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MANAGEMENT

**ASSESSMENT OF LOCAL GOVERNMENT SERVICE DELIVERY OF DRINKING
WATER SUPPLY AND SANITATION (IN CASE OF JIGJIGA CITY
ADMINISTRATION, EASTERN ETHIOPIA)**

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**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
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Declaration

I, **Ahmed Iman**, MPMP in Development Management GSR/0207/11/2019-2020, hereby declared that the research leading to the production of this thesis was conducted solely by me under the supervision of **SENAITT ARAGAW (ASST. PROFESSOR)**. It has not been presented for award of any form of academic qualification. All references and sources of information under listed for the thesis have been acknowledged accordingly.

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CERTIFICATION

This thesis has been carefully read, supervised, approved and accepted as having met the requirement for the award of Master's Degree in Public Management and Policy Specialization of Development Management (MPMP), Department of Public Administration and Development Management, Faculty of Business and Economics, Dire Dawa University.

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Dedicate to

This work is dedicated to my cherished parents as well as siblings who have all been a great source of inspiration to me.

Abstract

The main objective of the study is to Assess Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia. Regarding to research methodology; the researcher employed descriptive research design with both qualitative and quantitative data type. The researcher employed proportional stratified sampling, purposive sampling and convenient sampling for sample selection to households and officials. To achieve the objective of the study a total of 383 household heads samples were randomly selected. Interview, close and open ended questionnaires, and observation employed for data collection. Additionally, different documents from secondary sources were reviewed. The analysis conducted using SPSS for the study. Regarding the service delivery of water supply and sanitation nepotism, faulty governance, lack of accountability, transparency, integrity, corruption and incredible reporting mechanism and poor sanitary mechanism were found to be the manifestation of the ill administration of the water supply and sanitation sector. In line with this, the study result also indicated 76% of households were not satisfied with the existing water supply and sanitation services of the city. Eventually, the study forwarded a recommendation which was given based on the findings and conclusion of the study.

Key words: Local Governance, Service Delivery, Water Supply, Sanitation, Jigjiga City Administration.

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ABBREVIATIONS

JWSSA	Jigjiga Water Supply and Sewerage Authority
WMERDB	Water and Mining Energy Resources and Development Bureau
WWCE	Water Works Construction Enterprise
CSA	Central Statistical Authority
GDN	Global Development Network
WWDSE	Water Works Design and Supervision Enterprise
MDGs	Millennium Development Goals
MoWR	Ministry of Water Resources
UNICEF	United Nations Children’s Emergency Fund
UN-HABITAT	United Nations Human Settlements Program
UNDP	United Nation Development Program
WHO	World Health Organization
EWWCA	Ethiopian Water Works Construction Agency
UN	United Nations
WWDA	Water Well Drilling Agency
SPSS	Statistical Package for Social Science
MoWIE	Ministry of Water, irrigation and Energy
OECD	Organization for Economic Cooperation and Development
NGO	Non-Government Organization
MoH	Ministry of Health
WASH	Water, Sanitation and Hygiene
MLG	Multi-Level Governance

CHAPTER ONE

1. Introduction

1.1 Background of the Study

In today's global competitive environment, the service industry plays an increasingly important role in the economy of many countries. Delivering quality service is considered as an essential strategy for success and survival (Parasuraman et al., 1985). Improving service delivery is primarily about improving the effectiveness and efficiency of the way in which services are delivered. The current cities are faced with many urgent challenges which have necessitated the implementation of new intelligent service delivery systems to tackle those problems (World Bank, 2009).

According to the Organization for Economic Cooperation and Development (OECD, 2010), throughout the world cities face the most sensitive challenges of service delivery because of fast growing populations. In many countries, developing countries in particular, the issue of service delivery is a challenge that needs to be addressed given the low quality of service provision and the pressing needs of the poor (Besley and Ghatak, 2007).

Service delivery refers to a relationship between service providers and consumers. It is also a continuous cyclic process for developing and delivering user focused services (UNDP, 2013). Municipal Research and Services Centre (1993) also defines service delivery as the actual production of a service such as collecting refuse and disposing it or lighting the streets. Stauss (2005) supports this view and suggests that in economic transactions, it is specialized skills and knowledge that are exchanged for money rather than the physical resources.

Whitaker (1980) observes that depending on the kind of service being offered, each service has a primary intervention of transforming the customer and that the customer is the principal beneficiary. As a fundamental responsibility of government and government institutions, the public service should deliver services that a society requires to maintain and improve its welfare (Chala D. Fita, 2011). Government institutions require organizational structures and suitably qualified people which must be supported to deliver the services they are responsible for (Whitaker, 1980). Besley and Ghatak (2007) argue that public services are a key determinant of quality of life that is not measured in per capita income. The authors stress that service delivery is an important feature of the poverty reduction strategy. Hernandez

(2006) agree that services are vital to poverty alleviation and key to realizing the Millennium Development Goals (MDGs) both directly and indirectly, enhance the availability of services.

Aminuzzaman (2010) argues that although local authorities are the frontline local government organization closest to people, the scope and quality of service delivery is one of the most critical areas that have significantly tinted their credibility and institutional image.

On the other hand, the survival and well-being of a nation depends upon sustainable development and for this water supply and sanitation which are ingredients of a healthy and productive life, are essential requirements. For the poor people residing in urban slums and rural areas, to achieve a better economic growth rate and higher productivity, priority has to be given to the health of these people, for which provision of public utilities like water supply and sanitation is necessary (Chala Deyessa, 2011). Provision of safe and sufficient drinking water with adequate sanitation service in urban areas is an important investment which safeguards health and safety of the people living in urban areas, and protection, conservation and promotion of the environment, especially in developing countries (Pathak, Rajola & Rajnish, 2002).

According to WHO-UNICEF (2010), access to safe water and sanitary means of waste disposal is universal needs and indeed basic human rights. Besides, they are essential elements of human development and poverty alleviation and constitute an indispensable component of primary health care. Hence, provision of adequate sanitation services, safe water supply, and hygiene education represents an effective health intervention that reduces the mortality caused by diarrheal disease by an average of 65% and the related morbidity by 26%. To contrary, inadequate sanitation, poor hygiene and unclean water result not only in more sickness and death, but also in higher health costs, lower productivity, lower school enrollment and retention rates of girls and perhaps most importantly the denial of the rights of people to live with dignity.

According to, IHP/SDG-WATER/1/2014, UNESCO, the Sustainable Development Goals (SDGs) put particular emphasis on the importance of improved coverage of water and sanitation supply and have a global target to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by the year 2015. Achieving the targets will entail various challenges and pose a continuous uphill struggle for many countries in Africa.

As a result of rapid growth in urbanization with increased rural urban migration and informal settlements, population growth, and growing poverty, African governments will need to be able to provide access to safe water to 210 million and sanitation to 211 million additional urban residents over the next 15 years. It is also estimated that almost 300 million Africans will be living in slums and informal settlements by the year 2020. This implies that investments in water supply and sanitation would require injections that if governments are to maintain current levels of water supply and sanitation provision, under the projected growth scenario, access to these services should increase by 10 million a year for a 10-year period (UNESCO,2005).

The number of people lacking access to "improved" water in 2015 was 42 million (*WASH Watch, 2019*). Regarding sanitation, progress has been slower and there were still 71 million people without access to "improved" sanitation, in 2015 (WHO / UNICEF, 2019). According to data from the Joint Monitoring Programme for Water Supply and Sanitation of WHO and UNICEF, which are in turn based on data from various national surveys including the 2005 Ethiopia Demographic and Health Survey (DHS), access to an improved water source and improved sanitation was estimated as follows in 2008:

- 38% for improved water supply (98% for urban areas and 26% for rural areas)
- 12% for improved sanitation (29% in urban areas, 8% in rural areas)[1]

Even though there are no recent reliable estimates of actual investment levels in the sector, and available estimates vary greatly, a large amount of actual investment required to change the above major problem of the sector. But investments on Water and sanitation have declined as a share of total poor-focused expenditure from 7.4% in 2005/06 to 3.4% in 2009/10 (Getnet A. & David T., 2009). It seems that very significant proportions of resources are not utilized and are subject to bottlenecks.

Jijiga is one of the areas in the country with acute water shortage for animal watering and poor sanitary situation. In the dry seasons, Pastorals from the surrounding 30km radius are using water for their Animal Watering from the town's water supply system. All the water that goes in the distribution pipe does not reach the consumer. Some portion of this is wasted in the pipelines through: defective joints in between pipes, cracks on surface of pipes, and faulty valves and fitting (Water Works Design and Supervision Enterprise, 2015).

So, the purpose of this study was to assess Local Government Service Delivery within the context of current water supply and sanitation service delivery at Jigjiga city as well as it

helps the local municipal councils and authorities in terms of understanding the status of water supply and sanitation service of the city and the ways in which service delivery can be improved.

Therefore, this study is conducted to assess the water supply and sanitation service delivery of Jigjiga city administration in Somali National Regional State, Eastern Ethiopia and provide the possible ways in which service delivery can be improved.

1.1. Statement of the Problem

In most developing countries, there is growing dissatisfaction with the public service delivery. Deficiencies in the coverage, access and quality of basic services and infrastructures such as water supply and sanitation, and roads are common (Paul, 1992; OECD, 2008). UNDP (2006), for example, indicated that there are around 1.2 billion people in the world who lack access to sufficient quantities of safe water. Like most countries in the developing world, African countries have major difficulty in providing effective and equitable public services (ECA, 2005b).

In addition to growing dissatisfaction with the public service delivery, lack of safe drinking water and sanitation are the most serious challenges of the twenty-first century. Over 1 billion people lack access to clean water; nearly all of them live in developing countries. Yet, 2.6 billion people, 40% of the world population, half the developing world lack even a simple improved latrine. Unsafe water and poor sanitation are the primary causes for the vast majority of water borne and primarily diarrheal diseases. Every year, unsafe water coupled, with a lack of basic sanitation, kills at least 1.6 million children under the age of five years (Elimelech, 2006; UNICEF/WHO, 2004).

Access to water supply and sanitation in Ethiopia is amongst the lowest in Sub-Saharan Africa and the entire world. While access has increased substantially with funding from foreign aid, much still remains to be done to achieve the Millennium Development Goal of halving the share of people without access to water and sanitation by 2015, to improve sustainability and to improve service quality (Ministry of Water and Energy, and Ministry of Health, 2015).

Although above challenges exist, there is a dearth of scientific studies conducted on the issues of water supply and sanitation in the study area in particular and country wide in general.

Most of the available studies were conducted either at national level, outside case study, international level or general aspects of service delivery. To mention some of them, Mintesnot (2016) assessed governance and public service delivery: the case of water supply in Akaki Kaliti sub-city, the findings show that lack of transparency, accountability and responsiveness are obvious in water service supply, restriction of private sector in the supply of potable drinking water with pipe line, the community forums role is insignificant in decision making of water service and NGO's play great role in providing drinking water for Akaki-kality clients.

Obaje (2015) studied assessment of local government service delivery in Nigeria: a study of kaduna north local government area of kaduna state, the study revealed that, mismanagement of funds, joint account system, lack of transparency and accountability and restricted revenue sources available to local government and inability to effectively utilize its internal sources of revenue generation had impacted negatively on the provision of public goods at the local level.

Chala (2011) conducted the assessment of urban water supply and sanitation: the case of ambo town, oromia region the major factors attributed to lower accessibility are shortage of water supply, high cost of piped water connection, length of process during connection and frequent interruption. Community participation in water supply and sanitation is inadequate due to the weakness of offices or authorities particularly municipality in coordinating and promoting active community participation.

Nigist (2007) investigated water and sanitation provision and its effects on poor women: the case of selected neighborhoods in Addis Ababa, the major findings of the study indicate that in the city in general and in the studied neighborhoods in particular is unavailable of WATSN at the required quantity, place, affordability, accessibility and safety has been strongly affecting the lives of poor women. It shows that these interrelated effects highly influence the health, income, privacy, dignity, security, social status of poor women including the time they can use for self-improvement. The results of this study show that the roots causes are related to the socio-economic status of Women include the rigid division of labor, inadequate access to economic resources and poor decision making power.

Although, the above studies and many other studies conducted the study on the governance and public service delivery, and water supply and sanitation, most of the lessons focused on

various governance issues such as: social, economic and political, and good governance system such as accountability, transparency, community participation and responsibility. But they gave little emphasis on water supply and sanitation service delivery. This study contributes a lot in this line. Finally, this study differs from others; it will focus on Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia.

The source of water supply system for Jigjiga city is ground water. The supply is not adequate and there is a critical shortage of water supply in the city. The public water points and the house taps are usually dry. Water vending is a common practice in the city and a 20 liter Jar costs about 10 birr .There is no perennial stream in the area, and as in many towns and cities of the country, the sanitation condition of Jigjiga city is very poor (report on hygiene in Sewerage Enterprise, 2019).

In line with the above problems, the following is research questions addressed in this study.

1.2. Research Questions

During this study, the researcher tried to find answers to the following basic research questions:

1. What is the status of drinking water supply and sanitation service delivery in Jigjiga City?
2. What are the main challenges of drinking water supply and sanitation service delivery in Jigjiga City?
3. What measures should be taken to insure sustainable water supply and sanitation services in Jigjiga City?

1.3. Objective of the Study

1.3.1. General Objective

The general objective of the study was to assess Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia.

1.3.2. Specific Objectives

- To assess the status of drinking water supply and sanitation service delivery in Jigjiga City.

- To examine the main challenges of drinking water supply and sanitation service delivery in Jigjiga City.
- To identify measures should be taken to insure sustainable water supply and sanitation services in Jigjiga City.

