
**Addis Ababa University**
**School of Graduate Studies**

**College of Business and Economics**

**Department of Management**

# Assessment of Water Service Delivery, Utilization and Customer Satisfaction at Condominium Sites in Addis Ababa: The Case of Woyra Condominium Site, Kolfe Keraneo Sub City.

**By**

**Esam Mohammed**

**Research Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Executive Master of Business Administration.**

**August 2021**

**Addis Ababa, Ethiopia**

# Addis Ababa University

## School of Graduate Studies

This is to certify that the research thesis entitled, ***"Assessment of Water Service Delivery, Utilization and Customer Satisfaction at Condominium Sites in Addis Ababa: The Case of Woyra Condominium Site, Kolfe Keraneo Sub City."*** Has been submitted by Esam Mohammed under the supervision of Tewodros wuhib (Asist..Professor) in partial fulfillment of the requirements for the degree of Master in Executive Business Administration complies with the regulations of the University.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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| Dr.Taye Amogne | _____ | _____ |
| External Examiner | Signature | Date |
| Dr.Zelalem G/Tsadik | _____ | _____ |
| Internal Examiner | Signature | Date |
| Tewodros wuhib (Asist. Professor) | _____ | _____ |
| Advisor | Signature | Date |

## Acknowledgement

First, and for most, I would like to give my praise to the Almighty ALLAH for his invaluable cares and support throughout the course of my life and helped me since the inception of my education to its completion and enabled me to achieve my study by giving health, knowledge, power of communication and endurance.

Next I would like to my sincere gratitude to my Advisor Tewodros Wuhib (Asist. Professor) for his patience, motivation and valuable support while conducting this research. I would also like to thanks to Dr. Amir Alelign for his advice and assistance in the writing up of this work. And also I would like to thank my family members who have supported me a lot, especially my wife, Fetiha Senbit, for her encouragement and support starting from the beginning of the study.

I would also forward my heartfelt thanks to my sister Sofia Mohammed and my Mother who made their tremendous contributions to this study. Finally, I would like to thank for 'Woyra' condominium residents and the AAWSA officials who were unreserved in responding to my research questions and all rounded cooperation.

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## List of Acronyms/ Abbreviations

| | |
|---|---|
| AAHCPO | Addis Ababa Housing Construction Project Office |
| AAWSA | Addis Ababa Water and Sewerage Authority |
| E.C | Ethiopian Calendar |
| IHDP | Integrated Housing Development Program |
| UN-HABITAT | United Nations Human Settlement Program |
| MWUD | Ministry of Works and Urban Development |
| USD | United States Dollar |
| WDM | Water Demand Management |

## *ABSTRACT*

*In condominium houses the issue of water supply is crucial. The present study aimed to assess the water delivery, utilization and customer satisfaction at Woyra condominium site in Kolfe keranio Sub-city, Addis Ababa. A cross-sectional study was conducted from May 2021 to July 2021. Both qualitative and quantitative approaches were used to analyze information gathered concerning the respondents' characteristics, water supply situation, and customers' level of satisfaction towards the service. Moreover, information on the water delivery system, utilization and customer satisfaction has been analyzed. Among a total of 240 sample households, about the respondents' households had a family size ranging from a single person to 9 individuals in which the majority (61.3%) of the households had a family size of 4-6 individuals. This survey revealed that the majority of the respondents, 84.1% showed their agreement on the availability of functional water pipe lines. More than half of the total respondents, 58.7%, replied that they did not agree on the availability of adequate water supply for their average daily consumption needs. The study also showed that only about 5% of the respondents were satisfied with the current water supply system to the study site. The most rated water supply challenges in the present study were insufficient water source (49.5%), increasing number of population (14.1%) and frequent water interruption (10.5%). In the focus group discussion, both the residents of the study site and the water authority officials agreed that there are opportunities to improve the water supply service. Hence, the researcher recommended appropriate intervention measures should be taken by the water authority to alleviate the challenges in supplying adequate and quality water in the study area.*



***Key words:*** *Addis Ababa, challenges, Condominium housing, Satisfaction, Water supply*

# CHAPTER ONE

# 1. INTRODUCTION

## 1.1. Background

Rabid urbanization, climate change and higher living standards have led to continuous growth of Addis Ababa water supply. Globally Water Demand Management (WDM) is slowly coming to be recognized as an essential complement to supply management if fresh water is to be used in a sustainable manner. WDM has been shown to yield economic benefits through increasing efficiency as well as, in many cases, greater equity, reduced environmental damage, and greater public participation. Unfortunately, lack of clarity about what constitutes water demand management – and how it can be effectively introduced in different of sectors, regions, and cultures – is blocking its ability to play as great a role as it should in water policies and programs around the world (David, 2005). Water demand management more an issue of policy than of technology, it is about managing and moderating our demands for good quality fresh water. It is less a matter of piping and pumps and more a tool for changing the ways we use water and the rates at which we use it. In practice, WDM comes down to three key goals: efficiency, equity and sustainability. There are many ways to improve the efficiency of water use, for example by reducing losses in the distribution system, by reducing the amount or the quality of water needed to perform a task, and by changing the timing of water use. Reducing the amount of water used is an obvious benefit. Any strategy for the implementation of WDM must take into account the goal of social equity. A key element is the sensitive issue of water service delivery, utilization, customer satisfaction. Although water pricing, and ensuring that poverty is not a barrier to reasonable access to clean water. Responses to the needs of the poor will vary depending on the

setting. No other region of the world has so many people striving so hard for economic growth (sustainability) with so little water than the Middle East and North Africa Region (MENA). MENA has five percent of the world's population but only one percent of its fresh water (Wadimena, 2011). An important purpose of water management is to match or balance the demand for water with its availability, through suitable water allocation arrangements, and there is a large number of often conflicting of water uses including; domestic use in urban centers, irrigation, domestic use in rural areas, livestock, industrial use, commercial use, the environment (e.g. in stream flow requirements for aquatic life and wildlife), institutions (e.g. schools, hospitals), hydropower, cooling (e.g. for thermal power generation), waste and wastewater disposal, fisheries, recreation and navigation. In many Southern African countries there have been significant reforms in the way in which water is managed. One aspect of these water reforms in southern Africa is increased stakeholder participation in water management (CPUT, 2006). Addis Ababa city has very limited resources of surface and ground water which plays an important role in the support of domestic needs in mass condominium houses**.**

Importantly, water is environmental or ecological resource and an economic as well; despite of the fact of Ethiopia's being a water tower for African continent, because of nature of boundary in form of many lakes and rivers; sustainable urban water supply is still an issue of serious concern. Provision of quality urban infrastructure system has become also a major concern in many developed and developing countries. Contrary to this, the quality aspect of providing water service delivery, utilization and customer satisfaction has been down played by the focus put on access provision to the infrastructure. This is mostly the case of water supply provision and other basic infrastructure. The low quality of urban infrastructure such as water supply and sanitation may be detrimental to the environment leading unhealthy living conditions. The performance of

one infrastructure may affect the other due to their inter-connection such as water s water service delivery; utilization and customer satisfaction are highly inter-related. Hence, understanding this integration and interrelation provide a better consideration on the importance of providing quality infrastructure (Salendu, 2010).

Despite the intensive efforts of many institutions at the national and international levels, approximately 1.3 billion people in the developing world lack access to adequate quantity of clean water and nearly 3 billion people are without adequate means of waste disposal. (Bosch et al,2001). It is estimated that 10,000 people die every day from water and sanitation related diseases while thousands suffer from a range of water supply and sanitation related illnesses. The impact of inadequate water and sanitation services falls primarily on the poor. Badly served by the formal sector, the poor make their own, often inadequate, arrangements to meet basic survival needs (Liu, et al., 2019).

The Integrated Housing Development Program (IHDP) currently known as Addis Ababa Housing Construction Project Office (AAHCPO) is a government-led and financed housing provision programmed for low-and middle-income households in Ethiopia. The program was launched in 2004 (1996 in the Ethiopian calendar). The Addis Ababa Housing Construction Project Office considers four-unit typologies incorporated into each condominium block: a studio, 1-bedroom, 2-bedroom, and 3-bedroom. Each unit includes a bathroom, flush-toilet, and basin, and a separate kitchen. Each unit has water, sewerage, and electricity connections.

The provision of communal building to condominium sites was an attempt to respond to the cultural needs of residents. The function of the communal building is to provide a protected space for residents to perform traditional tasks such as slaughtering houses, and cooking extensive meals: activities the housing units themselves cannot accommodate (UN-HABITAT,

2011). The development of condominium housing is intended to solve many problems of the urban residents in Ethiopia. It enables to fulfill and solve basic problems like water supply, sheltering, and other infrastructures (toilets, Kitchen, waste water Solid waste collection, etc.) of the dwellers. Many countries including Ethiopia started this program because of social, financial and economic rationales. However, challenges in water service delivery, utilization and customer satisfaction remains to be one of the basic issues in such housing system in the country. Hence, this study aims to assess the water delivery, utilization and customer satisfaction at Woyra condominium site in Kolfe Keranio sub-city, Addis Ababa.

