census period (1984-1994). This is also much higher than the average growth rate of the total national population, which is estimated at 3 percent. Net migration is deemed to be the major factor as urban centers are presumed to be better positions whereas the rural setting continued to have deteriorated living standard and increased poverty.

However Ethiopia is now facing unprecedented urban growth rate the manifestation of which is number of urbanization-related problems.

> *...the major problems besetting Ethiopian urban centers include: poor housing and neighborhood quality; ... ever-increasing level of poverty; an ever deteriorating environmental conditions; serious shortage and limited coverage of basic infrastructure and services; ... NUPI (2003)*

Access to potable water and sanitation in Ethiopia is very low. World Health Organization (WHO) rated the country as having the lowest level of water coverage which is 24% and its sanitation cover to be 15%.Naomi Foxwood (2005) also shows that the country's level of services goes much lower than the average WHO's recommended minimum of 20 litters per capita per day. This performance definitely has immense implication on the socio-economic development in the country as a whole and adverse impact on the health sector of the country in particular.

Such feature in the county's water accessibility is pertinent also in it's urban centers. Among others Addis Ababa being a capital city of

Ethiopia, a diplomatic capital for Africa (AU and ECA) and a seat for quiet a number of UN regional head quarters is not an exception.

According to AAWSA's draft business plan (2005), the city gets its water supply from three main sources with approximately 210,500 m^3/day. Unaccounted for water (UFW) is estimated to be 37% which lowers the amount to 132,615 m^3/day. Estimated water demand corresponding to the population is 385,000m^3/day thus water deficit in 2005 was 46 percent without considering the UFW. Needless to be ignored here is the pattern of distribution. Although the deficit seems to be shard equitably by all parts of the city's residents, it is more severe to low income group city dwellers.

AAWSA's water supply project stage III pre design report (2004) shows slum areas of Addis Ababa has inadequate water source and sewerage systems. Even if the formal network exists the amount of consumption corresponds to the level of income. The same source puts 80% of Addis Ababa's population are in the income group below 600 Birr per month where the main source for such significant proportion of the city's residents goes to 40%, 33% and 27% from public fountains, vendors and shared yard connection respectively.

Access to water sources such as private tab in the house or in the yard among the poor is very low in Addis Ababa. The poor use public fountains, water vendors and shared tabs with neighbors as their major water sources. An overview of urban poverty in Addis Ababa done by UNCHS (2000) shows that the poor is not only inaccessible to private connection but also consume less as the result of the sources they use. Mainly high connection charge compare to income levels of the poor is sited as the major factor here.

Hence understanding the situation of the poor in terms of water service they get and factors that determine their accessibility is very important to intervene on the issue which in the end is to improve the situation of the poor. Thus, this research intends to contribute to this end..

1.3. Objectives of the Study

The general objective of the study is to examine the current status of water supply service to the urban poor in terms of their major water sources and consumption levels in central Addis Ababa.

The specific objectives are:

- To examine the relationship of household income and water accessibility ;
- To examine the types and extent of water provision problems in the area and their effects on the lives of the poor;
- To review policy issues on water service in the city.

The study intends to answer the following research questions.

- What is the existing situation of the urban poor in relation to water service in central Addis Ababa?
- What is the relationship between household income level and their level of water consumption as well as water sources used by them?
- What are the existing problems in the water service?
- Are policy issues on the matter pro poor? What should be the way forward?

1.4. Research Methodology

1.4.1 Sources of Data

Two major sources of data were used in the study. Primary data were

collected using quantitative data collecting methods. Questionnaires were developed and distributed to officials of AAWSA and other relevant personalities. Data regarding existing water service, factors attributing to the inaccessibility of formal sources to the poor residents and problems related to water, sanitation services in the area, and its implication in the lives of the poor were gathered through interviews with key informants by semi-structured interview questionnaires.

Secondary data sources that help to review the overall water and sewerage service in Addis Ababa were also used. Relevant documents concerning issues of accessibility, quality, distribution and implication of water services in people's life both in the metropolis and elsewhere in the country were the major sources of secondary data. Similarly, databases of health posts in the area showing incidents of water related illness were relevant for discussion. These sources of data are important not only for discussing data gathered from primary source but they will also equip the researcher with the extent of the problem and help envisage way forward.

1.4.2 Sampling Method

Households who were interviewed using structured interview questions are the unit of analysis of this study. These households are selected from the three kebles in Addis ketema sub-city. The respective kebeles' house numbers list obtained from kebele offices was used as the sampling frame.

1.4.3 Selection of Kifle Ketema

Addis Ababa has ten sub-cities and 203 Kebeles established so by proclamation no 361/2003. Addis Ketema sub-city, the central part of Addis Ababa, is one of the densely populated areas in the city. According

to Addis Ababa Water and Sewerage Authority (AAWSA's) official 52% of the authority's customers reside in central part of the city where Addis Ketema sub-city is part of this area. A study done by AAWSA shows that even though, the area is densely populated and water networks are available, the number of meter connected customers is relatively low. According to AAWSA (2003) bill collection division report using the previous naming, there are 28 Woredas of which 14 Woredas are lower consumer groups of the authority where some of the woredas are now in Addis Ketema Sub-city.

Moreover, according to AAWSA (2004), the sub-city is one of the areas where the urban poor majorities are residing. The study intended to explore the urban poor's water accessibility in terms of water sources they use, the level of consumption, existing water problems and their implication on their lives. To this end, Addis Ketema Sub-City is purposively selected because as explained above, it is one of a poor neighborhood in Addis Ababa

1.4.4 Selection of Households

The total population of Addis Ketema Sub-City is 354,755.The number of households in the sub-city 34,476. The Sub City has 9 kebeles among which according to an official from the sub-city, kebeles 08/09/18, 10/11/12 and 13/15 are the ones with high proportion of low-income residents. These Kebeles were selected purposively as the study sites with in the sub-city. From among the residents of these kebeles, 384 households were randomly selected for the in-depth interview. (See annex 1).

With regards to the physical location of the kebeles, kebele 10/11/12 is

located at the heart of Merkato[1]. The area is mainly for business where it covers the areas around the big halls in Merkato (also known as "Adarash" and "Tana" business centers). Although this kebele is mainly of business site it hosts a number of residential houses too. Kebele 13/15 is the area covering between the bus terminal and "gojam-berenda"[2]. This kebele is characterized by high slum settlement and deteriorated housing condition. The third selected kebele (i.e. 08/09/18) is the areas also known as "Mesalemia" is too a business site in the city. It is situated at the far end of the bus terminal. Compared to the other two kebeles, it seems to be better positioned but is still on of the slum and poor neighborhood in the sub-city.

The sample size was calculated using the formula and assumptions stated in Bulman (1992). The formula is:

$$n = P(1-P)(Z/e)^2$$

Where: n= is the sample size or number of surveyed population

P= is proportion of population possessing the major attribute. In the absence of reliable data about the population it is recommended to use 50% (or 0.5).

Z= is the two tailed critical value at 95%confidence interval (1.96) in this case

E= is standard marginal error of the proportion

The result gives

$$n = 0.5(1-0.5)(1.96/0.05)^2$$

$$n = 384$$

This sample size thus was drawn from the three kebeles of Addis Ketema sub-city using proportional to size method. Once the sample size from

[1] Merkato is the biggest market place in Ethiopia

[2] Gojam Berenda is a amharic name for a place

each kebele is determined the actual selection households proceeded in systematic random method. The kebeles list of residents was used as a sampling frame.

1.4.5 Method of Analysis

The study is principally intended to look into the urban poor resident's access to water service in the study area. To meet the purpose, both qualitative and quantitative data gathered from the opinions, ideas and responses of informants from the interview questions and questionnaires were summarized, systematically organized and analyzed using simple and relevant statistical techniques such as average, percentage and proportions.

1.5. Scope of the study

The study is intended to investigate the existing water supply in the urban setting in general and poor urban residents in particular. In this regard it will only investigate the major sources of water of the poor, their level of water consumption, the relationship between household income level and water consumption and major water problems encountered and the implication of water service on the lives of poor urban residents. The study is limited to residents of Addis ketema Sub City that were selected as the population for this study and 384 households used as the sample population. The study intends to investigate the sources of water for the urban poor and their level of utilization. Therefore this study only is meant to explore the prevailing situation in terms of access to basic human needs of the urban majority "the Poor".

1.6. Significance of the study

Water supply has been an area of concern both nationally and

internationally, which resulted in a lot of effort from all direction. In poor countries, water has long become the source of multifaceted challenges. However, research works so far in general are very few compared to its level of importance in human life. Moreover the existing researches mainly focus on rural water supply schemes, which make water related studies in urban setting to be scanty.

The study shows the existing water supply situation of the urban poor by exploring the sources of water, the existing problems and their impact on livelihood of the poor. It also reviews policy issues on whether they are pro poor or not. As a result it serves as springboard to other studies. It also provides insight to policy makers who might be concerned with urban water problems.

1.7. Limitations of the Study

The following are some of the limitations of the study:

- Financial limitations hampered proper and timely finalizing the work. And due to this fact the study only confined to only three kebeles that are mainly low-income neighborhoods compared to other kebeles in the sub-city.
- In the process of collecting primarily data, some field interviewers commit silly mistakes due to reluctance in understanding the r relevance of all questions. This has made data cleaning laborious.
- Concerning secondary data from AAWSSA, some relevant sources to this study happened to be incomplete and very difficult to access. To curb this problem, data was supplemented from the interviews with cooperating officials.

1.8. Organization of the Study

The first chapter of this study thus far incorporated the general overview of the study followed by the statement of the problem which elaborates the problem that give rise to the study and the general and specific objectives. Then followed are: the research questions, the significance of the study which answers the question of what the study is about and the scope which dealt about why the study is important. The research methodology, the major impediments the study has in the limitation part and this part, which explain about the organization of the study sequentially, comes in the end part of this chapter.

The second chapter of the study explored existing literatures on water and sanitation services in general and cases from countries with similar features with Ethiopia in particular were reviewed. This part also encompassed studies dealing the issue in different parts of the country and in the study area. Following is the third chapter, which is the core part of the study where findings are presented with tables and graphs and analyzed with the reviewed literature. In the end part of the study, conclusions are drawn and implications are forwarded.

CHAPTER TWO

Literature Review

2.1. Water supply overview

World population was estimated to be 5.8 billion in mid 1990 where United Nation's forecasted to 6.5 billion in the end of 1990s and is assumed to reach to 8.5 billion in 2025. Due to higher rate of population growth in under developed countries it is now estimated that 84 percent of the world's population resides in these countries. Todaro (1997:189)

Population growth is more aggravated in today's poor countries urban centres due to many factors. The push or pull factors can be cited as the major reasons for rapid urbanisation in poor countries. It has in turn resulted in various development challenges like water stress in these urban centres. On the other hand, such growing demand for improved water resource in these countries, as put by Alebel (2004) comes with corresponding increase in living standard too.

Access to safe drinking water is a basic human right and essential for achieving gender equality, sustainable development and poverty alleviation, where the later three are parts of MDGs. More specifically under "Ensuring environmental Sustainability" (7th Goal of the MDGs), halving by 2015 the proportion of people without sustainable access to safe drinking and basic sanitation has been set as a target for the world. The same target was set to Africa in particular, during the Johannesburg summit. However progress has so far been affront due to many factors.

The world's population is increasing in an alarming rate with corresponding rise in consumption levels of all natural resources which has resulted the growing "water stress" spreading around the globe. Winpenny (1994) discussed citing Falkenmark that society fall below

2000 m^3/person daily when the demand for water rises in the process of development. Further more, six to seven East African countries and all North Africa especially their coastal areas will fall below this critical limit.

Water is an indispensable natural resource to sustainable livelihood ranging from domestic use such as drinking, cooking and cleaning to hydropower generation. Ethiopia is a country often referred as "the Water Tower" of east and north east Africa because of its many rivers and water systems that shower neighboring arid countries. However the people are leading a low quality of life in terms numerous aspects related to water. Significant proportion of its population suffers from curable and simple water borne diseases; it has low infrastructure related to water resource such as poor electric power coverage, prevailing sanitation problems around the nation, agriculture mainly rain fed, infant status of tourism and fish industry are prevailing in the country.

In 2001 only 30 percent of the country's population gets pure drinking water of this 70 percent attributes to urban areas. Concerning sanitation only 7 percent coverage was in the whole country. Although there is a relatively better situation in its urban centers, those urban centers' socioeconomic development has been lagging due to meager water supply and sanitation service being way below the minimum standards. Gulilat and Tefera (2001:175).

The figures show although, the country has large water resources potential it need to develop water sector emphasizing resources conservation, pollution control and rational use of water resource.

2.2. Water Problem and its implications

> *"Number of water tabs per 1000 persons will be a better indicator of health than a number of hospital beds"*
> *Dr.Halfdan Mahler (Director General of WHO, 1980)*

The world is now facing numerous multifaceted problems related to water resource. Although water is an indispensable natural resource to sustainable livelihood and a base for socio economic development of any country, empirical findings show the situations is worse especially in under developed countries.

> *More than a decade after the UN Conference on Sustainable Development in Rio de Janeiro, Brazil, the world is still scrambling to meet its ambitious targets. An estimated 1.5 billion people remain without safe drinking water and about 2.5 billion have no access to adequate sanitation. Almost 1 billion people, most of them in developing countries, live in slums, a figure expected to double over the next 30 years. Gumisai(2004).*

United Nations Development Report (2006), show that

- Some 1.1 billion and 2.6 billion people in developing countries have inadequate access to water and lack basic sanitation respectively.
- Almost two in three people lacking access to clean water survive on less than $2 a day, with one in three living on less than $1 a day.
- 1.8 billion People who have access to a water source within 1 kilometer, but not in their house or yard, consume around 20 liters per day only.
- The loss of 443 million school days each year due to water-related illness.
- Millions of women spending several hours a day collecting water.
- Barlow (2001) described as:

> *A mere 12 percent of the world's population uses 85 percent of its water, and these 12 percent do not live in the Third World"*

Incidents of **water borne** diseases (such as cholera, typhoid, amoebic and bacillary dysentery and other diarrheal diseases), **water washed** diseases (such as scabies, trachoma, typhus, and other flea, lice and tick-borne diseases),**water based** diseases (such as Schistosomiasis and Dracunculiasis) and other **water related** diseases like dengue, filariasis, malaria, onchocerciasis, trypanosomiasis and yellow fever generally increased globally which is actually due to skimpy level of access to safe and clean water for domestic utility.

