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TITLE: THE DETERMINANTS TO HOUSEHOLD'S ACCESS TO WATER SUPPLY

CASE STUDY: UBUNGO DISTRICT, DAR ES SALAAM.

BY

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SUBMITTED TO

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DECLARATION.

I, **MOSHI,ARK ERICK.** hereby declare that this research report entitled "***The Determinants of Households Access to Water Supply***" is the result of my own original work and that all sources of information and data used in the report have been acknowledged appropriately through citation and references. This report has not been copied or presented for a degree or diploma award purpose or any other purposes from another University.

SIGN……

Date: …….

ACKNOWLEDGEMENT

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DEDICATION

This work is dedicated to my mentor**, Ms. ESTER MOSHI**, whose guidance, expertise and invaluable support was instrumental in shaping my understanding and approach to various life topics. Her support was always a beacon of light, guiding me through challenges and inspiring me to strive for excellence.

LIST OF ABBREVIATION

DAWASA	Dar es Salaam Water and Sewerage Authority
DAWASCO	Dar es Salaam Water and Sewerage Corporation
EWURA	Energy and Water Utilities Regulatory Authority
NAWAPO	National Water Policy
NBS	National Bureau of Statistics
SDG 6	Sustainable Development Goal No. 6
MDG	Millenium Development Goal
TBS	Tanzania Bureau of Standards
URT	United Republic of Tanzania
WHO	World Health Organization
STATA	Statistical and Data
UDSM	University of Dar es Salaam

ABSTRACT

The main purpose of the study was to access the determinants affecting household's access to water supply. A case study that was conducted in Ubungo, Dar es salaam region.

The main objective of this research was *"To identify the determinants of household's access to water supply"* which could help determine and solve water challenges that the residents of Ubungo district are currently facing.

The data collection was guided by three specific objectives which are "*To access socio-economic factors that affects water access to households*", This objective was tested using Binomial test, Chi-Square test and ANOVA. The second specific objective was "*To evaluate the impact of infrastructures and geographical factors on households to access water supply*" which was tested by using Logistic Regression Model and the third specific objective was "*To analyze the existing barriers and challenges hindering household's access to water supply*" which was tested by using ANOVA.

The quantitative research approach was applied using survey research design. The data obtained from primary sources of information with the closed ended questionnaire comprised a total of 450 respondents involved to whom were obtained through a stratified random sampling method. The collected data were coded and analyzed by using Microsoft Excel and STATA.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This introductory part presents the various issues related to household accessibility to water services and the challenges that hinder the development to water sector in our country especially in Dar es Salaam city. This study "***The Determinants of Households Access to Water Supply***: A Case study of Ubungo District, Dar es Salaam" focuses on investigating the availability and access of water supply to households in the wards within Ubungo District. The study aims at identifying the factors, challenges and opportunities facing the households in accessing clean and safe adequate water as well as providing recommendations that will in one way or another help to improve the situation.

1.2 Global Attention to Water Access

Human existence depends on water for food or drinking in order to survive in this world, so water access is a global issue. A healthy life depends on more abundant access of water for hygiene and daily household use. To live a comfortable life, water should be safe, easily reliable and available when needed. However, only some parts of the worlds' population have convenient access to water services. Internationally, in 2010 United Nations General Assembly recognized Water and Sanitation as a human right and which should be addressed through progressive realization of universal access to sufficient, safe, physically accessible and affordable water (Kayser, 2013).

WHO (2002), reported that only in wealthy countries do all citizens live in safe water environment, it was also reported that about 99.8 percent of the deaths worldwide ascribed to the environmental complex of unsafe water in developing countries. Water access issues has reached to global attraction a long time ago, thus in addition to numerous studies and researches, a Sustainable Development Goal No.6 (SDG 6) was introduced to come in place as one of critical development agenda. Sustainable Development Goal 6 has to ensure availability and sustainable management of water and sanitation for all, at all ages by 2030 (UN, 2015). Thus, in order to achieve SDG 6, there is a need of valuing water as a precious resource.

1.3 Dar es Salaam, Tanzania Water Access Background.

The responsibility for providing water services and sewerage services in the country is under the Ministry of Water and Irrigation. The Ministry has long since 1970s take various initiatives measures and strategies so as to provide universal access to safe water by 2025 with the community involvement and the private sector (URT, 2002). In Dar es Salaam, two public sector institutions are officially responsible for the provision of water and sewerage services. The Dar es Salaam Water and Sewerage Authority (DAWASA) is the owner of the city's water supply infrastructures meanwhile, the operational management of supply has been delegated to a public utility, Dar es Salaam Water and Sewerage Corporation (DAWASCO). This institutional framework is the outcome of the failed attempt at a full-fledged privatization of the city's water sector. Thus, DAWASCO was established following the cancellation of the contract between the DAWASA and the foreign owned private utility City Water Services Ltd. in 2005.

However, DAWASA performance is unable to cover capital expenses, and they still rely on the subsidies from the Ministry of Water and Irrigation for operations and maintenance costs as well as capital investment (Van den Berg *et al*., 2009). Throughout the city, water supply is highly unreliable due to the frequent breakdown in productions, power interruptions and decaying pipes. In 2010, after DAWASCO took over the management of city's water in 2005, their performance was still poor and fail to meet almost half of their target. The poor performance was reported to be attributed by number of causes including low metering efficiency, a high level of leakage and substantial illegal consumption (DAWASCO, 2010). Also, unreliable customer database, low staff morale, existence of water pirates and strained relationship between DAWASCO customers and staffs contributed to the failure of the services provision (DAWASCO, 2010).

Dar es Salaam city is facing rapidly growing of informal settlement that are difficult to reach for services. Thus, many people in such informal resident rely on informal network of unregulated private water vendors. New connections are financed by individual households to cover for materials and excavation. Also, households are not allowed to become connected if they are located more than 300 meters from a DAWASCO supply line, however; the

households located even far away from the supply line and can afford to pay the costs of material, do connect.

Despite the fact that effective regulation and the expansion of the piped water networks have been and are still taken in place to solve the problem of water access in the city, in reality these solutions are quite difficult to achieve.

1.4 Statement of the Research Problem

In Tanzania, despite significant investment in water sector since early post-independence years, water service supply coverage is not satisfactory. Although water service coverage in urban Tanzania is considered better in bigger picture compared to rural Tanzania, it is hardly to neglect and turn blind eye to the current situation facing urban population in accessing sufficient water supply water. The study aims to identify the determinants of household's access to water supply and to provide recommendations that can help to improve the situation.

The problem of water supply is a significant problem in many parts of Ubungo district since the district is highly populated with high demand for water and limited water supply. Through this study we can determine the amount of water supplied to households in the district and how it affects their daily life. The problem also has economic implications because the households may have to spend a significant portion of their income on purchasing water or investing in alternative sources of water supply.