1.4. Scope of the Study

The study was designed to assess the Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia. Thus, this study was tried to assess the status of drinking water supply and sanitation service delivery in Jigjiga City Administration and identified the main challenges of drinking water supply and sanitation service delivery of the City and forward measures that should be taken to insure sustainable water supply and sanitation services in the City. The city is one of the most populous cities in the country and one of the lacking safe drinking water and sanitation. Thus, the estimated water supply coverage of the city was about 50%. Reportedly the problems associated with the water supply of the city include water scarcity, poor water quality, high water loss through leakage and lack of skilled man-power. So, the purpose of this study was to assess Local Government Service Delivery within the context of current water supply and sanitation service delivery at Jigjiga city as well as it helps the local municipal councils and authorities in terms of understanding the statuesque of water supply and sanitation service of the city and the ways in which service delivery can be improved.

1.5. Significance of the Study

As the researcher's main focus was to assess the Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia. The study was important in different ways.

- § Helps the management of the municipality to review its public service delivery in way that meets its customer's needs and expectations.
- § Helps different levels of the sector to identify their respective status in relation to improvement needs of their drinking water service delivery and customer satisfaction of water supply and sanitation.
- § Let's the researcher to fulfill the partial requirement for the masters of degree in Public Management and Policy (specialization in Development Management).

§ May help any interested person who wants to conduct study in the area as point of reference.

The finding of this study would contribute to Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia and the City Administration may use the findings of this study to develop frameworks to overcome the challenges. Moreover, the findings of this study will help policy makers, Civil Society Organizations (CSOs) and other institutions who want to know the problems of water supply and sanitation service delivery. It also enables them to know what kind(s) of policies should be framed.

1.6. Limitation of the study

Lack of update and compiled data about the practice of service delivery in water supply and sanitation, and absence of officials and some experts from office during data collection were some of the limitations that the researcher confronted during the study. In addition to this, shortage of time to gather sufficient data and analyze them properly, and lack of sufficient and relevant literature that relate water supply and sanitation of service delivery in the study area are part of the limitations.

1.7. Organization of the Paper

The paper was organized in five chapters; the first chapter was consisted of the introductory parts which include background of the study, statement of the problem, basic research questions, objective of the study (general and specific objectives), scope of the study significance of the study and limitation of the study. The second chapter dealt with review of literature, and the third chapter was discussed the utilized research methodology such as Research Design, Description of the Study Area, Data Source and Gathering Tools, Target Population, Sampling Methods, Data Analysis Techniques, and Ethical Consideration.. In the fourth chapter, data presentation, analysis and interpretation was presented while the last chapter was consisted of major finding of the study, conclusions and recommendations.

CHAPTER TWO

RELATED LITERATURE REVIEW

2. Introduction

This chapter dealt with the theoretical overview of water supply and sanitation. It assesses conceptual review about Service Delivery, Strategies for Service Delivery, Theoretical Framework of Service Delivery Models, Overview of water supply and sanitation, different challenges in urban water supply and sanitation, major technological options for sanitation, Impacts of water and sanitation inaccessibility, Benefits of access to clean drinking water and sanitation, Major Challenges in urban water supply and sanitation, variables that affect better service delivery, It also assesses the Ethiopian government's water supply and sanitation policy, and the conceptual framework and the proposed model for the current study are incorporated under this chapter.

2.1. Conceptual Review

2.1.1. Service Delivery

Service delivery refers to the provision of social or public goods that will promote socioeconomic wellbeing of the citizens. Public services offered by government are numerous and may include the provision of public utilities, security, economic development projects, and the enforcement of the law and so on. The delivery of public goods and services at the local government level or the grass root is aimed at moving the standard of living of the populace to the next level (Angahar, 2013). Consequently, the efficient and effective provisions of basic amenities and social infrastructures for the people at the grass root are key factors to the existence of any government (Bolaito & Ibrahim, 2014).

2.1.2. Strategies for Service Delivery

In today's global competitive environment, the service industry plays an increasingly important role in the economy of many countries, therefore, delivering quality service is considered as an essential strategy for success and survival (Parasuraman et al., 1985). Improving service delivery is primarily about improving the effectiveness and efficiency of the way in which services are delivered.

A report by the World Bank, (2009) stated that the current cities are faced with many urgent challenges which have necessitated the implementation of new intelligent service delivery systems to tackle those problems.

The reason for this strategy is that, in the developed world, cities are increasingly becoming the driving forces of their national economies (World Bank, 2009). Jooste (2008) indicated that the use of public values, institutions, and service market in contracting can actually improve service delivery. They insist that stakeholder preferences and democratic processes establish the values to be optimized in service delivery. Furthermore, public law and organizational arrangements determine the contracting tools available for balancing competing values; and the characteristics of service markets influence which contracting tools and vendors are best suited to achieve stakeholder values. More so, a complex combination of strategies is needed to ensure that service employees are willing and able to deliver quality services and that they stay motivated to perform in customer-oriented, service minded ways. Continuous motivation of employees to be customer-oriented will enhance service quality. In order to build a customer-oriented, service-minded workforce, organizations must hire the right people, develop people to deliver service quality, provide the needed support systems, and retain the best people (Jooste, 2008).

In 2003 the Economic Commission for Africa (ECA) states that the public sector plays a crucial role in national development. To remain viable, efficient and effective in responding to the dynamic needs of the citizen, it has to embrace strategies that can enhance improved productivity and the quality of services delivered. It outlined a number of strategies that can be adopted by African governments to enhance public sector performance. These strategies that touch on key requirements for improving the public sector in general and service delivery in particular, are based on the concept of a lean government. This means a government that is run in partnership with all stakeholders, and one that focuses on promoting the advancement of the private sector and citizens through a well-managed policy and regulatory environment. The major strategies for improving service delivery as outlined by ECA (2003) are total quality management, organizational strategic management, training and development, and the Lean Six Sigma strategy.

2.2. Theoretical Framework

According to UNDP (1999), service delivery is a set of institutional arrangements adopted by the government to provide public goods and services to its citizens. Therefore, it is the specific institutional arrangements that critically influence the performance of public service delivery. Authors like Adank, M., Tuffuor, B. (2013), and Girma leta, (2018) highlights four basic broad models of public service delivery arrangements that governments everywhere have adopted:

1. *Direct Service Delivery Model* - The central government brings out legislation enforces it, hires staff, produces and distributes services, invests, either directly operating from the headquarters or through de-concentrated line agencies, assumes full responsibility, and is accountable not only for provisioning but also for providing services.
2. *Privatization Service Delivery Model* - The central government transfer the delivery of public services to the private companies. In this case it assumes no responsibility except for monitoring the company's compliance to legal codes. In many countries transportation and communication services are privatized. The basic rational of privatization is to gain advantages of allocate efficiency of the market mechanism and to meet resource gaps by mobilizing private sector investment in the public service sector.
3. *Decentralization Service Delivery Model* - Decentralization of service delivery functions to local government bodies is the most popular service delivery model in the world. Decentralization is based on subsidiary principals of governance; a rule where provision, production and delivery of services are to be devolved to the lowest layer of the government, local bodies, subject to economics of scale and capacity. By virtue of being closest to the public, local bodies are better positioned to match supply of a given service to citizens 'demands, transforming citizens from service recipient client, and ensuring citizens greater accountability for service quality.
4. *Alternative Service Delivery Model* - In the public service delivery arena, —Alternative Service Delivery Model“ is a relatively new phenomenon. It simulates a marriage between the government and private sector (Public-private Partnership) with different contractual arrangements. However, the ultimate ownership is generally vested to the government, and it retains the power to provide public services, whereas the private parties make the actual delivery.

In order to make a good research, researcher intended to apply only Decentralization Service Delivery model and Alternative service Delivery Model in this study. Even though the Alternative Service Delivery Model has numerous of sub models, this study apply only the Multi-level Governance Model. Because, the model require the participation of all actors regardless of the level at which they are located and the decision-making process is based on negotiations between the main actors, to arrive at a consensus and non-majority vote (Ivan &Cuglesan, 2009). Thus, as a new model, MLG model is more appropriate for present study.

2.2.1. Decentralization

The theory of decentralization is closely related with democracy, public administration, good governance and development (Khan, 2009). In the mid of the twentieth century, became the latest fashion in development administration, and it used as a tool for the development. The word decentralization could be defined as a transfer of power, authority, responsibility and functions from the central government to other levels of government (Hossain, 2005; Lai &Cistulli, 2005). According to Shamsur M. Rahman (1996) decentralization is the transference of authority from a higher level of government to a lower, delegation of decision making, placement of authority with responsibility allowing greatest number of actions to be taken where most of the people reside, removal of functions from the center to the periphery, a made of operations involving wider participation of people in the whole range of decision making beginning from plan formulation implementation (Hossain, 2005). According to Ronedenelli (1981) defined decentralization as a transfer of authority to plan, make decision and manage functions from national level to any individual organization or agency at the sub-national level. Whatever scholars understand by decentralization, it comprised with following essential features;

1. Decisions should be made in the field; officers must be selected and trained as to develop the capacity to resolve the problem on the spot.
2. A decentralized administration must be developed as far as possible with the active participation of the people themselves. Their cooperation and compliance are essential and the services of the state and the local bodies supplementing and stimulating but not duplicating their staff or equipment should be utilized.
3. Coordination of the work of the various agencies in the field should be done in the field itself because; central coordination means delays, jealousies and jurisdictional disputes (Hossain, 2005; Rahman 1996).

2.2.2. Multi-level Governance

Multi-level Governance (MLG) is a model which promotes neo-pluralism, meaning that it identifies the participation of different networks and political communities in the decision making process, besides the interest of old groups and problems are solved after reaching a negotiation through the aggregation of the various divergent interests (Ivan & Cuglesan, 2009; Stubbs, 2005). It has also been described as multi-tiered governance, polycentric governance and multi-perspective governance by various scholars. Multi-Level Governance signifies the totality of relations between public and private sector actors, located at different territorial levels in the governance process (Ivan & Cuglesan, 2009). Gary Marks (1993) originally defined the model of Multi-Level Governance as a system of continuous negotiation among nested governments at several territorial tiers which supranational, national, regional and local governments are enmeshed in territorially overarching policy networks.

Jachtenfuchs (1995) extended this institutional definition to encompass the relationships between governance processes and different government levels. Bache and Flinders (2004) outline that currently there is no single widely recognized definition of the model of multi-level governance; however they identify four common strands in the research carried out. The objective of multi-level governance consists of the participation of all the actors, through different forms of partnership, regardless of the level at which they are located (national governments, local and regional authorities, community institutions or civil society). A specific feature of the multi-level governance system is the fact that the decision-making process is based on negotiations between the main actors, to arrive at a consensus and non-majority vote (Ivan & Cuglesan, 2009).

2.2.3. Overview of water supply and sanitation

The survival and wellbeing of a nation depends upon sustainable development and for this water supply and sanitation which are ingredients of a healthy and productive life, are essential requirements. For the poor people residing in urban slums and rural areas, to achieve a better economic growth rate and higher productivity, priority has to be given to the health of these people, for which provision of public utilities like water supply and sanitation is necessary (Pathak, Rajola and Rajnish, 2002). Provision of safe and sufficient drinking water with adequate sanitation service in urban areas is an important investment which safeguards health and safety of the people living in urban areas, and protection, conservation and promotion of the environment, especially in developing countries (UNDP, 2006).

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

Unfortunately, World Bank (2012) stated that Even though significant investments have been made in the sector, the progress over the decades could not keep up with the population growth. Thus, progress in sanitation has been limited resulting in consistently lowers coverage for sanitation in comparison to water supply. According to the WHO-UNICEF (2006), 2.5 billion people are without access to improved sanitation (corresponding to a global access rate of 62%) and one billion people in rural areas still practice open defecation. In terms of drinking water, 87% of the world's population uses drinking water from improved sources as of 2006 (54% piped connection in their dwelling, plot or yard, and 33% other improved drinking water sources). This translates into 5.7 billion people worldwide who are now using drinking water from an improved source, an increase of 1.6 billion since 1990. Although a number of developing countries are on track to meet the Millennium Development Goal of 77% rate of coverage, large parts of sub-Saharan Africa and Southern Asia are not, meaning that the world as a whole is not on track to meet the MDG sanitation target (WHO-UNICEF, 2006).

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

Inaccessibility of safe water and adequate sanitation facility strengthens the cycle of disease, poverty and weakness; therefore water and sanitation programs are instrumental in efforts to rescue people from poverty. In other word, provision of water and sanitation should be indispensable parts of the Poverty Reduction Strategies applied by developing countries. In the developing world today poor access to safe water and adequate sanitation continues to be a threat to human health. Expanding access to basic water supply and sanitation, integrated with hygiene education can reduce the burden of water-related diseases significantly by improving the lives of a large part of the world's population. Since provision of sanitation breaks the vicious cycle of poverty and initiates a virtuous cycle of economic well-being, it should be a vital ingredient in the poverty alleviation programs (word bank report, 2006).

2.2.3.1. Urban water supply

Safe drinking water is the birthright of all humankind as much a birthright as clean air (Rao 2002) while access to clean water can be considered as one of the basic needs and rights of a human being. Health of people and dignified life is based on access to clean water (Korkeakoski, 2006). Alaci and Alehegn (2009) stated that, water is important in a number of ways; these include domestic and productive uses. Domestic water use takes the form of drinking, washing, cooking and sanitation, while productive water uses includes those for agriculture, Beer brewing, brick making etc. Safe drinking water matched with improved sanitation contributes to the overall wellbeing of people; it has significant bearing on infant mortality rate, longevity and productivity.

However, the majority of the world's population in both rural and urban settlements does not have access to safe drinking water. According to WHO (2006) only 16% of people in sub-Saharan Africa had access to drinking water through a household connection (an indoor tap or a tap in the yard). Not only their poor access to readily accessible drinking water, even when water is available in these small towns there are risks of contamination due to several factors like inappropriate waste disposal and lack of water supply infrastructure such as pipe line for water (Mengistu, 2008).

According to Water Utility Partnership Africa, (2003) the primary goal of all water supply utilities is to provide customers with a private connection to the piped water supply network.