## 1.2. Statement of the Problem

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

The current problem for Addis Ababa Water and Sewerage Authority (AAWSA) is related to the fact that, water demand for Addis Ababa is now greater than water production capacity and on the other hand the city government of Addis Ababa Housing Construction Project Office (AAHCPO) is engaged in the construction of condominium housing apartments in ten sub-cities of the metropolis in an effort to reduce the problem of housing in the city targeting 886,978 housing unit in 2020 E.C. However, the availability of adequate and safe water service delivery and utilization is among the basic and essential elements in any housing development program. The city of Addis Ababa is at present supplied from surface water from Legedadi, Dire and Gefersa dams with additional supplies from ground water pumped from Akaki well fields to the south of Addis Ababa, and other wells and springs within the city. Surface water from Legedadi and Dire dam is treated at Legedadi water treatment plant having a production capacity of 195,000m3 /day while that from Gefersa dam is treated at Gefersa water treatment works having production capacity of 30,000 m3 /day. Similarly, the collective groundwater production from Akaki well fields and other boreholes within and around the city is estimated as 222,333m3 /day. Therefore, the total current water production is about 447,333m3 /day. (Source: Addis Ababa Water and Sewerage Authority). However, the current estimated water demand of the city is about 736,816m3 /day. (Sources – Addis Ababa Water Supply Project – Stage IIIA). This indicates that it is very far to reach the demand of the city. It is therefore essential to reduce the water consumption, to substitute fresh water with alternative water resources and to optimize water use efficiency through reuse options. Among these alternatives water service delivery and utilization can be used to meet the anticipated deficit. water utilization is commonly defined as wastewater generated from shower, hand basins and cloth washing which accounts 40.3 % of the outflow from homes. Before being reused, water service delivery would be treated, using a

variety of treatment technologies of varying sophistication, to a quality where it can be reused for intended applications such as for toilet flushing, gardening, car washing, floor cleaning, etc. The water service delivery and utilization treatment processes can involve right from simple low-cost devices to highly complex and advanced biological treatment processes incorporating sedimentation tanks, bioreactors, filters, pumps and disinfection systems.

As one of the cities in the developing countries, Addis Ababa is currently experiencing huge expansion in condominium housing construction though the basic needs of the dwellers (e.g., housing, water and electricity supply, transportation, etc.) remain public issues. In these kinds of houses, the issue of water supply is crucial. For this reason, expansion of water supply infrastructures in the newly establishing condominium housings becomes mandatory. However, no enough data is available concerning the water delivery and utilization, and the subsequent level of customer satisfaction on the service in most condominium sites in Addis Ababa, Ethiopia. Therefore, the present study aimed to assess the water delivery, utilization and customer satisfaction at Woyra condominium site in Kolfe keranio sub-city, Addis Ababa.

### 1.3. Research Question

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

1. What was the status of water service delivery and its challenges at Woyra condominium site in Kolfe Keraneo sub city, Addis Ababa?
2. How was the level of water utilization by the community at Woyra condominium site.in Kolfe Keraneo sub city, Addis Ababa?
3. What was the level of customer satisfaction on water service delivery at Woyra condominium site?

## 1.4. Objectives of the study

### 1.4.1. General objective

The general objectives of the study were to assess water service delivery, utilization and customer satisfaction at condominium sites in Addis Ababa. The case of Woyra condominium sites, Kolfe- Keraneo sub city.

### 1.4.2. Specific objectives

1. To identify the status of water service delivery at Woyra condominium site in Kolfe-Keraneo sub city, Addis Ababa.
2. To analyze the major challenges in water service delivery at Woyra condominium site in Kolfe-Keraneo sub city, Addis Ababa.
3. To identify the water supply system in the community at Woyra condominium site.in Kolfe- Keraneo sub city, Addis Ababa.
4. To determine the level of customer satisfaction on water service delivery at Woyra condominium site. Kolfe- keraneo sub city, Addis Ababa.

## 1.5. Scope of the Study

The present study investigated the water service delivery and utilization in residents of condominium houses in the study site. The challenges in the water service delivery system including the sufficiency in water amount, infrastructures and technical capabilities in human power of the local water authority were investigated. The available opportunities to improve the water supply system were also investigated. The practices in water utilization of the community were also assessed. The study also determined the level of customer satisfaction in the study area. The present study was limited to Woyra condominium site located in Kolfe- Keranio sub city of Addis Ababa.

## 1.6. Significance of the study

The main significance of the study was to understand on water resource planner, decision makers, stakeholders, water users and any concerned person to the significance on water service delivery, utilization and customer satisfaction; and the impact of those have on water resource system performance and provide possible assessment measures to customers' satisfaction on the water supply service. Hence, the need to assess the importance of water service utilization is more possible than supplying more water to the water users using possible utilization methods to improve customer's satisfaction on the available water resources and delivery.

## 1.7. Limitation of the Study

The primary limitation for this study has been focused on a condominium site in Addis Ababa, the case of Woyra condominium sites, Kolfe Keraneo sub city. The secondary limitations for this research were lack of more published data on the study areas. Finding measurement instruments was very tough. So that the researcher was forced to adopt foreign studies and related researches as much as possible.

## 1.8. Organization of the Paper

The present study has been organized in six chapters. The first chapter will be consisted; the introduction of the paper, statement of the problems, objectives of the study, research questions, scope and significances of the study, limitation of the study and organization of the paper. The second chapter of the study consisted literature reviews of condominium housing and water supply; water supply challenges and opportunities in the condominium housing. The third chapter consisted methods of the study description of the study area, design of the study, study population, sampling method and sampling size determination and data collection techniques. The fourth chapter, major findings of the study such as socio-demographic characteristics of

household heads and the AAWSA official, water supply condition in the study area, level of satisfaction of customers on the water supply system, the available challenges and opportunities which hinder and improve the water supply system, respectively were included. The fifth chapter included the discussion section based on the major findings of the survey. Finally, the sixth chapter pointed out the conclusion and recommendation sections.

# CHAPTER TWO

# 2. LITRETURE REVIEW

## 2.1. General Review on Water Demand Management

Water demand management refers to the adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: Economic efficiency, Social development, Social equity, and Environmental protection, Sustainability of water supply and services, and Political acceptability. The three divisions of water demand management strategies can be categories; socio-political, economic and structural-operational.

**Socio-political**: since many users are not familiar with the value of water and there is no reduction of water demand in order to inform and changes the consumer behavior; socio-political type of strategies changes the water users‟ behavior towards water usage and water wastage using and accomplishing the public by education programs or media for awareness on WDM.

**Economic**: economic measures are based on the theory that water apart from a social good is an economic good. Hence an increase in water price would theoretically result in a lower consumption of water. In addition to increasing the water price, it includes penalties for excessive water use to supplement the bill price for financial incentives for efficient use of water.
**Structural-operational**: Structural-operational includes engineering and technological solutions that aim to reduce water consumption without lowering the level of service to the consumer. Which includes the promotion of water efficient devices, alternatives to water supply for example, rainwater harvesting, water recycling and adoption of plants that require less water.

## 2.2. Socio-Technical Issues of using Water delivery and utilization management

The high willingness among university students to accept recycled water systems for no potable water to reveals an opportunity in Pretoria, South Africa to substitute water sources with community support. University students appear to be very supportive of using recycled water for non-potable purposes which and would produce costs and energy use through only treating water to a level appropriate for the subsequent use. The opportunity for source substitution is particularly significant with regards to water use for toilet flushing given that the survey showed 97 % of university students would approve of using recycling water for this purpose. Approximately 63% of the water used in public environments or offices is for flushing toilets. Replacing the current potable water stream with reused water would significantly reduce the demand for potable water on university campus (Alison, 2013). The public perception on grey water recycling surveyed in England about 300 respondents which were distributed sufficiently to ensure that the findings of the survey were representative of the population. Over all the survey revealed a broad willingness to accept urban recycling as long as public health is not 6 compromised. The percentage of respondents willing to recycle is 88% for toilet flushing, whereas 12% of the survey revealed a willingness to accept for drinking (Jefferson, 2004).

## 2.3. Water Demand Management Considering Grey Water Reusing

Anthony (May 2011) quantifying the benefits of grey water systems in Georgia stated on the American water works association website (2010) the use of grey water has the ability to reduce water usage an additional 26.7% if only used for toilet flushing. Out of 100%, 34% of the fresh water used in the United States is used for irrigation. This 34% is the second largest percentage only preceded by thermoelectric at 48%. It should be noted that this 34% of water usage is used for agricultural irrigation. Reducing the amount of potable water for residential landscape

irrigation should be a very high priority (Anthony, May 2011). Replacing potable water with grey water for flushing toilets increases water efficiency in buildings. An evaluation of water savings, environmental, economic, and policy impacts of gray water reuse systems as exemplified in a campus residence hall, Williams Village North, housing 500 students at the University of Colorado Boulder. Treatment of shower and sink drainage and recirculation for toilet flushing is estimated to reduce water use in the building by 20%, an amount 3,300 m3 /year. At municipal water and wastewater utility rates, the annual savings are around $6,000 and will not provide a reasonable return on investment for the capital cost of the dual plumbing and treatment systems (Marie, 2012).

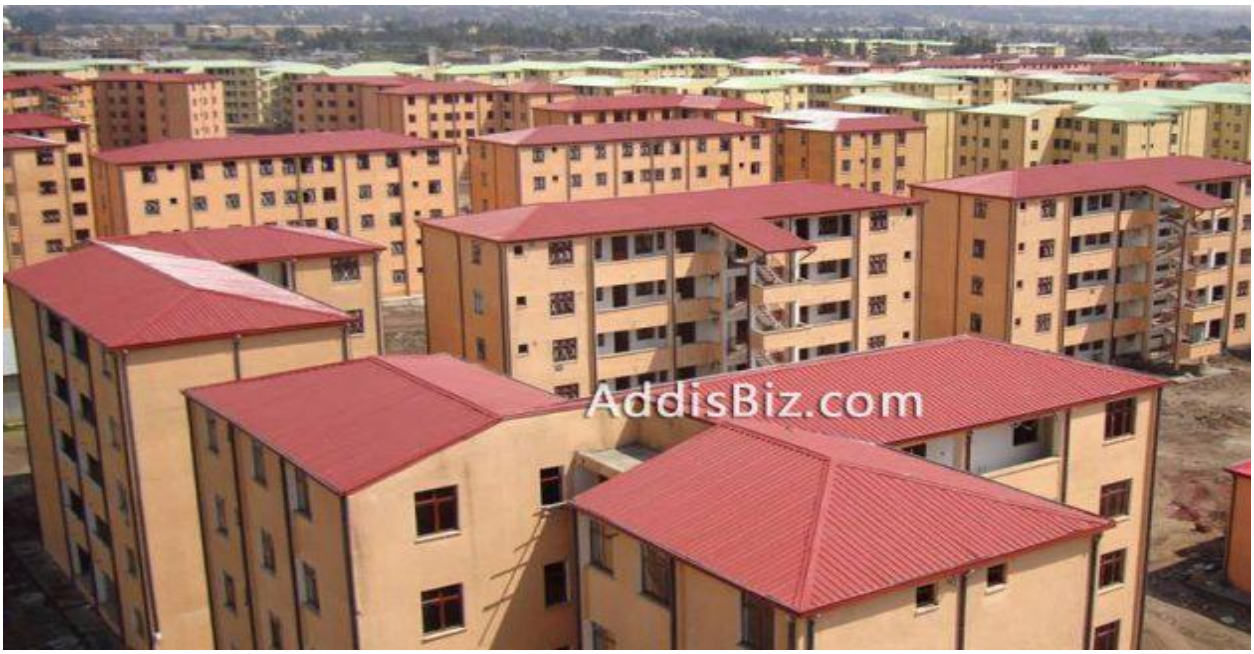
## 2.4. Condominium housing

The developments of condominium housing were intended to solve many problems of the urban residents. The development and introduction of condominium housings has been multiple goals to solve problems of housing and other important infrastructure facilities for the urban poor (water and sewerage facility, electricity, etc.) (Stephanie, 20l1).