According to the facts and figures stated in WHO (2004),

- 1.8 million People die every year from diarrhea diseases (including cholera); 90 percent are children under 5, mostly in developing countries.
- 88 percent of diarrhea disease is attributed to unsafe water supply, inadequate sanitation and hygiene.
- 500 million people are at risk from trachoma.
- 146 million are threatened by blindness.
- 6 million people are visually impaired by trachoma.
- 133 million people suffer from high intensity Intestinal helminthes infections, which often lead to severe consequences such as cognitive impairment, massive dysentery, or anemia. These diseases kill 9.4 thousand people every year.
- The number of cases of skin lesions related to drinking water in Bangladesh only is estimated at 1.5 million.
- 2 Million fewer people infected with guinea worm

Socio-economically, access to adequate, clean water will greatly contribute to improved health and better productivity. WHO (2004), analyses that improved water supply and better hygienic practices can;

- Reduce diarrhea morbidity by between 6 to 25 percent if adequate water supply only and up to 32 percent if proper sanitation is included.
- Reduce diarrhea episodes by 35 to 39 percents.
- Reduce trachoma morbidity by 27 percent.
- Reduce morbidity from ascariasis by 29 percent and hookworm by 4 percent.

In under developed countries, provision of adequate and sustainable potable water supply, not only reduces significantly water related illnesses, it greatly reduce the existing mortality and morbidity rates, working days lost which can increase production and reduces the demand for imported medicine which in the end will ease the balance of payment problem of the country. Alebel (2004)

The situation in Africa however is much worse while the global picture is positively changing. On most indicators on the provision of water, sanitation and human settlements, progress remains slowest in the world's poorest region.

In Africa more than 300 million Africans still lack access to safe drinking water and 14 countries on the continent suffer from water scarcity. Out of 55 countries in the world with domestic water use below 50 liters per person per day, 35 are in Africa. Almost half of all Africans suffer from one of six main water-related diseases. Although urban centers are likely for a positive change towards access to safe drinking water, Sub-Saharan

Africa urban centers exhibited only 3 percent progress in the last decade of the 20th century. Gumisai (2004)

Ethiopia has the lowest water supply coverage in the world and hence water related problems are greatly hampering the country's socio economic development. Out of the 58 percent safe water coverage in Sub-Saharan Africa (WHO/AFRO, 2006), Ethiopia have only 19 percent of its total population of which 80 percent comprises the urban population with access to safe water (Dessalegne1999).

Consequently, such low level of accessibility imposes greater burden on the health sector. Water problems have a lot of consequences to be manifested in the socio economic lives of the people. Apart from the significant amount of official and unofficial health care cost, water inaccessibility levies an adverse effect on peoples' productivity due to illness. Quiet significantly, workable days and educational times will also be lost. Generally water problems drain family resources if are not sustain ably, reliably and adequately accessible.

2.3. Factors that give rise to water inaccessibility

Water resources apart from the issues of distribution and altitude differences are facing pressure due to the growing demand which arises from various reasons. The factors that give rise to water stress in general are categorized as those of external to people's chance of getting water adequately. These include:

- Depletion of fresh water due to growing population in poor countries which give rise to increased water pollution. WB(1990)
- The cost of producing potable and safe water by itself by far contribute the availability of water to all. As population increase and the prevailing poverty in poor countries strain their public

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service givers to meet the growing demand (Winpheny 1994) and WB(1990)

- Water is also made unavailable when large scale industrial and agricultural developments step on the ways of water supply service. The Indian city "Pune" as stated in Rogers (1990) is a good example that large scale irrigation projects has levied water problem.

- It may be paradoxical to talk about shortage of water while floods are wreaking havoc in Ethiopian Cities. It is argued sometimes that our inability to alter rainfall to potable water has worsened the problem. For instance Addis Ababa receives high amount of rain but water shortage in the city is getting from bad to worse.

- Water crisis has also emanated from water management problem that is policies that advocate the commoditization of Water. This idea is advocated by Indian scientist activist Vandana Shiva sited in Shah 2006 that privatizing water only shut out the poor where the companies' accountability would only be limited to the shareholders to increase profit. Thus the poor whose income is much lower find it difficult to cover connection costs which are five to nine months of their salary in some cases. Not only had this price per unit potable water also found to be expensive to the poor.

2.4. Urbanization and water supply

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Although population explosion is a phenomena of most under developed countries, African nations, south of the Sahara, has exceptionally higher population growth. Further explained in Redcliff (1987:66),out of this region's thirty-nine countries only ten of them has a less than 2 percent annual growth rate whereas fourteen countries have above 2.5 percent growth rate. In those countries with annual growth rate of 2.5 percent, annual food production growth rate exhibited only at 1 percent which in turn leads to serious food insecurity. In the end, it has increased the vulnerability of the natural environment.

The situation in the world urban centers especially in poor countries is much worse where rate of population growth exceeds significantly from the national figures. Despite prevailing urban poverty's major implication on the rate of adding new born to these cities, rural-urban migration definitely exacerbated population explosion in poor countries infant cities. The push and pull factors that explain increasing rural urban migration in the world is articulated in Gilbert and Gugler (1992) as *"rural Prospects appear dim to many, the urban scene more promising".*

Apart from other development challenges, such rapid human population growth together with other determining factors has so far imposed greater stress on the available water resource only exhibited water crisis in these urban centers.

Empirical findings show service provisions in many cities affront by any standard. In Jakarta only 32 percent home in 1985, had running water. Cape coast of Ghana, 73 percent of houses has lacked water and 25 percent electricity in 1975.Brazil's two cities: Recife and Sao Paulo lacked 47 and 41 percents of houses; lacked running water.77 percent of Calcutta's families share lavatories and other 10 percents has no facility

at all. Acapulco, the Mexican resort had lacked piped water for its 45 percent residents in 1980. Gilbert and Gugler (1992)

Although Ethiopia is the least urbanized country even compared to sub-Saharan countries, its' Urban population is increasing in alarming rate. rapid urbanization in turn seeks huge investment on over all urban development which other wise creates urban problems such as deprivation, lack of access to essential needs, inadequate income etc UNCHS(2000). Table 2.2 below shows trend in urban population in Ethiopia form 1995 to 2020.

Table 2.1: Urban Population projection in Ethiopia (2000-2020)

Sr.	Year	Total Population ('000)	Urban Population ('000)	% of Urban Population	Addis Ababa Population
1	2000	63,495	9,473	15	2,495
2	2001	65,344	9,886	15.12	2,570
3	2002	67,220	10,307	15.33	2,646
4	2003	69,127	10,745	15.54	2,725
5	2004	71,066	11,199	15.76	2,805
6	2005	73,908	11,675	15.80	2,887
7	2006	75,067	12,172	16.22	2,973
8	2010	94,246	21,400	22.71	3,613.7*
9	2015	111,583	20,069	26.5	4,401.26*
10	2020	131,485	39,530	30.6	5,617.24*

Source: Central Statistical Authority: Statistical Abstract 2005 and CSA abstract of 1997
* Projection is made on 5% per annum basis.

Currently in Ethiopia, close to 85 percent of livelihood bases on subsistence level farming and livestock rearing. Only 32 percent of population out of which 72 percent of the urban residents (only 38 percent if Addis Ababa is Excluded) and 28 percent of rural population have access to clean potable water supply. As a rule though, rural people

travel long distance to fetch unsafe and unprotected water source while services in seemingly better-off urban areas is inadequate, unreliable and unsustainable Alebel (2004).

Concerning sanitation, Alebel (2004) citing Getahun 2002 showed its lowest level that is 17 percent country wide coverage with 46 percent to Urban areas while the rural coverage remains untouched to only one percent coverage (MOWR,2002).Impliedly three out of four incident of health problem in the country are induced by communicable diseases such as diarrhea.

The gap between UN 2002 estimate for standard of potable water supply and sanitation service on the one hand and actual figures in the country on the other, unless narrowed has enormous implication of the daily lives of the people. UN 2002 estimate defines:

> *Water accessibility is availability of at least, 20 litters per capita per day from a source not more than 1 km away from dwellings of users where as sanitation is connection to sewer or septic system, pour flush latrine, simple pit or ventilated pit latrine with acceptable local technology.*

In line with this some, urban centers in Ethiopia have water consumption ranging form 10 to 20 litters per capital per day while it is 3 to 4 in rural areas Alebel (2004).

Contrarily, UN Human Development report in 2006 has shown that an average person in United Kingdom uses more than 50 liters of water a day flushing toilets (where average daily water usage is about 150 liters a day. The highest average water use in the world is in the US, at 600 liters day).

2.5. Existing water situation

2.5.1 Water sources and production in Addis Ababa

Addis Ababa is one of alarmingly expanding urban center in the country. Its administrative area has significantly changed from 220 km2 in 1984 to 530 km² in 2005 where the figure stands at 540 km² in actual terms. Clean and potable piped Water is only served in 300 km² of its area leaving the rest un-served in 2005 (AAWSA 2005).

The major water sources, which are presently serving the residents and institutions of the city, are: Legedadi, Gafarsa, Dire, Akaki town spring and wells. The capacities of these sources are enlisted in table 2.2.

According to AAWSA's 2005 Draft business plan, the situation of Addis Ababa water supply is summarized as:

- People with House Connection which are only 4 percent consume 80 to 100 litters/capita/day
- Total water production ranges 193,000 litters /day to 210,500 m3
- Water is treated in only two treatment plants :Lagadadi and Gafarsa treatment plants
- Water supply has 235,740 connections as of 2005
- Average domestic consumption in 2000 amounts to 22 litters
- The billed water is only 52 litters/capita/day
- Unaccounted for water stands at 37 percent Table Water sources and production capacity in Addis Ababa

Water sources, treatment plants, storage reservoirs and distribution networks existing in Addis Ababa town and their capacity is summarized in table 2.2 below.

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Table 2.2: Water sources, treatment plants, storage and distribution by capacity

Sr.	Description of water supply system component	Current facilities	
		Description	Capacity (m^3/day)
1	Sources	Lagadadi & Dire Gafarsa Akaki Town Springs & Wells	150,000 30,000 48,000
		From All sources	228,000
2	Treatment Plants	Lagadadi treatment Gafarsa treatment plant	150,000 25,000
		From All sources	175,000
3	Storage	Total (M^3)	87,000
4	Distribution	Total length (km)	1560
5	Service Area	Km2	300

Source: AAWSA's unpublished document (2006)

2.5.2 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 will be distributed to end users who include domestic users and different institutions.

As indicated in the table above, AAWSA's distribution system has a total of 1,560 km network, the same document states that 500 km constitute for primary network where as the rest 1060 km are secondary distribution pipe lines. The distinction is made based on pipelines' diameters. Pipelines with greater or equal to 125-mm diameters are primary networks where as those which are less than 125 mm, and greater than 50 mm are secondary ones.

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With this distribution networks, AAWSA has 17 pumping stations which renders the task of transferring water to different pressure zones. Water system has also storage reservoirs important to temporarily store water. With capacity ranging from 100 to 20,000 m^3 AAWSA has 22 balancing or storage reservoirs made of reinforced concrete and stone masonry. In total existing reservoirs has approximately 87,000-m^3 capacity.

2.5.3 Water Coverage in Addis Ababa

As shown in the table above out of the 540 km^2 total Addis Ababa area, areas served by AAWSA is only 300 km^2 in the year 2005. This area covers most of the central and old areas. The un-served areas of the city are mostly those areas that are at the outskirts of the city as the physical growth of the city is unprecedented due to the growing population.

The current coverage and demand of potable water and projections made to the year 2025 is shown in (annex 5).The rate of urbanization in the city of Addis Ababa is alarmingly imposing water crisis. Although planned activities to boost the current coverage of water in the city are underway, the issue is beyond matter of concern. Water deficit which is currently 52.5 percent (see annex 5) will be increasing until the year 2010 and will decrease afterwards due to the fact that planned activities will boost water production in the city.

This includes as stated in AAWSA (2006), the development of Akaki Ground water phase 1&2; Gerbi and Sibilu Dams are projected to be operational in 2011 with a total approximate capacity of 792,000 m^3.

Moreover, in line with water deficit, Unaccounted for Water (UFW), a term used to depict water being produced and distributed through distribution mains but no payment is made for it. UFW could be commercial or as a result of fraudulent act or leakage. Currently 31 percent of water

produced for consumption in Addis Ababa is UFW due to various reasons. It is projected to decrease in subsequent years (See annex 5).

2.6. Urban Poor and water supply service

Poverty, although a national phenomenon in most poor countries it is increasingly becoming more complex and acute in urban areas. Even within a given urban area, the definition of "the poor" usually lacks uniformity. Thus to avoid ill understanding and impediments that hinder the success of interventions made to alleviate urban poverty, assessing the later using clearly set indicators at the lowest possible stratum is indispensable. Such an assessment will give a poverty profile of the city will enable local authorities to base their poverty strategies on a clearly identified causes, characteristics and location of the city's poverty and provide a snapshot showing: who is poor, where they live in the city, and their access to services, their living standards, and so forth.

To this end, Willoughby (2004) puts the three main dimensions both urban and rural poverty has in under developed countries are:

- lack of income and economic security,
- lack of access to public services critical to human development (health, water and sanitation, and basic education), and
- Lack of respect by others and of power in society. Gender equity is an important aspect in all three dimensions

Income (or consumption) is the most frequently used proxy for poverty. Money-based poverty definitions and assessments provide a standard scale so that different population groups can be compared. Social indicators, such as life expectancy and infant mortality, are also important. Definitions and benchmarks should allow the living conditions of different population groups to be compared with others.

Persistently increasing unemployment, poor quality dwellings and homelessness, increasing number of slums and squatter neighborhoods, congestion, lack of basic services and infrastructure is the current feature of urban poverty in Ethiopia. Tarekegn (2002:3)

> *Addis Ababa, the capital city of the country, shows a paradoxical situation in Ethiopia. On one hand with the highest concentration of facilities per population than other centers in the country, enjoys a privileged position. On the other hand the city is not capable of accommodating the increasing population that is being attracted by the luring facilities and seemingly employment opportunity. Hence poverty is rampant and widespread in the city. In 1992, it was found that 60 % of the city's residents were below the poverty line (World Bank, 1992). Recent estimates are not also different from the past. Thus urban poverty beleaguers the city and requires serious attention to curb the consequential disaster UNCHS (2000).*

Among the basic services, water as frequently stated not only as crucial for survival but has immense socio economic implications. However, worldwide water crisis is making the poverty reduction goal an onerous task for development efforts. Besides, the problem is mainly felt among the poor as it is apparent that this part of every society is vulnerable to problems induced by under development.

Currently poor people often lack access to safe water and sanitation, and other infrastructure services. According to Brook and Irwin (2003) income is one major factor for lower access of poor people to all infrastructure services because the later is often expensive. However, it only explains some but far from all cases. In justifying the fact that income is not the only factor, firstly, some cases of access to telephone and safe water dealt in their studies do not show perfect correlation of income and access. Secondly, the fact that poor people tend to incur more for services from informal and non-standard providers show although they often claim they are willing to pay more for services than

formal providers charge, they would not always pay for all costs including connection charges. Thirdly the 1950s to 1990s adopted strategies that put state ownership of infrastructure services comprising: no competition and lower price for services in view of avoiding monopoly pricing, enhancing planned investment in extending services and making services affordable to the poor.

Therefore, policies strategies and approaches pertinent to increasing access to basic infrastructure services in general and water and sanitation service in particular need to base on in-depth assessment of socio economic and institutional facts.