Therefore, the study's findings will be significant to policymakers, water authorities, and other stakeholders involved in providing water supply services. The study will provide insights into the challenges faced by households in accessing clean and safe water and suggest ways to improve the situation. The recommendations made will be useful in developing policies and strategies aimed at improving water supply services in Ubungo District and other similar areas.

1.5 Research Objectives

The objectives include the determinants of household's access to water supply in Ubungo District, assessing the amount of water supplied to households, analyzing the impact of inadequate water supply on household activities and providing recommendations to improve the availability and accessibility of clean and safe water supply for households in the district.

The study aims to contribute to the achievement of Sustainable Development Goal 6, which is to ensure availability and sustainable management of water and sanitation for all. Research objectives are in two categories; the main objective and specific objectives.

1.5.1 Main Objective

To identify the determinants of household's access to water supply.

1.5.2 Specific Objectives

i. To access socio-economic factors that affect water access to households, such as education level, income level, employment status.

ii. To evaluate the impact of infrastructures and geographical factors on households to access water supply

iii. To analyze the existing barriers and challenges hindering household access to water supply

1.6 Research Questions.

i. What is the relationship between household's socio-economic factors to affordability and availability of water services?

ii. To what extent does existing infrastructure and geographical factors affects water access disparities among households?

iii. What are the barriers and challenges hindering household access to water supply in Ubungo district?

1.7 Significance of the Study.

The study on the determination of water supply among households in Ubungo District, Dar es Salaam is significant for several reasons. Firstly, it provides insights into the current water supply situation in the district and identifies potential issues that may be affecting access to clean water. This information can be used to develop policies and strategies to improve water supply and ensure that households have access to safe water.

1.8 Scope of the Study.

The scope of this study is focus specifically on household's access to water supply in Ubungo district, considering socio-economic, geographic and infrastructural factors influencing access. Analysis of qualitative data to provide a comprehensive understanding as well as recommendations tailored to address the specific challenges facing the households in Ubungo district.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers the literature review in three aspects which are theoretical review, empirical review and policy review regarding the households' accessibility of water services of previous researches which have been conducted in our country or in other developing countries. The aim is to establish the appropriate base information that will give guidance to the better understanding of the topic. The literature review looks back from early 2000s up today households' accessibility to water services.

2.2 Key Concepts Definitions

2.2.1 Water

There are many definitions of 'water', but simply water is basic necessity to life, and biologists believe that a person can hardly survive past three days without having drinking water. Water is the heart of many livelihood activities and is an important source of food and income (FAO, 2004).

2.2.2 Access to Water Supply

Tanzanian definition of Access to Water Supply Services "A person/household is considered adequately covered if he has access to a household (domestic) connection (no neighborhood sales) or a public stand pipe or (kiosk) or a borehole receiving water from a water service provider acting within the regulatory framework. For collecting water, the person/household should not need more than 30 minutes (go, wait, collect and return). Also, WHO defined access to water service in terms of distance and time spent to fetch for water.

2.2.3 Household

According to Tanzanian National Bureau of Statistics (NBS) definition "A Household is the socio-economic unit that consists of one or more persons with common living and catering arrangements". Also, according to Willekens (2016), a household is a group of people that co-ride and share some resources such as housing, food and other essentials for living. According to Population and Household 2022 Census, urban areas like Ubungo-Dar es Salaam have average household size of 4.2 people.

2.2.4 Household Adequate Water Supply

According to the National Water Policy (NAWAPO) and National Bureau of Statistics (NBS) standards "A household is having adequate amount of water supply if every member in the household get more that 25 liters of water per day, and inadequate water if a household's every member got less than 25 liters per day".

2.2.5 Sanitation.

The definition of Sanitation coverage, Access to improved sanitation is the percentage of population using improved sanitation facilities that ensures hygienic separation of human excreta from human contact. Such facilities include flush or pour-flush toilets connected to a piped water system / septic tank / pit latrine, a ventilated improved pit latrine (VIP) or a pit latrine with slab (Pauschert *etal*, 2012). In Dar es Salaam Tanzania, many households in low-income areas do not have access to improved sanitation facilities which complies with the minimum standards approved by the government.

2.2.6 Sustainable Development Goal 6 (SDG 6)

Sustainable Development Goal 6 declares the need "To ensure access to water and sanitation for all" since access to safe water, sanitation and hygiene is the most basic human need for health and well-being. SDG 6 is one of the 17 SDGs that were established by United Nation General Assembly in 2015 to succeed the former Millennium Development Goals (MDGs). The goal has 8 targets to be achieved by year 2030. One of the key targets of the goal to be achieved by 2030 is to achieve universal and equitable access to safe and affordable drinking water for all.

2.3 Theoretical Review

In Tanzania, Water is considered inaccessible if it requires to travel for more than one kilometer or more than thirty minutes round trip (URT, 2002) and again NAWAPO set 400 meters to domestic water points or not exceeding 30 minutes time for going, waiting and return (URT, 2006). Hence, the accessibility of water is measured by the amount of time required for a person to go to the water source, collect water and return as well as the actual walking distance from the household to the source and go back. In recent decades, various studies have been conducted with the aim of establishing the level of household's access to

domestic water services, In Tanzania, Masanyiwa *et al,* (2013) found that more than half of water users in rural areas travel more than one hour to collect water during dry season. Far back in the 2002 *Population and Housing Census* report revealed that 92 percent of the households in Dar es Salaam were recorded as having access to improved water sources in which over 46 percent access water by purchasing from their neighbors. Consequently, women and girls in Dar es Salaam spend a lot of money, time and effort on water collection in most cases with very little assistance from men or boys. The inefficient access to water services reinforces poverty among households.

In Africa, the link between economic growth and urbanization is a problem. Beyond problems of poverty and poor governance, the urban water challenge is attributed by rapid urban growth the situation which further affects urban policies and plans. According to National Bureau of Statistics (2008), the population of Dar es Salaam was expected to reach 3.5 million by 2015 from 2.5 million in 2002, this increase is associated with the increase of demand for basic services, thus increase demand for water as well as the increase of informal settlement. Water demand in Dar es Salaam is estimated to be double of water supply, this means that the true gap between water production and demand is likely much higher. As a result, many households resorted to the alternative sources of water such as boreholes, unprotected ponds or vendors who sell water at slightly higher price.

Nearly 90 percent of the city's water supply is originated from RUVU RIVER and the rest is provided by DAWASA boreholes and due to the fact that most of infrastructures in the city were established far back during colonial years or more than 30 years and lack of fund to recover the costs, total water production for the city's daily consumption falls short of supply. This situation is no wonder, DAWASA not only serves Dar es Salaam city, but it is also responsible to provide water in Bagamoyo and Kibaha provinces (Bayliss *et al,* 2011).