Based on UN-HABIT AT (20 I 0), Condominium housing name has been given to the form of housing tenure where each resident household owns their individual unit, but equally shares ownership and responsibility for the communal areas and facilities of the building, such as hallways, heating systems, and elevators. There was no individual ownership over plots of land. All of the land on a condominium site was owned by all homeowners. Usually, the external maintenance of the roof and walls are undertaken by a Condominium Association that jointly represents ownership of the whole complex, employing strict management to ensure funding from each homeowner.

Shortages of affordable housing were one of the serious challenges that affect economic competitiveness, and quality of life. On the other hand, most municipal governments and housing providers are unable to meet housing need. Like other poor countries, the urban housing problem in Ethiopia, particularly in the capital Addis Ababa, was mainly due to continuous population increase, low level of economic performance, inefficient land service delivery and inadequate urban management and regulatory framework (Weldemariam, 2017).

The government of Ethiopia planned condominium housing development program in the country since 2003. Accordingly, the first pilot test condominium housing units were constructed in Addis Ababa at Bole sub city between the year 2003 and 2005. In the subsequent years, regional and federal government of Ethiopia borrowed money from the commercial bank of Ethiopia, and constructed the subsidized condominium houses at the capital city and some selected towns (Weldemariam, 2017).




(Source: from the web: https://www.google.com/search?q=woyra+condominium+site-Addis+Ababa&tbm).

**Figure 1**. **Condominium housing in Addis Ababa, Ethiopia**

## 2.5. Condominium housing and Water supply

Condominium water supplies and sewerage systems was first developed in Brazil in the 1990s and have been used in many cities such as Durban, La Paz and Buenos Aires and smaller urban centers like Iquitos, Peru and various small urban centers in Brazil (Melo, 2005). The best example was Parauapebas in the northern Brazilian state of Para. Here, the cost savings achieved by the condominium water supply network were considerable: the cost per connection was only USD 45 (1997 USD) vs. USD 167 for a conventional water supply network, despite the basic design criteria being the same in both cases which meant that substantially less ' public' excavation was required (UN-HABITAT, 2007). However, the basic concept remains valid: the cost of the public distribution network can be substantially reduced if the supply were to condominiums (or co-operatives) rather than to individual households and if the in-condominium pipe work is installed by the condominium.

The condominium water supply system has been relevance for smallest urban centers because, it has been showed that, how much the costs of a piped water supply network could bring down. Some of the features of the system were not been replicable in most small urban centers, especially in sub-Saharan Africa and Asia - for instance such high water consumption per household and the provision of connections to each household. But the basic concept remains valid: the cost of the public distribution network can be substantially reduced if the water agency provides the supply to groups of households (including condominiums or cooperatives), rather than to individual households, with these groups managing the connection to each household.

## 2.6. Water supply Challenges and opportunities in condominium housings

In high rising condominium housings, the water pressures fluctuate at each level throughout the building and should be considered in system layouts and when choosing equipment and pipe materials. Providing water to the upper floors were necessity and also one of the main challenges of a high-rise building project.

Moreover, Berhanu (2008) explained that the model of condominium house project provides all sites with drainage and sewer pipes. The study also stated that, most high-rise societies and gated communities generally have backups for water and power, and so compared to independent houses, they are generally better off. One important thing in condominium housings water supply systems is Community participation brings a number of advantages; among them are further reductions in connection costs as a result of training local residents to construct and maintain their own condominium branches. Community involvement helps to improve the acceptability of the infrastructure, promoting network connections, and provides an entry point for imparting hygiene education.

Condominium water and sewerage systems were pioneered in Brazil during the 1980s as way of bringing piped sanitation services within the economic reach of poor households (Watson, 1995). Regarding the challenges in condominium housings were concerned, due to the ever-increasing population in search of better opportunities and services the drainage and sewer pipes were frequently busting and blocked because they are failing to cope with the increasing pressure. (Berhanu, 2008).

Besides, (UN-HABITAT, 2011) stated that, the other common grievances in condominium housings were the weakness of the inadequate water pressure on the top floor of the buildings resulting in a noticeably weaker water supply at this level. Furthermore, during times of water shortages, families must collect water in buckets and carry them to their flats as there are no water tanks to generate a secondary water supply in case of such emergency. Some literatures showed that the challenge in water supply and sanitation as in the provision of adequate clean water and sanitation facilities to urban dwellers were related to capacity of the nations, (i.e., technological know-how and institutional), inadequate finance, rapid urbanization and Population growth. In case of condominium needed large finance, technological know-how and institutional effectiveness and efficiency than conventional housings.

## 2.7. Theoretical Framework

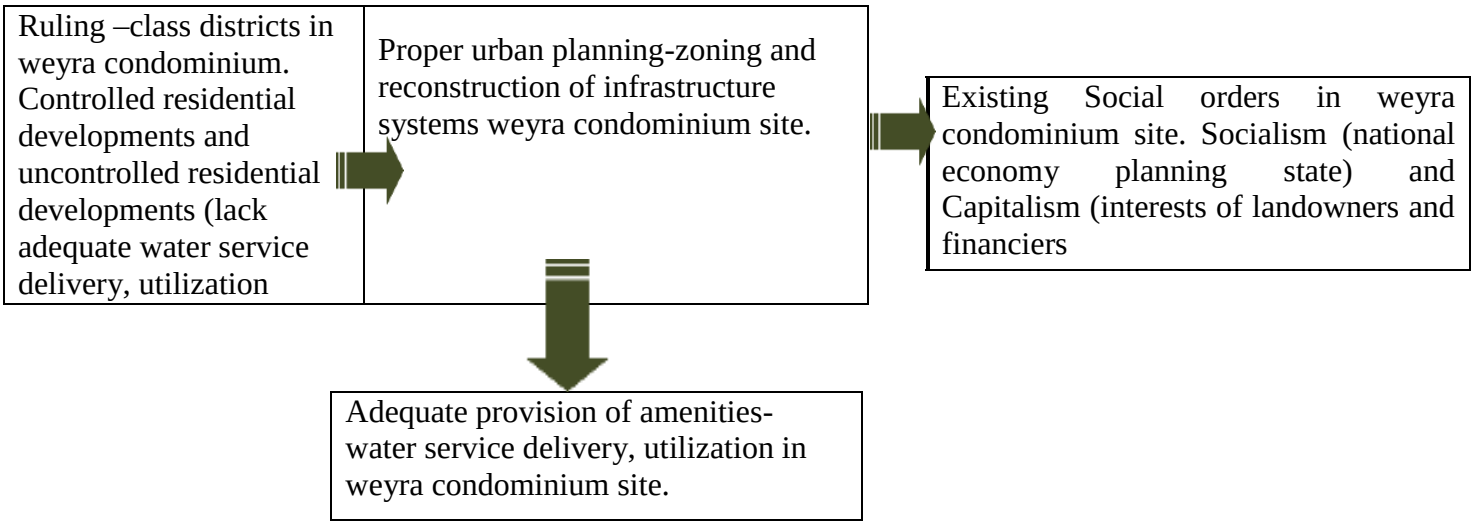
According to the theory of planning and building cities, urban planning is governed by social structure, level of development of productive forces, science and culture, natural and climatic conditions, and a country's national characteristics. This theory has been developed by planners based on Theoretical schools of urban planning, such as de-urbanism (related to the late 19th-century concept of the garden city) and urbanism (the designs of Le Cor-busier, the leader of the school in the 19th century). Urban planning encompasses a complex network of socioeconomic, civil engineering, architectural and decorative, water service delivery, utilization and customer satisfaction problems. The general rule for pre-socialist urban planning involved to some degree the influence of private ownership of condominium sites. The inequality of property distribution was reflected in the methods of planning and 16 constructions and in the organization of public services of urban territory. Ruling-class districts, created on the basis of the best contemporary urban planning achievements were drastically different from the overcrowded working-class

areas, which lacked essential public amenities such as water service delivery, utilization and customer satisfaction. There are presently two social orders in the world socialism and capitalism which determine two ways of developing urban planning. Under capitalism the interests of landowners, industrialists, and financiers usually lead to the haphazard construction of population centers that contradict the goals of urban planning. Under socialism the state planning of the national economy creates all the conditions needed for the systematic, scientifically based development of the kinds of cities most suitable for the work, daily life, and relaxation of the entire population. The theory and practice of urban planning accomplishes two tasks: the reconstruction and development of old cities and the construction of new cities. It proposes zoning of urban territory to be carried out in order to create the most beneficial living conditions for the population and to facilitate the functioning of the city as a whole.

Urban planning decisions should be made with due regard for the development of industrial, residential, and recreation areas and for satisfying the requirements of sanitary engineering (for example, in water and air purity, insolation, and soundproofing).

This research paper can be applied to as well solve the challenges of water service delivery, utilization and customer satisfaction in weyra condominium site kolfe keranyo Addis Ababa.