2.7. Water supply: Approaches & policies that increase access

2.7.1. Approaches

The two prominent approaches to water supply have entirely distinct features in terms of stakeholders of water supply, bases of tariff setting, efficiency and effectiveness of investments towards sustainable service delivery. Mani, (2000:20) have categorized these approaches as supply oriented and demand oriented approaches.

The supply oriented approach unlike the demand oriented one, views that water service delivery should be through public monopoly and focuses on technical elements only. The shortfalls of this approach gives rise to the demand oriented approach which on its side focuses on service consumption needs and willingness to pay full costs of services. The former approach as Mani, (2000:20) argued widened the gap of service delivery because it is economically inefficient. Perhaps poor countries find it difficult to cover the costs of piped water networks as they are large scaled covering longer distance transfer and pumping costs. Moreover it excludes poor and urban and slum dwellers which in the end aggravates inequitable consumption. Environmental implication

that a supply oriented approach has is explained as it presses the hydrological limit to meet the demand which in turn impose environmental costs.

The later approach, as it bases on demand for and willingness to pay for water supply services, it incorporates competitive market and partnership with other development actors (such as private sector, NGO's and CBO's) ensures (pp: 21)

- Economic efficiency due to existence of competitive markets and private sector's participation;
- Social responsibility because of increased responsiveness to users needs and partnership among development actors ;
- Environmental safety through demand management.

Brook and Irwin (2003:9), in many country case studies undertaken in their work, have shown that private participation in water supply has increased access. In telecommunications, private sector's participation and competition has been associated with strong growth in access. Quiet many cases have also shown the same effect on electricity too.

The new public management paradigm entails despite the fact that private sector is infant in Africa; public sector activities need to be given to private sectors by either privatizing or corporate-izing. Such market orientation to public infrastructure service provision through techniques such as management incentives, competitive forces and firm objectives ensures efficiency and accountability. In the mean time government role will be limited only to policy making, regulation, ownership or financing of investments Tegegne and Meine (2005).

2.7.2 Policies that increase access

Most talked about approaches and quiet a number of studies although have emphasized on the participation of the private sector and allowing competition in the provision of infrastructure services in the view of efficiency and improving coverage, Clarke and Wallsten asserted that some people worries such reforms can hurt the poor in two ways. The fact that market orientation and competition immediately puts service providers to "cream skim" i.e. choose profitable customers, which excludes the unprofitable: the poor and rural people and such reforms necessitate tariff balancing to cover costs result in increasing prices in turn makes services unaffordable to the poor Brook and Irwin (2003:22).

Further more opponents of the participation of private sector in provision of basic services which enhance competition in the end get prices risen, views it will promote water inaccessibility by the poor cognizant to the fact that access to safe and clean water and sanitation services are basic human rights. The basis that validate water as a fundamental human right, not a commodity; a privileged service that you can only access if you can afford it, is the UN Declaration of Human Rights perhaps signed by all nations:

> *"Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing, medical care and necessary social services, and the right to security in the event of ... circumstances beyond his control." United Nations, December 10, 1948*

Water, as basic human right is a basis for most components of the universal declaration. It has been recognized both explicitly and implicitly in General Comment No. 15 of the UN Committee on Economic, Social and Cultural Rights since November 2002.

Experience shows that the privatization of water services cannot ensure universal, delivery of safe water and efficient sanitation. In Tanzania where 11 million lives are short of water service, increased prices and lack of access have burdened the lives of the poor due privatization. In the major city of Bolivia, about a quarter of it's population not been connected rather use "illegal" ways mainly due to unaffordable connection charges. Even the poor in rich countries such as African Americans in Detroit (USA) had to make trips to fetch water. Some 100 thousand people faced water shortage because they are too poor to afford the bills. Shah(2006) and Tan (2003).

The above documentaries have shown the exceeding disadvantage of privatizing water sector over public service delivery. On the contrary the World Bank and other international institutions is persistently perusing privatization of most resources even if it was inappropriate (e.g. health, education, and, possibly, water, amongst other services, Shah (2006).

The attempt to commoditize water resources as argued by Tan, (2003) is now heralded as the answer to the world's water woes is due to the fact that water is a US $400 billion global business. Moreover, it is not perused by a collective of democratically elected governments acting in the interest of the world's population, but by a cartel of corporations motivated by profit and market conquest.

Although many writers viewed privatizing infrastructure services apprehensively, Brook and Irwin, (2003:10) mentioned that the extent to any positive effects would depend on some governments polices. The justification for them in their analysis is that the poor is willing to pay the costs of service. The problem in increasing access therefore remains facilitating a deal between willing buyers and sellers. The following five policies are outlined their work as follows:

Allowing entry and permitting competition: suggests that governments should allow service providers who serve the poor be legally permitted. The impact of this policy has distinct feature on the different types of infrastructural services. In industries such as piped water and electricity, the effect of this policy is mainly speeding the extension of services to un-served areas by formal utilities cognizant the fact that firms compete to be dominant in some locations.

Clarifying property rights and facilitating contract enforcement: has a greater impact on access to services in that economic policies in addition to those that help increase incomes, those that facilitate the making and enforcing of contract between buyers and sellers should increase access. This policy suggestion has a two-fold advantage for the poor. On the one hand, it grants the poor a property right, "a legal title to their property to contract with utilities" and on the other hand it will enable them to borrow money for covering costs of connection. On the other hand, it ensures the utilities protection at times of theft, illegal non-payments of bills. The later also ensures incentives for utilities to expand networks.

Allowing prices to cover costs, now and in the future: People tend to doubt that they are getting good deal because companies that provide services have strong market power or monopolistic. For water, some argue it is so important it should be free. With such prevailing impressions about services, people tend to pressure governments to regulate prices to be below costs. When governments do so, it adversely affects investors to provide new services to the poor, which in the end hampers accessibility.

Setting Appropriate Quality Standards: quality standard although they are equally important in both developed and underdeveloped countries, developed countries tend to focus much on high quality

standards to the extent of trading off between quality and affordability. Such approaches are adopted crudely in under developed ones it will make services prohibitively expensive and in the end discourages service provision to the poor.

Targeting subsidies to the poor: subsidies are controversial issues that need to careful analysis. Brook and Irwin (2003) explained the need as:

> *Even if the government has removed all impediments of increasing access discussed above, the poor my still finds that formal infrastructure services are too expensive to buy or, if they can afford them, that they are extremely expensive relative to their incomes. Thus the question arises whether and is so how the government should subsidize their use of the services. (pp: 14)*

The issue that needs to be considered under this policy perspective is on identifying the strategic areas on which subsidies could be effective. In cases where subsidies target on consumption level, they had targeted to the non-poor because many low-consumption households are not poor.

Despite enormously advocated by many companies and organizations that privatizing water is the best way to deliver it safely to the thirsty, many others advocate subsidized provision even "provision for free" of water service as it is a tantamount for life. Among others Barlow (2001) puts the alternative as;

> *It is true that governments have done an abysmal job of protecting water within their boundaries. However, the answer is not to hand this precious resource over to transnational corporations who have escaped nation-state laws and live by no international law other than business-friendly trade agreements. The answer is to demand that governments begin to take their role seriously and establish full water protection regimes based on watershed management and conservation.*

Generally the factors that entail to the in-availability and less accessibility of water resources are both inherent and external to governments of under developed countries. The amount of rainfall a country get, its' distribution pattern, seasonal variation, altitude differences, the existing potential of ground water, depletion of water resources and the stakeholders interest on the available water resources are those external factors of which some can be altered through an interventions possibly made. On the other hand, issues such as: nature of rights of access to water resource, the system of management, technology invested, growing demand management, population increase (urbanization), financial constraints, wastage , resource utilization, and pollution of water resources are inherent factors that needed greater attention in order to engine socio-economic development of a country and change the lives of people.

Increasing access is not only a means to socio economic development of a country but is also an end in it self. It is an end in that people are entitled to basic services to life. Pertaining to this fact, the UN declaration of human rights in 1948, UN charter articles, Geneva conventions and Protocols,1966 covenants and a lot more conventions all either explicitly or implicitly have recognized the human right of water for all people irrespective of their economic status (Scanlon et al., 2004). Therefore, "the poor" as an integral part of the world population need to be addressed in universal access to clean water endeavors. Progress otherwise is unattainable as articulated by Franklin Delano Roosevelt as:

> *"The test of our progress is not whether we add more to the abundance of those who have much; it is whether, we provide enough for those who have little."* Gleick (1999)

CHAPTER THREE
PRESENTATION AND ANALYSIS OF DATA

3.1. Description of the Study Area

Addis Ketema sub-city is one of the sub-cities found in the central parts of Addis Ababa. It is bordered by Arada in the West; Kolfe Keranio in the East; Gullele in the north and Lideta in the south (see appendix 2). Currently, the sub-city has an estimated population of 354,755 and a density of 475 people per hectare (Addis Ababa city Administration, 2003). It is the densely populated sub-city and currently comprises an estimated number of 35,476 households Yelak et.al.,(2004).

Addis Ketema sub-city, which is study area of this piece of work, has distinct features. Firstly it is the major commercial center of the city where Merkato, the biggest market center in the continent, exist. Secondly the sub-city is also one of a high traffic routes in the city. It has one of the oldest bus terminal, which serves as a destination and departure point for both the in-city and out of the city buses. Thirdly, even though the sub-city is considered as a commercial center it has also quiet a large number of HHs and its residents range from the poorest of the poor with income of less than a dollar a day to those who are up in the ladder. Furthermore, it is also one of the slum or squatter settlements in Addis Ababa town. Housing conditions, existing infrastructure and provision of basic services is very devastated in the area.

Addis Ketama Sub-city is not only a commercial center but also hosts different institutions: schools, churches, mosques banks and different governmental and non-governmental organizations. Concerning the physical situation of the sub city, it is one of the congested and slum neighborhood in the city where houses are attached close to each other, narrow streets compared to its high traffic, higher rate of informal

activities along many of its streets and poor waste management. The later is witnessed by a pile of rubbish along the streets and bad odor when passing through.

The sub-city under the new structure incorporates nine kebeles[3] that resulted from merging two or three of old kebeles under each of these nine kebeles.

3.2. Results and Discussion

3.2.1. Characteristics of Sample Households (HHs)

Out of the 384 households who have been interviewed in the survey, 219 (57.03 percent) and 165 (42.97) are male headed and female-headed households respectively. The average age for these household heads was 48.54 ranging from the elder (90 years old) to the younger (20 Year of Age). The average household size of the study area is 5.69 ranging from the higher family size of 12 people to the lower of one person. Table 3.1 and 3.2 below shows the educational and marital status of surveyed households.

Table 3.1: Educational status of sample households heads

Sr.	Educational Level	Number of respondents	Percentage of respondents
1	Illiterate	131	34.12
2	Elementary	172	44.79
3	High-School	61	15.89
4	College	16	4.17
5	University Degree	4	1.04
	Total	384	100

A significant proportion (44.79 percent) of the sample household heads have an elementary educational level which is eight to nine years of formal education including both modern and traditional schooling at earlier ages. Considering their age group all educational level is

[3] The lowest administrative body under the new structure

understood with the old educational policy of the country. Those households who are illiterate and have joined a four years formal high school education constitute 34.12 and 15.89 percents respectively. Those with a college level and university level education comprise 5.21 percent of the sample population.

Table 3.2: Marital status of sample households

S.N	Marital Status	Number of respondents	Percentage of respondents
1	Married	274	71.4
2	Single	33	8.6
3	Divorced	13	3.4
4	Widow	64	16.7
	Total	**384**	100.0

Out of the 384 household heads in the sample population 71.4 percent are married, 8.6 percent never got married leaving the rest of 3.4 and 16.7 percents who are divorced and widowed respectively. Employment status of the sample households is show in table below

Table 3.3 Employment status of sample households heads

Sr.	Employment status	Number of respondents	Percentage of respondents
1	Employed	322	79.12
2	Unemployed	84	20.64
3	Student	1	0.246
	Total	407	100

Those who are employed include employees of different formal institutions, daily laborers, pensioners and businesspersons often undertaking in informal business activities. The sources of income that sustains the livelihood of the households reportedly to be unemployed are help from relatives and other activities which are neither permanent source of income nor sustainable.

The average household monthly income of the sample population is Birr 551.30, which ranges from 83 Br. to 2,498.00 Br. The frequency of Income distribution of the sample household's is summarized in table 3.4.

Table 3.4: Sample House holds Income category

S.N	Category of Income (In Birr)	Number of respondents	Percentage of respondents
1	50-200	33	8.59
2	201-400	85	22.14
3	401-600	114	29.69
4	601-800	71	18.49
5	801-1000	55	14.32
6	1001-1200	8	2.08
7	1201-1400	[illegible]	1.30
8	1401-1600	[illegible]	0.78
[illegible]	Above 1601	[illegible]	1.04
10	Non Respondent	6	1.56
	Total	384	100

As indicated in the table about 60.42 percent (232 out of 384) house holds earn a monthly income less than or equal to Birr 600.00 which is roughly above 2 USD per day. Those who fall in the income categories between Birr 601 to 1200 comprise 34.9 percent (134 out of 384). Households with income between 1200 to 2000 Birr are only 2.86 percent (11 out of 384). Only one family is reported to earn more than 2000 Birr and the rest six respondents of the total sample population did not reveal earnings. Of the total 384 sample population 68 households (17.71 percent) earn below one US dollars; 147(38.28 percent) earns less than two US Dollars; 82 households (21.35 percent) earns around 2.5 USD whereas the rest 87 households (22.66 percent) earns 3 to 9.22 USD per day.

Taking the average income of each household (i.e. Birr 551.30) and the [illegible] household size [illegible] the monthly average income per [illegible]

individual in the sample population is Birr 96.84 which is much lower than the poverty line.

The housing situation of the sample households, its construction, availability of toilet and bathing facilities and issues of solid and liquid waste disposal are presented in the parts to follow.

Table 3.5: House Ownership of the sample population

S.N	House Ownership		Number of respondents	Percentage of respondents
1	Private		75	19.5
2	Rented	From Keble	298	77.6
		From Government	9	2.34
		From Individual	2	0.52
		Total	**384**	**100**

House ownership is skewed to renters where 309 (80.5 percent) houses in the sample household population are living in houses rented from Kebele administration, government or individual house owners. The majority rented from Keble administration whereas 75 HHs i.e. 19.5 percents have own houses.

The study area is one of the city's slum settlement in that among the 384 sample population's houses 337(87.8 percent) are constructed with Chika[4]; 23(5.99 percent) with stone/Blokete; 21(5.47 percent) constructed with Bricks and the rest 3(0.78 percent) are made of metal sheets.

Facility wise, of the total sample population 86 (22.40 percent) houses have toilet facility where 24 (27.90 percent) and 62 (72.10 percent) are flush toilets and pit latrines respectively. 298(77.6 percent) HHs out of 384 houses do not have private toilet facility. These households use shared toilets on average with four to five households. This group

[4] Chika constructed house is where the walls of the house are made of soil and wood skeleton inside

constitutes the large share 287 (96.31 percent) whereas the rest 11(3.69 percent) uses different means such as individual toilets with a certain amount of payment, rivers, hotel toilet rooms, public toilets, street sewerages (tubos) etc.