2.4 Empirical Review

For many decades Governmental, Non-Government and International donor agencies have been taken various measures and efforts to deal with the problem of inadequate water accessibility especially in the developing areas. In Ubungo district like many other parts of the city depends on mobile water vendors to supply water to households during time of shortage, but most of them do not have an operating license due to the high tariff introduced

by formal water authorities. Water tanker trucks as well as pushcarts vendors distribute water across the city parts. However, there is no guarantee that the tanks are regularly and properly cleaned before filling them with water for drinking and other domestic purposes. A study by Bayliss *et al* (2011) revealed that at Kimara area in Ubungo, there were numerous smaller trucks buying and selling water. A case of pushcart water vendors was also discussed by Bayliss *et al* (2011) a pushcart can carry less than 30 can of 20 liters at a time. Vendor buy water from variety of water sources such as DAWASCO tap, boreholes or trucks and then resell the water to households. Pushcart vendors do have the advantage of minimum competition from pick up and trucks because they have ability to reach households located in deep congested streets. This allows for more extensive door-to-door service delivery.

Informal water providers do fill the service gap but not much. According to Pauschert *et al* (2012) approximately 50 percent of urban population in Tanzania depends on informal service providers for drinking water. Thus, informal service provision plays a significant role in delivering water services to household population where formal service provision is insufficient. However, the study by Kjellen (2006) showed that there is a tendency of tampering with water networks and infrastructures and many water pipes were stolen and damaged in many parts of the city. Such allegations implied that some of water vendors that resell water go out of their way to obstruct other people access to water, and by that they create a geographical monopoly of their own. The cuttings of water pipes lead to further problem of reduction in pressure and water availability. Also, Bayliss *et al,* (2011), pointed out the problem of water quality. In the country, the regulation of water sector in the country is under EWURA as well as TBS. But, EWURA and TBS only regulate formal water authorities such as DAWASA and DAWASCO. The households do pay higher price for water which does not even qualify as safe or improved. Many households do rate the quality of water as ‘poor’ and complains if water is too salty and dirt to drink.

Water utilities and government agencies have failed to recognize the poor as valuable customers, but rather as recipients of subsidized water. Thus, service providers avoid investing more in water access for low-income earners. More ever, Bayliss *et al,* (2011) provided empirical evidence that the poor households billing pay was actually 13 times more for water and sanitation services than middle- or high-income households do and it was

suggested that water utilities should invest and adapt new strategies to improve the situation of the poor so that there could be a win-win situation and a great financial benefit for service providers.

Outside Tanzania, in Lagos city Nigeria, Akoteyon (2019), explained that low investment combined with weak policies in water service sector accelerated the inadequacies in water supply coverage and other available statistics revealed that only about half of the Nigerian population do not have access to potable water supply. In most cases households trek for more than 1 km to source water while some spend more than 30 minutes fetching water, also the dense nature of population and poor old water infrastructures as well as low-income level of residents drives the majority to obtains water from unimproved sources such as streams, unprotected dug wells and informal vendors (Akoteyon, 2019). Also, a study by UNDP (2013) in Uganda reported that residents (mostly women and children) travel more than 660 hours equals to two full month of labor a year to collect water.

The other related scenario has been observed in South Korea, by Koo (2020), that the shortcomings of water sector in the country is fundamentally caused by water structure being directly operated and controlled by the local government unlike other services. Although, there have been observed water supply service grew rapidly over years and currently safe tap water is available everywhere and the quality standards conforms that of the Western developed countries, there is undeniably the long-standing challenge of service imbalance between urban and rural areas, pipe leakages, aging facilities, drought and water sources pollution. Such problems combining the rapid population growth, raises the government concerns to improve and keep providing the service to the its citizens, and in 2018 Korean government implemented a Unified Water Management System (Koo, 2020).

2.5 Policy Review

This part reviews on the Tanzanian government policies, strategies and social management framework that have been laid down to intervene water resources, accessibility, usage and preservation not only for the current generation but also future generation welfare. Tanzania government formulate such polices and implement them so that life cycle can still take place harmoniously.

2.5.1 The National Water Policy, 2002

The policy outlines the process of decentralization of water supply from the government to the community for cost effective recovery and ownership. The role of government is through local government by formulating policies and guidelines, coordination, monitoring and regulation water resources management. The policy emphasizes that a sufficient supply of water and adequate means of sanitation are provided for by the government and is basic human needs. Also, the policy calls for sustainable water management, community participation as well as private sector involvement in the provision of water services.

The main policy objective is "*to create an enabling environment and appropriate incentives for the delivery of reliable, sustainable and affordable urban and rural water supply and sewerage services as well as integrated water resources management"*. Other objectives are to lay a foundation for sustainable development and management of water resources in the changing roles of government from service provider to that of coordination, policy and guidelines formulation and regulations. Also, the policy requires rural communities to share costs of managing water supplies and participate in financing their water supply programs.

2.5.2 The National Environment Policy

This policy emphasizes to seek the control of the use of chemicals and invasive species like weeds and controlling pollution during oil and gas extraction. The main goal of this policy is to promote the use of environmentally sound technology that protects environment that include less polluting, use all resources in the more sustainable manner, recycle more wastes and handle wastes in acceptable way as stated in Environment Management Act and Regulations. This policy ensures the safety and sustainability of water sources such as Ruvu River which is the regarded as main supplier that feed the city's population.

2.5.3 National Water Quality Management and Pollution Control Strategy

Here, the review focuses on the strategy that outlines the principles, threats, priorities and sectorial recommendations for surface and ground water quality protection and monitoring. The strategy aims at improving the quality of life and social well-being for current and future generations, to protect biological diversity and maintain essential ecological processes, as well as focuses on the community participation in water quality management, providing water quality monitoring system as well as expanding drinking water quality country wide.

2.5.4 Water Sector Development Program (2006-2025)

This program defines the priority interventions and investment needs in the areas of water resources management, urban water supply and sewerage services and rural water services, with the focus on institutional strengthening and capacity building. The program captures three phases to implement and assess objectives. The primary goal of the program is to achieve universal access to water and sanitation by 2025. The program is nearing its end date, but the achievement of its goals hardly fulfilled, and the citizens (households) cry to water access is still loud.

2.6 Conceptual Framework

Conceptual framework shows the interlinked concepts that provide a comprehensive understanding of a phenomenon (Yosef, 2009). In conceptual framework access to water is dependent variable explained by a number of independent variables which are socio-economic factors, geographical and infrastructure factors as well as barriers to water access.