Figure.2.1: Theoretical model representing the theory of planning and building condominium sites. (Source: Author, 2014).




(Source: Author, 2014).

**Figure 2: Theoretical model representing the theory of planning and building condominium sites.**

## 2.8. Application of the theoretical Model

The theoretical model (above) shows how the challenges of water service delivery; utilization and customer satisfaction would be tackled basing on the theory of planning and building cities. There exist ruling class districts in in weyra condominium sites where there are controlled on residential developments adequately supplied with water and sanitation along in weyra condominium sites. However, in the other similar areas, there were exist uncontrolled residential developments that lack adequate water service delivery, utilization and customer satisfaction. This inequality calls the need for proper urban planning and reconstruction of infrastructure systems to ensure this challenge is addressed. The two social orders of socialism and capitalism exist in weyra condominium site and would be determine the development of urban planning. There are private landowners and service providers whose interests in the

maintenance and rehabilitation of service delivery, utilization and customer satisfaction. network would be considered. There would be reduce conflicts in implementing the goals of urban planning. The government and relevant authorities would be providing the state planning of the national economy to provide all the conditions needed for the systematic, scientifically based development of the kinds of urban condominiums were most suitable for the work, daily life, and relaxation of the entire population which includes adequate provision of service delivery, utilization and customer satisfaction in weyra condominium site through urban planning.

**Table 1: Water Service Quality model (WASERVQUAL)**

| Dimension | Description | Indicators |
|---|---|---|
| Reliability | Ability to perform the service dependably and accurately | ▪ Living to the promises made<br>▪ Showing sincere interest in solving customer's problems<br>▪ Providing water at the promised time<br>▪ Ensuring billing accuracy<br>▪ Ensuring few water interruptions |
| tangibles (service environment) | Appearance of physical facilities, equipment, personnel and communication materials. | • Having up-to-date equipment<br>• Having visibly appealing facilities<br>• Having employees that are well dressed and appear neat<br>• Having water pipes that are well maintained |
| Responsiveness | Willingness to help customers and provide prompt service. | • Customers given individual attention<br>• Identifying customer's needs<br>• Having customers' interests at heart<br>• Prompt handling of complaints |
| Assurance | Knowledge and courtesy of employees and their ability to convey trust and confidence. | • Customers trusting employees<br>• Customers considering water to be safe<br>• Employees being polite<br>• Employees having knowledge to address customer's questions |
| Empathy | Caring, individualized attention provided to the customer. | • Timely information on likely water disconnection<br>• Adequate time given for water bill clearance<br>• Length of queues while clearing water bills<br>• Willingness of employees to help |
| (Source: Parasuraman et al. [10]; Tynan and Kingdom [19].) | | |

## 2.9. Conceptual Framework

Water service delivery, utilization and customer satisfaction challenges can be viewed in terms of policy relevant questions for instance; how much resources are available and who needs it? Who gets how much? At what cost? (IDRC, 2002). In connection to this more pressing questions need to be addressed: who decides? By what procedures? What features of governance will most likely produce management decisions that are fair, equitable and environmentally sustainable? The aim of this conceptual model is to address issues of environmental degradation as result of water and sanitation access challenges, discrimination of some areas in provision of Water service delivery, utilization and customer satisfaction, demographic pressure on Water service delivery and utilization management, infrastructure deterioration among others.

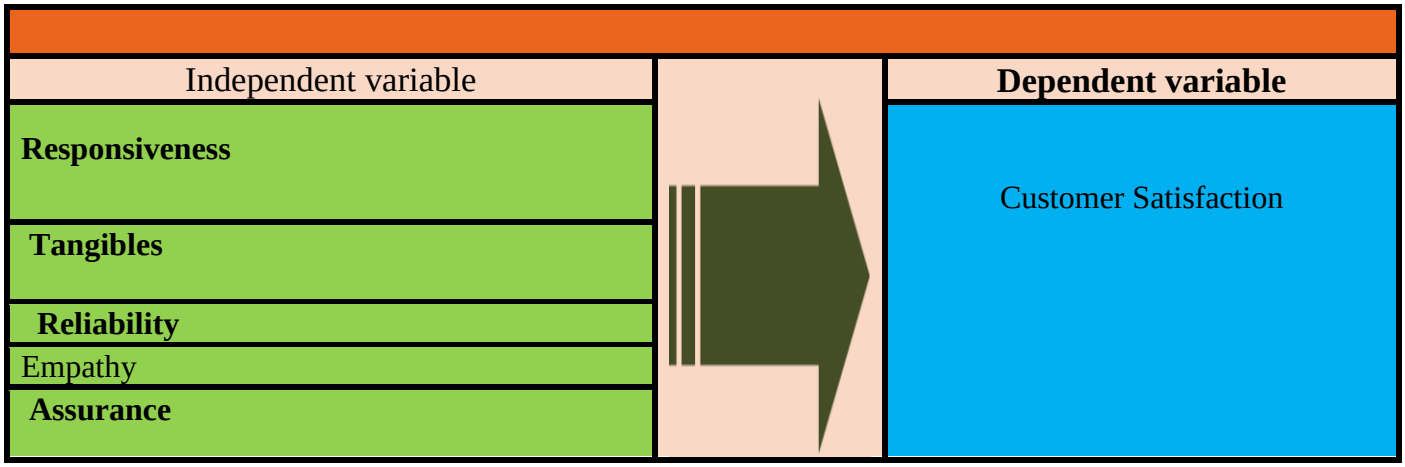
Water delivery service and customer utilization were key concepts which lead to estimate customer satisfaction. The concept raised in this respect are policy relevant questions which needs to be addressed; adequacy of the available resource? At what quality? Equitability in resource distribution? The aim of my research conceptual model was focused on assessing the water delivery and utilization in ‘Woyra’ condominium site which will help to measure level of customer satisfaction.

**Table 2: Conceptual model showing improved, adequate and equitable water service delivery, utilization and customer satisfaction**

| Basic characteristics of water and sanitation services | Access challenges | Equitable access dimension | Interventions | Result |
|---|---|---|---|---|
| No physical access (no water service delivery, utilization available, water sources polluted, no facilities) | Uncontrolled residential affected by environmental degradation or scarcity, have no physical access or have access of lower quality than other areas - Mechanical incompetence - Demographic pressure on water service delivery, utilization and customer satisfaction management - Dilapidated water infrastructure | Geographical disparities | Employ qualified water service delivery professionals Adjust water and sanitation tariffs Upgrade of infrastructure Community participation in key water and sanitation decision making Equitable Allocation policy to be adhered to Proper monitoring and maintenance of water and sanitation infrastructure | Improved, equitable and adequate water delivery and customer sanitation |
| Low quality of physical services (water contamination, discontinuous service) | Physical services are not adapted to the physical needs of certain groups (people with disabilities, schoolchildren, poor people) | Access by vulnerable or marginalized groups | | |
| | The water and sanitation bill represents too large a share of disposable income for some household | Affordability by users | | |

(Source: Author, 2014).

The conceptual framework indicates the relationship between the quality service delivery (independent variables of the study) responsiveness, tangibles, reliability, empathy, assurance and customer satisfaction (dependent variable of the study).




Source: Parasuraman, et al, 1988.

**Figure 3: service quality and customer satisfaction model.**

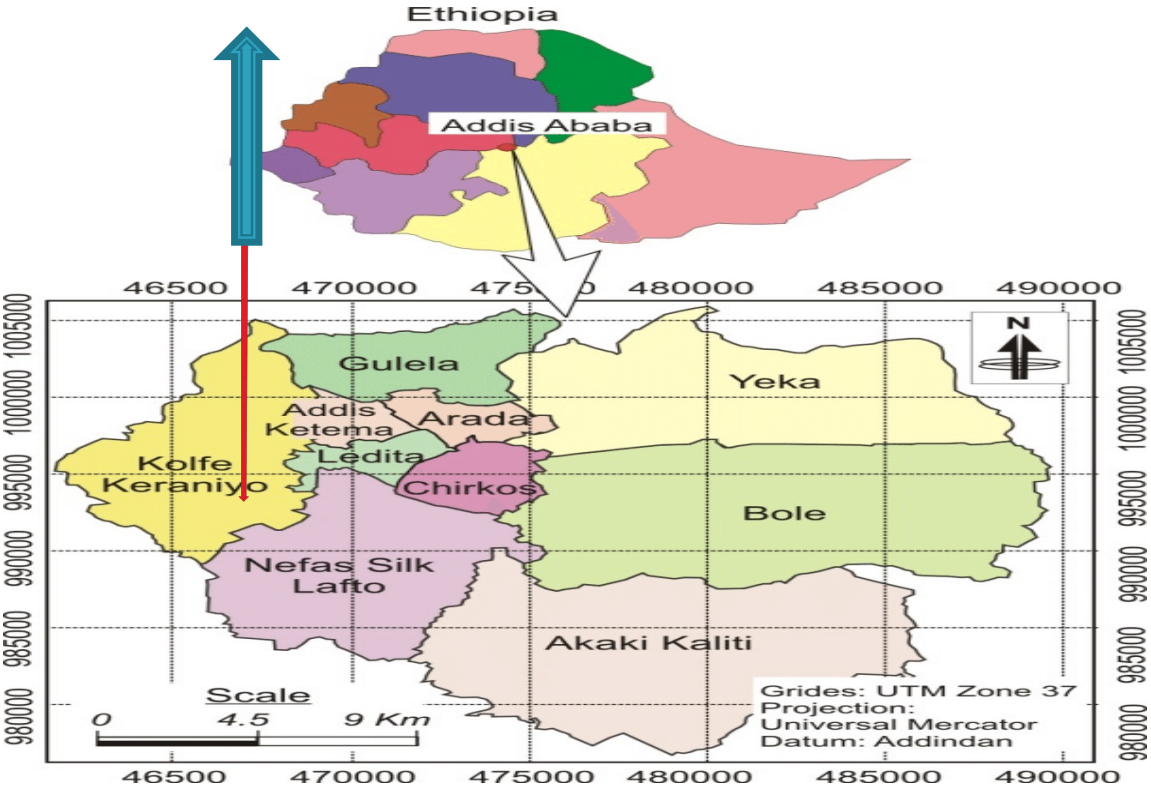
# CHAPTER THREE

# 3. METHODOLOGY

## 3.1. Physical description of the study area

The study area was conducted in Woyra Condominium site which is located at Kolfe Keranio sub city, Addis Ababa. Kolfe Keranio sub-city is one of the newly established ten sub-cities of Addis Ababa. It was located in the western part of the city, between 8°S7'00"N and 9°0S'24"N and between 38°39'36"E and 38°43'12"E It is 9.6 km from the center of the city and has an estimated total area of c. 6400 hectares (See Figure1). According to the records of the sub-city, the total populations of the sub-city were estimated at 261,235 in 2011. Geographically, the Kolfe area covers locations stretching from the Dutch Embassy to the General Wingate High School area. The General Wingate area in the north, the Mesalemiya area in the east and the Torr-Hayloch area in the south bordered Kolfe. Bulecha and Akaki Rivers are the two perennial rivers flowing through the Kolfe area.