For many public officials, policy makers and politicians a household or yard connection (hereafter referred to as a private connection) is considered the most satisfactory way to meet the following key objectives (WHO, 2006).

- _ Public health objectives: by ensuring better quality and access.
- _ Commercial objectives: by facilitating cost recovery and revenue generation.
- _ Social objectives: by improving access for the poorest and enhancing security and safety.
- _ Environmental objectives: by enabling better demand management and water conservation

2.2.3.2. Sources of water

According to Sijbems, (1989) and UN-HABITAT (2003), peoples in urban area obtain the water the use from three basic sources: groundwater, surface water and rainwater. Groundwater includes all water that is found underground within the rocks. Surface water means water in rivers, lakes, pools and ponds. Rainwater replenishes both groundwater and surface water, and can also be collected directly. These sources are discussed further as follow:

Groundwater: Groundwater is water used by humans comes mainly from land such as wells, springs, etc. It tends to be of higher microbiological quality (having undergone natural soil filtration). However, it is relatively difficult to extract. More technology and energy is needed (compared with other water sources) to bring water from within the earth up to the surface ([http/ www/open eduopen learn works](http://www.open.edu/open_learn/works), 2016).

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

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

However, in practice the term ‘water source’ can be used to mean both the origin of the water and also the place where people get their water (spring, piped supply to household tap, water point, well, etc.).

According to WHO/UNICEF,(2006) the categories of water sources are classified as ‘improved’ and ‘unimproved’ sources on the drinking water ladder, which describes the steps in improvement of quality of water supply depending on the type of source. Surface water is at the bottom of the ladder and piped water into the household is at the top. There are number of improved water sources of which, several of them are described in the following sections as follow:

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

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

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

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

2.2.3.3. Water accessibility

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

According to Adeyemo and Afolabi (2005), accessibility is the balance between the demand for and the supply of consumer services over a geographic space and narrowing or bridging the gap between geographic spaces is the all significance of transport.

Access to essential resources and services has come to be recognized as positively related to development such that inaccessibility or lack of access is cited as lack of development or symptom of underdevelopment (Ayeni, 1987 and Moseley, 1979 cited in Alaci, 2004). To the extents that improved access to essential services has become an accepted part of the rubrics or measure of development and standard of living (Alaci and Alehegn 2009).

According to UN-HABITAT (2003), access to safe water is the share of the population with reasonable access to an adequate amount of safe water. Safe water includes treated surface water and untreated but uncontaminated water such as from springs sanitary wells and boreholes. In urban areas the water source may be a public fountain or a stand pipe not more than 200 meters away from households. An adequate amount of water is that which is needed to satisfy metabolic, hygienic and domestic requirements usually about, 20 liters of safe water per person per day. This minimum quantity however vary depending on whether it's an urban location or rural and whether warm or hot climate. Perhaps this is why the African Water Development Report (2006) described basic human water need to be 20 to 50 liters of uncontaminated water daily. UNICEF, (2006) stated that, population using improved sources of drinking water are those with any of the following types of water supply: piped water (into dwelling yard or plot), public tap or standpipe, tube well or borehole, protected well, protected spring and rain water collection while unimproved sources are unprotected dug well ,unprotected spring ,surface water (river, dam, lake, pond, stream, canal, irrigation channel), vendor-provided water (cart with small tank or drum, tanker truck),bottled water, tanker truck provided water.

2.2.3.4. Water accessibility indicators

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

Table 1:WHO water accessibility indicator

Travel distance to collect water	WHO standard	Average time spent to collect water	WHO standard
Water supply through taps continuously	(Optimal access)	Water supplied through multiple taps Continuously	Optimal access
< 100m	Water supplied through multiple taps continuously	Within 5 minute	Intermediate Access
101-200m	Between 100 and 1000m	5-30 minutes	Basic access
201-500m			
5001-1000m	(Basic access)	30 minute-2hours	No access
1.2-2km(1.5km)	More than 1000m	2-4hours	
>2km(3km)	(No access)	>4 hours	

Source: WHO, (2004)

2.2.3.5. Affordability

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

2.2.3.6. Time and distance travel to fetch water

Time and distance traveled to fetch water are also key indicators of water accessibility. To most communities of Africa, long distance travel to fetch water is common. Hence, they spend much time and money (Chala Deyessa, 2011). According to WHO, (2004) standards if households travel more than 200 meters far away from house in urban, there is no access.

Distance travel to fetch water is also one of the indicators of water accessibility. WHO standards in relation to time, more than 30 minutes no access 5 minutes - 30 minutes basic access and within 5 minutes intermediate access

2.2.4. Urban sanitation

World Health Organization (WHO) defines sanitation as group of methods to collect human excreta and urine as well as community waste waters in a hygienic way where human and community health is not altered. The main objective of sanitation is to decrease the spreading of diseases by adequate waste water excreta and other waste treatment, proper handling of water and food and by restricting the occurrence of causes of diseases (Korkeakoski, 2006). Sanitation is a system to increase and maintain healthy life and environment. Adequate sanitation systems include both facilities and behaviors that form a hygienic environment and reduce people's exposure to disease-causing organisms (Bruijne, Geurts & Appleton, 2007), Korkeakoski, (2006) also stated that, the purpose of sanitation is assuring people enough clean water for washing and drinking. Typically, health and hygiene education is connected to sanitation in order to make people recognize where health problems originate and how to better sanitation by their own actions. Essential part of sanitation is building and maintenance education on sewerage systems, wash up and toilet facilities

A household is considered to have adequate access to sanitation if a waste disposal system, either in the form of a private toilet or a public toilet (i.e. latrines at markets, bus terminals and lorry parks, patient and staff latrines at health facilities, teacher and pupil latrines at schools) shared with a reasonable number of people, is available to household members (UN-HABITAT, 2006).

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

Mein zinger, Oldenburg and Otterpohl (2008) stated that, the majority of the existing toilets in urban areas of Ethiopia are simple pit latrines, which face a variety of problems like pit collapsing and flooding. Also the need for digging of new pits once the old one is filled is

considered a drawback of this conventional technique. The use of septic tanks is impeded by factors like the lack of dislodging facilities (e.g. vacuum trucks) and missing sludge management concepts. Centralized sewerage systems are usually not within reach of the municipalities due to the high costs for sewers and treatment facilities. For example, the sewerage system in Addis Ababa caters only for about 3% of the city's population. In addition, many Ethiopian cities face difficulties in implementing a water-based sanitation system (i.e. water-flushed toilets) as a result of water shortages and inappropriate water supply systems.

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

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

Convenience: Women in particular dislike having to walk long distances to relieve themselves. **Comfort:** People dislike the smell of excreta and public toilets in densely populated communities are generally appalling.

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

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

2.2.4.1. Available technology options for sanitation

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

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

1. Onsite sanitation

On-site sanitation is the main form of excreta disposal in most sub-Saharan African cities and will remain the most appropriate level of service for the urban poor in the medium term. Despite heavy public investment in sewerage systems in most primary and some secondary cities, typically only 10-15% of the urban population benefit from access to the sewer network. According to Water Utility Partnership (Africa, 2003; Ahmed and Nalubega, 2001 and Mara, 1996b), onsite sanitation include SanPlat[‘] latrines, ventilated improved pit (VIP) latrines, pour flush (PF) toilets, and ecological sanitation (Eco San[‘]) toilets. In these systems, wastes are stored at the point of disposal and usually undergo some degree of decomposition on site. Onsite systems either require periodic emptying or construction of new facilities once they fill up.

2. Offsite sanitation

Offsite systems are forms of sewerage where part or all of the excreta are transported away from the household for treatment or disposal at a central point. Sewerage may be conventional (typically, connected to flush toilets and household grey water, and in many cases storm water) or modified where only liquid matter is piped away (small-bore sewerage) or where sewerage works on a non-constant flow principle (shallow sewers) and does not take storm water (WHO,2010). In order to minimize environmental pollution and disease transmission it is important that the sewage is properly treated and not allowed to flow untreated into rivers or other water bodies (WRI, 1998). It is important to note that there is no single appropriate technology for all circumstances and all socio-economic segments of a community, town or city. The more costly or, apparently, convenient technologies may not provide the greatest health benefit or may be unsustainable from an economic or technological point of view (Franceys et al. 1992).

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

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

Sanitation is a challenging issue of today's world especially in poor countries where inadequate resources and awareness of community. Thus, it would be decent to launch community teaching and expanding community driven programs, encouraging local institutions such as; civil society organizations, community based organizations and private investors on the sector.

In general, to win the battle against poor sanitation in developing countries like Ethiopia, several programs has to applied otherwise sanitation is a rampant threat of health in these countries.

2.2.5. Impacts of water and sanitation inaccessibility

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

2.2.5.1. Health impacts

The improvement of water and sanitation in developing countries is largely driven by the need to reduce the incidence and prevalence of infectious disease caused by pathogenic microorganisms. The majority of pathogens that affect humans are derived from farces and transmitted by the faecal-oral route. Pathogen transmission may occur through a variety of routes including food, water, poor personal hygiene and flies (Ahmed and Nalubega, 2001).

2.2.5.2. Socio-economic impacts

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

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

for the sick and attending clinics. There are also the financial costs of treatment for medicines and clinic attendance.

2.2.5.3. Environmental impacts

Besides being pollutants of surface waters (necessitating higher treatment costs), faeces and urine are a potential (under-exploited) source of compost and fertilizer which could help address decreasing soil fertility and reduce the high cost (both financial and environmental) of chemical fertilizers. They can also be used to produce biogas (a renewable energy source) which as well as safely containing excreta could contribute to reducing deforestation which is a key environmental issue. Biogas digesters can also be fed ‘with organic solid waste in urban areas as an efficient treatment and use of waste’ (MoH, 2005).

2.2.5.4. Poor educational performance

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

2.2.6. Benefits of access to clean drinking water and sanitation

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

2.2.6.1. Convenience

Most people, when identifying improved access to water as a priority, are thinking of convenience. Everybody wants water as close as possible to their home, simply because it is more convenient. As such, convenience is as important a consideration as health benefits. In

some societies and situations, convenience is also related to the security of women: water closer to home can minimize the chances of abduction or assault (Alaci & Alehegn, 2009).

2.2.6.2. Time saved

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

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

2.2.6.3. Energy saved

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

2.2.6.4. Prevention of injuries

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

2.2.7. Challenges in urban water supply and sanitation

In the provision of adequate clean water and sanitation facilities to urban dwellers, the world faced many challenges, which are related to capacity of the nations, (i.e. technological

knowhow and institutional), inadequate finance, rapid urbanization and declining of global water resource (Girma Leta, 2018).

2.2.7.1. Lack of capacity

According to Wallace et al., (2008) capacity is a flexible concept and encompasses the public sector, academia; community based organizations and the private sectors, and ranges from the individual to institutions to society as a whole. Capacity can be described in terms of the human, technological, infrastructural, institutional and managerial resources required at all levels from the individual through to national governance. Not only does capacity have to be built within each of these levels, but it has to be institutionalized and local communities need to be empowered to use it effectively. Additionally, capacity building incorporates the followings.

1. The capacity to engage, educate and train; including community awareness building, adult training and formal education; so as to provide sufficient numbers of competent human resources to develop and apply enabling systems within the local environment.
2. The capacity to measure and understand aquatic systems through monitoring, applied research, technology development and forecasting, so that reliable data are used for analysis and decision making.
3. The capacity to develop policies and programs and to legislate, regulate and achieve compliance through effective governmental, non-governmental and private sector institutions and through efficient enforcement and community acceptance, particularly for rural areas.
4. The capacity to identify and provide appropriate and affordable water technologies, infrastructure services and products through sustained research, investment and management.

1. Technological capacity

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

2. Institutional capacity

There is a need for institutions that bring together many disciplines, such as the natural sciences, public health, engineering and the social sciences. Integration and interaction between institutions and different sectors of the population, at decision-making, executive and participative levels is required to plan and execute actions in a coordinated way. This integration is the basis for multi spectral approaches to ensure that planned goals are achieved and actions converge to solve environmental, water and health problems (Wallace et al, 2008).

2.2.7.2. Inadequate financing

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

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

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

improved service delivery must be greatly enhanced. To this end, the Camdessus Panel and others have urged that corruption, managerial capacity, sustainable cost recovery and legal and contractual aspects of safe water and sanitation management within developing countries be addressed.

2.2.7.3. Population growth and urbanization

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

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

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

2.2.8. Increasing global water scarcity

UN-HABITAT (2006) stated that, not only is the numbers of those requiring better water supplies very large, water itself is becoming scarcer. The number of people living in water stressed and water scarce over the world is estimated to increase approximately six fold from 1995 to 2025 to reach 2.8 billion.

2.3. Water supply and sanitation policy in Ethiopia

The water supply and sanitation policy began in Ethiopia in the mid of 1980s. At that time the general policy of the government was to provide water and sanitation through its own public water sector institution with the supply side approach. In this regard in order to strengthen the government owned institutions, the military government (since 1975) nationalized the private sector driller and their equipment first absorbed by Ethiopian Water Works Construction Agency (EWWCA), which was later used to set up the autonomous Water Well Drilling Agency (WWDA). The whole water sector was generally envisaged as a supplier of free services which failed to consider the scarce nature of water resource in the country. Tariff and cost recovery also could not get full attention due to the socialist economic policy implemented in the country (MoWR, 2002). In the same way the sanitation part of the Water Resource Management policy sets the general framework along which sanitation is provided with the objective of enhancing the well-being and productivity of the people through the provision of adequate and reliable sanitation services. The new sanitation strategy focuses in public sector subsidies on promotion and public facilities rather than subsidizing at the household level. This is an example of a cost conscious and well-conceived use of limited public resources in the areas where they are likely to do best.