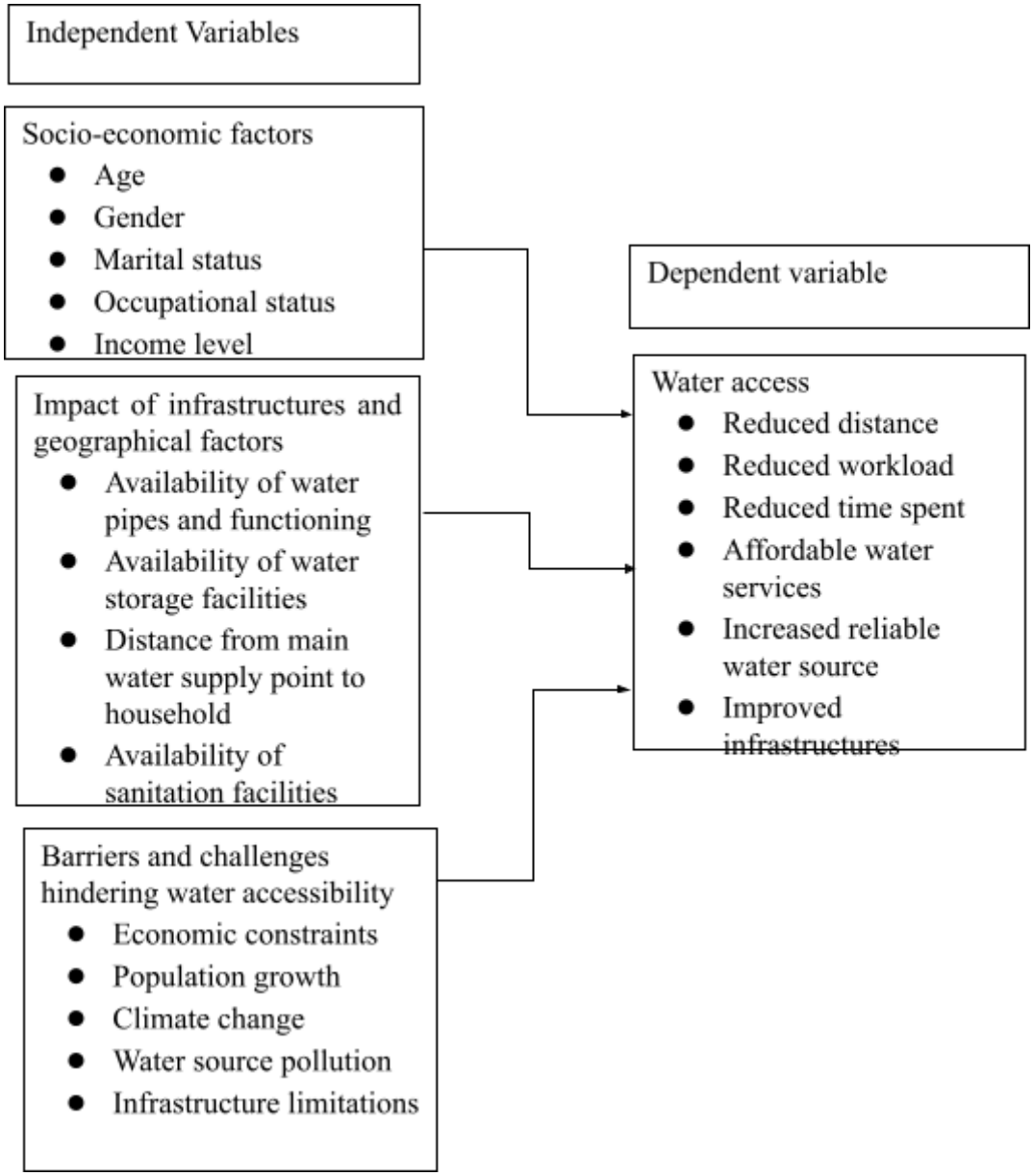

Figure 2.1: The Conceptual Framework designed for the study.

2.7 Research Gap of Knowledge

Apart from inadequate supply, households in Dar es Salaam do not access clean and safe water efficiently. According to the recent study by the Ministry of Health and Social Welfare, it was found that the only 22 percent of households in Tanzania treat drinking water before consumption. Poor water treatment and storage habit do accelerate the spread of contamination and waterborne diseases such as cholera.

Also, previous researches did not tell much the fact that inadequate access to water supply as the product of the climate change and pollution. Drought and floods can frequently disrupt water supply system, while human and industry activities and improper waste disposal contaminate water sources. Much stress is being upon criticizing government failure.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section presents the research design and sampling techniques applied in the study. It begins by describing the study area where research was conducted and the target population. It also includes data collection methods and provides the description to which data collected are going to be analyzed.

3.2 Research Design

Research design is the plan and the procedure for research that span the decisions from broad assumptions to detailed methods of data collection and analysis (Creswell, 2009). The study was designed with the aim of determining the factors affecting water supply access in Ubungo district. Thus, descriptive research design is intended to be applied.

3.3 Study Area and Target Population

The study area is Ubungo district within which two wards namely Ubungo and Kimara were purposely selected for the study, and in each ward three streets were then randomly selected. The target population in this study is households in Ubungo district randomly chosen. The study intended to reach about 450 households who will be interviewed and their responses will be recorded for analysis.

3.4 Data Collection Method and Tools

This study will use quantitative data obtained directly from the household's respondents. The data will be collected through personal interview whereby an enumerator will ask questions as they appear in questionnaire but in Swahili language version and record household's response in Open Data Kit (ODK) Collect, a software tool designed for collecting data. Primary data will be collected with the aid of close ended structured questionnaire to collect socio-economic demographic household characteristics, water access and other factors potentially influencing water supply.

3.5 Sampling and Sampling Techniques

The study intends to employ both probability and non-probability sampling techniques to get the sample size of respondents. Two wards were purposely selected because those wards do experience frequent water shortage. A total of 450 households were randomly chosen and then interviewed with reference to questionnaire. The questions were asked in Swahili language so as to allow respondents to understand and respond to questions easily. According to 2022 Population census, Ubungo ward had total population of 44,340 people while Kimara ward had a total population of 96,996 people, to get sample size for the study Yamane formula was applied as follows

Yamane sample size formula; $n = \frac{N}{1+N(e)^2} \frac{N}{1+N(e)^2}$

$$n = \frac{141336}{1+141336(0.047)^2} \frac{141336}{1+141336(0.047)^2}$$

$$n = 450$$

Whereby,

N = Population size

n = Sample size

e = Sampling error (e = 0.047)

3.6 Ethical Consideration

The study adhered to the ethical principles, first the research team seek research permit from Office of Vice Chancellor, University of Dar es Salaam and then the university introduce a research team to the City Municipal Council as well as Ubungo District Council for research permit. Also, the research approval introductory letter to and fro the two wards area were given. In this research, the researcher assured the respondent that any information provided by them will be confidential in such way that they can feel comfortable to show cooperation. The data collected will be kept confidential and to be used only for the study analysis purposes.