**Kolfe Keranio sub city**




**(Source:https://www.google.com/search?q=kolfe+keranio+sub+city+map&tbm)-**

**Figure 4**: **Location map of Kolfe Keranio sub city, Addis Ababa, Ethiopia**

## 3.2. Study Design

The aim of thesis is to gather information among water service delivery, utilization and customer satisfaction at weyra condominium site kolfe keraneo Addis Ababa.Cross-sectional studies were conducted from May 2021 to July 2021 at Woyra condominium site, in Kolfe-Keranio sub city, Addis Ababa, Ethiopia. Both qualitative and quantitative approaches were used to analyze information gathered concerning the respondents' characteristics, water supply situation, customer water utilization and level of satisfaction towards the service. Moreover, information on the possible challenges and opportunities on the water delivery system were analyzed.

## 3.3. Study Population

All the residents of Woyra condominium site who have been lived at least for the last two years prior to the time when this study was conducted were considered as the study population for the present study.

## 3.4. Sampling Method and Sample Size Determination

A simple random sampling technique was used to select the study participants in the study area. In Addis Ababa, there are 11 sub cities. These are Arada, Addis Ketma, Ledeta Kolfie Keranio,Yeka, Nifas Silk, Kirkos, Akak, Gulelie, Bolie and the newly formed Bole-Lemi. Among these, Kolfe-keranio sub city was selected randomly. Similarly, the Woyra condominium site was also selected as a study site with simple random technique. The sample sizes for this study were determined based on the assumption that there is no adequate information about the magnitude of water supply challenges in the study area. There was desirable to have a sample which was representative of the total households of housings as much as possible. Thus, the minimum sample size of the house hold for this study was considered to be 200 households. However, we have been managed to collect data from 240 households. The housing blocks were also selected randomly.

## 3.5. Data Collection method

The data was collected using a structured questionnaire to collect information on water service delivery, utilization and customer satisfaction challenges on the water supply system. In addition, was conducted to collect information on water delivery service, challenges from the AAWSA officials. Although, Observation and focus group discussion with key respondents were made.

**Survey:** To generate information at household level, structured questionnaires would be used. Prior to conducting the survey, pre-test of the survey schedule would be under taken and accordingly remedial action would be made. Then, the survey would be conducted to the selected respondents in the study area.

**Key Informant:** A group consisting of 10 members; 1 branch manager from Kolfe-keranio sub-city office of Addis Ababa city Water and Sewerage Authority (AAWSA), two officials from the head office of the AAWSA would be selected and carried out the interviews about the water supply coverage, the balance between demand and supply of water in condominium housings of Addis Ababa, the major challenge were faced in the provision of these services and there would be sorted out.

**Personal Observation**: There would be carried out in order to obtain information how residents of Condominium housings collect water when there was no water in the building and some other important situation related to water supply. Therefore, the researcher would carry out documentation of the area's water collection and storing methods with photographs. The researcher would make various visits to the site to make preliminary assessments. This initial observation was followed by a more focused survey to identify the main characteristics of the area.

# CHAPTER FOUR

# 4. RESULTS

## 4.1. Analysis and Implementation

The data were collected to meet the general and specific objectives were analyzed using different approaches. Both qualitative and quantitative approaches were employed to organize and analyze the data collected. First, the data from the answered questionnaires were manually transferred to an excel spreadsheet. Statistical analysis was conducted using SPSS software version 20. For quantitative data, the data were using frequencies and percentages and the findings were presented in the form of tables and figures. A narrative approach was used to analyze qualitative data which were collected by personal observation.

## 4.2. Socio demographic Characteristics of the Study Participants

Among a total of 240 sample households, 90 (37.5%) and 64 (26.5%) were in the age ranges of 31-40 years and 41-50 years, respectively. Out of the total 240 respondent's household heads, 114(47.5%) were males and 126 (52.5%) were females, respectively. The respondents were different levels of education, among which, 86 (35.8%) had BA/BSc degree and 82(34%) of the household heads had other none formal education level. The households were a family size ranging from a single person to 9 individuals in which the majority 147(61.3%) of the households had a family size of 4-6 individuals.

Regarding to the marital status of sample households, out of 240 heads of households in sample population, 168 (70.0%) were married, 43 17.9%) never got married while the rest 23 (9.6%) and 6(2.5%) were divorced and widow, respectively.

Accordingly, the average monthly income of the sample households was 5250 birr, which ranges from 2500 birr to 15000 birr. On the other hand, when this average monthly income was divided to the average family size of the sample households (5 individuals) and monthly was 1050 birr per person (Table 1). About more than a half of the households 168 (68.7%) had a monthly income of 5000 Ethiopian birr (ETB) and above. In terms of occupation, about 37.1% of the total respondents were merchants, while; 20% and 34.6% were government and private employees, respectively.

**Table 3: Socio-demographic Characteristics of the Study Participants, Woyra Condominium Site, Addis Ababa, 2013**

| Characteristics | Frequency | Percent |
|---|---|---|
| • **Age** (years) | | |
| • 20-30 | 51 | 21.5 |
| • 31-40 | 90 | 37.5 |
| • 41-50 | 64 | 26.5 |
| • >50 | 35 | 14.5 |
| • **Gende**r | | |
| ▪ Male | 114 | 47.5 |
| ▪ Female | 126 | 52.5 |
| • **Marital status** | | |
| • Married | 168 | 70 |
| • Single | 43 | 17.9 |
| • Divorced | 23 | 9.6 |
| • Widowed | 6 | 2.5 |
| • **Education status** | | |
| • BA/BSC | 86 | 35.8 |
| • MA/MSC | 43 | 17.9 |
| • PhD | 29 | 12 |
| • Other | 82 | 34 |

| | | |
|---|---|---|
| ❖ **Family size** | | |
| ▪ 1-3 | 61 | 25.4 |
| ▪ 4-6 | 147 | 61.3 |
| ▪ 7-9 | 32 | 13.3 |
| ❖ **Occupation** | | |
| ▪ Merchant | 89 | 37.1 |
| ▪ Government employee | 48 | 20.0 |
| ▪ Private employee | 83 | 34.6 |
| ▪ Other | 20 | 8.3 |
| ❖ **Monthly income** (ETB) | | |
| ✓ <2000 | 21 | 8.8 |
| ✓ 2000-5000 | 54 | 22.5 |
| ✓ 5000-10,000 | 92 | 38.3 |
| ✓ >10000 | 73 | 30.4 |
| **Total** | **240** | **100** |

In addition, 5 responsible officials of the Addis Ababa Water and Sanitation Authority (AAWSA) were responded about the water supply and sanitation condition, challenges of water supply and opportunities to improve the water supply in Woyra condominium site. Four of these officials were males with in the age range of 20-30 years. Three of them had a first degree and the other 2 had a master (MA/MSc) degree of educational status.

### 4.3. Water Supply Conditions of Household Respondents

In this part of the study the summery of respondents were responded on water supply and utilization related questions, that were, the availability of pipes connected to their condominium unit, whether tap water flows weekly or not, availability of other sources to fetch water around their residence, expensiveness of their monthly water bill, water adequacy to meet their basic requirements, availability of enough daily water flow for consumptions such as drinking, cooking, bathing, toilet flashing; whether the water price per liter was affordable to their condo site; about an interruption/or irregularities in the water supply in the condominium site; variation in the amount of water supply in each floor of the building; quality of water supplied by

AAWSA to their Condominium unit; satisfaction level of the respondents with the water supply and sanitation provided by AAWSA.

Moreover, the AAWSA officers were interviewed concerning the water supply service they were supplying including the challenges and opportunities in their effort of service delivery.

**Table 4: Availability of functional water pipe lines in Woyra condominium unit, Addis Ababa, 2013**

| Scale | Frequency | percent | Valid percent | Cumulative percent |
|---|---|---|---|---|
| Strongly disagree | 5 | 2.08 | 2.08 | 2.08 |
| Disagree | 11 | 4.583 | 4.583 | 6.663 |
| Neutral | 22 | 9.16 | 9.16 | 15.82 |
| Agree | 103 | 42.916 | 42.916 | 58.736 |
| Strongly agree | 99 | 41.25 | 41.25 | 99.986 |
| Total | 240 | 100 | 100 | |

Source: Field Survey, 2013.

#### 4.3.1. Availability of Water Pipes Connected to their Condominium Unit

The availability and functionality of water pipes were connected to the condominium units of the respondents were important to assess and understand the water supply efforts made by the government water supplier office.

The survey result in the present study revealed that the majority of the respondents, 201 (84.1%) showed their agreement [strongly agree (41.2%), agree (42.9%)] that there are functional water pipe lines connected to their condominium unit. Whereas, a total of 16 (6.5%) of the respondents did not show their agreement on the availability of functional pipe lines to their residential units. They have been explained their disagreement in that although there are pipe lines in place, there was a frequent break down of the pipes due to lack of proper and timely maintenance services. As shown in Table 2 above, only 22(9.2%) of the household heads were neutral in responding for the survey question raised above.