Concerning bathing, 46(11.98 Percent) houses do have bathrooms and 338(88.02 percent) HHs do not have bathroom thus take bathing service at vendors, shared bathrooms, in toilets and use safa[5] at their homes. The biggest share goes to safa bathing, which constitutes 317 out of the 338 houses (i.e 93.79 percent) and the rest 6.21 percent for the other means.

Responses for the frequency of taking bath show that 295 (76.82 percent) take bath on a weekly basis, 85(22.14 percent) does it 2 to 4 days per week and only four respondents do bath every day.

Both Solid and liquid waste disposal is a great problem in Addis Ababa in general and in the study area in particular. Due to increasing population in the city, the existing solid waste disposal sites in the city are at a point of holding no more waste generated in the city daily. The situation is exacerbated by their long age of service. The existing liquid waste sewerage system in the city is no exception. Currently all most every street of Addis is shattered with bad smells coming from its street sewers. The sewers are every thing to the city in that they accommodate both solid and liquid waste from domestic house including toilets in some cases. Generally the situation in the city needs greater intervention.

Regarding solid and liquid waste disposal methods of the sample population, 303 (78.91 percent) dispose their household solid wastes in a

[5] Safa bathing is taking bath sitting on a kind of wider bowl and using own hands to pour water.

formal solid waste disposal methods including containers, solid waste collecting vehicles and individuals organized to collecting solid waste. 73 (19.01 Percent) dispose on near by rivers and two of this throw wastes on open field and the rest 8(2.08 percent) burn solid waste generated in their house holds. A large number out of the 384 interviewed sample population i.e 337 (87.76 percent) households' dispose their liquid waste on 'tubo'[6] and 47 (12.24 percent) households dispose their liquid waste on their compounds, open streets and septic tanks.

3.2.2 Water sources of Sample Population

Categorically people get water supply from two sources namely: piped water and/or non-pipe systems. Pipe water supply is the safest and reliable source of water where as non-pipe systems, which include rivers, lakes, hand-dug wells and other unprotected water sources. The latter is often the main source of water for all needs in most rural communities and some urban centers. Where as piped water is a source for urban residents. For urban population the issue is mainly how piped water is reaching the residents except those living in the periphery where pipe water networks are yet absent.

The study area being located at the center of the city, has existing water distribution networks thus the residents are currently supplied with piped water from the sources that are discussed in section 2.5.1. In fact AAWSA's network supplying pipe water is the sole producer and supplier of potable water to Addis Ababa City. However significant numbers of households get pipe water through sources other than house connection and/or private yard meter connection which are the most convenient systems of water supply to households in the study area. (See table 3.6)

[6] Is street sewerage system passing usually in front of houses

Table 3.6: Water supply systems used by sample households

S.N	Water supply Systems	Number of respondents	Percentage of respondents
1	House Connection(HC)	29	7.6
2	Yard Connection – Private(YCP)	169	44
3	Yard connection – Shared (YCS)	16	4.2
4	Public fountain(PF)	85	22
5	From Water Vendors (VEN)	126	33
6	Unprotected Sources(UPS)	0	0
7	Others	0	0
	Total	425	111

Households with House Connection (HC) and Yard Connection Private (YCP) the latter being as good as house connection except that the location of the tap is outside the house constitute 51.6 percent (198 out of 384) households; house holds getting water supply from vendors take the second large share. Public Fountain (PF) also renders its share of supply to quiet a good number of households in the sample population. Households who get water from yard connection shared, Public fountains and vendors together constitute 227(59.02 percent) and pay higher price per container compared to the payment made to AAWSSA, fetch compromised quality and face inconvenience to fetch water.

The average distance and time lapsed by each household to fetch water are 30 meters and 10 minutes respectively. On average each HH fetches water 4 to 5 times a day with a Jerican/Baldi[7] that makes the average water consumption per each household is as low as 60 litters and as high as 80 litters. WHO estimate of minimum water accessibility should assure every person 20 litters each day from a source not more than 200 meters away from house. The sample population's average water consumption falls by half from this minimum standard. Study made on Assosa town by Assefa (2006) also shows that the average daily consumption of water by an individual accounts to 12.93 litters.

[7] A water container both for fetching and storage which carries 15 litters

The implication is, as the number of households who gets water from yard connection shared, public fountains and from vendors increased, it implies that firstly, there is inequitable distribution of water. This is due to the fact that those with house and yard connection private customers tend to use water as much as their need. Secondly water wastage will be aggravated in the process of fetching water, as there is a considerable distance between water points and the residence. Thirdly in view of economic use of water due to the distance factor and expense reduction, people tend to cut consumption which in turn will make them susceptible to water induced health problems which in-turn boosts the expenditure made on health. Needless to say this calls for enhanced intervention on water sector, as water is the basis for life and investment as well. Although data for other similar cites is unavailable, the situation in urban centers in Ethiopia is staggering.

Households using Yard Connection Shared (YCS), Public Fountain and Vendors (VEN) responded that they use these sources mainly due to financial constraint, paying lesser price for water from these sources etc. Assefa (2006) also found out that one factor that brought about variation in meter connection between kebeles in Assosa town is due to their difference in income levels. Installation, material and connection tasks involve much higher costs, which the members of the households considered in this study "the Poor" by any standard do not afford. On average a household inures Birr 1,000 to 1,300 to be able to get meter connection. Price could be very high depending on the location of the house from the existing water network. This amount includes Birr 300,450-500 and 500 for installation, meter and material costs respectively.

These connection fees are one-time expenses that should be incurred in order to get private meter connection either at the house or in the yard.

Even if the poor are willing to be connected to the formal authority, these expenses are unaffordable. Due to this fact, the poor tend to pay more prices for the same quantity of water from vendors. Therefore either providing house or private yard connection on a credit basis for low income residents or introducing alternative technologies will enable low income people to have access to meter connection. Installing additional public fountains whose tariff setting is meant f or low-income people will also narrow the gap. However at public fountains service timings should be improved.

The study found out that, 54 (63.53 percent) HHs out of 85 households using public fountain, responded that service is available only for two hours in the morning and afternoons. Only 14(16.47 percent) and 17(20 percent) and 17(20 percent) HHs responded service is available for 12 hrs and mornings only respectively. Concerning convenience of these timings, 18 out of 85 HHs i.e 21.18 percent of this group consider the supply time convenient where as the other 67(78.82 percent) HHs face difficulty with these timings.

Since water interruption is imminent in most parts of the city, water storages are of paramount importance. This will enable the people to cope at times of interruption since water is the basis for life. However the sample HH population selected for this study tends to have very low water storage facilities. When seen in line with both the duration and the frequency of water interruption in the area, it is very wise to use storage to be able to overcome water shortage at times of crisis.

Table 3.7 sample households having water storage

Sr.	HH with/Without Water storage	Number of respondents	Percentage of respondents
1	HH with water storage	66	17.19
2	HH without water storage	318	82.81
	Total	**384**	100.0

The average water storage carries 78.18 litters the biggest is as big to carry as 400 litters and the smaller carries 15 litters. Quiet a high number of the households surveyed do not have water storage due to inability to install or buy water containers where a 5 litter capacity Jerican costs 7 Birr. Large number of households responded that the prices are unaffordable for them to buy Jerikans for water storage purpose.

Water deficit as explained in the earlier parts in this study is pertinent in the city. The study reveals that there is no other alternative water source other than the piped water supplied by AAWSSA that could supplement water coverage in the area. In some parts of the city else where, water sources such as wells and rivers are contributing a great deal despite their adverse effect in human well being. Households surveyed thus are using only pipe line water supply for all their needs except that they use seasonal rain water harvested from respective roofs for different consumption including general cleaning, laundry, gardening and etc.

3.2.3 Water needs and consumption

In different parts of Ethiopia, water not only is a basic service, but also is a source of income. Water is used as an input to petty trades such as sale of tea and traditional home processed beer. People specially women render laundry service at their homes to generate income.

Survey result show water is needed amongst great number of the sample population for domestic needs which encompasses water for drinking, cooking, bathing, cleaning, gardening etc. Although the proportion of households who use water for different kinds of commercial activities in the sample population is low, in some parts of the city, it is lucrative business. In those areas that are either close to the outskirts of the city

or close to new settlement areas, it is frequent phenomenon to see people carrying jerikans to transport water.

Table 3.8: Water needs of the sample households

Sr.	Water Needs of Sample HHs	Number of respondents	Percentage of respondents
1	Domestic only	349	90.89
2	Commercial only	0	0
3	Both Commercial & Domestic	35	9.11
	Total	**384**	100.0

As table 3.8 show, 349 (90.89 percent) out of the 384 HHs surveyed need water for their domestic uses only and 35(9.11 percent) HHs need water for both domestic and commercial purpose. The commercial needs include water vending as a source of income and using water as a basic input to producing certain services for trade such as tela[8], tea selling and rendering laundry service.

To this end, out of the 35 households who use water to generate income, 20 of them sell water itself, another 5 uses water to render laundry services, the rest 10 uses water to produce sellable services like tea and tela to make a living.

3.2.4 Water consumption Level and payment

In line with the average household size of the sample population, per capita water consumption per person per day is as low as 11.01 litters and as high as 22 litters. The latter is comprised for very few households that in turn is very much lower than WHO's standard of 20 litters per each individual per day. Among the HHs surveyed, 214 out of the 384 households are consuming piped water through House Connection, Yard Connection Private and Yard Connection Shared (See Table 3.6). Below is a table showing the average monthly payment of these households

[8] tela is a traditionally brewed beer which is often sold as a main source of income

categorized from the lowest of 5 Birr per month to highest of 180 per month.

Table 3.9: Monthly Payment for water service by households with House Connection, Yard Connection Private & Yard Connection Shared.

Sr.	Payment Category in Birr / month	Number of respondents	Percentage of respondents
1	≤ 30	183	85.51
2	31-40	19	8.88
3	61-90	4	1.87
4	Above 90	6	2.80
5	Non respondent	2	0.93
	Total	**214**	**100**

The average monthly expenditure of the all sample households getting water service from house connection, yard connection private and shared is 25 Birr per month where as 183 (85.51 percent) out of 214 HH spend up to 30 Birr. For HHs using water vendors and Public fountain as a main source of pipe water a fixed rate of 0.25 and 0.10 ETB is spent per Jerican of water.

Table 3.10: Monthly Payment for water by HHs who gets water form Vendors and Public fountains.

Sr.	Monthly Payment In Birr	Water from Vendors		Water from Public Fountain	
		No of HHs	Percentage	No of HHs	Percentage
1	≤ 30	89	70.63	85	100.00
2	31-40	36	28.57	0	0.00
3	61-90	1	0.79	0	0.00
4	Above 90	0	0.00	0	0.00
	Total	126	100.00	85	100.00

Table 3.10 show also that 70.63 percent households getting water form Vendors spend monthly expense as low as Birr 6 and as high as Birr 75 and all households that get water form PF spend 6 to 30 Birr per month. The average daily consumption of households using these sources is 3.9 and 5.11 Jerikans from Vendors and Public fountains respectively. Thus

the mean monthly expenditure on water from these sources is Birr 30.30 and 15.32 for vendor and PF respectively.

AAWSSA renders supply of potable water with tariff set on cost recovery basis and very recently it has introduced a progressive tariff setting for urban population in justification of enhancing economic (optimal) and proper use of water resources. The authority is thus introduced different payment levels for different consumption levels. This does not include water tariff for PF users where a flat rate of Birr 1.75 is being applied for any consumption. For HC, YCP and YCS the authority apply Birr 1.75 for the first 7m3[9] ; Birr 3.15 for consumption from 7 to 20 m3 and Birr 3.8 above 20 m3. For consumption other than domestic purposes a flat rate of Birr 3.8/m3 applied on any level of consumption.

3.2.5 Water sources & Consumption level by HHs Income Category

In the preceding parts water consumption and monthly expenditure of households on water were presented as averages, which show different categories. The factors that determine the level of water consumption differ from place to place. In most rural areas in Ethiopia, water consumption mainly depends on the availability of water points in the area and the physical distance between water points and residential area. This holds the same in some urban centers especially in periphery of these urban centers. Income of households and purchasing power holds common to all areas. In survey population, household income was found to be the major determinant of household water consumption level. Household average size and the source that households get water from have also implication on water consumption level. In table 3.11 the sample population's water sources by income categories and their average household size and water consumption is summarized.

[9] 1 m^3 equals 1000 litters

Table 3.11: HH water consumption by income category and sources of water

Sr	Income Category	Water Sources					Total	Average HH Size	Water consumed /day/HH (Lt.)
		HC	YCP	YCS	PF	VEN			
1	< 300	3	25	5	24	32	89	6.13	61.35
2	301-600	6	39	5	35	52	137	5.88	62.63
3	601-900	6	81	3	24	35	149	5.57	61.11
4	901-1100	8	11	1	1	3	24	5.75	92.50
5	1101-1300	2	6	2	0	0	10	2.70	60.00
6	1301-1600	2	4	0	0	0	6	4.60	95.00
7	> 1601	1	2	0	0	1	4	3.80	78.75
8	Non Respondent	1	1	0	1	3	6	5.00	52.50
	Total	**29**	**169**	**16**	**85**	**126**	**425**	**5.69**	**63.92**

The sample population's water consumption trend in line with their income categories presented in table 3.11 show that there is a positive relation between income and water consumption. The average water quantity consumed per day per household increases as income of the respective household increases. In the first three income categories the change in water consumption as income goes up is very low. There is a drastic increase in water consumption for income categories in line 4 and 6 where as income categories in line 5 and 7 show slight change and those households who do not revealed their incomes have lowest consumption level.

From this one can understand that household income not only determines the type of water sources a household would choose but it also determines the level of water consumption. Thus as income goes up the amount of water consumed by a household also increases. However, in some income categories in the above survey data this seems not to hold true always. Those factors that determines level of consumption in the study population and findings of other similar studies is presented in the following parts.

As shown in the above survey data, water consumption per day per household is also inversely related to household size. As the average household size increases, the level of water consumption decreases. In the first income categories, households have higher average household members but consume lesser amount compared to those in high-income categories. This holds the same for households who do not revealed their incomes. Households with income categories in line number 5 and 7 show higher consumption and lower average household sizes.

Thus as household size is higher water consumption goes lower. The rationale for this is that households with high number of members tend to cut consumption in view of managing expenditure on water. However this in-turn points toward income because even if household size is high if income level of the household is sufficient enough to cover the needs of the family members, spending more on water would not be a problem. Therefore, income is the major determinant of water consumption level in the survey population. Similar study by Assefa (2006) on Assosa town has also shown that consumption is determined by income level, purchasing power and household size. The physical distance between water points and residents is also one factor in Assosa where residents tend to travel around 5 km.