The policy recognizes the inseparable nature of water supply and sanitation and requests the promotion of both an integrated and sustainable framework. Therefore, according to this policy, all water supply institutional setups have legal right to implement the integrated water supply and sanitation policy. In addition to these since the establishment of a Ministry for a water sector in 1995/96, a strategic and participatory approach has been introduced by bringing into place key sector reform initiatives. The National Water Resources Management Policy also requires urban centers to cover their investment, operation and maintenance costs, while rural WSS is required to cover operation and maintenance costs, with some cost sharing (up to 10 percent) for initial investment cost. The National Sanitation Strategy calls for a shift towards funding ‘sanitation promotion and leveraging resources’, and away from subsidy for hardware, and gives priority to low-cost, pro-poor solutions. Importantly, the financial requirements to achieve WSS targets are premised on the capacity to implement the approaches outlined in policy (MoWR, 2003).

2.3.1. Water sector policy and goals of Ethiopia

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

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

2.3.2. Sanitation policy and goals of Ethiopia

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

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

hygiene promotion as key interventions to prevent disease, protect the environment and enhance socio-economic development (MoH,2005).

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

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

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

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

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

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

2.3.3. Regional Water Resource Development Bureau

The Somali National Regional State through its Water Resources Development Bureau has made construction supervision consultancy agreement with Water Works Design and Supervision Enterprise (WWDSE) to start the construction activities of the Jijiga town water supply system which was designed by WWDSE in the year 2001. The system was designed to serve for a design period of 20 years that ranges from 2004 to 2024. However, the construction activity of the system was not implemented as per the timetable scheduled in the previous design made by WWDSE (*Water Works Design and Supervision Enterprise, November 18, 2008*).

Thus, before the commencement of the construction activities, it is determined to make design review in order to account the observed change in population size, urban development pattern, the change in design horizon and check the overall adequacy of the system with respect to the new projected future water demand of the town (ibid).

Consequently, the Somali Water Resources Development Bureau has made design review consultancy agreement with Water Works Design and Supervision Enterprise to carry out the

necessary design review work and prepare the necessary documents that will be used for the commencement of the construction activities of the project (ibid).

Field visit was made to the project area in order to assess the current existing situation of the town, to identify the future potential development directions of the town, to assess alternative reservoir sites in view of future development and pressure requirement and to make discussion with the relevant governmental bodies in order to share their view and account it in the design review work. All the available data and documents have been collected from the relevant institutions and are reviewed (ibid).

In this design review, two new phases have been proposed. Phase I covers the period from 2010 to 2020 and phase II covers from 2020 to 2030. The population size will be determined and the average, maximum and peak hour water demand will be estimated. *With* the revised water demand, the phased capacities of various components of the system that includes, the quantity of water required from the sources, the capacity of the distribution network and the size of the reservoirs will be determined. The distribution network will be designed for the peak hour demand of phase II i.e. year 2030. All the pipe lines are aligned to follow the road networks as per the development master plan of the town (ibid).

In addition, Jigjiga City Water Supply and Sewerage Service Enterprise is the organization responsible for the provision of water supply in Jigjiga City. Following the reestablishment of City water services as independent entities supervised by City water boards, as per proclamation No 61/1999 of the Regional Government, at present, the Jigjiga water service is organized as an autonomous public organization under the City Administration. The present organizational chart of the water service was studied and implemented in 2005 (*Somali Regional State Water Resources Development Bureau*).

The City Water Board is the higher echelon mainly responsible for policy formulations and strategic management including budget approvals of the Jigjiga water service. The top executive is the head of the water service of Jigjiga with Operation and Maintenance and Administration, Finance and Customer services being directly responsible to him. The major responsibilities of the water service head lie in the planning, organizing, directing, coordinating, staffing, & controlling all the activities of the water service in line with the policy guidelines of the City water board (ibid).

Water is a vital resource for survival improving access to save water supply plays a crucial role towards economic developments there by reducing poverty. Today one of the world

greatest concerns is lack of fresh water for drinking and cooking in terms of water resources (ibid).

Finally, Somali region being the most water scarce area, low annual rainfall and high evaporation coupled with geology largely dominated by gypsum, uneven spatial and temporal distribution occurrences and other aquifer formations and poor sanitation in particular Jigjiga City is the most populous in the region (ibid). Due to that, this study was designed to investigate Local Government Service Delivery on Water Supply and Sanitation in Jigjiga City Administration.

2.4. Empirical review

Although there has been substantial progress in increasing access to safe drinking water and basic sanitation services worldwide and in Ethiopia, ensuring access to safe drinking water and basic sanitation remains a challenge (World Bank Group, 2017; World Health Organization & UNICEF, 2017).

Even though Access to safe water and sanitation is crucial to support Ethiopia's ambitious development agenda, Evidence showed that inadequate water and sanitation are associated with considerable economic costs as well as increased risk of diarrheal diseases (Muluken Azage, et al. 2020).

According to Muluken Azage et al., (2020) this lower access for improved drinking water source and sanitation for Ethiopia could be due to population growth and low socio-economic status of the country compared with other countries in the world.

According to Abebe Beyene, (2015) the 2014 sanitation coverage status in Addis Ababa and Ethiopia along the sanitation ladder and Only 11.4% of Addis Ababa's population in the urban slums and 41.2% of the city's total population had access to improved sanitation. Most people in the urban slums (80.4%) used unimproved sanitation facilities and 8.2% practiced open defecation. Better sanitation and toilet coverage in the urban area of Addis Ababa than in the Addis Ababa slums.

According to the 2014 WHO/UNICEF (2010) report, 73% of Ethiopia's urban and 77% of its rural population used unimproved sanitation facilities, with 8% in urban and 43% in rural communities practicing open defecation.

The Ethiopian Demographic Health Survey (DHS) data in 2014 estimated that 82.5% of the urban and 97.5% of the rural population had no access to improved sanitation and that 8.7% of urban and 37.5% of the rural population practiced open defecation. The use of shared latrines was less common in rural than in urban areas.

According to the trend analysis by Hopewell and Graham, (2014) in 31 major Sub-Saharan Africa cities, nearly half of them, including Addis Ababa, did not make progress in reducing open defecation from 2000 to 2012. The slow progress in increasing access to improved sanitation in Ethiopia and other developing countries can also be attributed to the lack of contextualized strategies, policies, and actions (Mara D. 2012, Cairncross S. 2010); weak sectorial coordination and low national budget allocation (Kumie A & Ali A, 2005).

Several researchers like Isunju JB et al. (2011); Kwiringira J, (2014); and Konteh FH, (2009) reported that lack of access to improved sanitation forces the urban poor to use unhygienic pit latrines or polythene bags and/or discharge into nearby open storm drains and natural watercourses, creating severe environmental contamination and disease-related hazards.

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

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

Systematic review and meta-analysis and other studies revealed that people living far away from their improved water source has significant increase in illness risk in developing countries, like diarrheal diseases (Nygren et al., 2016; Pickering & Davis, 2012; Wang &

Hunter, 2010), musculoskeletal disorders among women and children (Geere et al.,2018), perinatal and mental health problems, and violence against vulnerable people (Geere et al.,2018).

2.5. What factors affect the better service delivery?

The minimization of disadvantages of decentralized service delivery depends on a number of variables. Akpan H. Ekpo, (2008) has identified following as key variables affecting the better service delivery of lower levels of government:

1. **Appropriate Constitutional and Legal Framework** - Powers and functions of lower levels of government must be clearly defined through an appropriate constitutional and legal framework. Through this process central government must be willing to give up control and recognize the importance of sub-national government in service delivery (Ekpo, 2008).
2. **Sufficient and Competence Human Resources** - A one of the major decisive variable of efficiency and effectiveness of services provided by sub-national governments is the human resource or staff which it has. In this way, sufficiency and competency of that staff is very important. Where shortages of qualified and experienced persons exist, the training, retraining and opportunities for higher education must be given in order to develop professional and technical expertise that would be help to enhance the efficiency and effectiveness of the service delivery at the sub-national levels (Ekpo, 2008).
3. **Adequate Financial Resources** - Lower levels of government must have legal authority to raising needy revenue to support its expenditure requirements. Thus, the fiscal relationship between the center and lower - levels of government must be clearly worked out on the basis of equality, fairness and justice (Ekpo, 2008).
4. **Accountability and Transparency** - Decentralization must be accompanied by accountability and transparency, so that is no abuse of power. This will help to fight against the corruption. Corruption implies a breakdown of cooperative behavior in which few collude to detriment of all. Thus, devolving functions to smaller units that are closer to the population should in theory increase consensus and legitimacy concerning the choice of public services. This, in turn, can be expected to foster cooperation, vigilance, as well as acceptance of and adherence to rules of public sector integrity (Rule-obedience). This could be effective where the financing of the public services decentralized through the assignment of tax instruments or the collection of user fees (Ekpo, 2008).

5. **Ensure the Easy Access to Community for Information and Services** - A one of the important problems faced by the developing countries' public sector, is that policy-makers as well as ordinary people have limited access to information and services. Implementation of strategies like Citizen Charter, e-Government will be helpful to overcome these problems and ensure the easy access for public to information and services, and end result of that is the enhancement of efficiency and effectiveness of services (Ekpo, 2008).

6. **Mutual Understand between Central and Lower level of Governments** - It is important that both central and lower level of governments engage in dialogue to reduce tension and conflict. In additionally, dialogue is necessary to face the new challenges and ensure coordination and to guarantee macro-economic satiability of the country (Ekpo, 2008).

2.6. Conceptual Framework

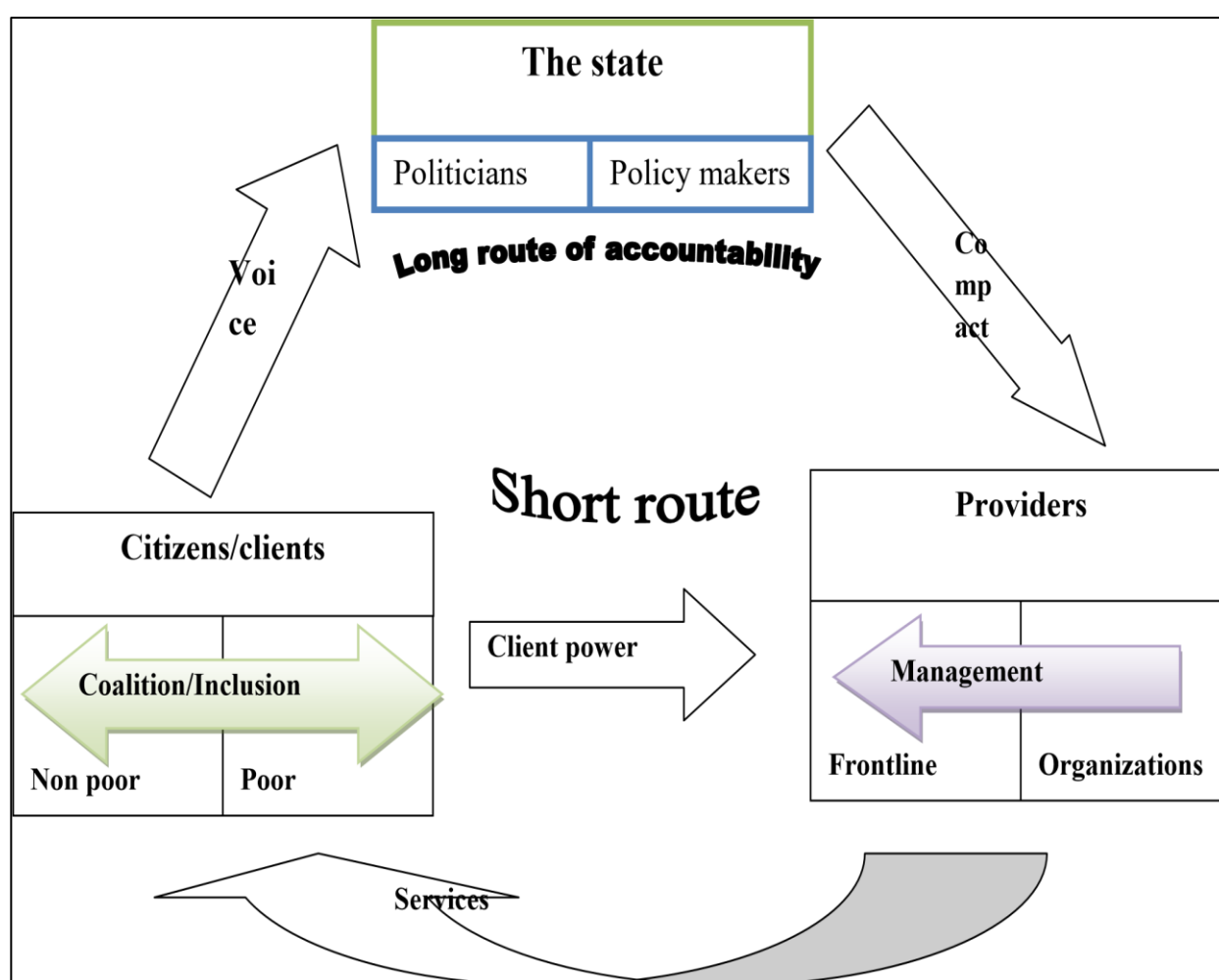


Figure 1; conceptual Framework Source: - adapted from Girma Leta (2018)

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

Research methodology is one of the most important aspects of any scientific research (Mbachu, 2005). This chapter dealt with the research methodology that was used in gathering data for the study. It contained the research design, population, sample size and sampling techniques, sources of data, data gathering instruments and data collection procedures and data analysis.

3.2. Description of the Study Area

Jigjiga is the capital city of Somali Regional State found in Jigjiga Zone and Jigjiga Woreda which is located 630 kms south east of Addis Ababa and 103 kms approximately east from the National Regional State city of Harari which is Harar and 47 kms to the south west of commercial town Togwajale (Official Jigjiga City Profile, 2015).