3.7 Data Analysis Flow and Procedure

Data analysis is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, informing conclusions and supporting decision making. Data analysis is important in research because it makes studying data a lot simpler and more accurate. The primary data collected from respondents shall be summarized and coded before being it is entered into the computer for processing, coding some of the responses where necessary using Microsoft Excel, the rest of the data analysis will be done using STATA. Total of all respondent involved in this study were 450, under which after data cleaning a total of 439 observation are obtaining relating to age, education, marital status, occupation and different water access information. The study has three independent variables, water access, water supply and current units of water consumed by the household. Data analysis was guided by three specific objectives which are "*To access socio-economic factors that affects water access to households*", This objective was tested using Binomial test, Chi-Square test and ANOVA. Another specific objective was "*To evaluate the impact of infrastructures and geographical factors on households to access water supply*" which was tested by using Logistic Regression Model. And lastly, was "*To analyze the existing barriers and challenges hindering household's access to water supply*" which was tested by using ANOVA.

3.7.1 Data Cleaning and Dummy Variables

Before proceeding with any further deep analysis, the first step was data cleaning whereby the irrelevant values were omitted thus, remained with 439 datasets for analysis out of 450 datasets. Some of variables were generated, renamed, and also dummy variables were created for good understanding and meaningful interpretations.

3.7.2 Descriptive Statistics

Before analyzing specific objectives, descriptive analysis of basic household demographic data was performed for the purpose of understanding general household characteristics such as measuring the literate level of majority, wealthy level and the household size.

3.7.2.1 Table of Variables

Table 3.1: Elaboration of variables

S/N	NAMES	VARIABLES
1	Hhsize	Number of people living in households
2	Gender	Gender of respondent
3	Age	Age of respondent
4	Marital_status	Marital status
5	Occupation	Occupation status
6	Education	Education level
7	Income_level	Income level of household per month
8	Primary_source	Primary source of water for daily basic household requirements
9	Piped_ins	Is the water from main supplier piped inside your building?
10	Pipedout	Is the water from main supplier piped outside your building?
11	Distance	If yes, water from main supplier piped outside your building
12	Current_available	Is water current available (within 24 hours)
13	Well_maintained	Is water tap at your household well maintained
14	Alternative_source	What is the alternative water source for domestic purpose
15	Average_per_weeek	How many days on average supplied
16	Inter_shortage	How often experience interruptions or shortage in water supply
17	Safe_water	Does your household have access to safe water source?
18	Rate_quality	How do your rate the quality of your water from the main source
19	Treate_water	Do you treat the water before use?
20	Method_treatment	What is the method of treatment
21	Sanitation_fac	Do you have access to sanitation facilities in your household
22	Storage_contained	Type of storage contained used

23	Challenge	Is there any challenge that you face in acquiring water
24	Water_cost	To what extent do you consider the cost accessing water services
25	Government_initiatives	How effective do you think government initiatives have been in addressing water supply challenges in your area
26	Local_restriction	Are there any restriction on water usage imposed by the local authorities?

Table 3.2:Variables codes

Variable –name	**Variable Codes**
Gender(female)	● 0=Male ● 1=Female
Education (literate)	● 0=illiterate (Never attended to school0 ● 1=Literate (primary school, O' level, A' level, diploma, university)
Marital status (married)	● 0=Not married (single, divorced, separated, widow or widower) ● 1=Married
Income level (wealthy)	● 0=poor (Less than 50000,50000-200000,200000-500000) ● 1=wealthy (500000-1000000,1000000-3000000,3000000 and above)
Hhsize(large)	● 0=small (1-5 people) ● 1=large (6-10 people)

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS OF FINDINGS

4.1 Introduction

This chapter presents the analysis for this study. The main objective of this study was to identify the determinants of household's access to water supply, the findings were obtained from the descriptive analysis.

4.2 Demographic Information

In this part respondents were asked some questions in order to know some information such as number of people living in a household (household size), gender of respondent, marital status, Occupation status, education level and income level of household per month.

The field study included administering of questionnaires and interviews to the respondents by the researcher and the response rate of the respondents was 100%. A total number of 450 responded to the questionnaire through interview.

4.2.1 Gender:

The table 1.1 below shows that a total of 439 respondents were involved in this study from Ubungo District. 339 respondents were obtained from Ubungo ward and 100 respondents from Kimara. One person from each household was interviewed. The majority of the respondents were females because in the study area the females were responsible for taking care of the domestic water supplies, women were therefore met at their homes.

Table 4.1: Distribution of the respondents by gender

Ward	Gender of respondent		
	Male	Female	Total
Ubungo	126	213	339
Kimara	19	81	100
Total	145	294	439

4.2.1.1 Dummy of Gender.

This study collected information from males and females but contained females largely. Hence the dummy variable selected was females as shown in Table 2 below.

Table 4.2: Show the dummy of the Gender (female)

Gender of respondent	Observation	Percent
Male	145	33.03
Female	294	66.97
Total	439	100.00

4.2.2 Age of Respondent

The table shows that the majority of respondents fall within the 25-34 age group, comprising 31.89%, next largest group is the 35-44 age range accounting for 27.56% 0f respondents. The 18-24 age group represents 17.31% of respondents, the 45-54 age group constitutes 13.21% of respondents, those above 55 years old makeup 9.11% of the total respondents and the smallest group is below 18 years old with 0.91% of respondents.

Table 4.3: Distribution of Respondents by Age.

Age of respondent	Observation	Percent
Below 18 years	4	0.91
18-24	76	17.31
25-34	140	31.89
35-44	121	27.56
45-54	58	13.21
Above 55 years	40	9.11
Total	439	100.00

4.2.3 Marital Status

The table presents data on marital status among a sample of 439 individuals from Ubungo and Kimara wards. The majority of respondents are married, accounting for 56.72% of the sample, followed by singles at 28.70%. Divorced individuals represent a small portion at 2.28%, while separated and widowed or widower individuals make up 4.56% and 7.74% of the sample, respectively. This distribution suggests a predominant presence of married individuals in the sample population, with relatively smaller proportions of divorced, separated, and widowed or widower individuals.

Table 4.4: Marital Status Distribution

Marital status	Observation	Percent
Single	126	28.70
Married	249	56.72
Divorced	10	2.28
Separated	20	4.56
Widow or Widower	34	7.74
Total	439	100.00

4.2.3.1 Marital Status for Married Individuals

The table provides insights into the marital status of a sample of 439 individuals, specifically focusing on the married individuals within this group. Among married respondents, 56.72% are currently married, while 43.28% are not married. This suggests a significant proportion of individuals within the sample who are married, with a notable subset who are not currently married.

Table 4.5: Marital Status Breakdown amongst Respondents.

Marital status(married)	Observation.	Percent
Not married	190	43.28
Married	249	56.72
Total	439	100.00

4.2.4 Occupation Status

The data in below provides insights into the occupational status of respondents. The majority of respondents are involved in the private sector, with 24.37% owning businesses privately and 11.39% being employees in the private sector. This indicates a significant presence of entrepreneurship and employment within private enterprises among the surveyed population. Additionally, a considerable proportion of respondents, at 22.78%, are engaged in casual work, highlighting a segment of the workforce that may not have fixed or formal employment arrangements.