The acceptable standard by WHO is 200 meters where this is not a major constraint in the case of this study. The average distance remains only 30 meters.

Per capita water consumption per day in the first three income categories is 10.01, 10.55 and 11.05 litters respectively. This figure is way below the minimum set standard of water consumption for an individual. In the rest four income categories', household members consume water equal to or above 20 litters per day that is the minimum standard set by WHO. In

the households who did not revealed their income, per capita water consumption holds at 10.50 litters per day. The average per capital water consumption in the sample population is thus 11.23 litters per day taking the average household size in the total population is 5.69 and water consumption per day per household as 63.92 litters.

Apart from water consumption, households' source of water is also correlated with income. The sample population when categorized by income and sources of water in table 3.11 indicates that there is multiple source of water for households which make the total number 425. In particular households who gets water from Yard Connection Shared, from vendors and Public Fountains use complementarily. In this part of the study these water sources are categorized in two groups. Group 1 includes House Connection and Yard Connection Private, which are similar, except that tap is outside of the house in the case of Yard Connection Private. Due to their inconvenience and method of payment YCS, PF and VEN are categorized in-group 2.

The trend of water sources used by sample population in the income categories also show as income increase the number of households who uses house connection and yard connection private also increases. The average from the total households however show slight difference in that 198(46.59 percent) out of 425 households get water from House Connection & Yard Connection Private whereas 227(53.41 percent) households get water from the other three sources.

3.2.6 Major problems and views of the sample population on existing water service

Water service in the city in general and those areas, which are designated as slum and squatter settlements in particular, is way behind what is ought to be. Households whom this study had surveyed had numerous problems concerning water services. Table below shows those

major problems and the number of households who responded as their major constraint impediment to better water access and raised consumption level.

Table 3.12: Sample households' problems on the existing water service

Sr	Problems	Number of Respondents	Percentage from384 HH
1	No Private Connection	178	46.4
2	Expensive Tariff	124	32.3
3	Poor water quality	119	31.0
4	Interruption	373	97.1
5	Un-repaired pipe lines	102	26.6
6	Inconvenient and short timings at PF	153	39.84
7	Long distance and queue at PF	59	15.36
8	There are No problems	11	2.9

Water interruption is the major challenge faced by the sample population. Out of 384 households 373(97.1) percent had revealed water interruption had affected them immensely. When seen in line with the water storage trend of the sample population, water related crisis, is imminent in the areas. During such interruption residents are oblige to travel long distance to fetch water, pay higher price per container water and face water shortage in view of economical use.

Households whose water sources are mainly from Yard Connection Shared, Public Fountain and Vendors found their inability to afford private connection, as their major challenge. Out of 384 these households constitute 178 (46.4 percent). Those households who found the existing water tariff very expensive relative to their income, those who found piped water of low quality and whose distribution lines un-repaired for long time, constitute 124(32.3 percent),119(31 percent) and 102(26.6 percent) respectively.

Households 153(39.84 percent) revealed that they have difficulty on the timings at water service at public fountains and the rest 53(15.36 percent) encountered long distance traveling and queue to fetch water.

Water interruption in the area is not only creating inconvenience but also affects the rate of consumption. Not only mere interruption the frequency and duration of interruptions show how service is poor in the study areas. This is shown in the table below.

Table 3.13 Frequency of Water Interruption

Sr.	Frequency of Interruption	Number of Respondents	Percentage of Respondents
1	Once a day	160	41.7
2	Once a week	120	31.3
3	Twice in a week	55	14.3
4	Once in a month	32	8.3
5	No interruption	11	2.9
6	Others	6	1.6
	Total	384	100.0

The frequency of water interruption shown in the above table affirms the problem is greater in the sample population. Out of 384 households 160(41.7 percent) has claimed that water interruption occurs once a day. This is followed by 120 households (31.3 percent) who have encountered weekly water interruption. The responses of 55 households (14.3 percent) is a twice a week water interruption and those who has said to have monthly and occasional water interruption constitute to 38 households (9.9 percent). The rest 11(2.9 percent) households have encountered no water interruption.

Apart from frequency of water interruption in the study area, the duration of water interruption at any one time also shows the severity of the problem in the study area. The maximum duration of water interruption happened at any one time is shown in table 3.14.

Table 3.14 the maximum duration of water interruption

Sr.	Duration	Number of Respondents	%age of Respondents
1	One week	175	45.57
2	Two week	6	1.56
3	A month	1	0.26
4	2 months	0	0.00
5	Did not recall	202	52.60
	Total	384	100.99

As shown in the table, concerning the maximum duration of interruptions,175 (45.57 percent) HH revealed there has been a range of four days to a week continuous intruption,6(1.56 percent)respondents experienced two weeks interruption ,1 (0.26 percent) show a month of continuous interruption and the rest 202(52.60 percent) did not recall maximum duration of interruption.

At times of such interruptions, HH get water from vendors traveling long distance; from neighbors and public fountains. In doing so, they face various problems such as incurring more costs including the cost of transportation; more load to transport water; long queuing to get water and adversely affect income in the case of those HHs whose living partly or wholly depend on water.

The major reasons attributed to severe water interruption in the study area include:

1. Lack of proper water management
2. shortage of water at the sources
3. lack of effective water distribution systems
4. Lack of maintenance of existing water networks, etc.

Since water interruption in the areas is imminent and is causing considerable water crisis, it needs to be addressed. Not only in the study area, in many parts of the city, water interruption affecting the lives of

many. Hence actions that could revert this problem include increasing water production through developing new water sources, enhancing maintenance of existing water network, employing durable technologies and most importantly scaling up water resource management though building the capacity of the organization is indispensable.

Apart from the so far discussed problems related to the existing water problems of the sample households, their level of satisfaction was assessed in this part. 328 (85.42 percent) out of 384 households viewed the existing service is not satisfactory whereas 56(14.58 percent) households did not have a problem with the service. The reasons were enlisted hereunder from the frequently traced to the least one:

- Frequent interruption and its adverse effects on their lives;
- Escalated connection charge affecting their chance of House Connection or Yard Connection Private;
- Unreliability of service;
- Poor quality of piped water;
- Un-affordable tariff per container ;
- Adverse effects of water service on health and earnings.

AAWSA being the sole producer and supplier potable water resource to the city need to issue strategies relevant to meet the growing demand for water and sustain the development of the city. In doing so an effective water resource management is indispensable to overcome possible water crisis in the city in particular and to contribute to the socio-economic development in general.

Sustainable water supply strategies are of paramount importance to bring about the desired change in Africa's diplomatic capital. Of these strategies the major ones are to involve stakeholders, actors and pro

customer approaches of service delivery. Policies designed need to address the problems of the major segments of the society: the poor.

The sample population's view whether there is a mechanism by which AAWSA assesses the gap between service delivery and actual coverage and substantial strategies to increase coverage are summarize in a tables below.

Table 3.15: Comments of Sample HH on complaint handling by AAWSA

Sr.	Compliant Handling	Number of Respondents	Percentage of Respondents
1	Exist	170	44.3
2	Does not exist	111	28.9
3	I do not know	103	26.8
	Total	384	100.0

As in the table 170 (44.3 percent) out of 384 HH suggested that there is a way to give feedback to AAWSA where the rest 111(28.9 percent) and 103 (26.8 percent) revealed that there is no way to complain and or do not know whether there is one.

The present situation concerning fresh water situation in most African cities is discouraging. The number of people who are living under water scarce environment is increasing through time. To tackle this problem policy maker in Africa planned to halve the proportion of people who are unable to or afford safe drinking water by 2015.

Thus in this study households without either House Connection and or Yard Connection Private were identified as to whether there is any sort of strategies and pro-poor policies to increase water accessibility of city's population in general and poor households in the sample population in particular. Hence out of 384 HH 177(46.09 percent) households responded that there is no credit facility designed by AAWSA to enhance meter connections by each households in the city and the rest 207(53.91 percent) households are unaware of any strategy.

In general households' satisfaction level towards the existing water supply service in Addis Ababa town rendered by AAWSSA depicts the service is affronting to residents of the study area.(see table 3.16)

Table 3.16: Satisfaction level of Sample HHs on AAWSSA water service

Sr.	Existing water supply is	Number of Respondents	Percentage of Respondents
1	Very Satisfactory	7	1.82
2	Satisfactory	89	23.18
3	Un Satisfactory	286	74.48
4	Non respondents	2	0.52
	Total	384	100.0

Quiet significant number of households is not satisfied with the service AAWSSA is rendering. Chief among the rationale for this level of dissatisfaction in addition to the major problems sited above that respondents suggested that AAWSSA need to revise its strategies to incorporate the poor. Private meter connection need to be facilitated rather than imposing impediments such as demanding house ownership or permission letters from renters. Respondents also pinpointed that there should be a periodic and intensive distribution network repair work which will carve the problem of interruption. Enhanced customer service quality and integration with other stakeholders are also of paramount importance in order to contribute to the development of the city.

3.2.7 The impact of water service on livelihood of the poor

Water is an important basic service for life. Increasing access to adequate and potable water is set as one of the Millennium Development Goals (MDGs) by its own. It is also a component in the other MDGs such as reduction of poverty, decreasing child and maternal mortality, decreasing incidents of diseases and enhancing environmental stability.

Katte et al.(2003) in their case study in urban centers in Cameroon indicate that inadequate supply of water has ever been one of a central

cause of poverty in developing counties in that water affects basic need of people, their heath, food security and basic livelihood. Among the many elements of poverty, inability to satisfy basic needs is the major one stated in World development report 2000.

Water shortage in general has immense implication on peoples' livelihood. However, more than water shortage, poorly managed water resources in today's developing countries' urban centers are incapacitating the people with water related diseases. As shown in section 3.2.5 the average water consumption by HH is way below the minimum level set as a standard. On this part forward the views of households on the existing water quality and incidents of water related diseases will be discussed.

The water supplied in the city of Addis Ababa even though it is treated before distribution, respondents indicated that it has low quality. Out of 384 HH surveyed, 213 (55.5 percent) households commented that it is not healthy and potable. Major problems sited by these 213 households are summarized in the table below.

Table 3.17: Comments on water quality by Sample HHs

Sr.	Water Problems	Number of Respondents	Percentage from 213 HHs
1	Salinity	0	0
2	Chemical Unfitness	7	3.29
3	Insects and Flies	29	13.62
4	Turbidity	152	71.36
5	Unpleasant smell	25	11.74
	Total	**213**	**100**

Households have encountered various water quality problems. As shown in table 16 the two major problems in terms of water quality in the study area are turbidity and carriage of insects, flies and small particles in pipe water. Out of 213 households 152(71.36 percent) had seen piped water often becomes turbid and 29(13.62 percent) out of 213 HH witnessed

insects, flies and other particles in pipe water. Out of 213, 25(11.74 percent) households have found piped water with very bad smell and the rest 7(3.29 percent) households consider it is chemically unfit.

The implication of poor quality of water had resulted in poor health in the sample population. Sample population has been surveyed whether piped water had ever caused illnesses related to water on them and or other Household members. To this end out of 384 households 206 (53.65 percent) indicated there were water related illnesses in their household and the rest 178 households (46.35 percent) did not encountered water related problems. Households who were affected by water quality are categorized by income in the table below.

Table 3.18: HHs incidents of water related diseases by income category.

S.r	Income category	Number of Respondents	Percentage to the total
1	Less than 300	45	21.84
2	301-600	92	44.66
3	601-900	43	20.87
4	901-1100	12	5.83
5	1101-1300	5	2.43
6	1301-1600	2	0.97
7	Above 1600	2	0.97
8	Non respondents	5	2.43
	Total	**206**	**100**

The table shows that large household numbers from among the respondents who had earlier indicated to have incidents of water related incidents are in the first three income categories. As income increases the propensity of illness related to water decreased. The justification for this is mainly consuming alternative drinks such as soft drinks; mineral waters and filtrated water using in house built facilities.

Major reported diseases include diarrhea, typhoid, amoeba, jardia, cholera, and others where the lion share of illnesses are the first three.

Some HH are affected by frequent and interchangeable occurrence of these illnesses. The problem is further exacerbated by the poor sanitation coverage of the city. In most developing urban centers proper sanitation is either absent or of scanty. The relationship between safe water supply and that of sanitation is viciously circulating in that where there is no adequate supply of water there will be a problem of sanitation. If sanitation service is scanty, pollution will be enhanced which in turn adversely affect water supply.

The existing water service has also affected a proportion of households not only their health but also their earnings. The survey revealed that out of the 35 households who gets their living wholly or partially from water 31(88.6 percent) of them revealed that their income is adversely affected. Households who vend water itself during the frequent water interruptions had lost considerable income; those who uses water to render services such as laundry, tea and tela selling buys water with higher prices at times of interruption's and water shortage, that could other wise be their profit.

Similar study made by Assefa (2006) on Assosa town show that the average household consumption per day is 4 Jerickans and 3 Jericans from House Connection and Public Stand pipes (PF) respectively. Sample HH under this study forwarded their rationale for their skimpy water consumption includes: reduction of pipe water price; limited-ness of service at Public Fountains; reducing distance ought to be traveled to fetch water and non-affordability of payment for water from vendors.

The study so far incorporated the existing water situation, consumption levels, and problems of the households, impact and rationale behind the existing situation. Policy issues on water supply follows in the next parts.

3.3 Policy Issues on Water Supply

The level of access to clean and safe water supply in Ethiopia can be cited as one of very low supply and coverage even by sub-sharan standards where unsustainable and unreliable water supply in the country poses vulnerability of well being and productivity of Ethiopian people. This is mainly due to the fact that the country has been lacking clear and comprehensive water resource management policy. This is evidently shown in that the country had adopted its Water Resource Management (WRM) policy not more than a decade ago.

Currently the existing WRM policy only serves as general and directive principle in wider scope where it incorporated irrigation, hydropower and water supply and sanitation policies lacks detailed action plans and or activities. The policy bases the constitution of the FDRE macro economic and social policies and development strategies and principles of water resource development objective that would enhance the socio-economic development of the people of Ethiopia.

The water supply and sanitation policy, as an integral part of the EWRM policy, is developed to provide momentum for the development of water supply in terms of coverage, quantity, reliability and acceptable quality for all users considering the existing and future realities of the country.

> *The overall objective of water supply and sanitation policy is to enhance the well-being and productive of the Ethiopian people through provision of adequate, reliable and clean water supply and sanitation services and to foster its tangible contribution to the economy by providing water supply services that meet the livestock, industry and other water users' demands.(.MWR-EWRMP)*

The specific objectives pertinent to implement the Water supply and sanitation policy include:

- ensuring sustainable and sufficient water supply to all Ethiopian people as much as conditions permit;
- satisfying water supply requirements for livestock, industries and other users;
- maintaining and operating water supply and sanitation service sustain-ably and efficiently;
- enhancing efficient use and conservation of water resource and
- ensuring well being and productivity of all Ethiopians through creating enabling environment for appropriate sanitation services.