Jigjig city is located at the foot Karamara mountain chain. It is the start of a vast plain continuing to the east for a thousand kms to the borders of the country. The altitude of the city ranges between 1720 m around Duda-hidi to 1620 m around Jigjiga Health Science College. It is a fast growing town in the area along with Harar and Dire-Dawa having economic integration with them (Official Jigjiga City Profile, 2015).

Based on figures from the Central Statistical Agency in 2015, Jigjiga has an estimated total population of 250,000 of whom 123,422 are men and 126,578 are women.

Currently the settlement area of the City is divided into 20 Kebeles i.e. the former ten and ten newly added. It has a flat terrain with a gentle slope bordered by a range of mountains running from west to east not far from the city at the northern side. The soil in the city and its environs is sandy and permeable which allows rainwater to seep to the ground easily making ground water source access feasible (Water Works Design and Supervision Enterprise, 2018).

Currently existing 41 boreholes within and around the city with a depth ranging from 20-90 m and yield ranging from 1.75-10 l/s are evidences for it. Some of these boreholes are not functional. However, since the soil is very permeable the wells are susceptible for

contamination from the latrines. The city has a city administration status. As the city is located not far from outlets to sea ports of neighboring countries, trade of various consumable and non-consumable items is the main economic activity of the city serving as the main income source for the city and its dwellers. Moreover, there are several service provision businesses such as hotels, restaurants, cafeterias, garages, and internet shops etc. which render services to the city dwellers and to significant number of visitors as it is the regional capital (Water Supply and Sewerage Authority Enterprise, 2019).

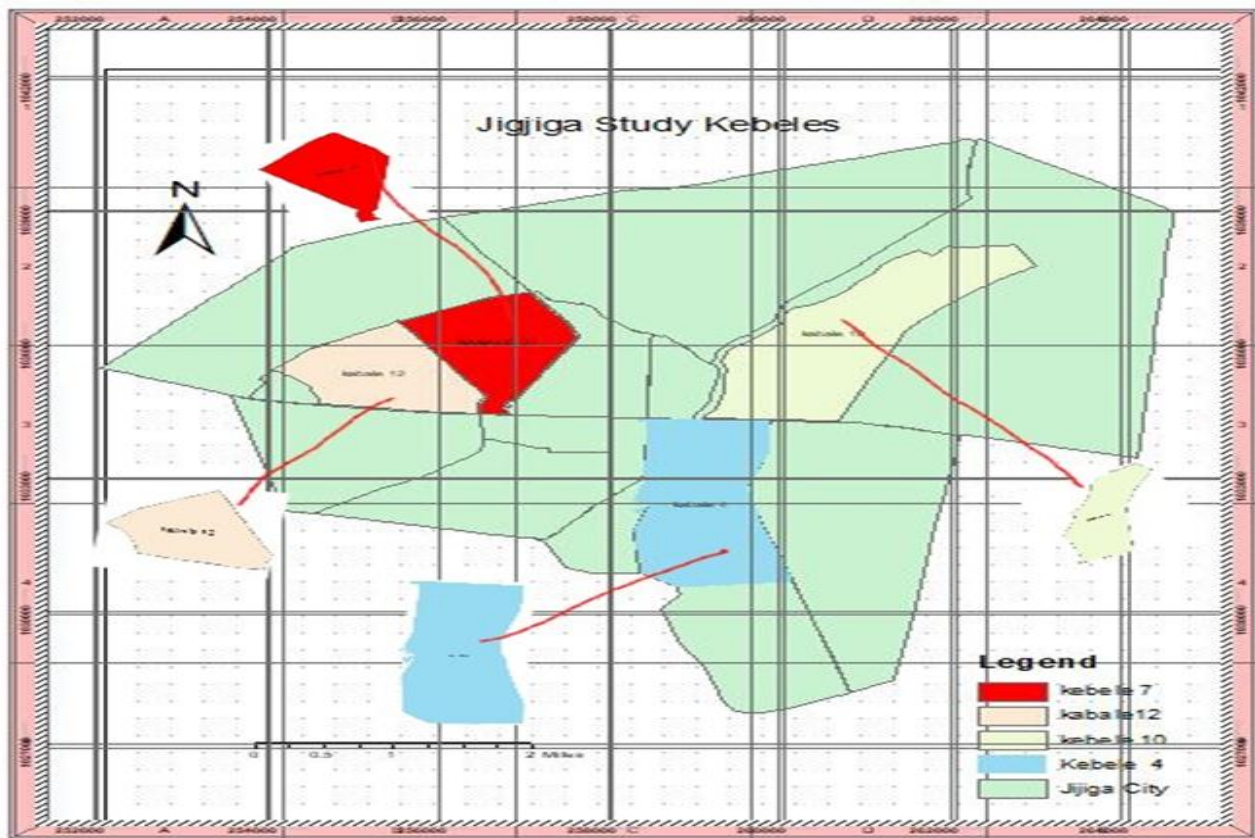
In addition, Jigjiga City Water Supply and Sewerage Service is the organization responsible for the provision of water supply in Jigjiga City. Following the reestablishment of City water services as independent entities supervised by City water boards, as per proclamation No61/1999 of the Regional Government, at present, the Jigjiga water service is organized as an autonomous public organization under the City Administration. The present organizational chart of the water service was studied and implemented in 2005 (Water Works Design and Supervision Enterprise, 2018).

The City Water Board is the higher echelon mainly responsible for policy formulations and strategic management including budget approvals of the Jigjiga water service. The top executive is the head of the water service of Jigjiga with Operation and Maintenance and Administration, Finance and Customer services being directly responsible to him. The major responsibilities of the water service head lie in the planning, organizing, directing, coordinating, staffing, & controlling all the activities of the water service in line with the policy guidelines of the City water board (ibid).

Water is a vital resource for survival improving access to safe water supply plays a crucial role towards economic developments thereby reducing poverty. Today one of the world's greatest concerns is lack of fresh water for drinking and cooking in terms of water resources (ABAY Engineering P.L.C. 2012)

The selection of Jigjiga city as a study area is due to the researcher's personal experience of severe drinking water scarcity and poor sanitation was the prevailing problem of the city. In addition, the rapid industrialization, urbanization and high population growth of the city which leads to complexity to provide better service. Since the City is the most populous in the region, providing better services for the urbanized community by the local government officials is challenging. Those complex and challenging service provision situations need to be addressed, before the problem increases and the condition becomes downhill. Due to

that, this study was investigated the Local Government Service Delivery of Drinking Water Supply and Sanitation In Case of Jigjiga City Administration, Eastern Ethiopia.



Map of the Selected Kebeles, Source; Jigjiga’s Water Supply and Sewerage Authority

3.3. Research Design

The research design used was descriptive research design. The descriptive design refers to a set of methods and procedures that describe variables (Kothari, 2008). This research design involved gathering data that describes events. According to (Mugenda and Mugenda, 2003), descriptive design is a process of collecting data in order to test hypothesis or to answer the questions of the current status of the subject under study. It was described the general characteristic of the study population. In order to assess the Local Government Service Delivery in the case of Drinking Water Supply and Sanitation in Jigjiga City, The researcher aimed at collecting information from respondents on challenges they encountered while delivering services of water supply and sanitation.

3.4. Sampling Design:

3.4.1. Target Population

The target population for this study was the households of Jig-jiga City Administration. According to CSA (2015) projected population of Jig-jiga City, the population and housing estimation results of Jig-Jiga City was about 250, 0000 of whom 123,422 are men and 126,578 are women. The numbers of households who live in 20 kebeles of the city were 35,818. Due to difficulties to conduct census study for whole population who live in 20 kebeles of the city, the researcher was taken as a target population for those households who live in Kebeles 04, 07, 10 and 12 because these four kebele have a severe problem of access to drinking water as compared to other remaining kebeles in the city. There is less equity of access clean water and sanitation in Jigjiga's twenty Kebeles (20 kebeles). Kebeles 04, 07, 10 and 12 have no improved access to safe water supplies and sanitations in comparison to other Kebeles. According to a report on Hygiene Activity in Jigjiga's Kebels, 2019, most water supplies, latrine constructions and sewer connections mostly benefit households that are central Kebeles of the city and economically wealthy people. Thus the target population of the study was households who live in above four kebele which consist a total of 9,212 households.

3.5. Sampling methods and Sample Size

3.5.1. Sampling methods

To get representative samples from the target population, the researcher employed both probability and non- probability sampling methods in the sampling and selection process. The researcher employed proportional stratified sampling so as to obtain a representative sample for questionnaire purpose from each stratum, convenient sampling methods were used to pick up the sample respondents from the target population and purposive sampling to select key informants. According to Kothari (2004) stratified sampling is best method for heterogeneous population so as to obtain representative sample from each group of given population.

The existing number of households in four purposively selected kebeles (04, 07, 10 and 12) were 9,212 and the required respondents for questionnaire from varieties of different kebeles was determined through proportional sampling method under which the sizes of the samples

from each stratum was kept proportional to the sizes of the strata, Next to this, the sample respondents of each stratum were picked up conveniently which were available at Water Supply and sewerage authority in Jigjiga City Administration.

The general manager of Water Supply and sewerage authority, experts at sanitation and beatification agency in City Administration and Kebele officials were selected purposively for the interview. According to Kothari (2004, p. 15), purposive sampling method is desirable because this method is used to meet the right and concerned body on the stated problem from the study population.

3.5.2. Sample Size

The researcher has drawn a sample from a population who live in the four purposively selected kebeles (04, 07, 10 and 12) in Jigjiga City Administration who were 9,212 household. From the total number of household in the above silted kebeles, the sampled respondents were selected by using a simplified formula provided by Yamane (1967) to determine the required sample size at 95% confidence level, degree of variability= 0.05 and level of precision =5%. Such determination will be made to reconcile manageability with representativeness. First the researcher was tried to apply the formula by taking into consideration the number of households who live in the above four mentioned kebeles(04, 07, 10 and 12) who are 9,212 households in order to select the sample size from universe population and the result that researcher got was scarified in to four strata based on proportional sampling. In this case each kebele taken as a stratum.

$$n = \frac{N}{1 + N(e)^2}$$

Where n = the desired sample size

N = Population size (equal to 9212)

$$e = \text{the level of precision (equal to 5\% or 0.05). } n = \frac{9212}{1+9212(0.05)^2} = 383$$

Adopting proportional allocation, the researcher got the sample sizes as under for the different strata. Thus, assuming that n_1 is strata of Kebele 04, n_2 is strata of Kebele 07, n_3 was strata of Kebele 10 and n_4 was the strata for Kebele 12. Then the sample size of stratum is as follow;

$$n_i = \frac{p_i \times n}{N}$$

Where; n_i = the strata sample size

P_i = total population of the strata

N = the total population of the study area

For strata with $n_1 = p_1 \times n / N = 2110 \times 383 / 9212 = 88$

For strata with $n_2 = p_2 \times n / N = 4105 \times 383 / 9212 = 170$

For strata with $n_3 = p_3 \times n / N = 1562 \times 383 / 9212 = 65$

For strata with $n_4 = p_4 \times n / N = 1435 \times 383 / 9212 = 60$

Therefore, the formula was used to allocate proportional sample from each strata as:

Sample1 = 88, from Kebele 04

Sample2 = 170, from Kebele 07

Sample3 = 65, from Kebele 10

Sample4 = 60 from Kebele 12

Table 2: Details sample size of the respondents of the four kebeles

N₀	Kebeles	Number of HHs	Sampled Respondents
1	Kebele 04	2110	88
2	Kebele 07	4105	170
3	Kebele 10	1562	65
4	Kebele 12	1435	60
	Sum	9212	383

Computed by the researcher (2020)

3.6. Sources of Data and Instruments of Data Collection

To obtain necessary data for the study, the researcher was used both primary and secondary sources of data.

I. Primary sources of data

A primary data source is the most important because it is collected afresh and for the first time as well as its advantage is its relevance to the user. To address this particular research

questions, the researcher was used primary source of data that was collected directly through Questionnaire (open- ended and close ended), Interviews and observation.

1. Questionnaires

Questionnaires are very cost effective and are familiar to most people; respondents are free from the influence of the researcher and etc.

A Questionnaire (which has both open ended and closed ended questions) was used to collect primary data related to the demographic, socio-economic characteristics of the respondents, water supply and sanitation status such as access and quality, accountability and responsibility of service delivery system, general perception of customers towards the service, level of consumer satisfaction for the service provided, technical and institutional issues would be collected.

2. Interview

Key informant interview (which has unstructured questions) was conducted with people from different offices with different responsibility, knowledge and experience about the city's water and sanitation coverage, the balance between demand and supply of water and sanitation in the city, major challenge faced in the provision of these services, level of community awareness and participation in the provision of these services. On the basis of this selection key informant was taken from each institution such as Officials from Water Supply and Sewerage Service Enterprise, Urban Water Supply and Sanitation Coordination Office, and Mayor Office which would be purposely selected. Prior to the selection a very close consultation was undertaken with Mayor Office of the Jigjiga City Administration regarding the number and which individual would be taken for the study to complete the interview.

3. Observation

In addition to questionnaire and interview, the researcher also used an observation which is the process of gathering first-hand information by observing people and places at a research site. Observations were carried out during household field visits to enhance the data collected from the other methods. Observations during interview while filling questionnaire were carried out to assess the household's conditions. Using checklists, the field visit was accompanied by photographing and informal conversation with people. Therefore, the study sites' housing conditions, and service facilities/ infrastructures such as health, education, water, and sanitation facilities, as well as latrines developed by Jigjiga City Administration in

particular Water Supply and Sewerage Authority were included during the observation. observes how they fetch water and exercise sanitation and asking clarification on their actions.

II. Secondary sources of data

Secondary data is also very important. Therefore, the researcher will use different published and unpublished documents such as research findings, annual plan and reports, journals, books, magazines, articles, websites, policy documents, different work manuals and other relevant documents to the research, recorded documents, various literatures related to the topic and Internet as secondary data source.