### 4.3.2. Adequacy of average daily water flow for household consumptions

Furthermore, respondents were asked whether the average daily water flow was enough for their consumption needs such as drinking, cooking, bathing and toilet flashing. From the survey result we observed that most respondents used the available water for their daily consumptions such as drinking, cooking, bathing. However, due to insufficiency of water only some of them used clean water for toilet flashing. Table 2 below shows that more than half of the total respondents, 141 (58.7%), replied that they couldn't agree [strongly disagree (56.7%), agree (2%)] on the availability of adequate water supply for their average daily consumption was needed. These respondents has been explained that there were variations in the amount of water flow across the different floors of their condominium units; hence, those at the upper floors did not get adequate water flow to their daily consumption needs. Whereas, about 67(27.9%) of the total respondents replied that they were comfortable in having adequate water for their daily consumption. They have been pointed out that they are benefited to get more water access as their houses were at lower floors of the condominium unit (Table 3).

**Table 5: Adequacy of average daily water flow for household consumptions such as drinking, cooking, bathing and toilet flashing, Woyra Condominium unit, Addis Ababa, 2013**

| Scale | Frequency | percent | Valid percent | Cumulative percent |
|---|---|---|---|---|
| Strongly disagree | 136 | 56.66 | 56.66 | 56.66 |
| Disagree | 5 | 2.08 | 2.08 | 58.74 |
| Neutral | 32 | 13.33 | 13.33 | 72.07 |
| Agree | 49 | 20.41 | 20.41 | 92.48 |
| Strongly agree | 18 | 7.5 | 7.5 | 99.98 |
| Total | 240 | 100 | 100 | |

Source: Field Survey, 2013

### 4.3.3. Household's family size and average daily water consumption

The water consumption in relation to family size of respondents, family size and Water consumption were directly proportional and those who had large number of family size were needed large amount of water for their different family needs and is crucial to lead their daily ways of life.

Therefore, regarding family size of the respondents and water consumption, the survey result showed that from the total household respondents, the majority 147(61.3%) of them had 4 to 6 household members, 61 (25.4%) of the respondents had family size of 1 to 3 and 32 (13.3%) of respondent household had 7 to 9 household members. As shown in Figure 3 below, among respondents who had 1-3 individuals (family members), 32 (52.5%) of them had 20 liters or less average daily water consumption whereas only 8 (25%) of households who had a family size of 7 to 9 individuals consumed 20 liters or less amount of water for their daily consumption. In addition, 42.1% and 43.7% of households having family sizes of 4 to 6 individuals and 7 to 9 individuals, respectively, consumed more than 80 liters of water daily. Whereas, only 4.9% of households having 1 to 3 individuals had a daily water consumption of more than 80 liters (Figure 4).

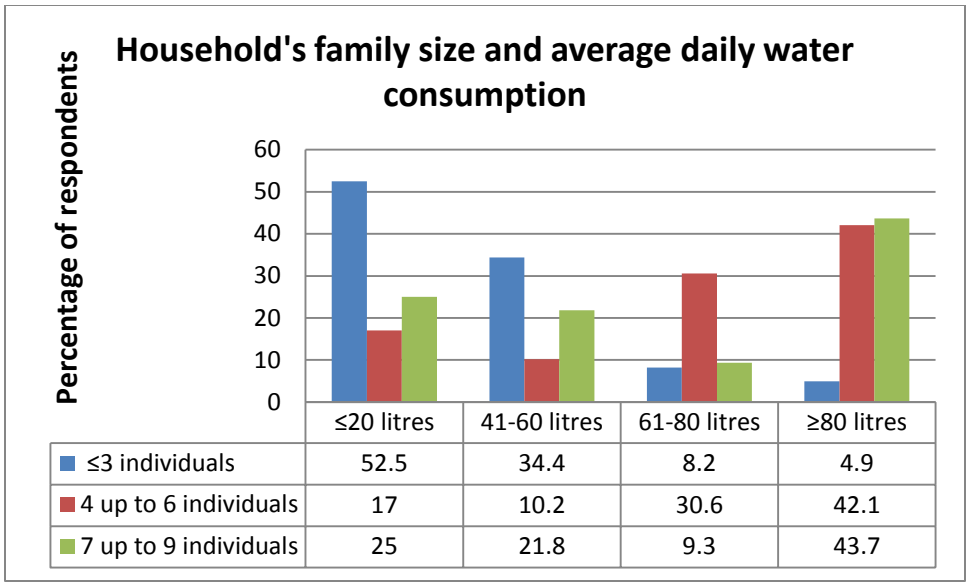



**Figure 5: Household's family size and average daily water consumption, Woyra condominium site, Addis Ababa, 2013.**

#### 4.3.4. Cost of water in condominium housing units

In addition, the respondent households were asked about the cost of average as water bill per month in their condominium residence water supply. The households are billed according the liters of water used per month. The respondents had different opinions on the issue of water tariffs in the study area. Whilst some people believe that they are being paid much, others are enjoying under- billing. The findings of the survey shown in Table 3 indicated that most of the respondents, 208 (86.6%), agreed at different levels [strongly agree 112 (46%) and agree 96 (40%) that the water tariffs they were paying per month was affordable to them. Whereas, 20(8%) and 12(5%) were neutral and disagree with the affordability of the monthly water bill, respectively (Table 4).

The AAWSA officials argued that the water tariff was very low and much affordable to the customers. However, the low water tariff was insufficient to cover costs such as operation, maintenance, energy and replacement costs. Hence, the water tariff could not encourage the AAWSA in its efforts to improve services to the residents of condominium unit.

**Table 6: Affordability of Cost of water in condominium housing units, Woyra site, Addis Ababa, 2013**

| Scale | Frequency | percent | Valid percent | Cumulative percent |
|---|---|---|---|---|
| Strongly disagree | | | | |
| Disagree | 12 | 5 | 5 | 5 |
| Neutral | 20 | 8.33 | 8.33 | 13.33 |
| Agree | 96 | 40 | 40 | 53.33 |
| Strongly agree | 112 | 46.66 | 46.66 | 99.99 |
| Total | 240 | 100 | 100 | |

#### 4.3.5. Satisfaction level in the water supply and sanitation in current condominium housing unit

Respondents were also asked about their level of satisfaction with respect to water supply and sanitation in their current condominium housing unit. About 10.8% of the respondents were neutral regarding the satisfaction in the water supply and sanitation in current condominium housing unit whereas 18.3% were not satisfied. About 5% of the respondents were satisfied whereas none of the respondents were strongly satisfied their current housing water supply and sanitation facilities (Figure 5).

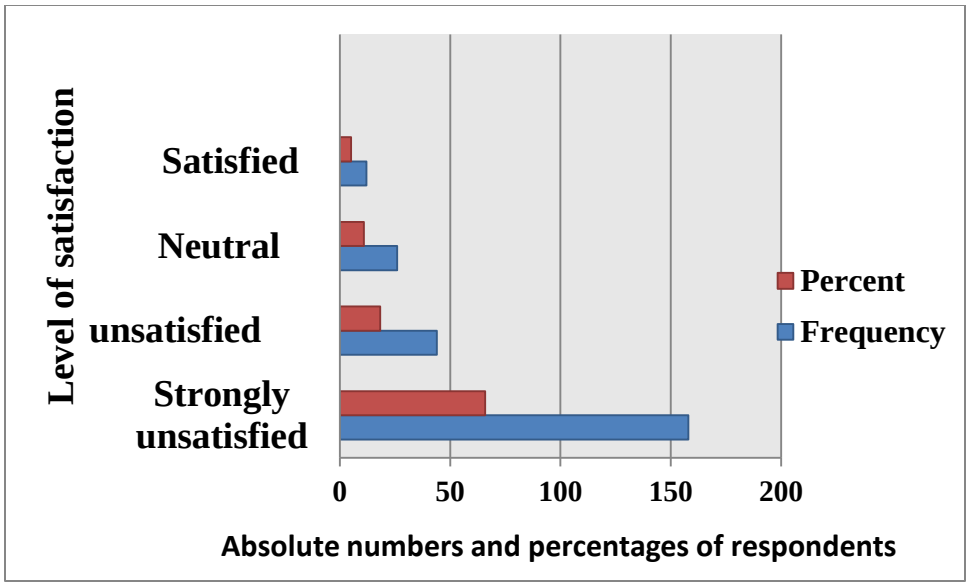



**Figure 6: Level of satisfaction of respondents to water supply and sanitation condition in Woyra condominium site, Addis Ababa, Ethiopia.**

#### 4.3.6. Challenges of water supply in Condominium housing units

This survey showed that the possible causes of water supply problems in Woyra condominium site are many. The respondents were asked to rank the causes of the water supply problems in their condominium residential units. 45.9% of the respondents stated that the major cause of the water scarcity in the area was due to the insufficient water source. About 14.1 % of them suggested the cause of the problem was an increasing number of populations in their residential site in which the available water source cannot support the needs of all the residents sufficiently. About 7.9% of the respondents argued that the frequently broken down of water pipe lines were one of the major causes of water supply in the study area. Among the total respondents, about 10.5% of them suggested that water interruption and irregularity was one of the major challenges in the supply of water in the study area. Poor governance and policy support, lack of knowledge and skills of the AA WSA technical expertise and Settlement pattern and topography were rated

as the possible challenges of the water supply service by 8.3%, 4.6% and 5% of the total respondents, respectively (Table 5).