Table 4.6: Distribution of Respondents by Occupation

Occupation status	Observation	Percent
Business own private	107	24.37
Employee public sector	54	12.30
Employee private sector	50	11.39
Farmer	28	6.38
Casual worker	100	22.78
Unemployed	95	21.64
Other	5	1.14
Total	439	100.00

4.2.5 Education Level

The education level table provides a comprehensive overview of the educational attainment within the Ubungo and Kimara wards surveyed population. It reveals a diverse distribution across different levels of education, with notable proportions at each stage. The majority of respondents, at 27.33%, have completed O'level secondary school education, showcasing a significant presence of individuals with foundational secondary education. Additionally, university education represents a substantial portion, with 26.42% of respondents having attained degrees, indicating a considerable segment of the population with higher education qualifications. Moreover, the data reflects efforts towards further education, as 17.08% of respondents hold diplomas, suggesting a pursuit of specialized knowledge beyond basic schooling. However, it's noteworthy that a small percentage, 2.96%, never attended school, highlighting potential disparities in access to education that may warrant attention**.**

Table 4.7: Distribution of Education Attainment

Education level	Observation	Percent
Never attended school	13	2.96
Primary school	94	21.41
O'level sec school	120	27.33
A'level sec school	21	4.78
Diploma	75	17.08
University	116	26.42
Total	439	100.00

4.2.5.1 Illiterate and Literate level

Illiterate: Represents 2.96% of respondents, indicating a small percentage of individuals who are unable to read or write while Literate are the majority, comprising 97.04% of respondents, are literate, suggesting that the vast majority of the Ubungo and Kimara surveyed population possesses reading and writing abilities. This data highlights a predominantly literate population, with only a small percentage categorized as illiterate.

Table 4.8: Literacy Status Distribution

Education level	Observation	Percent
Illiterate	13	2.96
Literate	426	97.04
Total	439	100.00

4.2.6 Income Level of Household per Month

The table provides a breakdown of household income levels per month within a sample of 439 individuals. The largest proportion of households falls within the income range of 50000-200000, representing 28.02% of the sample, followed closely by the 200000-500000 income range at 25.97%. Additionally, 21.18% of households fall within the 500000-1000000 income bracket. Smaller proportions are observed in higher income brackets, with 8.88% in the 1000000-3000000 range and only 2.05% earning 3000000 and above per month. A minority of households, 13.90%, have incomes below 50000 per month. This distribution highlights the varying income levels within the studied population, with a significant number of households falling within middle-income ranges but also notable proportions in lower and higher income brackets.

Table 4.9: Household Income Distribution per Month

Income level of household per month	Observation	Percent
less than 50000	61	13.90
50000-200000	123	28.02
200000-500000	114	25.97
500000-1000000	93	21.18
1000000-3000000	39	8.88
3000000 and above	9	2.05
Total	439	100.00

4.2.6.1 Household Monthly Income Classification

The table presents data on the income levels of households per month within a sample of 439 individuals. The majority of households, accounting for 58.09% of the sample, are categorized as wealthy, while 41.91% are classified as poor. This distribution indicates a significant presence of households with higher income levels compared to those with lower income levels in the studied population.

Table 4.10: Monthly Household Income Distribution.

Income level of household per month	Observation .	Percent
Poor	184	41.91
Wealthy	255	58.09
Total	439	100.00

4.2.7 Household Size of Respondent

The table presents data on the number of people living in households (household size) alongside observations and their corresponding percentages. The majority of households surveyed have between 2 to 6 members, with households of 5 members being the most prevalent at 20.27%. Smaller households with 1 or 2 members make up a smaller percentage of the total, while larger households with 7 to 10 members are less common, collectively representing around 17% of the Ubungo and Kimara surveyed households. This distribution suggests a typical household size range in the surveyed population, with a notable concentration in the middle range of household sizes.

Table 4.11: Distribution of Household Size

Number of people living in household (household size)	Observation	Percent
1	33	7.52
2	54	12.30
3	66	15.03
4	60	13.67
5	89	20.27
6	62	14.12
7	27	6.15
8	31	7.06
9	7	1.59
10	10	2.28

Total	439	100.00

4.2.7.1 Proportion of Small and Large Household

The table categorizes households into two groups based on size: Small and Large. Small households, defined as those with fewer members, constitute the majority at 68.79%, indicating that a significant portion of the surveyed population lives in smaller households. On the other hand, large households, comprising more members, account for 31.21% of the total. This distribution highlights a tendency towards smaller household sizes within the Ubungo and Kimara surveyed population, with a noticeable minority residing in larger households.

Table 4.12: Household Size Distribution: Small versus Large

Household size	Observation	Percent
Small	302	68.79
Large	137	31.21
Total	439	100.00

4.2.8 Income Disparities Based on Literacy and Wealth

The table illustrates a clear correlation between education level, household wealth, and literacy. Wealthier households tend to have higher literacy rates, as evidenced by 250 literate individuals compared to 176 literate ones in poor households. This suggests that economic status plays a significant role in educational opportunities and literacy levels within communities.

Table 4.13: Literacy Impact on wealth

Education level	Income level of household per month	
	Poor	Wealthy
Illiterate	8	5
Literate	176	250

4.2.9 Relationship between Literacy Levels and Gender

The table illustrates a higher literacy rate among females compared to males, with 286 literate females and 140 literate males. However, both genders show a significant gap between

illiteracy and literacy levels, indicating ongoing disparities in educational opportunities between genders.

Table 4.14: Gender and Literacy Rate Comparison

Gender of respondent	Education level	
	Illiterate	Literate
Male	5	140
Female	8	286

4.2.10 Income Distribution across Age Groups and Wealthy Categories

The table depicts income levels of households based on respondents' age groups and wealth status. Generally, as age increases, income levels tend to rise, especially evident in the 25-34 and 35-44 age brackets within wealthy households. However, there's a decline in income for the 45-54 age group.

Table 4.15: Income by Age and wealthy Comparison

Age of respondent	Income level of household per month	
	Poor	Wealthy
Below 18 years	3	1
18-24	45	31
25-34	51	89
35-44	44	77
45-54	25	33
Above 55 years	16	24

4.2.11 Relationship between Household Size and Marital Status

The table compares household size with marital status, showing that married households tend to be larger, with 89 in the large category compared to 48 in the not married category. This suggests a correlation between marital status and household size, indicating that married individuals are more likely to reside in larger households.

Table 4.16: Relationship between Household Size by Marital Status

Household size	Marital status	
	Not married	Married
Small	142	160
Large	48	89

4.2.12 Occupation and Household Size Comparison

The table presents household sizes categorized by occupation status, showing that certain occupations tend to be associated with larger households. Business owners in the private sector and casual workers have larger household sizes compared to other occupational categories. This suggests that occupation type may influence household size, possibly due to factors like income levels and family structures associated with specific occupations.