3.6. Method of Data Analysis

The study was used descriptive method of data analysis. Both primary and secondary sources of data were analyzed using qualitative and quantitative methods. The statistical package for social sciences (SPSS) version 22 was applied for processing and analyzing the data obtained from questionnaires. Descriptive statistics like frequencies, percentage and figure were used to facilitate meaningful analysis and interpretation of the research findings.

All the recorded data and field notes through key informant interview, open ended questions including the non-verbal communication were transcribed to English language and narratively analyzed.

3.7. Ethical Consideration of the Study

In conducting the study, the researcher was considered ethical approaches:

- ✦ The researcher ensured that there would not be exploitation for personal gain of research population.
- ✦ All the study participants would be informed about the purpose of the study and verbal consent of all study subjects would be obtained before data collection.
- ✦ Participants also would be informed that they have full right to discontinue or refuse to participate in the study.
- ✦ The researcher was not influence over respondents and others to enforce them to participate in the research.

- ✦ The study was considered cultural, religious, gender and other significant differences into account within the research population.
- ✦ The researcher used the data only for the intended purpose that would be for the academic purpose.

To sum up, this chapter deal with the overall research design of the study that gives clear path about what kind of data are required and from whom, how to gather those data, and how to analyze and present those data was put orderly.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1. Introduction

This chapter concerned with data presentation, analysis and discussion of the results. The analysis was based on data gathered from the questionnaires administered as well as interview and observation. The collected data were edited in order to identify omissions and to correct errors where necessary. The questionnaires were coded, after which the variables were given sequential numbers and were categorized such that, items and responses measuring the same concept were grouped together. Frequency counts of each category was done and presented in tabular forms where necessary to show frequency and percentage distributions of the trend of responses through the use of Statistical Package for Social Sciences (SPSS version 22). An interview was administered to 6 senior management personnel and households of the selected villages; 380 respondents completed and returned the questionnaires yielding a 97.5% response rate but 3 questionnaires were not returned due to different reasons. An observation is part of this chapter which was discussed and depicted with evidential pictures.

4.2. Demographic Information

This section of the study presents the results and discussion on demographic findings. Since research comprised more of qualitative or descriptive element, the researcher made use of categorization of data collected under suitable headings in tabular to show flow of information. The demographic characteristics of the respondents include age distribution, gender distribution, and level of education, marital status, and number of years of working experience.

Table 3: profile of study participants (n= 380)

Demographic Variables	Category	Frequency	Valid Percentage (%)
Gender	Male	218	57.4
	Female	162	42.6
	Total	380	100
Age	25-34	101	26.6
	35-44	189	49.7
	45-54	70	18.4
	55 and above	20	6.5
	Total	380	100
Marital status of the respondents	Single	108	28.4
	Married	232	61.1
	Divorced	21	5.5
	Widowed	19	5.0
	Total	380	100
Educational status of the respondents	No formal education	152	40.0
	Certificate	162	42.6
	Diploma	32	8.4
	Degree	29	7.7
	Masters	5	1.3
	Total	380	100

Source: survey data, 2020

As shown in table 4.1, item 1, and majority of the respondents 218 (64%) are represented by male and the rest 162(36%) are female.

Regarding their age, item 2 indicated almost half of the respondents were in the age range of 35-44 189 (49.7%) followed by respondents who are in the age range of 25-34 (26.6%), and 45-54 (18.4%) respectively and also above 55 were (6.5%). The majority of the participants 232(61.1%) of the respondents are married, 42(39.6%) are singles while, 21 (4.8%) of the respondents are divorced and 19(5%) of the respondents are widowed. The most common educational status attained by the respondents which consist of majority of employees is Certificate 162 (42.6%) of the respondents followed by 152 (40.0%) informal education. Also

8.4 percent and 7.7 were diploma and degree holders respectively. Above 1.3% have masters 'degree or above. This may indicate that as educational status increase people may shift to safe water supply and sanitation area.

Table 4: Housing Condition

Category	Frequency	Valid Percent
House ownership Status		
Owner occupied	149	39.2
Rented from kebele	1	.3
Rented from private HH	230	60.5
Total	380	100.0
The construction materials of the houses		
Wood and mud	110	28.9
Cement blocks	252	66.3
Wood and thatch	18	4.7
Total	380	100.0
Size of the House		
One room	94	24.7
Two rooms	142	37.4
Three rooms	144	37.9
Total	380	100.0
Quality of the house		
Very good	20	5.3
Good	153	40.3
Very poor	44	11.6
Poor	163	42.9
Total	380	100.0

Source: Survey data, 2020

The housing condition of the respondent households indicated that 149 (39.2%) have their own house, the majority 230(60.5%) are rental and 1(.3%) are rental from kebele. This implies that the majority of the respondents are new comers for the city. That means the residents of the city has doubled in the last 10 years. This phenomenon aggrandizes the population of the city in a fast track. This study supports on the reports 2007 to 2017; population of Jijiga has increased by 35% (Situation Assessment Report of Jijiga City on Urban Wastewater Development Plan).

According to table 4, majority of the respondents 252 (66.3%) reported that their houses are made of cement blocks followed by 110 (28.9%) which are constructed from wood and mud materials and 18 (4.7%) consists of wood and thatch materials. This implies that the majority of the construction materials are cement blocks.

The above tables 4.4 had shown that the majority 144 (37.9) of the respondents have three rooms and 142 (37.4) of the respondents live in two rooms whereas, 94(24.7%) of the respondents reside in one room. This implies that the majority of the respondents have three and two rooms respectively.

Regarding the quality of the houses 163 (42.9%) of the respondents are replied poor and 153(40.3%) responded good. The rest of 44(11.6%) and 20(5.3%) of the respondents replied very poor and very good respectively. This means, that the quality of houses is poor and the majority of the respondents live less quality houses.

Table 5: Employment and Income Status of Sampled Households;

Category	Frequency	Valid Percent
Employment status of the head of Household head		
Employed	163	42.9
Unemployed	175	46.1
Retired	42	11.1
Total	380	100.0
Employment type		
Civil servant	43	11.3
Private employee	122	32.1
Daily labor	215	56.6
Total	380	100.0
Total income of the head of the household		
2000-3000/month	175	46.1
3000-5000/month	146	38.4
6000-7000month	59	15.5
Total	380	100.0
2000-3000/month	175	46.1
3000-5000/month	146	38.4
6000-7000month	59	15.5
Total	380	100.0

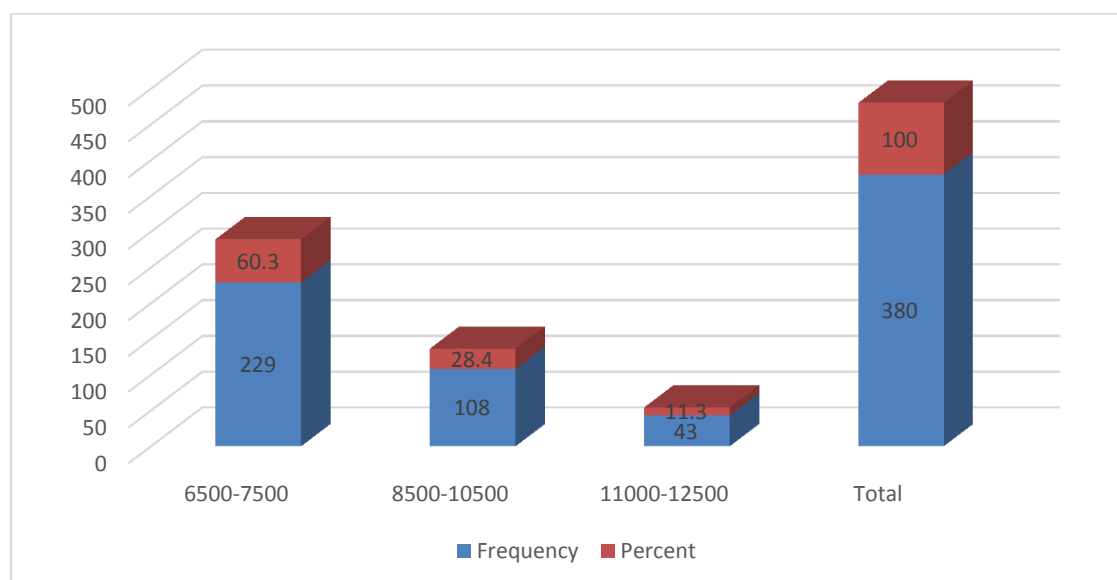
Source: Survey data, 2020

Regarding the employment condition of respondents, 175(46.1%) is unemployment followed by employed number of 163(42.9%) and 11.1% of the respondents are Retired.

Regarding the working condition of respondents, half of them (56.6%) are daily labor followed by private employee (32.1%), Civil servant (11.3%). This means the majority of the households are daily laborers and private employees.

With respect to monthly head of the household income, 175(46.1%) of the respondents said that their head of the household income is between 2000-3000 birr and 146(38.4%) of the respondents replied that their total income is between 3000-5000 birr. And 15.5% of the Respondents have the total income between 6000-7000 birr. Implies that majority of the total incomes of the head of the households have the monthly income between 2000-3000 birr and birr and 3000-5000 birr respectively.

Figure 2: Total Household Income (Birr)



Source: Survey data, 2020

According to monthly total household income, 229 (60.3%) of the respondents said that their total household income is between 6500-7500 and 108 (28.4%) of the respondents replied that their total household income is between 8500-10500birr. And 11.3% of the Respondents have the total household income between 11000-12500 birr. This implies that, the majority of the total household incomes have the monthly income between 6500-7500 birr and birr and 8500-10500 birr respectively.

Table 6: water supply (n= 380)

		Frequency	Percent
What is your source of water?	Private tap	103	27.1
	public tap	77	20.3
	Boreholes	200	52.6
	total	380	100
Is there a water supply interruption in Your Kebele?	Yes	316	83.2
	No	64	16.8
	total	380	100
Degree of difficulty to get water from the source	Very difficult	166	43.7
	Difficult	134	35.3
	Medium	80	21.1
	Total	380	100
For how many hours do you get water supply service delivery per day?	Less than one hours	183	48.2
	2-5 hours	118	31.1
	6-15 hours	56	14.7
	16-20 hours	23	6.0
	Total	380	100

Source: survey data, (2020)

Regarding the source of water, more than half (52.6%) of the respondents indicated that they receive the water from Boreholes. 27% and 20.3% of the respondents get water from private tap and public tap.

In respect to the water supply interruptions, 83.2% of the respondents replied that there is water supply interruptions in their kebele and 16.8%, replied no water supply interruptions in their respective kebele.

Respondents were also asked the degree of difficulty to get water from the source. The majority of the respondents 43.7% responded as very difficult and 35.3% of the respondents' responded difficult while, the rest 21.1% of the respondents said that it is moderate. Therefore, the study revealed that there was difficult to get water sources.

The majority of the sample households 183 (48.2%) replied that the water supply service delivery per day is less than one hour, and 118(31.1%) of them said that it is up to 2-5 hours while the 56(14.7%) were responded they get water service delivery per day 6-15 hours and the remaining 23(6%) replied up to 16-20 hours per day.

The service deficiencies primarily affect the poorest segments of the population in developing countries. This survey result showed that out of the total respondents, about 52.2% are dissatisfied with the current service. To support the above table of water supply, a report on water supply and sanitation, 2018, indicated that, Jigjiga city is one of the most populous cities in the country and one of the lacking safe drinking water and sanitation. Thus, the estimated water supply coverage of the city was about 50%. Reportedly the problems associated with the water supply of the city include water scarcity, poor water quality, high water loss through leakage and lack of skilled man-power. Urbanization has become one of the major development activities in Ethiopia. Accordingly, many regional cities and towns have been created with an increasing number of investment activities and population growth. These trends have demanded basic facilities like provision of adequate, safe and sufficient water supply and sanitation services for the sustainable development of the cities and towns. These basic social services are believed to be one of the major contributors for poverty reduction and socio-economic development of the country.

On the other hand, observation revealed that, this implies households who live in the four purposively selected Kebeles face many problems. Because they pay high cost for water consumption and their water consumption level is low due to water scarcity. In many cases the long waiting of donkey cars in water from water points, shown in the below figures reflect the inefficiency management of the water supply system because of delaying water point's starting time. Any reduction in water point's losses to start the correct time and water shortage requires coherent action to address not only technical and operational issues but also institutional, planning, financial and administrative issues.

Figure 3: Donkey cars of Jigjiga city used for fetching water



Source- Field Observation, (2020)

The Gidib dam is the main water source of Jigjiga city. But the city do not benefited from the dam. The pictures presented under figure 3, show that residents are fetching and traveling water from Shabeley, Qordhere water points and pools asides of the city. The water is not safe and clean. The towns 'residences use donkey carts and yellow plastic jars Jerikans to fetch water from long distances and some organizations and hotels also use Lorries to meet their water demand from public taps.

Figure 4: Residents fetching water from main pipeline and unsafe area



Source: survey data, (2020)

As depicted in figure 4, respondents are fetching water from public water Tap(bono). Furthermore, the pictures show that a large number of yellow jerks are waiting their turn.

Figure 5: showing ways of solid waste disposal



Source: survey data, (2020)

The above figure shows that liquid waste is coming from bathing, laundry, water point's wasting water, washings and cooking which are disposed in open drainage and on the surface of the roads instead of proper sewer. Moreover, all of the inner selected kebeles and slums have seen similar characteristics in Jigjiga.