**Table 7: Challenges of water supply at Woyra condominium site, Addis Ababa, 2013**

| **Possible challenges of water supply** | **Frequency** | **Percentage** |
|---|---|---|
| Poor governance and policy support | 20 | 8.3 |
| Technical challenges such as lack of knowledge and skills | 11 | 4.6 |
| Technological challenges such as availability & selection of appropriate technology | 2 | 0.8 |
| An increasing population number is among the social challenge | 34 | 14.1 |
| Environmental issues such as quantity and quality of water sources | 7 | 2.9 |
| Settlement pattern and topography | 12 | 5.0 |
| water interruption and irregularity | 25 | 10.5 |
| Frequently broken down of pipe lines | 19 | 7.9 |
| Insufficient water sources | 110 | 45.9 |
| **Total** | **240** | **100** |

Source: Feld survey, 2013

In addition, The AAWSA officials and experts interviewed in this survey agreed on the availability of challenges in water service delivery to the condominium sites. The officials also admitted that their water delivery service was not to the level that brings customer satisfaction. In short, they pointed out that the major challenges were lack of proper planning and implementation, financial shortages for maintenance of broken pipes and installation of new pipe line, lack of trainings to empower technical experts, lack of support from stallholders and rapid population growth at the condominium sites.

#### 4.3.7. Opportunities and Interventions to improve water supply services in the condominium housings units

In the focus group discussion, both the residents of the Woyra condominium site and the AAWSA officials agreed that there are opportunities to improve the water supply service. Among these, the residents have a formal committee or association which is willing to work and cooperate with the AAWSA officials to solve challenges together. There is also an opportunity to increase the water volume supplied by developing other water sources such as additional wells. During the discussion, the AAWSA officials also showed their commitment to discuss with the residents and find out better solutions to the problem.

**Interventions:** The households' respondents were asked what to be done to overcome water supply problems or to improve water supply services in the condominium housings of Woyra site. In response to the question, they have prioritized some intervention measures to be taken both by the residents themselves and the AAWSA of the city. Among the proposed intervention measures, development of additional water sources (wells) was rated by most (41%) of the respondents. About 22% of the respondents stressed that the authority would be distribute the available water fairly among the different condominium sites and across the different floors of the same buildings. Conducting timely response to customers' requests such as maintenance of broken pipe lines and frequent water interruptions was suggested by 12% of the total respondents. Moreover, about 10.5% of the total respondents said development of electrical power supply and upward pumping motors could improve fair distribution of water along the building floors (Table 6).

**Table 8: Intervention measures to be taken to improve water supply to Woyra condominium site, Addis Ababa, 2013**

| Intervention measures | Frequency | Percentage |
|---|---|---|
| AAWSA should distribute water fairly and equally among the different condominium sites | 53 | 22.0 |
| AAWSA should conduct timely response to customers' requests such as maintenance and water interruptions | 29 | 12.0 |
| The authority should support and cooperate on the development of additional water sources (wells) should be developed by the cooperation of the residents and the AAWSA | 98 | 41.0 |
| Awareness creation on proper water utilization and water saving to the residents | 10 | 4.2 |
| Proper planning and coordination by concerned bodies to meet the residents water needs. | 13 | 5.5 |
| Development of electrical power supply and upward pumping motors for fair distribution of water along the building floors | 25 | 10.5 |
| The residents' association should cooperate with the AAWSA and NGOs to improve water supply service | 12 | 4.8 |
| Total | 240 | 100.0 |

# CHAPTER FIVE

# 5. DISCUSSION

In the present study, about 47.5% were males and 52.5% were females, respectively, suggesting that there was no significant gender variation on the water customers in the study area. This finding was in agreement with a previous study conducted (Lwitakubi, 2013) in which 50% of the study participants were females and the other 50% of them were males, respectively. The above raw data in this study reflected the basic necessity of water demand by all sex groups in the study area. However, in a study conducted in 11 major cities of Uganda, household gender differences were one of the socio demographic characteristics influencing payment for water services (Kayaga, Calvert, and Sansom, 2003). This variation may be due to geographical location and sociocultural habit differences between the study sites.

Household income was the most determinant factors of individual living standard in general and consumption in particular. In the present study, the average monthly income of the sample households was 5250 birr, which ranges from 2500 birr to 15000 birr. This finding was greater as compared to a previous study conducted by Deyessa (2011) in Ambo town which recorded an average monthly income of 602 Birr. A similar study in Micky Leland condominium site, Addis Ababa recorded a monthly income of less than 3000 Birr for about 58% of the residents (Mekonnen, 2015). However, when this average monthly income is divided to the average family size of the sample households in the present study (5 individuals), the monthly income was 1050 birr per person. This suggested that there is a low financial power to afford the water bill costs in the study community. The above finding implies the water authority should conduct periodic surveillance on the water costs and take corrective measures for its affordability by the customers.

In this study, the majority (61.3%) of the households had a family size of 4-6 individuals. This was in agreement with the previous study conducted in other part of Addis Ababa ((Mekonnen, 2015). Which recorded an average number of family member's equals to 4. When we see the water consumption in relation to family size of respondents, family size and water consumption is directly proportional and those who had large number of family size need large amount of water for their different family needs. Similarly, a study conducted by Yehouala (2013) recorded that 18 households having a family member of 3 to 5 individuals had an average daily water consumption of about 100 liters while only a single household having less 3 family members was reported to consume the same amount of water daily. Hence, the presence of larger family members in the condominium sites indicated a need of much water consumption. This implies that the water supply effort should be enhanced to meet the ever increasing population size in the condominium site.

Most of the respondents (58.7%) replied that they did not agree on the availability of adequate water supply for their average daily consumption needs such as drinking, cooking, bathing and toilet flashing. During the field observation and according to focus group discussion made with selected study participants, they have got water by storing when water comes through their water taps. In Woyra condominium there are many water tankers seen in most buildings. Residents complained that unless those individuals' tanker filled, water cannot reach to 3'd and 4th floors. Furthermore, these respondents explained that there were variations in the amount of water flow across the different floors of their condominium units; hence, those at the upper floors did not get adequate water flow to their daily consumption needs. This was in agreement with the finding of a research conducted at Micky Leland condominium site in the other part of Addis Ababa (Mekonnen, 2015). The above findings indicated that the water volume currently delivered

should be increased to meet the daily consumptions of the residents. Moreover, equity in water distribution across the different floors of buildings should be maintained.

With respect to the customer satisfaction level on the water supply service in the Woyra condominium site, only 5% of the respondents were satisfied and none of the respondents were strongly satisfied. This level of satisfaction in the present study was lower than the findings of Yehouala (2013) in the other part of Addis Ababa in which about 17.5% of the total respondents were satisfied and 16% of the respondents also strongly satisfied with their current housing water supply and sanitation facilities. Another previous study in Addis Ababa reported that about 40% of the total respondents did not agree for the question asked if they were satisfied by the general service, they obtained from AAWSA organization (Wakagari, 2010). The above difference in the level of satisfaction may be due to differences in service delivery by the AAWSA. This reasoning was supported by points raised by the respondents during the focus group discussion. According to them, there was a biased water distribution system by the authority in which some sites in Addis Ababa such as Bole, Rwanda where high living standards of population were living had a continuous access of water where as those with poorly living standards populated areas such as Woyra, Kolfe-keranio and other sites were experiencing a continuous water interruption. This implies that a lot should be done by the authority to meet the customer's water satisfaction in the study site.

The present study revealed that there were many problems or challenges regarding the water service supply in the study area. The existence of the problem was confirmed by both household respondents (water consumers) in the survey and interviewed officials of the Addis Ababa Water and sewerage Authority. The most rated challenges in the water supply system were insufficient water source (45.9%), an increasing number of populations in their condominium units (14.1%),

water interruption and irregularity (10.5%) and frequently broken down of water pipe lines (7.9%). The finding of the present study with respect to level of water interruption/ irregularities was lower as compared to another study in Addis Ababa which recorded about 91% of the residents replied that there is water interruption! irregularity/ in condominium housing water supply (Yehouala, 2013). In support of our findings, insufficient water production, water leakage, unreliable and high-power tariffs, poor bill payment and insufficient training of man power were reported to be some of the challenges of water supply system in Dodoma, Tanzania (Lwitakubi, 2013). The above findings indicated that a considerable amount of the population was suffering from water shortages and the variation in water irregularities also indicated the presence of biased distribution of water within the different condominium sites in the city. All the above findings and reasoning have an implication to a low satisfaction level of the customers by the current water supply system. During the focus group discussion, the respondents also pointed out that there is variation in the amount of water across the different floors of buildings. This has been also supported by the above previous study in which about 83% of them said water is not always/ all the time / available in their floor (Yehouala, 2013). This suggested that a lot should be done to maintain equity in the distribution of water among the residents.

In general, according to the interviewed officials of AAWSA, shortage of finance and skilled man power or technical experts, weak coordination and collaboration among different offices such as water authority with telecommunication and road authorities, failure in effective plan implementation, rapid population growth that demand water delivery service were the major challenges in supplying water to residence of Addis Ababa in general and Condominiums including the Woyra site in particular, implying the water supply system is encircled by different challenges which need an urgent mitigating measures.

Despite the existence of serious challenges that hinder water supply services to the condominium sites in Addis Ababa, both the residents and the AAWSA officials suggested the presence of some opportunities to improve the condition. Among these good opportunities, the residents have a formal committee or association which is willing to work and cooperate with the AAWSA officials to solve challenges together. The residents were willing to share the finance required for the development of other water sources so that their water volume will increase. They also pointed out that the good social interaction among the residents of the site will give a good opportunity to share the available water without quarrel or disagreement. Similarly, other studies conducted in Addis Ababa also felt that having opportunities such as having individual pipe lines, having immediate response by the AAWSA officials for their group questions will improve the water availability without frequent interruption in their condominium sites (Yehouala, 2013). The availability of different opportunities raised above implied that the challenges faced in water supply system in the study area can be solved with active participation of the residents and the water authority officials.

# CHAPTER SIX

# 6. CONCLUSION AND RECOMMENDATION

## 6.1. Conclusion:

In this chapter, the main findings presented in the result section will be presented. Particularly, the researcher were presented the responses of both the residents' responses at Woyra condominium site and those interviewed officials of the AAWSA officials concerning the household heads socio demographic characteristics, water supply conditions, level of satisfaction of customers on the water supply system in their condominium unit and the major challenges that hinder the water supply and delivery system. Furthermore, the available good opportunities to improve water access and reduce frequent interruption of water were presented.