The water supply policy in general and the drinking water supply policy in particular as components of the water supply and sanitation policy encompassed all areas relevant to boost supply of adequate and safe water as per the standards of all peoples of Ethiopia.

According to EWRMP, the drinking water policy, being the main concern of this study, envisaged to:

- develop appropriate water supply planning parameters, design and standards to water supply schemes in the country;
- promote self financing of programs and projects at local level
- provide subsidies to communities who can not afford to pay for basic service on capital costs only based of criteria set and temporarily;
- ensure all water supply in the country to address costs of maintenance and operation on the basis of cost recovery;
- ensure and promote accountability and responsibility in the management of water supply service;
- ensure equitability and practicality of water supply systems;
- Enhance urban water supply programs to fully cover costs and self financing.

- establish "social tariff" to enable the poor to cover operation and maintenance costs only;
- ensure rural tariff setting to cover operation and maintenance costs where as the urban areas tariff based on full cost recovery.
- establish "Progressive tariff" to urban supplies and "Flat Rates" to communal services such as PF etc;
- ensure efficiency, coherence and setting appropriate guide lines to institution in water supply scheme at all levels;
- Develop sustainable and effective collaboration of all stakeholders at all levels and legalize forum for their participation;
- Promote technologies which are appropriate and conversant to local knowledge to ensure the management and sustainability of water supply projects;
- Develop framework for sustainable and effective collaboration amongst stakeholders at all levels and legalize forum for their participation;
- Build technical, material, financial and human capacity of water supply organization

Although some of the components of the drinking water supply policy seem to support the poor who cannot afford to access safe and adequate water services, the policy seem to neglect the vast majority the urban poor. The fact that urban water supply programs and projects base on full cost recovery basis and the tariff setting is progressive, it won't obviously be affordable to the poor by any standard. Not only that, the tariff also is progressive based on consumption which also in-turn affects the consumption level.

Though the policy had a component of subsidizing communities using established criteria to enable those parts that cannot afford capital costs, this had never been implemented in the urban areas in general and in the study area in particular. Moreover, as indicated in previous parts, connection charges to get private meter connection either at the house or in the yard, are expensive for the poor. To this end the drinking water policy lacks objective strategies to enhance private meter connections by the poor.

Although the policy envisaged the participation of all stakeholders such as local banks, investors and other community organizations through incentive mechanisms it had no clear and distinct set roles of these stake holders in the development of water supply in the country.

One of the major capacity problems of Addis Ababa water and sewerage authority's (AAWSA) that is impeding the efficient and effective supply of adequate and safe water to all city's residents is the lack of expertise. High staff turnover especially among the experts exacerbated the problem. Secondly financial constraint is also one obstacle to the authority. Currently it is rendering the supply of water with financial resource from subsidy from city administration, own sources and aid/loans. From these the share from own sources is very low. Thus capacity of the authority needs to be enhanced as the one of the component of the policy concerns about capacity building.

Due to the fact that there is distinct socio-economic and political distinctness between urban centers and rural areas, an independent water supply policy for urban center based on in-depth policy research is indispensable to enhance urban development in Ethiopia. Currently urban centers are only incorporated in the general water supply and sanitation policy.

Chapter Four

4. Conclusion and Implications

Supply of water at adequate quantity and acceptable quality is the issue of most poor countries. Urban centers of these countries although considered as a "better of" positions, they are multifaceted with numerous problems among others is water resource crisis. The situation in one of the urban sites "Addis Ababa" is worse than elsewhere even in sub Saharan countries.

In view of this major development challenge, the study conducted in one of the sub-cities in Addis Ababa: Addis Ketema has revealed that water coverage and consumption is way below by any standard. The existing water supply service in the area when compared with other areas is affronting.

Water sources to the city of Addis Ababa are currently Lagadadi, Dire Dam, Gafarsa and Akaki Town Springs & Wells at a total capacity of 228,000 m3 per day. With the growing demand for water as population is growing at shocking rate water stress is imminent in the city. Water produced in these sources is distributed through distribution networks, some of which are old that worsen water supply service.

The water service reaches the residents of the city through different means. These are House Connection (HC), Yard Connection Private (YCP), Yard Connection Shared (YCS), Public Fountain (PF) and water from Vendors. Residents who use YCS, PF and from Vendor most often comprises in the low and middle income categories where as HC and YCP are relatively well in their financial status.

The state of water supply in the study population show quiet significant number of respondents get pipe water from water vendors and Public

fountains which in turn affect their level of consumption. The results in the study show that household income positively associates with both the types if water sources households use and the amount of water they consume. Thus households with lower income not only get piped water from less convenient and sustainable sources but also consume less.

The major problems often cited in the study area is that large number of households could not afford the connection charges and material costs to be able to have private meter connections. Thus they are oblige to pay higher prices per quantity of water from vendors and those that are using public fountains complain that service timings are either inconvenient and or short in duration. The low income residents often lack access to private meter connection and are also unable to pay the amount set by vendors. Therefore as a strategy, they tend to cut consumption levels to reduce expenses on water.

The inefficiency of distribution systems together with water shortage itself had imposed poor and unreliable service in the area. Unexpected interruption is thus a frequent phenomenon. In line with low level of water storage trend in the sample population, both the frequency and maximum duration of interruption had adversely affected the residents of the sub-city. The effect includes inconvenience, loss of income and poor sanitation.

Water shortage on one hand and lack of maintenance on the existing network on the other has laid a question on the quality of pipe supplied water. Although Addis Ababa Water and Sewerage Authority (AAWSA) official has asserted that quality of water is of World Health Organization's standard, issues of quality is frequently raised among the users. The study had assessed the view of residents on this regard. Quiet a large number of residents revealed that quality is major problem. In general water service in the city has rather hinder the development of

city. As water is life and a basis for productivity, its low level of coverage, inadequacy of supply and quality by and far has adverse implications.

With regards to policy issues, although the national WRM policy has some elements of equitable distribution of life's most indispensable need, it lacks details of way forwards to the existing problems. Urban water supply issue is included as an integral part of the national WRM policy however due to its complexity and as urban centers are engines of overall country's socio-economic endeavor, it need to be separately addressed. Not only this, the water supply policy basically lacks pro-poor element in getting water supply accessible to the urban poor. This is evident in that urban water supply programs and projects should be on full cost recovery basis and tariff setting progressive. The other issue regarding policy is that the policy does not have any strategic comment to enhance the poor's access to private meter connection.

With regards to efficient management of urban water supply, building institutional capacity is indispensable. AAWSA like other institutions in the country has a problem of both financial and human capacity. Currently the authority is covering the costs of rendering water to the residents of the city from three sources namely: Own source, Addis Ababa region's administrative body and Aid/Loan. Own source is used to cover costs related to operation, maintenance and complementing costs to the projects. Addis Ababa Administration funds the different projects and the left over from these source is covered by Aid &Loans. Percentage share of these sources in 2007 show out of 312.2 million Birr investment 10.7 percent, 38.4perccent and 50.9 percent were generated from own funding, City's administration and Aid/loan respectively.

Enhanced capacity building and corresponding accountability is thus crucial to wards betterment of the water supply service in Africa's diplomatic and the largest urban center Ethiopia.

Urban water supply should ensure equitable distribution of water resource through pro poor strategies which in turn contribute to the poverty alleviation venture. Among others, building more public fountains in areas where coverage is very low, enhancing coverage through credit based meter connection, integrating stakeholders and cutting out management bottlenecks that hinder people's accessibility to meter connection. More importantly as Addis Ababa is of high altitude and gets abundant rainfall water harvesting should be enhanced through both creating awareness among the community and introducing relevant water harvesting technologies on AAWSA side.

Involvement of actors in the urban water supply scheme will both increase the coverage in currently un-served areas and with the existing areas it will be instrumental in improving existing situation. Thus investment in this regard needs to be encouraged and efforts to attract capital investment and operational involvement in areas of water supply and sanitation should be AAWSA's priority. Although the policy states that attracting different stakeholders in water supply sector as an objective, detailed activities towards enhancing participation of stakeholders ,incentives to attract them in the development of more water sources and setting distinctive roles for all stakeholders need to be realized.

Water as a basic human right should be accessible to all adequately and safely. This involves not only because water is a natural resource but also is a base for dignified and quality life. Thus introducing Progressive tariff setting on urban water supply, although it promotes optimum use and carve the problem of water scarcity, it also impede consumption. This in turn adversely affects socio economic development. Hence priority should be on identifying and developing more water sources rather than promoting restricting consumption.

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Annex 1

Population, Total households and Size of Sampled Households drawn from selected kebles of Addis Ketema Sub-City

Sr.	Kebele	Population No	HH size	% age from total	No of sampled HHs selected
1	01,02,03	43,256	4,327	12.2	0
2	04,05	33,480	3,348	9.4	0
3	06,07	34,208	3,421	9.6	0
4	08,09,18	38,443	3,844	10.8	123
5	10,11,12	47,109	4,711	13.3	151
6	13,15	34,362	3,436	9.7	110
7	16,17	37,370	3,737	10.5	0
8	19,20	31,567	3,157	8.9	0
9	14,21	54,949	5,495	15.5	0
10	**Total**	**354,755**	**35,476**	**100**	**384**

Annex 2 : Map of Addis Ketema Sub-City

Annex 3: Questionnaire in English

Questionnaire No.1

This questionnaire is prepared as an instrument to conduct an academic research for the fulfillment of Masters of arts degree in regional and local development studies (RLDS).This main objective of the study is to identify the factors that explain the low level of the urban poor residents' access to safe and protected water service and their utilization in central Addis Ababa.

The questionnaire has two parts: the first one is about household profile and the second one deals with current status, major source utilized, factors that explain inaccessibility of and problems induced by water services in the area of the study.

General Instructions to Enumerators:

1. Earnestly introduce your self and where you came from
2. Explain the objective of the study and express gratitude in advance for being received.
3. Assure respondents that their response will only be used for this particular study and their address will be kept confidential
4. Notify respondents to give their best accurate responses in order to achieve a higher outcome for the study
5. Circle or put a tick (✓) mark for the corresponding letter of informant's choice for multiple choice questions and description of their opinion for questions which are not multiple choices.

- Name of the Enumerator:_____
- Interviewee No _____ Woreda _____ Kebele _____ H.No _____
- Date _____

I. Household Profile

1. Age, Sex, Educational and Employment Status of House Hold Members.

No. of HH Members	Age of HH Head	Sex		Educational Status		Employment Status		
		M	F	Illiterate	Grade if Literate	Un-employed	Employed	Student

2. Marital status

1. Never Married
2. Divorced
3. Married
4. Widowed

3. Occupational status and monthly income of employed family members

No. of HH Members	Occupation					Monthly income (Birr)
	Government employee	Private Company	Own Business	Daily laborer	Others	

4. House ownership:

1. Private
2. Rented

5. If rented, rented form whom:

1. Kebele
2. Private ownership
3. Government
4. Other, Specify_____

6. Do you have toilet facility?

1. Yes
2. No

7. If your answer is yes to No.6 is it:

1. Flush 2. Pit Latrine 3. Others, specify _____

8. If your answer to Number 6 is No what system do you use

1. Open Fields
2. On road sides
3. Nearby river course
4. Other, Specify_____

9. Do you have a bath room in your house?

1. Yes
2. No

10. If your answer to number 9 is No where do you take bath?

1. Business bath rooms
3. Nearby river

2. Shared Bath rooms 4. Other, Specify_____

11. How often do you and members of your family take bath?

1. Daily 3. Weekly
2. Once in two days 4. Other, Specify_____

12. Where do you dispose solid waste?

1. In Your compound 3. On road sides 4.On open fields
2. in solid waste disposal material 5. Other, Specify_____

13. Where do you dispose Liquid wastes?

1. In Your compound 3. On the street
2. In Septic Tank 4. Other, Specify_____

II. The Existing Status Of Water Supply

14. What is/are/ the source/s of water do you use?

1. Tap inside the house
2. Tap in the compound (private)
3. Tap in the compound (Shared)
4. Public Fountain (Shared Bonos)
5. Form private Water Vendor
6. Unprotected sources (well, etc)
7. Other, specify_____

15. If your answer to Number 14 is other than No 1 and 2 why did you prefer this source?

1. Unable to pay for connection charges
2. Price is lower than AAWSSA's tariff
3. Its reliability
4. Others, Specify _____

16. If your answer to Number 14 is other than No 1 and 2 what is the average round trip distance and time you spend to fetch water?

1. Distance _____ meters
2. Time _____ minutes

17. If your answer to Number 14 is from "Public fountain", what time is it open for service?

1. The whole day(12 hours) 2. In the mornings

3. In the afternoon only 4. others, specify _____

18. How many times do you fetch water per day? _____

19. Do you have private water tanker?

1. Yes 2. No

20. What is its capacity in litters? _____

21. Is there any other water source in your village apart form the piped water sent by AAWSSA?

1. Yes 2. No

22. If yes, state each of them_____

23. Do you use the same source of water the whole year for your consumption?

1. Yes 2. No

24. If your answer to question number 23 is "No", what sources do use for

1. "Bega" season _____
2. "Kiremt" Season_____

VI. Water Needs And Sources Of The Poor

25. What are your water needs?

1. Domestic Needs only 3. For both commercial and domestic purposes
2. Commercial purpose 4. Other, Specify _____

26. If you use water for commercial purpose, Is it

1. Water vending 2. Washing clothes service
3. Others ,specify _____

27. Do you use same source of water supply for different household purpose?

1. Yes 2. No

28. If your answer to question number 27 is "No", please specify the sources you are using on the dashed spaces.

1. Drinking and Cooking _____ 4. Floor washing _____
2. Clothes Washing _____ 5. Gardening_____
3. Bathing _____ 6. Others _____

29. Why do you use different sources for different purposes?

1. to reduce pipe water charge
2. inadequacy of piped water
3. frequent interruption of piped water
4. to reduce distance to fetch water
5. Others, specify_____

VI. Water Consumption Level and Tariff

30. If you are using shared tap connection in your compound, how do you make payments for your consumption of water?
    1. As per your consumption
    2. Divided in to the number of household using the tab
    3. Other way, please specify _____
31. If it is as per your consumption specify
    1. Amount of water you consume/day_____
    2. How much you pay per container_____
32. If it is other than as per you consumption what is the average payment you made for your water consumption per month?

    _____
33. If you buy water form private vendor specify the
    1. Amount of water you consume/day_____
    2. How much you pay per container_____
34. If you are using public fountain specify the
    1. Amount of water you consume/day_____
    2. How much you pay per container_____
35. If you are using a private tab either in the your house or in your compound fill the following table from (January to December,2006)

Month	Amount in (m^3)	Cost (Birr)	Month	Amount in (m^3)	Cost (Birr)
January			July		
February			August		
March			September		
April			October		
May			November		
June			December		

VI. Major constraints/problems of the poor on water service

36. What problems do you face in your household water supply system?

Circle as much as you exhaustively specify your problems.