Table 4.17: Occupation Distribution across Household Size

Occupation status	Household size	
	Small	Large
Business own private	76	31
Employee public sector	35	19
Employee private sector	27	23
Farmer	14	14
Casual worker	74	26
Unemployed	72	23
Other	4	1

4.2.13 Occupation and Gender Comparison

The table presents the distribution of occupational statuses among males and females. It indicates that females dominate certain occupations such as business owners in the private sector and casual workers, with significantly higher numbers than males in these categories. Conversely, males are more represented in employee roles in both public and private sectors.

Table 4.18: Occupation Distribution by Gender

Occupation status	Gender of respondent	
	Male	Female
Business own private	27	80
Employee public sector	30	24
Employee private sector	16	34
Farmer	9	19
Casual worker	30	70
Unemployed	31	64
Other	2	3

4.2.14 Occupation and Marital Status Comparison

The table depicts the distribution of marital status among different occupational categories. It shows that married individuals are more prevalent in business ownership, both in private and public sectors, compared to those who are not married. Casual workers also have a relatively equal distribution between married and not married individuals. However, the unemployed category shows a higher proportion of not married individuals.

Table 4.19: Occupation Distribution by Marital Status

Occupation status	Marital status	
	Not married	Married
Business own private	29	78
Employee public sector	14	40
Employee private sector	14	36
Farmer	15	13
Casual worker	46	54
Unemployed	69	26
Other	3	2

4.3 To Assess Social-economic Factors that Affect Water Access to Households, such as education level, income level, employment status.

In Ubungo and Kimara wards, household water access is influenced by various factors such as the availability and condition of water sources (e.g., piped water, boreholes, wells), the functionality and maintenance of water supply infrastructure, alternative source of water in use, average time per week where water flows. Understanding and addressing these factors are crucial for ensuring equitable, sustainable, and sufficient water access for households in these areas.

Socio-economic factors refer to the social and economic conditions that influence the well-being, behavior, and opportunities of individuals and households within a given community or society. These factors encompass a wide range of dimensions, including education, income, employment, housing, health, and social capital.

Within the context of the research, socio-economic factors play a pivotal role in shaping household access to water supply in Ubungo Municipal. For example, education level can

influence individuals' awareness of water conservation practices and their ability to advocate for improved water infrastructure. Income level determines households' purchasing power and affordability of water services. Employment status affects households' financial stability and ability to invest in water-related expenses.

Analyzing socio-economic factors allows researchers to understand the underlying drivers of water inequality and identify vulnerable populations who may face barriers to accessing clean water. By addressing these socio-economic determinants, policymakers and stakeholders can develop targeted interventions to enhance water access, promote social equity, and improve overall community well-being.

4.3.1 Binomial test for water access

The binomial test is a statistical method used to determine if an observed proportion or frequency differs significantly from a hypothesized value. It's particularly useful when dealing with categorical data with only two possible outcomes, such as success or failure, yes or no, or heads or tails.

Relationship of literate (education level)

Pr (k >= 426) = 0.000000 (one-sided test)
Pr (k <= 426) = 1.000000 (one-sided test)
Pr (k <= 13 or k >= 426) = 0.000000 (two-sided test)
The proportion of literate level is statistically significant from the hypothesized value of 50%

Table 4.20: Binomial test of Education level (literate)

Variable	N	Observed k	Expected k	Assumed p	Observed p
Literate	439	426	219.5	0.5	0.97039

Relationship of wealthy and income level.
Pr (k >= 255) = 0.000408 (one-sided test)
Pr (k <= 255) = 0.999713 (one-sided test)
Pr (k <= 184 or k >= 255) = 0.000816 (two-sided test)
The proportion of wealthy level is statistically significant from the hypothesized value of 50%

Table 4.21: Binomial test of income-level

Variable	N	Observed k	Expected k	Assumed p	Observed p
Wealthy	439	255	219.5	0.5	0.58087

4.3.2 Chi-square for the water access

Chi-square (χ^2) is a statistical test used to determine whether there is a significant association between two categorical variables. It compares observed frequencies of data with expected frequencies to assess if the differences between them are due to chance or if there's a meaningful relationship.

A chi-square test is used when you want to see if there is relationship between two categorical variables. It compares observed frequencies with expected frequencies to assess if any differences are statistically significant.

Due to the social-economic factors that affect water access we consider relationship between income levels and water treatment also relationship between income levels and assessment of sanitation facilities as shown in below

Relationship between income levels and water treatment

Pearson Chi2 = 6.38 Prob = 0.0115

There is statistically significant relationship between income level of household and water treatment at 0.05 level of significant.

Table 4.22: Relationship between income level and water treatment

Treatment of water before used	Income level of household per month		
	poor	wealthy	Total
Yes	97	165	262
No	87	90	177
Total	184	255	439

Relationship between income level and assessment of sanitation facilities

Pearson Chi^2 = 59.03 Prob = 0.0000

At 0.05 level of significant there is statistically significant relationship between income level of household and assessment of sanitation facilities

Table 4.23: Relationship between income level and assessment of sanitation facilities

Assessment of sanitation facilities	Income level of household per month		
	Poor	Wealthy	Total
Yes	104	226	330
No	80	29	109
Total	184	255	439

4.3.3 Analysis of variance (ANOVA)

ANOVA (Analysis of Variance) is a statistical technique used to compare means across multiple groups to determine if there are statistically significant differences between them. Here's a brief overview of how ANOVA is applied in analysis.

ANOVA allows researchers to assess whether there are statistically significant differences in the means of a dependent variable (water access) across different groups defined by socio-economic factors. By analyzing these differences, researchers can identify the socio-economic determinants that significantly influence household access to water supply and inform targeted interventions to address disparities and promote equitable access within the community.

Test for the social-economic factors that affect water access to households which consist of previous-unit, literate, wealthy, household size, and occupation by using ANOVA table shown as below

This ANOVA table presents the results of testing the social-economic factors affecting water access to households.

The model is statistically significant, as indicated by the F-value of 15.67 and a probability (prob>f) of 0, suggesting that at least one of the independent variables significantly affects water access. Among the independent variables, "Wealthy" shows the most significant impact

with an F-value of 124.57 and a probability of 0, followed by "Occupation" and "Hhsize" with F-values of 5.64 and 4.71 respectively.

"Literate" doesn't seem to have a significant impact, with a high probability value of 0.5118.

Overall, the model explains a substantial portion of the variance in water access (R-squared = 0.3876), suggesting that these social-economic factors collectively influence water access to households.

Number of observations = 439 R-squared = 0.3876

Root MSE = 7.61608 Adj R-squared = 0.3629

Table 4.24: Analysis Of Variance Table for Social Economic Factors Affecting Water Access to Households.