- The present study revealed that the household heads had diverse socio demographic characteristics such as different age groups, sex, educational back ground, marital status, family size and different average monthly income. Among the different residents' characteristics, average monthly income and family size were found to be the major determinant factors to influence their water consumption level.
- The study was also targeted to assess the water supply condition in the study area. The survey results showed that the majority of the respondents (84.1%) showed their agreement on the availability of functional water pipe lines connected to their condominium unit. Moreover, more than half of the total respondents (58.7%) replied that they were not agree on the availability of adequate water supply for their average daily consumption needs such as drinking, cooking, bathing and toilet flashing.

- This study was also interested in assessing the cost of water (tariff) in Woyra condominium site. In this respect, the respondents had different opinions on the issue of water tariffs in the study area. Most of the respondents (86.6%) agreed at different levels that the water tariffs they were paying per month were affordable to them. Similarly, the AAWSA officials argued that the water tariff was very low and much affordable to the customers. However, the low water tariff was insufficient to cover costs such as operation, maintenance, energy and replacement costs.
- Moreover, the study was aimed to assess customer level of satisfaction with respect to water supply and sanitation in their current condominium housing unit. In this case, only about 5% of the respondents were satisfied whereas none of the respondents were strongly satisfied with their current housing water supply and sanitation facilities.
- Finally, this survey showed the possible challenges that hinder the water supply system and the available opportunities to improve the condition. Insufficient water source, an increased number of population, frequent interruption/irregularities of water delivery the frequently broken down of water pipe lines, lack of skilled man power of the authority and Poor governance and policy support were raised as the major challenges in the supply of water in the study area. However, despite the existence of problems, the survey showed the availability of opportunities to improve the current water supply system at Woyra condominium site.

## 6.2. Recommendations:

The findings of the present study revealed that there were many major challenges which hinder the water supply system in the study area. Hence, we have suggested below what things should be addressed and how to be implemented.

- The authority were needs to make additional effort in developing new water sources such as digging local wells and increase water volume for the customers. This can be done by creating mutual consents and active participation of the residents themselves.

- The AAWSA should develop its electrical power system or use pressure pumping system to deliver water equally to each floor of the condominium buildings, particularly, the $4^{th}$ and $5^{th}$ floors.
- By improving the skilled human power and using modern service delivery systems, the authority should give immediate responses to the resident's group questions concerning water supply and availability and maintenance issues.
- The authority should improve water supply services.by introducing and implementing the use of new technologies.
- For an effective service delivery, the AAWSA should implement an integrated approach with other supportive organizations such as telecommunication and Electricity authorities.

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## Annex-l

**Addis Ababa University**

**School of Graduate Studies**

**College of Business and Economics**

**Department of Management**

**Questionnaire for sample condominium household respondents (Water Consumers)**

**Dear Respondents:** This questionnaire is prepared as an instrument to conduct academic research for the partial fulfillment of the degree of Master in Executive Business Administration from Addis Ababa University College of Business and Economics. The main objective of this questionnaire is to get information about the socio-economic characteristics of households and the water supply opportunities and challenges of condominium housings in your area. The research aims to assess the challenges and opportunities of water supply service and water utilization, and customer satisfaction in Condominium housings at 'Woyra' area in Kolfe Keranio sub-city, Addis Ababa. The information supplied by you will be held strictly confidential and is used for academic purpose. You will not be held responsible for anything arising thereof.

**Thank you in advance for your valuable cooperation.**

**For further information, I will be available with the following address:**


- **Email: mesam48@yahoo.com**
- **Tel: 0913746946**

**Part I: Characteristics of Respondents**

**Section A: Personal profile of the respondent (household head)**

Respondent Nurnber _____

Site Name _____ Block number ____ housing floor number _____

**1) Gender:** Male ☐ Female ☐

**2) Age:** 20-30Years ☐ 31-40 Years ☐ 41-50 Years ☐ Above 50 Years ☐

**3) Educational level: -**BA/BSC ☐ MA/MSC ☐ PhD ☐ Others ☐

**4) Marital status: -** Married ☐ Single ☐ Divorced ☐ Widowed ☐

**5) Family Member (size):** 1-3 ☐ 4-6 ☐ 7-9 ☐ above 9 ☐

**<u>Section B: Economic characteristics of household respondents</u>**

1. **Occupation:** Merchant ☐ Government employee ☐ rivate employee ☐ Other ☐
2. Average monthly Income

**Less than** 2000-birr ☐ 2000-5000 birr ☐ 5000-10,000 birr ☐ above 10000, birr ☐

**Part II. Weyra Condominium site water Service delivery utilization and customer satisfaction and related questionnaire.**

Please select the appropriate answer for the questions stipulated below using a 5 Likert scale where **strongly agree (5), agree (4) neutral (3) disagree (2) and strongly disagree (1). Indicate a (√)** mark in respect to your response(s).

| No | Item | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| | **Part II. Weyra Condominium site water Service delivery, utilization and customer satisfaction and related questionnaire.** | | | | | |
| 1. | There are pipes connected to your condominium unit | | | | | |
| 2. | your tap water flows weekly | | | | | |
| 3. | There are other sources to fetch water around your residence | | | | | |
| 4. | You pay much (on the average) for water bill per month | | | | | |
| 5. | The water you fetch is sufficient to meet your household requirements | | | | | |
| 6. | The average daily water flow is enough for consumptions such as drinking, cooking, bathing, toilet flashing | | | | | |
| 7. | You use the same source of water throughout the year the one provided by the municipality to your condominium unit | | | | | |
| 8. | During water interruption of the municipal pipe, you pay more to buy water outside your house | | | | | |
| 9. | The water price per liter is affordable to your condo site | | | | | |
| 10. | There is an interruption/irregularity in the water supply in the condominium | | | | | |
| 11. | There are Insufficient water sources for the resident site | | | | | |
| 12. | Frequently broken down of pipe lines are observed in the condo site | | | | | |
| 13. | The reason for water interruption at condo sites is few pipe lines cannot support fast expansion of township and Poor quality of scheme construction | | | | | |
| 14. | There is A variation in the amount of water supply in each floor of the building | | | | | |
| 15. | A good quality of water is supplied by AAWSA to your Condominium unit | | | | | |
| 16. | The resident's association by the AAWSA will be helpful in solving some of your water supply problems | | | | | |
| 17. | You are satisfied with the water supply and sanitation provided by AAWSA | | | | | |
| | **Open ended question**<br>What can be done to overcome water supply problems or to improve water supply services in the condominium housings of Addis Ababa_____ | | | | | |

**Annex-II**

**Addis Ababa University**
**School of Graduate Studies**

**College of Business and Economics**

**Department of Management**

**Questionnaire for Water suppliers (AAWSA)**

**Dear Respondents:** This questionnaire is prepared as an instrument to conduct academic research for the partial fulfillment of the degree of Master in Executive Business Administration from Addis Ababa University College of Business and Economics. The main objective of this questionnaire is to get information about the socio-economic characteristics of households and the water supply opportunities and challenges of condominium housings. This research aims to assess the challenges and opportunities of water supply service and water utilization, and customer satisfaction in Condominium housings at 'Woyra' area in Kolfe Keranio sub city, Addis Ababa.

The information supplied by you will be held strictly confidential and is used for academic purpose. You will not be held responsible for anything arising thereof.

**For further information, I will be available with the following address:**


- **Email: mesam48@yahoo.com**
- **Tel:0913746946**


**Thank you in advance for your valuable cooperation.**

**Name of Responding Officers _____Position _____**

## I. Demographic Data

1. **Gender** Male ☐ Female ☐
2. **Age** 20-30Years ☐ 31-40 Years ☐ 41-50 Years ☐ Above 50 Years ☐
3. **Educational level** BA/BSC ☐ MA/MSC ☐ PhD ☐ Others ☐

## II. Water supply and sanitation related questions

Please select the appropriate answer for the questions stipulated below using a 5 Likert scale where **strongly agree (5), agree (4) neutral (3) disagree (2) and strongly disagree (1).** **Indicate a (√)** mark in respect to your response(s).

| No | Item | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| | **water service delivery system, customer satisfaction and sanitation related questions** | | | | | |
| 1. | The sources of water to dwellers of condominium housings of Addis Ababa are enough to meet the current and future water demand | | | | | |
| 2. | The current water tariff/price is sufficient to cover costs such as operation, maintenance energy and replacement costs | | | | | |
| 3. | The level of tariff / price encourages the AAWSA in its efforts to improve services to the residents of condominium | | | | | |
| 4. | There are problems with water supply and delivery services to the Condominium housing in Woyra area | | | | | |
| 5. | The challenges in providing water services to Condominium housings of Addis Ababa frequently exist. | | | | | |
| 6. | There is A Poor governance and policy support on water delivery system at condo housing | | | | | |
| 7. | Technical challenges such as lack of knowledge and skills happened on water service | | | | | |
| 8. | Technological challenges such as availability & selection of appropriate technology, and availability and affordability of spare parts happened on water service delivery. | | | | | |
| 9. | An increasing population number is among the social challenges in water supply system at condo sites in Woyra | | | | | |
| 10. | Environmental issues such as quantity and quality of water sources are among the challenges in water service delivery at condo sites | | | | | |
| 11. | Settlement pattern and topography are additional challenges to the water delivery system at condo sites. | | | | | |
| 12. | Sanitation problems happened due to water interruption and irregularity at condo sites | | | | | |
| 13. | The current water supply satisfies the customers | | | | | |
| 14. | There are opportunities of the water supply and delivery system in condominium housings of Addis Ababa compared with conventional houses | | | | | |
| 15. | AAWSA involved with residents' association of condominium housing in discussing water supply and delivery issues | | | | | |
| | **OPEN ENDED QUESTION**<br>What do you think can be done to overcome water supply problems or to improve water supply services in the condominium housings of Addis Ababa? | | | | | |