Table 7: accountability and responsibility

Items	Response	Frequency	Percentage (%)
How do you evaluate the way of information distribution about the problems, cost and quality of drinking water supply and sanitation services?	Very poor	158	41.6
	Poor	132	34.7
	Moderate	90	23.7
	Total	380	100
Responsiveness of the water supply agencies to customers' demand	Very low	130	34.5
	Low	185	48.7
	Moderate	65	17.1
	Total	380	100
Availability and functionality of complaint handling and voicing mechanisms	Moderate	149	39.2
	Low	231	60.08
	Very low		
	Total	380	100
Availability of Information to clients	Not at all	142	37.4
	Available but not enough	195	58
	Available and adequate	43	11.3
	Total	380	100
What are the other disparities affected while accessing these services?	Favoritism and Nepotism	148	38.9
	Inappropriate influence on customers	155	40.8
	Improper Gifts and Gestures	77	20.3
	Total	380	100

Source: survey data, (2020)

Respondents were asked how to evaluate the way of information distribution about the problems, cost and quality of drinking water supply and sanitation services. 158 (41.6%) of them rated it as very poor responded and the rest part of the respondents were answered d poor and moderate 34.7% and 23.7% respectively.

Responsiveness in the context of this study is refers to the degree to which water service providing agencies take actions to solve the problems of the clients and to satisfy their demand. Respondents were asked the Responsiveness of the water supply agencies to customers' demand. The majority of the respondents 48.7% responded as Low responsiveness of the customer service and 34.5% of the respondents' responded Very low, while, the rest 17.1% of the respondents said that it is Moderate. Therefore, the study result depicted that there was low customer service responsiveness of the water supply and sewerage authority in Jijiga city administration.

With respect of availability and functionality of complaint handling and voicing mechanisms, the majority of the sample households 231 (60.08%) replied that the availability and functionality of complaint handling and voicing mechanisms is low and the rest of 39.2% replied moderate.

Based on the above table, the respondents were asked again the availability of information to clients. 58% and 37.4% of the respondents replied available but not enough and not at all respectively. And the remaining of 11.3% of the respondents responded available and adequate.

Based on the above table, the respondents were asked the other disparities affected while accessing the services. Only 20.3% of the respondents said Improper Gifts and Gestures whereas, 40.8% and 38.9% of the respondents replied inappropriate influence on customer's favoritism and Nepotism.

According to researcher point of view, in most case in Somali region, nepotism, tribalism and political interference happens when those in higher management positions influence the service giving institutions. Top management takes advantage of their positions to secure jobs to favor friends and relatives.

The service deficiencies primarily affect the poorest segments of the population in developing countries. This survey result showed that out of the total respondents, about 58.4% are dissatisfied with the current service due to frequent interruption and unfair distribution of water whereas the rest reported that they are satisfied with the services. The interruption is attributed to malfunction of submersible pumps and power supply interruption.

While expanding improved water source schemes is generally essential, it is equally important to ensure that the schemes have increased users 'satisfaction with water quality and availability for everyday use (UNICEF, 2010). The majority of the sample households replied that the water distribution is unfair and variable. As reported by respondents, some area may be served water frequently while other areas stay without water service at all. Consequently, the town water supply service enterprise should devise a mechanism so as to minimize the inequitable distribution of water among the residents of the town.

On the other hand, the researcher observed the schedule of water delivery which significantly affects availability of water particularly for the public tap users; most of the time it starts from 8:00 am to 11:00 am in Kebeles 04, 07, 10, 12 and its neighborhoods and stays for two hours in average. But actually water release is always 9; 30-10; 00am. Thus, these timings do not work sometimes as the tap attendants often delay opening the taps, particularly during the rainy season or due to personal reasons. This indicates that households are not able to use water whenever they need but whenever it is released from the source. Also this reveals lacking of accountability and responsibility. The following pictures depicted the truth;

Figure 6: Jerrys waiting water point's absence and donkey cars



Own observation, 2020

Finally, In Jijiga city there are significant numbers of poorly designed and maintained pit latrines and mishandling of wastewater resulting in insanitary conditions in the city. The insanitary situation in the city has affected public health and the surrounding natural resources. Sanitation facilities are inadequate both in coverage as well as in quality (*Situation Assessment Report of Jijiga City on Urban Wastewater Development Plan*).

Table 8: Service Quality

	Response	Frequency	Percentage
Water and sanitation service delivery	I am happy	12	3.2
	Moderate	24	6.3
	Unhappy	344	90.5
	Total	380	100
Employees availability on their work	They are in the office 50% of working hours	76	20
	They are not in the office always	200	52.6
	They are not in the office all the time	104	27.4
	Total	380	100
Awaiting time	More than 24 hours	221	58.2
	Half a day	135	35.5
	1-3 hours	24	6.3
	Total	380	100
Hospitality	Good	123	32.4
	Neither good nor poor	173	45.5
	Poor	84	22.1
	Total	380	100

Source: survey data, (2020)

Respondents were asked to evaluate the general water supply and sanitation service of Jijiga city. The majority of 344(90.5%) responded as unhappy, while 24(6.3%) of the respondents were said that it is moderate and least part 12(3.2%) of the respondents were responded they are happy the water and sanitation services of Jijiga city administration.

According to the above table, the respondents were asked the availability of employees on the work place and indicated as follow: the majority of the 200(52.6%) of the respondents were replied they are not in the office always, on the other hand, 104(27.4%) and 76(20%) of the

respondents were responded they are not in the office in all the time and they are in the office 50% of their work respectively. Therefore, the result of the study was revealed that the working and services delivery of the employees of the water supply and sanitation authority are not in the office in all the time.

As indicated the above table, the majority of the respondents 221(58.2%) confirmed that they wait more than 24 hours' time in water services. And the remaining of the respondents were 135(35.5%) and 24(6.3%) were waiting the service delivery on water. According to the responses related to hospitality of services delivery of on water supply and sanitation, the majority of 173(45.5%) claimed that neither good nor poor, while rest of the respondents answered 123(32.4%) and 84(22.1%) good and poor respectively.

Some of the respondents also reported that due to water shortage they incur additional costs and face health problems like diarrhea as they are forced to use alternative sources of water of poor quality. Hunter et al. (2010) reported that a poor water supply impacts human health by causing diarrheal and non-diarrheal disease, limiting productivity and the maintenance of personal hygiene.

Most countries give first priority to satisfaction of basic human needs for water. The service deficiencies primarily affect the poorest segments of the population in developing countries. While expanding improved water source schemes is generally essential, it is equally important to ensure that the schemes have increased users 'satisfaction with water quality and availability for everyday use (UNICEF, 2010).

4.3. Respondents perception about the water supply and sanitary service

Table 9: Respondents perception towards water supply and sanitation service

	Response	Frequency	Percentage
How do you evaluate the general water supply and Sanitary service of Jijiga city?	Poor	204	53
	Fair	100	27
	Good	76	20
	Total	380	100
Are you satisfied with the city water supply and Sanitation service?	Yes	63	16.6
	No	317	83.4
	Total	380	100
Are you satisfied with the cost of water supply and Sanitation service of the city?	Yes	95	25
	No	285	75
	Total	380	100
In the last one year, was there any family member who Were infected by water and sanitation related problems?	Yes	253	66.6
	No	127	33.4
	Total	380	100
Is there any water and sanitation problem faced your health	Yes	304	80
	No	76	20
	Total	380	100

Source: survey data, (2020)

With respect of the service quality rendered by the water supply office, more than half (53%) of the respondents are poor on the service. Only 100(27%) of them are satisfied by the service which means fair and the rest 76(20%) replied as they are satisfied on the service quality delivery of the water supply and sanitation which means that they said good service.

According to the above table, the respondents were asked whether they are satisfied or not then they replied as follows: the majority of 317(83.4%) were respondents they are not satisfied the services of the water supply and sanitation of the Jijiga city administration, while the rest and remaining part of the respondents were answered that they are satisfied the service delivery of the water supply and sanitation of the Jijiga city administration.

As indicated the above table, the participants of the study were asked the cost of water supply and sanitation of jijiga city administration whether they are satisfied or not, then they replied as follows: the majority of 317(83.4%) of the respondents were responded that they are not satisfied the cost of the water supply and sanitation services while the rest part of the 63(16.6%) were eplied that the cost of the water supply and sanitation services are satisfied the cost of services delivery of the water supply and sanitation. The source of water supply system for Jigjig city is ground water. The supply is not adequate and there is a critical shortage of water supply in the city. The public water points and the house taps are usually dry. Water vending is a common practice in the city and a 25 litter Jerry can costs about 10 birr .There is no perennial stream in the area, and as in many towns and cities of the country, the sanitation condition of Jigjiga city is very poor according to reports on Somali Regional Water development bureau.

According to the above table, whether the water sanitation problem infected any family member or not were asked to participants of study and they replied as follows: the majority of participants 253(66.6%) replied that yes they are infected water sanitation problem in to their families while the 127(33.4%) of the respondents were said that there no any family member which infected for the sake of water sanitation related problems. According to Abayneh A. (2019), water quality and related disease episodes are directly related. As the water quality becomes good the chance of getting water born disease such as typhoid, diarrhea, cholera and others. The provision of improved water service among other things means, good quality of water which is safe for health and an increased amount of water available for use.

And lastly the researcher asked the participants is there any water sanitation problem your health, then the majority of 304(80%) respondents was said that yes there is faced health problem on the water and sanitation and least part of the participants were said that there is no health problem faced for the sake of water and sanitation. Some of the respondents also reported that due to water shortage they incur additional costs and face health problems like diarrhea as they are forced to use alternative sources of water of poor quality. Hunter et al. (2010) reported that a poor water supply impacts human health by causing diarrheal and non-diarrheal disease, limiting productivity and the maintenance of personal hygiene. Therefore, according to USAID lowland and water, sanitation and hygiene report on May 2016 show very low which is substantial proportion of the households 48% from three regions did not

have access to drinking water from improved sources and 60% of households have no latrines which causes health related problems on the family members.

Table 10: status of sanitation (n= 380)

	Response	Frequency	Percentage
Toilet in compound	Yes	310	91
	No	30	9
	Total	380	100
Common toilet	Yes	33	8.7
	No	347	91.3
	Total	380	100
Bathroom in the compound	Yes	180	47.4
	No	200	52.6
	Total	380	100

Source: survey data, (2020)

Regarding the sanitation service of the study area, majority (91%) of the respondents have a private toilet in their compound. Respondents who have a common toilet covered 9% of the respondents. Only 47.4% of them have a bathroom in their compound.

4.4. Results of Interview Data

The available water sources throughout the world are becoming depleted and this problem is aggravated by the rate at which populations are increasing, especially in developing countries. This has brought into focus the urgent need for planned action to manage water resources effectively for sustainable development. The problem of water scarcity in urban areas is of particular concern. Currently, some 30 countries are considered to be water stressed, of which 20 are absolutely water scarce. It is predicted that by 2020, the number of water scarce countries will likely approach 35 (Rosegrant *et al.*, 2002). It has been estimated that, one-third of the population of the developing world will face severe water shortages by 2025 (Seckler *et al.*, 1998).

Due to that, water supply and sanitation services are the two most important infrastructures among the many and require high investment to meet the demand of rapid urbanization. Hence, as per the interview made with different officials, such as Key informants with a position of Officials from Water Supply and Sewerage Service Enterprise, Urban Water Supply and Sanitation Coordination Office, and Mayor Office, kebele administrators and households were interviewed from the city water supply and sewerage authority.

Hence, there are common major challenges that all of them mentioned, these are;

- Limited human and material resources (lack of capacity).
- Poor infrastructure and communication.
- Spare parts and construction materials deficient in the market.
- Low capacity of regional water work construction enterprise (technologies problem).
- Delay in budget release.
- Inadequate research and data in water sector.
- Inflation on construction materials.
- Complexity of environmental and ecology of the region.
- Poor Community participation and management due to low level of awareness.
- Weak monitoring & evaluation capacities.
- Low capacity contractors.
- Turnover of well trained and experienced professionals and skilled technicians (poor institutional capacity)..

According to Situation Assessment Report of Jijiga City on Urban Wastewater Development Plan, since 2007 to 2017, population of Jijiga has increased by 35%. Based on this study the below measures are recommended:

- ✓ The Municipality should develop additional water supply sources and water infrastructure to enable the whole community to access potable water.
- ✓ The alternative water supply sources may include rainwater harvesting and boreholes by large institutions and service providers (e.g. hotels, industries).
- ✓ This will help to supplement the Municipal potable water supply system.
- ✓ To accommodate sanitation needs of an increasing population, Jijiga should prepare an integrated town master plan which must assimilate wastewater, solid waste, and storm water drainage management.

CHAPTER FIVE

5. MAJOR FINDING, CONCLUSION AND RECOMMENDATION

5.1. Introduction

In this chapter the researcher tried to summarize and draw a conclusion about the outcome of the study and give some recommendation which could be important for the local government service delivery on water supply and sanitation issues. Also, the researcher included further aspects and outlooks.

5.2. Major finding

The research revealed that there are a number of problems that made customers were not happy in the service delivery system of the city administration. This was the result of poor attention given to the customers by the employees as well as the response of the city administration officials. The Water Supply and Sewerage Authority office unable to provide sufficient water supply for its people, the enterprise's policies and tools are not once which can translate the household's demand into sustainable service delivery system of water resources and sanitary activities. The observation also showed that there is no check and balance between households and water supplier agency to ensure accountability and responsiveness. However accountability is not effective in water service supply in Jigjiga city administration, due to lack of quick responsiveness, in many water points are delayed their release in timely and some are not totally functional.

On the other hand, majority of the respondents 218 (64%) are represented by male while the findings revealed that almost half of the respondents (49.7%) were in the age range of 35-44. Also the findings showed that majority of the participants 232(61.1%) of the respondents are married. The most common educational status attained by the respondents which consist of is Certificate 162 (42.6%) and informal education.

The sanitation of Jigjiga city has been deteriorating from time to time, which is caused by;

- ✓ Inadequacy of latrine facilities and its management,
- ✓ Inadequate water supply,
- ✓ High water interruption, and

- ✓ Lack of sewerage system,
- ✓ Inadequate cleaning and poor abattoir services.