1. I don't have private connection
2. Piped water tariff is expensive.
3. Inconvenient time of water supply
4. physical distance to the water point is too much
5. water quality is low
6. water supply time is very short
7. queuing for long time at public stand pipes
8. unexpected water interruption
9. problem of repairing water pipes
10. I don't face any problems
11. Others, specify _____

37. Had there been any water supply interruption

1. Yes 2. No

38. If yes in which season of the year?

1. In "Bega" Season 2. In "Keremt"

39. Frequency of interruption in pipe water supply is:

1. Once in a day
2. Once in a week
3. Twice in a week
4. Once in a month
5. others, specify_____

40. What is the maximum duration of interruption?

1. For a Week
2. for two weeks
3. For a month
4. For two months
5. For more than two months
6. others, specify_____

41. Where do you get water at the time of interruption?

1. Buying form Vendors
2. Buying form Neighbors
3. From Public fountains
4. Others, specify_____

42. What are the main problems faced by the household during interruption?

1. Walking for long distance
2. Waiting for long hours
3. Higher water cost
4. Burden of carrying water
5. Others, specify _____

43. What do you think are the main reasons for the supply interruptions?

1. Lack of water management
2. shortage of water at the sources
3. lack of effective water distribution system
4. lack of maintenance
5. geographical factor
6. other, specify_____

VI. The Impact of water service on livelihood of the poor

44. Is the source of water you are using at present healthy potable?
    1. Yes 2. No
45. If it is not healthy, what are the specific problems?
    1. Salinity
    2. Chemically Unfit
    3. It Carries Insects
    4. Turbidity
    5. Other, specify _____
46. Are there incidents of water related diseases among your family members?
    1. Yes 2. No
47. If yes what are the diseases occurring frequently?
    1. Jardia
    2. Amoeba
    3. Diarrhea
    4. Cholera
    5. Typhoid
    6. others specify _____
48. How frequently do you or members of your family got sick with water problem?

    _____
49. Does the existing water service affect your life in any other way apart from family health issues?
    1. Yes 2. No
50. If your answer to question No 49 is "yes" ,state how_____

    _____
51. Are you satisfied with the existing water supply service?
    1. Yes 2. No
52. If no, what is/are the cause/s of your dissatisfaction (Rank starting form the most serious cause)?
    1. ___ Poor Quality
    2. ___ Unreliability
    3. ___ Less Quantity
    4. ___Higher Connection Charge

5. ___Higher tariff per container
6. Other, Specify _____

VI. Service Delivery and Policy Issues

53. If you do not have private meter/tab/, have you ever requested to be connected?
    1. Yes 2. No
54. If your answer to question number "53" is yes, state the time lapsed since you placed the request _____
55. What is the reason why you did not get private meter connection so far?
    1. shortage of meter
    2. unavailability of existing network
    3. Bureaucratic factors
    4. Financial problems
    5. Unable to meet requirements
    6. others, specify _____
56. If your answer to question No 57 is "Unable to meet requirements" what are they? _____
57. Do you know any facility made by AAWSSA to your financial constraints to get private connection?
    1. Yes 2. No
58. If Yes, please state_____

_____

59. What are your suggestions to ensure safe and protected water to you and all households in your vicinity? _____

_____

_____

60. The water supply delivered by Addis Ababa water and sewerage authority(AAWSA) generally is:
    1. Very satisfactory
    2. Satisfactory
    3. Unsatisfactory
    4. Other, Specify _____

Questionnaire 2

Questions forwarded to AAWSSA's selected officials and experts

1. What is the existing urban water supply service level and the distribution networks to render this service?
2. What is the mandate of AAWSSA?
3. What are the strategies set by AAWSSA to deliver water services to the urban residents?
4. What is the institutional arrangement set to deliver service to urban residents?
5. Are there any strategies, which are pro poor in delivering improved water supply?
6. Are there water sources that could be developed to meet the growing demand in the city?
7. Who do you think are the major actors in supply of safe and potable water services?
8. Do you think privatizing water service delivery improves both coverage and quality of services? If you say yes explain why?
9. If your answer to question number 8 is No why do you think so?
10. What are the major impediments of the existing water sources to efficiently meet the demand in the city?
11. What is the average per capital water consumption of the residents of the city?
12. Had there been acute water shortage in the city? If so how often?
13. What solutions were there at times of such shortage?
14. Are there any standards of water services set?
15. Have you encountered any claim of illness due to water service quality?
16. What are the often claimed illnesses?
17. What major quality issues are raised in your water service?

18. What is the proportion of the city's residents with private meter connection?
19. What are the factors that can be impediments to residents' ability to get private connection?
20. What are the requirements to get private meter connection?
21. What is the existing water tariff?
22. Do you think the existing water service tariff fair and affordable?
23. If your answer to question 22 is No what is the reason?
24. Is the tariff AAWSSA is charging for water service below/above or equal to the cost of delivering water service? Why?
25. What strategies do you propose to change the gaps existing in water service delivery?
26. If there are other development actors involving in the potable water service in Addis Ababa are they integrated with any of AAWSSA's programs?
27. What are the sources of funds for AAWSSA to undertake it's over all tasks?
28. Are these sources of funds reliable and sustainable?
29. Had there been any reforms in the service delivery of AAWSSA?
30. If there had been any, are they implemented?
31. How do you rate customer service of AAWSSA?
32. What are the problems encountered by the authority to deliver improved water supply service?
33. Do you think AAWSSA is contributing its level best to the development of the city? Explain your judgment.
34. Generally please rate the overall performance of AAWSSA in terms of coverage, customer service, efficiency and cost management.

Annex 4: questionnaire in Amharic

I. የቤተሰብ አጠቃላይ ሁኔታ

1. የቤተሰብ አባላት እድሜ, ፆታ, የትምህርት እና የቅጥር ሁኔታ

የቤተሰብ አባላት ብዛት	የቤተሰብ ኃላፊ እድሜ	ፆታ		የትምህርት ደረጃ		የቅጥር ሁኔታ		
		ወንድ	ሴት	ያልተማረ/ች	የትምህርት ደረጃ	ስራ የሌለው /የሌላት	ስራ ያለው /ያላት	ተማሪ

2. የጋብቻ ሁኔታ

1. ያላገባ/ች
2. ያገባ/ች
3. የተፋታ/ች
4. የትዳር አጋር የሞተበት/ባት

3. የስራ ሁኔታና ወርሀዊ ገቢ መጠን (በስራ ላይ ያሉ የቤተሰብ አባሎች በሙሉ)

የቤተሰብ አባላት ብዛት	ስራ/መተዳደሪያ/					ወርሃዊ የገቢ መጠን(በብር)
	የመንግስት ተቀጣሪ	የግል ድርጅት ተቀጣሪ	የግል ተቀጣሪ	የቀን ሰራተኛ	የተለየ ካለ	

4. ወርሃዊ የ ቤተሰብዎ የምግብ ፍጆታ ወጪ በግምት ምን ያህል ብር ነው?_____

5. የቤትዎ ባለቤትነት

1. የግል
2. ኪራይ

6. ኪራይ ከሆነ ከየት:

1. ከቀበሌ
2. ከመንግስት
3. ከግል አከራይ
4. ሌላ ከሆነ በጠቅሱ _____

7. የቤትዎ ይዞታ(የተሰራበት ቁሳቁስ)

1. ከጭቃ
2. ከብሎኬት
3. ከድንጋይ
4. ከሸክላ ጡብ
5. ሌላ ከሆነ በጠቅሱ_____

8. የመፀዳጃ ቤት አገልግሎት አለዎት?

1. አለኝ
2. የለኝም

9. ለጥያቄ ቁጥር 8 መልስዎ "አለኝ" ከሆነ ምን አይነት እንደሆነ በገልፁ:

1. የውሃ መልቀቂያ ያለው ዘመናዊ (Flush)
2. ደረቅ የመፀዳጃ ቤት(Pit Latrine)
3. ሌላ ከሆነ በጠቅሱ_____

10. ለጥያቄ ቁጥር 8 መልስዎ "የለኝም" ከሆነ ምን እንደሚጠቀሙ ቢገልፁ:

1. ክፍት ሜዳ ላይ
2. በአቅራቢያዮ ባላ ወንዝ አካባቢ
3. መንገድ ዳር
4. ሌላ ከሆነ ቢጠቅሱ_____

11. የመታጠቢያ ቤት እቤትዎ አለዎት?

1. አለኝ
2. የለኝም

12. ለጥያቄ ቁጥር 11 መልስዎ "የለኝም" ከሆነ ምን እንደሚጠቀሙ ቢገልፁ:

1. የጎረቤት መታጠቢያ ቤቶች
2. የጋራ መታጠቢያ ቤት
3. በአቅራቢያዮ ባላ ወንዝ ወስጥ
4. ሌላ ከሆነ ቢጠቅሱ_____

13. እርስዎና የቤተሰብዎ አባላት በምን ያህል ጊዜ ልዩነት የግል ንፅህናዎትን ይጠብቃሉ(ይታጠባሉ)?

1. በየቀኑ
2. በየሁለት ቀኑ
3. በሳምንት በሳምንተ
4. ሌላ ከሆነ ቢጠቅሱ_____

14. የደረቅ ቆሻሻ የት ያስወግዳሉ?

1. በግቢዎ ውስጥ
2. መንገድ ዳር
3. ክፍት ሜዳ ላይ
4. የደረቅ ቆሻሻ ማስወገጃ ላይ
5. ሌላ ካለ ቢጠቅሱ_____

15. የፈሳሽ ቆሻሻ የት ያስወግዳሉ?

1. በግቢዎ ውስጥ
2. መንገድ ላይ
3. ለፈሳሽ ቆሻሻ ማጠራቀሚያ (septic tank)
4. ሌላ ከሆነ ቢጠቅሱ_____

II. ያለው የውሀ አቅርቦት

16. ለቤተሰብዎ የውሀ አገልግሎት የሚያገኙት/ባቸው/ ከየትኛው ምንጭ ነው?

1. በመኖሪያ ቤትዎ በተዘረጋ ቧንቧ
2. በግቢዎ በሚገኝ የግል ቧንቧ
3. በግቢዎ በሚገኝ የጋራ ቧንቧ
4. ለህዝብ በተዘጋጀ የውሃ ማከፋፈያ (ቦኖ)
5. ከውሃ ነጋዴዎች በሽያጭ
6. እንደ ጉድጓድ ካለ ካልተጠበቀ ምንጭ
7. ሌላ ከሆነ ቢጠቅሱ_____

17. ለጥያቄ ቁጥር 16 መልስዎ ከ 1 እና 2 ውጪ ከሆነ እነዚህን ምነጮች ለምን መረጡ?

1. የግል የውሃ ቧንቧ ማስገባት ስላልቻልኩ
2. ከነዚህ ምንጮች የማገኘው ውሀ አስተማማኝ በመሆኑ
3. የምከፍለው ክፍያ አነስተኛ በመሆኑ
4. ሌላ ከሆነ ቢጠቅሱ_____

18. ለጥያቄ ቁጥር 16 መልስዎ ከ 1 እና 2 ውጪ ከሆነ ውሃ ለማምጣት በአማካይ ደርሶ መልስ ጉዞ ና የሚወስድብዎ ጊዜ ምን ያህል ነው?

1. የደርሶ መልስ ጉዞ _____ ሜትር 2. የሚወስድብዎ ጊዜ ____ ደቂቃዎች

19. ውሃ የሚያገኙት ለህዝብ ከተዘጋጀ የ ውሃ ማከፋፈያ (ቦኖ) ከሆነ የሚሰራባቸው ጊዜአት በቀን ውስጥ

1. ሙሉ ቀን(12 ሰዓት) 3. ከሰዐቱን ብቻ
2. ጠዋት ጠዋት ብቻ 4. ሌላ ከሆነ ቢጠቅሱ_____

20. ከላይ በተ.ቁ 19 የጠቀሱት ሰዓት ለእርስዎ አመቺ ነውን?

1. አዎ 2. አይደለም

21. በቀን ውሃን ለምን ያህል ጊዜ ይቀዳሉ? _____

22. ከቤተሰብዎ አባላት በአብዛኛው ጊዜ ውሃን የሚቀዳው ማን ነው?_____

23. የግል የውሃ ማጠራቀሚያ አለዎት?

1. አዎ 2. የለኝም

24. ለጥያቄ ተ.ቁጥር 23 መልስዎ አዎ ከሆነ ምን ያህል ሊትር ውሃ ይይዛል? _____

25. በአዲስ አበባ ውሃና ፍሳሽ በለስልጣን በኩል ከተዘረጋ የውሃ መሰራጫ መስመር ውጪ በአካባቢዎ በጥቅም ላይ የዋለ የውሃ አገልግሎት አለ?

1. አዎ 2. የለም

26. ለተራ.ቁጥር 25 መልስዎ አዎ ከሆነ ቢገልፁልን_____

27. አመቱን ሙሉ ውሃ የሚያገኙት ከላይ በተራ ቁጥር 16 ከጠቀሱት ቦታ ብቻ ነው?

1. አዎ 2. አይደለም

28. ለጥያቄ ቁጥር 27 መልስዎ "አይደለም" ከሆነ በተለያዩ ወቅቶች የሚጠቀሙት የውሃ ምንጭ ቢጠቅሱ

1. "በበጋ" ወቅት _____ 2. "በክረምት" ወቅት_____

III. በአነስተኛ ገቢ የሚተዳደሩ ነዋሪዎች የውሃ ፍላጎትና የሚያገኙባቸው ምንጮች

29. የእርስዎ የውሃ ፍላጎቶች ከሚከተሉት የትኛው ነው?

1. ለቤት አገልግሎቶት ብቻ 3. ለቤትም ለንግድም
2. ከንግድ አገልግሎት ብቻ 4. ሌላ ካለ ቢጠቅሱ_____

30. ውሃን ለንግድ የሚጠቀሙ ከሆነ ለምን አይነት ንግድ ይጠቀማሉ?

1. ውሃ ሽያጭ 2. ልብስ እጥበት አገልግሎት

3. ሌላ ካለ በጠቅሱ_____

31. ለላይ በጥያቄ ቁጥር 16 ላይ የገለፁትና አሁን እየተገለገሉበት ያለው የውሃ ምንጭ ለሁሉም አይነት አጠቃቀም ነው የሚያውሉት?

1. አዎ 2. አይደለም

32. ለጥያቄ ቁጥር 31 መልስዎ "አይደለም" ከሆነ ለሚከተሉት ፍጆታዎች የሚጠቀሙት የ ውሀ ምንጭ ምን እንደሆነ በ ክፍት ቦታዎቹ ላይ ቢጠቅሱ

1. ለመጠጥ ና ለምግብ ማብሰያ ___ 4. ለወለል ማጠቢያ ና ጠቅላላ ፅዳት _____
2. ለልብስ ማጠቢያ _____ 5. ለመኖሪያ ግቢ ማስዋቢያና አትክልት እንክብካቤ
3. ለገላ መታጠቢያ _____ 6. ለሌሎች ጉዳዮች _____

33. ለተለያዩ ፍጆታዎች የተለያዩ የውሃ ምንጮችን ለምን ይጠቀማሉ?