Regarding the service delivery, nepotism, faulty governance lack of accountability, transparency, integrity, corruption and incredible reporting mechanism were found to be the manifestation of the ill administration of the water supply and sanitation sector. In line with this, the study result also indicated 76% of the study households were not satisfied with the existing water supply and sanitation services. Majority of the respondents (100%) reported that nepotism, seeking gifts and money for service were the major problem of customers.

5.3. Conclusion

In this study, it was designed to investigate Local Government Service Delivery on Water Supply and Sanitation in Jigjiga City Administration. It was also tried to address the major challenges of drinking water supply and sanitation services in Jigjiga City and also the researcher asked the possible solutions to these challenges.

Jigjiga City Water Supply and Sewerage Service Enterprise is the organization responsible for the provision of water supply in Jigjiga City. Following the reestablishment of City water services as independent entities supervised by City water boards, as per proclamation No 61/1999 of the Regional Government, at present, the Jigjiga water service is organized as an autonomous public organization under the City Administration. The present organizational chart of the water service was studied and implemented in 2005.

In Somali region being the most water scarce area, low annual rainfall and high evaporation coupled with geology largely dominated by gypsum, uneven spatial and temporal distribution occurrences and other acquitter formations and poor sanitation in particular Jigjiga City is the most populous in the region. On the other hand, In Jijiga city there are significant numbers of poorly designed and maintained pit latrines and mishandling of wastewater resulting in insanitary conditions in the city. The insanitary situation in the city has affected public health and the surrounding natural resources. Sanitation facilities are inadequate both in coverage as well as in quality (*Situation Assessment Report of Jijiga City on Urban Wastewater Development Plan*).

The major problems that hinder Water Supply and Sanitation in Jigjiga City Administration are the following;

- Population Growth and Urbanization.
- Inadequate finance or budget.
- Low implementation capacity of the Sector (lack of capacity).
- Technological capacity.
- Turnover of well trained and experienced professionals and skilled technicians (poor institutional capacity).
- Increasing global water scarcity.

The detailed information about the above main challenges of water supply and sanitation in Jigjiga city administration are also addressed and discussed in the study.

5.4. Recommendations

Based on the findings of the study, the following recommendations are forwarded.

1. The current water supply per capita is calculated on the basis of water supplied by population but does not consider other institutions that consume excess water.
 - ⑩ The government should construct more water infrastructure that will supply the whole community and institutions with water; these include installing extra boreholes, improving water wells, taps and pumps.
 - ⑩ There is a need to replace old pipe water works with new waterworks and to extend the water networks from surrounding location where water is always available and to residential points.
 - ⑩ Moreover, there is a need to replace frequently broken pump and/or avail spare parts to minimize water supply interruption.
 - ⑩ Open water sources should be protected from pollutants to reduce health hazards. There is a need to enhance environmental protection around water sources. Water sources need to be regularly cleaned with appropriate chemicals.
 - ⑩ There should be awareness programmes in the community that educate people about protecting water sources.
2. The study result indicated that, the current status of water supply and sanitation accessibility in Jigjiga city is very low in any standards. Hence, of all others City Water Supply and Sewerage Services Enterprise should increase water production and expand the distribution line to bring the system near to the residences.

3. The rapid population growth is a main challenge for all urban services - not only sanitation. In many ways, sanitation depends on the development of other urban services: water supply (for grey water generation), roads (providing access to collection services and disposal site), energy (for treatment) and so on.
 - ⑩ There should be a sanitation master plan to be integrated into the existing urban Structure Plan.
4. Though the available public latrines in Jijiga for the residents' size is not enough because of high number of people visiting the city every day, the deficit of public toilets need to be added in the city.
 - ⑩ It is recommended to conduct a study to determine the most appropriate locations to build new public toilets. Therefore, the city administration should establish a sewerage and solid waste management system.
5. Sanitation of Jigjiga city is very poor as there is no sewerage system, inadequate communal latrines in slum areas. Liquid wastes were simply dumped directly into rivers, ditch and in open spaces and this act pollutes the rivers and environment, which causes high negative health and socioeconomic impacts on the community. Therefore, the city administration should establish a sewerage and solid waste management system.
6. The study also revealed that the transparency and accountability of the City Water Supply and Sewerage Services Enterprise is very poor. Nepotism and mal administration were also the prominent challenges that hinder the service delivery. Setting systems and structures that can reduce incidences of nepotism and ensure efficient delivery of services, use modern information communication technologies, awareness creation, support the participation of stakeholders, creation of strong cooperation between governmental and non-governmental actors, developing institutional anti-corruption strategy are highly recommended to fight against water supply and sanitation sector corruption to fulfill the demand and supply of service seekers.
7. Water and Sanitation infrastructure expansion activities that match with the town development must be carried out to meet the water requirements of the town. Every concerned stakeholders government and non-government institutions, Jigjiga city Water supply and sewerage service enterprise, Electric and Power Authority should discharge their respective responsibility properly.

8. The City administration should devise a mechanism so as to minimize the inequitable distribution of water among the residents of the town.
9. In addition to the above mentioned recommendations the study should be conducted to find out other possible causes for water shortage so as to act accordingly.

In Further aspect and outlook, this study of local government service delivery on water supply and sanitation of Jigjiga city administration needs to be further studied and investigated.

According to (Khatri, K.B and Vairavamoorthy K., 13 June 2007) there is an urgent need for planned action to manage water resources effectively. The problems in urban areas of developing countries are of particular concern as still large sections of the community are living without safe water supply and basic sanitation services. It has been widely acknowledged that in the past several urban water interventions (particularly in developing countries), have failed and this has been in part due to little or no attention given to the institutional landscape within which these interventions are applied and the lack of stakeholder involvement in the development and implementation of these interventions.

On the other hand, adequate provision of water supply and sanitation of Jigjiga is very low or poor due to several challenges such as population growth and urbanization, low implementation, inadequate finance and infrastructure deterioration. The challenge is to develop appropriate technical and institutional responses to these pressures that radically change the way in which urban water systems are managed. Interventions are needed over the entire urban water cycle and sanitation. The enterprise, regional water bureau and researchers are expected to be further investigating the problem and find appropriate solutions. In addition, the findings of this study may help them to use it as a guideline and as a secondary source by showing identified challenges.

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College of post graduate studies

Department of Public Administration and Development Management

Appendix 1

Questionnaire

Dear Respondent;

I am a postgraduate student at Dire-Dawa University. I am presently conducting a research on “An Assessment of Local Government Service Delivery on Drinking Water Supply and Sanitation of Jigjiga City”.

I am grateful for your benevolence to fill this questionnaire and share your experiences. I kindly, request you try to complete all sections of questionnaire because your appropriate response is very important to attain the objective of the study. You are expected to give your honest and sincere views on the questions by ticking and filling the options. I will assure all information given here shall be treated with absolute confidentiality and shall be used for the purpose of this study only

Thanks for your anticipated cooperation.

General information;

- § No need of writing your name
- § Please put “√” mark in the boxes
- § Give your answers or comments on the space provided for open ended questions

Part I: Demographic Information

1. Age of respondents _____

A. 18-24 () B. 25-29 () C. 30-34 () D. 35-40 E. above 55

2. Gender of respondent _____

A. Male () B. Female ()

3. Marital Status of respondent

Married ☐ Single ☐ Separated ☐

Divorced ☐ Widowed ☐

4. Education level of respondent;

A-No formal education ☐ B- Certificate C- Primary school (1-8) ☐

D- Secondary school (9-12) ☐ E- Degree and Above ☐

5. Total Household size, _____

Part II; Housing characteristics

1. House Status A- Owner Occupied ☐ B- Rented from Kebele ☐

C- Rented from Private HH ☐ D- Rent Free ☐ E- Other _____

2. Type of Construction Materials; A- ☐ Wood and mud ☐ B- Cement Blocks ☐

C- Wood & Thatch ☐ D- Others

3. Size of the House

a. One roomc. Three rooms

b. Two roomsd. More than three

4. Quality of the house

A. Very good

C. Very Poor

B. Good

D. Poor

Part III; Occupation and Income of Household

1. Employment status of the head of Household head?

A. Employed

B. Unemployed

C. Retired

D. Disabled

2. Employment type

A. Civil servantB. Private EmployeeE. Student

C. Daily laborerD. Beggar F. Other

3. Total income of the head of the household

A. 1500 Birr month B. 2000-3000/month C. 4000-5000/month

D. 6000-7000/monthE. 8000-9000/month F. >10,000 Birr Month

4. Total earnings of other household members (Birr) _____

A. 1000-2500

B. 2600-3000

C. 3500-4000

D. >4500

5. Total Household Income (Birr) _____

A. 6500-7500 Birr month B. 9500-10500/month C. 12,000-14,000/month

D. 16000-17000/month E. 20,000-22000/month F. >24000 Birr Month

Part IV; Water Supply and Sanitation Status

I. Access

1. What is your average daily water consumption? _____
2. Do you have private toilet at your home? A- Yes ☐ B- No ☐
3. Is there any public toilet in your Kebele? A- Yes ☐ B- No ☐
4. Do you have bath room in your home? A- Yes ☐ B- No ☐
5. How do you dispose liquid waste? _____
6. Where do you dispose liquid waste? _____
7. What round trip distance and time you spend to fetch water? _____
8. How much of time you spend to fetch water? _____
9. Is there any other water source in your Kebele except the one provided by the municipality? A-Yes ☐ B- No ☐
10. Is there any water supply interruption in your Kebele? A- Yes ☐ B- No ☐
11. What is your source of water? _____
A- Private tap B- Yard tap C- Public tap D-Boreholes E- Rain F- Spring
12. For how many hours do you get water supply service delivery per day inJigjiga City?
A- Less than 2 hours B- 3-8 hours C- 9- 15 hours D- 16-20 hours E- 21-24 hours
13. Degree of difficulty to get water from the source
A- Very difficult B- Difficult C- Moderate D- Easy E- Very easy
14. How do you evaluate the competence of service providers?
A-Very high B- High C- Moderate D- low E- very low

III. Quality

1. Do you think that, the source of water and sanitation facilities you are currently using have a good quality? A- Yes B- No
2. How do you evaluate the purity of the water provided to you by the city municipality?

 A- Pure B- not pure
3. Are you satisfied with the current standards/quality of service delivery?

 A- Yes B- No

If no, why not? _____

III. Questions about accountability and responsibility

1. How do you evaluate the way of information distribution about the problems, cost and quality of drinking water supply and sanitation services?

 A-Very poor B- poor C- Fair D- High E- very high
2. Responsiveness of the water supply agencies to customers' demand

 A-Very high B- High C- Moderate D- low E- very low
3. Availability and functionality of complaint handling and voicing mechanisms

 A-Very high B- High C- Moderate D- Low E- very low
4. The availability of information to clients

 A- There is not at all B- Available but not adequate C- Available and adequate
5. What are the other disparities affected while accessing these services?

 A-Favoritism and Nepotism
 B-Influence
 C-Kick backs
 D-Improper Gifts and Gestures

E- Others (point out) _____

Part IV; Service Delivery status

1. How do you feel about the water and sanitation service delivery of the city?

A-Very happy B- Happy C- Neutral D- Unhappy E- very unhappy

2. What is your experience about the availability of service providers in the office hours?

A. They are available in the office all the times during working hours

B. They are in the office 50% of working hours

C. They are in the office only sometimes

D. They are not in the office all the time

3. How long do you wait before getting specific service from staffs of Jigjiga city administration?

A-Less than 1 hour B- 1-3 hours C- half a day D-one full day E- more than one day

4. The staff courtesy (Politeness, respect and consideration) toward customers is:

A-Very good B- Good C- Neither good nor poor D- Very Poor E- poor

I. General perception of customers towards the service

1. How do you evaluate the general water supply and sanitation service delivery?

A- Very Good B- Good C- Fair D- Poor E-very poor

2. Do you satisfied with the water supply and sanitation service provided by the city administration?

A- Yes B- No

3. Do you satisfied with the price of water and sanitation service delivery?

A-Yes B- No

II. Consequences of inadequate water supply and sanitation

1. Is there any water and sanitation related problems on your health and life.

A-Yes B- No

If yes describe the problems? _____

2. Did you and your family members exposed to water borne diseases.

A- Yes B- No

3. Please mention if there is any problem your family faced because of lack of water and sanitation supply and quality. _____

4. In your opinion, what are the major challenges that are related with the challenges which affect the better drinking water supply and sanitation service delivery of the city officials?

a. _____

b. _____

c. Do you have any suggestions to how the city officials can overcome its challenges?

1. _____

2. _____

3. _____

4. _____

Thank You

Appendices 2

-Interview Questions for officials of Jigjiga City Administration (Mayor Office, Urban Water Supply and Sanitation Coordination Office, and Water Supply and Sewerage Authority)

1. Unstructured-Interviews for officials

2. Name:_____

Position:

1. What is your role/function at the Jigjiga City Administration? /8
2. What is/are the source(s) of water to urban dwellers in the Jigjiga City? Is /are it/they enough to meet the current and future water demand of Jigjiga City?
3. Is there any water and sanitation related problems on the life of the urban dwellers and the Environment?/4
4. What are the challenges in providing improved water services to the urban dwellers?
5. In your opinion, what are the major challenges that are related with the challenges which affect the better drinking water supply and sanitation service delivery of council?
6. Have you ever encountered any claim related to water and sanitation from urban dwellers?
7. What strategy is set by your office to provide improved water and sanitation facilities to the urban dwellers as city administration?
8. What is your role/function at the city administration?
9. What measures should be taken to overcome the problems?

Appendix 3; Check List for Direct Observation

Housing characteristics

- ✓ Housing status- number of rooms, Type of Construction Materials, Size of the House, and Quality of the house.
- ✓ The living physical environment.
- ✓ Occupation and Income of Household.

Service Delivery status;

- ✓ Water Supply and Sanitation Status---- time, access and quality, and Latrine facility – type toilet.
- ✓ Accountability and responsibility.

Sources of water;

- ✓ Public water taps to the community.
- ✓ Water points functionality.