1. የቧንቧ ውሃ ክፍያ ለመቀነስ 3. ተደጋጋሚ የቧንቧ ውሃ መቋረጥ ችግር
2. የቧንቧ ውሃ አቅርቦት ማነስ 4. ውሃ ለማምጣት የሚፈጀውን ጊዜና ርቀት ለመቀነስ
5. ሌላ ከሆነ በጠቅሱ_____

IV. የውሃ አጠቃቀም ደረጃ እና ክፍያ መጠን

34. በግቢዎ በሚገኝ የጋራ ቧንቧ የሚጠቀሚ ከሆነ ክፍያ የሚፈፅሙት እንዴት ነው?

1. በተጠቀሙት ፍጆታ ልክ 2. በግቢዎት ባሉት ቤቶች ልክ ተካፍሎ
3. በሌላ መንገድ ከሆነ በጠቅሱ_____

35. ለጥያቄ ተራ.ቁጥር 34 መልስዎ ቁጥር 1 (በተጠቀሙት ፍጆታ) ልክ ከሆነ

1. የሚጠቀሙት የውሃ መጠን በቀን ስንት ነው?_____ ሊትር/ ጀሪካን/ ባልዲ
2. በውሃ መያዣነት የሚከፍሉት ክፍያ ስንት ነው የውሃ መያዣነቱን በገልፀ?_____

36. ለጥያቄ ቁጥር 34 መልስዎ ከ ቁጥር 1 ውጪ ከሆነ በአማካይ በየወሩ የሚከፍሉት የክፍያ መጠን በገልፀ? _____

37. ከውሃ ነጋዴ ውሃን የሚገዙ ከሆነ

1. የሚጠቀሙት የውሃ መጠን በቀን ስንት ነው?_____ሊትር/ ጀሪካን/ ባልዲ
2. በ ውሃ መያዣነት የ ሚከፍሉት ክፍያ ስንት ነው?_____

38. ከህዝብ የውሃ ማከፋፈያ(ቦኖ) ውሃን የሚገዙ ከሆነ

1. የሚጠቀሙት የውሃ መጠን በቀን ስንት ነው?_____ሊትር/ ጀሪካን/ ባልዲ
2. በ ውሃ መያዣነት የ ሚከፍሉት ክፍያ ስንት ነው?_____

39. ከላይ በጥያቄ 16 ላይ መልስዎ ተራ ቁ.ጥር 1 እና 2 ከሆነ ያለፉት 12 ወራት የ ፍጆታ ክፍያን ከታች በተገለፀው ሁኔታ ቢሞሉልን ማለትም ከ ጥር 1998 እስከ ታህሳስ 1999(January,2006 to December,2006)

ወር	ፍጆታ በሊትር	ፍጆታ በብር	ወር	ፍጆታ በሊትር	ፍጆታ በብር
ጥር			ሐምሌ		
የካቲት			ነሐሴ		
መጋቢት			መስከረም		
ሚያዚያ			ጥቅምት		
ግንቦት			ህዳር		
ሰኔ			ታህሳስ		

40. ለእርስዎና ለቤተሰብዎ የውሃ ፍጆታ በቀን መክፈል የሚችሉትን መጠን ቢገልፁ_____

V. በአነስተኛ ገቢ የሚተዳደሩ ነዋሪዎች የውሃ አገልግሎት ችግሮች

41. የቤተሰብዎ የውሃ ችግሮች የሆኑትን በመሉ(ከአንድ በላይ ከሆኑም ማክበብ ይቻላል) የትኞቹ ናቸው?

1. የግል የውሃ ቧንቧ የለኝም
2. የቧንቧ ውሃ ውድ መሆኑ
3. የውሃ አቅርቦት ጊዜው አመቺ አለመሆኑ
4. ውሃ የምናገኝበት ቦታ እሩቅ መሆኑ
5. የምናገኘው ውሃ ጥራት ዝቅተኛ መሆኑ
6. የውሃ አቅርቦቱ ለአጭር ጊዜ መሆኑ
7. በህዝብ የውሃ ማከፋፈያ(ቦኖ) ረጅም ሰልፍ መኖሩ
8. ያልተጠበቀ የውሃ መቋረጥ መኖሩ
9. የውሃ ማስተላለፊያ ቧንቧዎች አለመታደስ
10. ምንም ችግሮች አላጋጠመኝም
11. ሌላ ከሆነ ቢጠቅሱ_____

42. የውሃ መቋረጥ አጋጥሞ ያውቃል

1. አዎ
2. አጋጥሞ አያውቅም

43. የውሃ አቅርቦት መቋረጥን በተመለከተ በእርስዎ አካባቢ ውሃ በአማካይ

1. በቀን አንዴ ይጠፋል
2. በሳምንት አንዴ ይጠፋል
3. በሳምንት ሁለቴ ይጠፋል
4. በወር አንዴ ይጠፋል
5. ውሃ ጠፍቶ አያውቅም
6. ሌላ ከሆነ ቢጠቅሱ_____

44. እስከዛሬ ካጋጠመት የውሃ መቋረጦች ከፍተኛው ጊዜ ምን ያህል ነው?

1. ለአንድ ሳምንት ብቻ
2. ለሁለት ሳምንታት

3. ለወር ያህል
4. ለሁለት ወራት
5. ከ ሁለት ወራት በላይ
6. ሌላ ከሆነ ቢጠቅሱ_____

45. በውሃ መቋረጥ ወቅት ውሃን ከየት ያገኛሉ?

1. ከውሃ ሻጮች
2. ከጎሮቤት እየገዙ
3. ከህዝብ ውሃ ማከፋፈያ(ቦኖ)
4. ሌላ ከሆነ ቢጠቅሱ_____

46. በውሃ መቋረጡ ወቅት በእርስዎና በቤተሰብዎ ላይ የሚያጋጥሙ ችግሮች የትኞቹ ናቸው?

1. ብዙ ርቀት ተጉዞ ውሃን ማምጣት
2. ውሃ ለመቅዳት ብዙ ጊዜ መጠበቅ
3. ለበለጠ የውሃ ወጪ መዳረግ
4. የውሃ ሽክም መጨመር
5. ሌላ ካለ ቢጠቅሱ_____

47. ለውሃ አቅርቦት መቋረጥ አይነተኛ ምክንያት ናቸው የሚሏቸው የትኞቹ ናቸው?

1. የውሃ አስተዳደር እጦት
2. የውሃ እጥረት ራሱ
3. አስተማማኝ የውሃ ማሰራጫ አለመኖር
4. የጥገና አገልግሎት እጥረት
5. የመልከዐ ምድር አቀማመጥ
6. ሌላ ካለ ቢጠቅሱ_____

48. ውሃን በበቂ መጠን ወይም እንደፍላጎትዎ እንዳይጠቀሙ የሚያደርጎት ምክንያቶች

1. የውሃና ፍሳሽ ክፍያ ውድ በመሆኑ
2. የውሃ ሻጮች ዋጋ ውድ በመሆኑ
3. የ ህዝብ ቦኖ አገልግሎቱ ውሱን በመሆኑ
4. ውሃን የሚያመጡበት ቦታ እሩቅ በመሆኑ ለመቆጠብ
5. ውሃን እንደፍላጎቱ እየተጠቀምኩ ነው
6. ሌላ ከሆነ ቢገልፁ

VI. በአነስተኛ ገቢ የሚተዳደሩ ነዋሪዎች የውሃ አገልግሎቱ በኑሮአቸው ላይ ያሳደረው ተፅዕኖ

49. አሁን እየተጠቀሙት ያለው የውሃ አገልግሎት ምንጭ ለጤና ተስማሚና ንፁህ ነው?

1. አዎ
2. አይደለም

50. ለተራ.ቁጥር 49 ጥያቄ መልስዎ አይደለም ከሆነ ችግሮቹ ምንድን ናቸው ይላሉ (ከአንደ በላይ ማክበብ ይቻላል?

1. ውሃው ጨዋማ ነው
2. የንጥረነገር ችግር

3. ነፍሳትና ትላትሎች መገኘት 5. ሌላ ካለ ቢጠቅሱ_____

4. ድፍርስ ነው

51. በእርስዎም ሆነ በቤተሰብ አባላትዎ የተከሰተ ከ ውሃ ጋር የተያያዘ ህመም አለ?

1. አዎ 2. የለም

52. ለተራ.ቁጥር 51 ጥያቄ መልስዎ አዎ ከሆነ በተደጋጋሚ የተከሰተው የበሽታ አይነት የትኛው ነው?

1. ጃርዲያ 4. ኮሌራ

2. አሜባ 5. ታይፎይድ

3. ተቅማጥ 6. ሌላ ካለ ቢጠቅሱ_____

53. በእርስዎም ሆነ የቤተሰብዎ አባላት በምን ያህል ጊዜ ድግምግሞሽ ከውሃ ጋር የተያያዘ ህመም ታመው ያውቃሉ?

_____

54. በእርስዎም ሆነ የቤተሰብዎ አባላት ላይ ከጤና ውጪ የውሃ አቅርቦቱ ያሳደረው ተፅዕኖ አለ?

1. አዎ 2. የለም

55. ለጥያቄ ተራ.ቁጥር 54 መልስዎ አዎ ከሆነ ቢያብራሩ_____

56. በአዲስ አበባ ውሃና ፍሳሽ ባለስልጣን እየተሰጠ ያላው የውሃ አቅርቦት አገልግሎት ደስተኛ ነዎት?

1. አዎ 2. አይደለሁም

57. ለተራ.ቁጥር 56 ጥያቄ መልስዎ አይደለሁም ከሆነ ላለመርካትዎ ምክንያት ይሆናሉ የሚሉትን በቅደም ተከተል ቢያስቀምጡ(ከአስከፊው ጅምረው የመ.ሉ)

1. ____ ደካማ ጥራት ያለው ውሃ አቅርቦት በመሆኑ

2. ____ አቅርቦት አስተማማኝ ባመሆኑ

3. ____ የውሃ አቅርቦቱ ማነስ

4. ____ የግል ቆጣሪ ማስገቢያ ክፍያ ከፍተኛ ሙሆን

5. ____የውሃ አቅርቦት ታሪፍ ከፍተኛ መሆኑ

6. ላላ ካለ ይግለፁ _____

VII. የውሃ አቅርቦት አገልግሎትንና የ ፖሊሲ ጉዳዮች

58. የግል የውሃ ቱቦሪ ከሌሎች ከአዲስ አበባ ውሃና ፍሳሽ ባለስልጣን ለማስገባት ጠይቀው ያውቃሉ?

1. አዎ
2. አልጠየቅሁም

59. ለተራ.ቁጥር 58 ጥያቄ መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ሰይፈፅምሎት ቆየ

_____

60. እስካሁን ላለመቀጠሉ ምክንያቶቹ ምንድን ናቸው(ከ አንድ በላይ ከሆነ ያክብቡ)?

1. የውሃ ቱቦሪ እጥረት
2. የውሃ መስመር አለመኖር
3. የአሰራር ብልሹነት
4. የገንዘብ ችግር
5. መሟላት ያለባቸውን ሁኔታዎች ባለማሟላት
6. ሌላ ካለ ይጥቀሱ _____

61. ለተራ.ቁጥር 60 ጥያቄ መልስዎ ተራ ቁጥር **5** ከሆነ ቢያብራሩ. _____

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62. በአዲስ አበባ ውሃና ፍሳሽ ባለስልጣን የተዘጋጀ በአገልግሎት ላይ ያለን ቅሬታ ማስተናገጃ መንገድ የሚያውቁት ካለ ቢገልፁ

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63. በአዲስ አበባ ውሃና ፍሳሽ ባለስልጣን የተተገበረ በዱቤ ወይም በሌላ አይነት መንገድ እርስዎን የግል ቱቦሪ ባለቤት ለማድረግ የተደረገ ማንኛውም አገልግሎት አለ?

1. አዎ
2. የለም

64. ለተራ.ቁጥር 63 ጥያቄ መልስዎ አዎ ከሆነ በገልፁ

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65. ለእርስዎም ሆነ ለአካባቢዎ ንፁህና የተጣራ የ ውሃ አገልግሎትን ለመስጠት ምን መደረግ አለበት ብለው ያስባሉ?

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66. በአዲስ አበባ ውሃና ፍሳሽ ባለስልጣን እየተሰጠ ያለው የከተማው የውሃ አቅርቦት አገልግሎተ በእርሶ እምነት:

1. በጣም በቂ ነው
2. በቂ ነው
3. በቂ አይደለም
4. ሌላ ካለ ይጥቀሱ

Annex 5: Water demand and supply analysis and projection in Addis Ababa

Year	Population	Water DD /person/ day (Lt)	Total amount (m3)	Total SS/day (m3)	Gap b/n DD &SS	%age water SS	% age of UFW
2002	2,795,425	123	343,837	206,000	-137,837	-40.1	35
2003	2,894,997	127	367,665	206,000	-161,665	-44.0	34
2004	2,998,776	131	392,840	211,000	-181,840	-46.3	33
2005	3,104,908	136	422,267	211,000	-211,267	-50.0	33
2006	3,215,504	140	450,171	211,000	-239,171	-53.1	32
2007	3,330,039	144	479526	228,000	-251,526	-52.5	31
2008	3,448,654	148	510401	228,000	-282,401	-55.3	30
2009	3,571,494	152	542,867	228,000	-314,867	-58.0	29
2010	3,698,710	157	580,697	228,000	-352,697	-60.7	28
2011	3,830,457	161	616,704	640,015	23,311	3.8	28
2012	3,966,897	165	654,538	640,015	-14,523	-2.2	27
2013	4,107,837	168	690,117	640,015	-50,102	-7.3	26
2014	4,253,277	171	727,310	640,015	-87,295	-12.0	25
2015	4,394,217	175	768,988	640,015	-128,973	-16.8	24
2016	4,535,157	178	807,258	825,000	17,742	2.2	23
2017	4,676,097	181	846,374	803,000	-43,374	-5.1	23
2018	4,817,037	185	891,152	803,000	-88,152	-9.9	22
2019	4,957,977	188	932,100	803,000	-129,100	-13.9	21
2020	5,098,917	192	978,992	783,000	-195,992	-20.0	20
2021	5,239,857	199	1,042,732	783,000	-259,732	-24.9	20
2022	5,380,797	207	1,113,825	783,000	-330,825	-29.7	20
2023	5,521,737	214	1,181,652	777,000	-404,652	-34.2	20
2024	5,662,677	221	1,251,452	777,000	-474,452	-37.9	20
2025	5,803,617	229	1,329,028	777,000	-552,028	-41.5	20

Source: Unpublished AWSSA Document

Declaration

This thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for this thesis have been dully acknowledged.

Declared by

Name: Meskerem Girmay

Signature: _____

Date: July, 2007

I confirm that this thesis has been submitted with my approval as an academic advisor.

Name: _____

Signature: _____

Date: _____

Addis Ababa, July 2007.