Source	Partial SS	Df	MS	F	prob>f
Model	15455.25	17	909.13213	15.67	0
Literate	25.00207	1	25.002066	0.43	0.5118
Wealthy	7225.685	1	7225.6847	124.57	0
Hhsize	2456.232	9	272.91467	4.71	0
Occupation	1962.528	6	327.08804	5.64	0
Residual	24419.96	421	58.004659		
Total	39875.21	438	91.039287		

4.3.4 BOX PLOT

A box plot, also known as a box-and-whisker plot, is a graphical representation of the distribution of a dataset. It summarizes the central tendency, dispersion, and distribution shape of the data. Box plots are useful for quickly identifying the central tendency and spread of a dataset, as well as detecting outliers and comparing distributions between different groups or categories. They are particularly handy when dealing with large datasets or when you want to understand the overall distribution without getting lost in individual data points.

Box plot shows comparison between Education and Income level with water bills per month

From the box plot it seems as people who are illiterate but also are poor the average between the previous and current units seems to decrease from previous units compare to the current units while the range are the same, but for the wealthy people who are illiterate the range and average of units are the same. For the side of the literate people who are poor also the average are seems to decrease from previous units to current units while the range for the current units there is outlier from 30 to 40 units, for people who are literate and wealthy seems to use large amount of water where by the units paid are also high while there is outlier who paid 125 units previous but for the current there is no outlier. So generally, people who are literate and wealthy are the one who use a lot of units per month

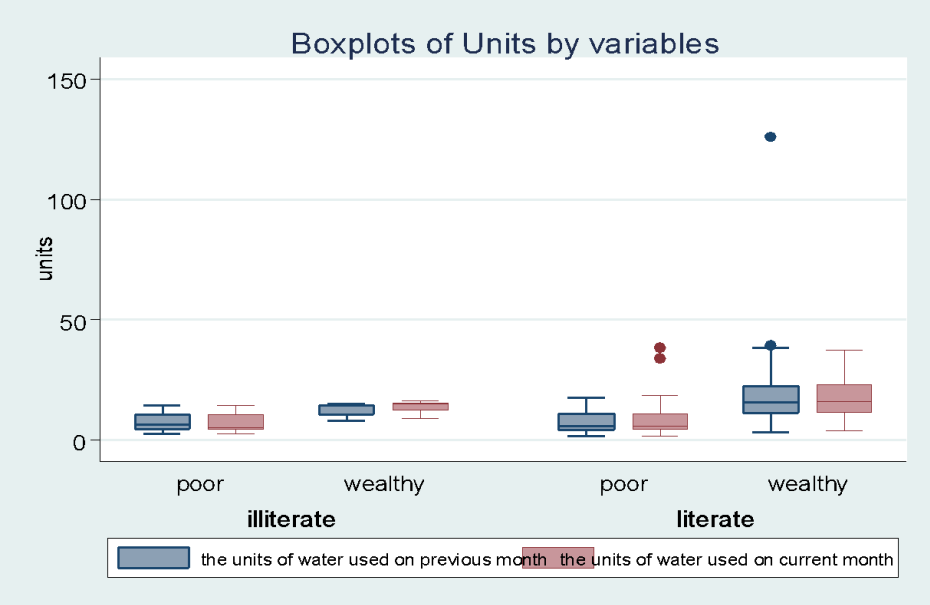

Figure 4.1: Box plot shows comparison between Education and Income level with water bills per month

Box plot shows comparison between Income level and treatment of water with water bills per month

From the box plot looking the people who are treat water it seems the wealth people use more water that poor people in both months while the wealthy people have high median compare to

poor people in both months. From people who did not treat water it seem that wealthy used more water than people while the median are equal from the both current and previously months.

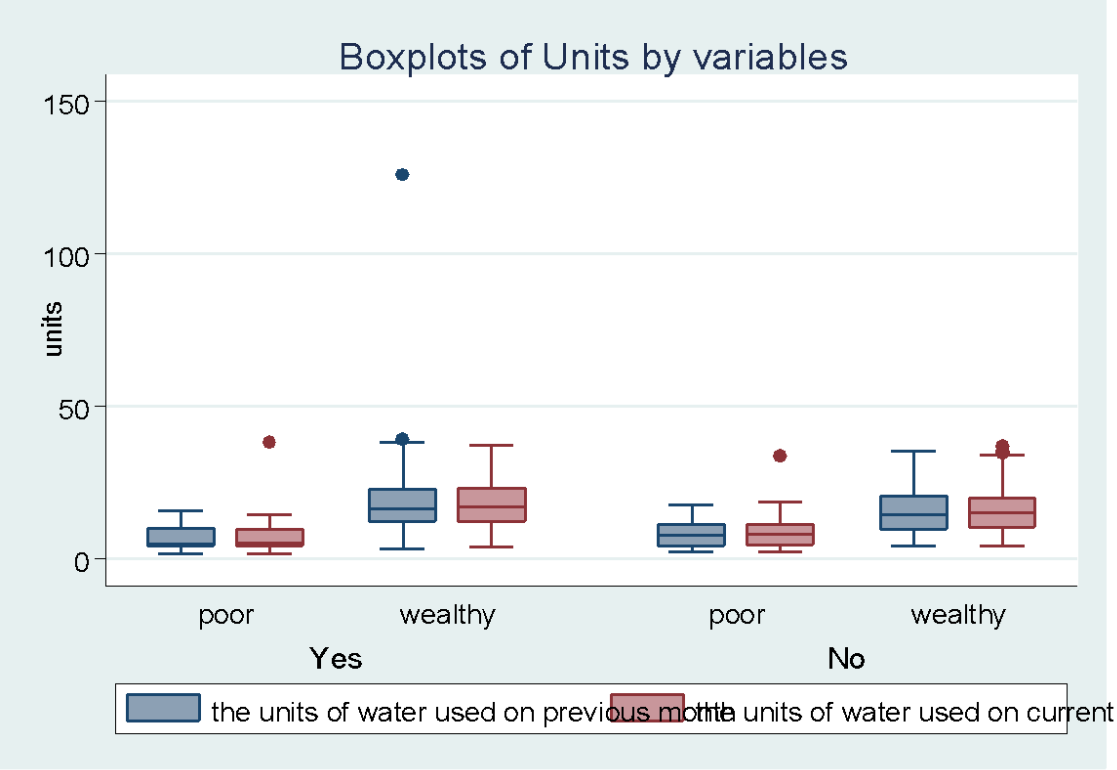

Figure 4.2: Box plot shows comparison between Income level and treatment of water with water bills per month

Box plot shows comparison between Education level and sanitation facilities with water bills per month

From the graph people who are literate and own sanitation facilities for both months the average seem to be the same but the range are high compare to all others which also outlier occurred at high units 125 units at previous month, also for the one who does not own sanitation facilities but are literate there is some who have high bills (outlier). For the illiterate who has no sanitation facilities deem to be the same for the range but also average.

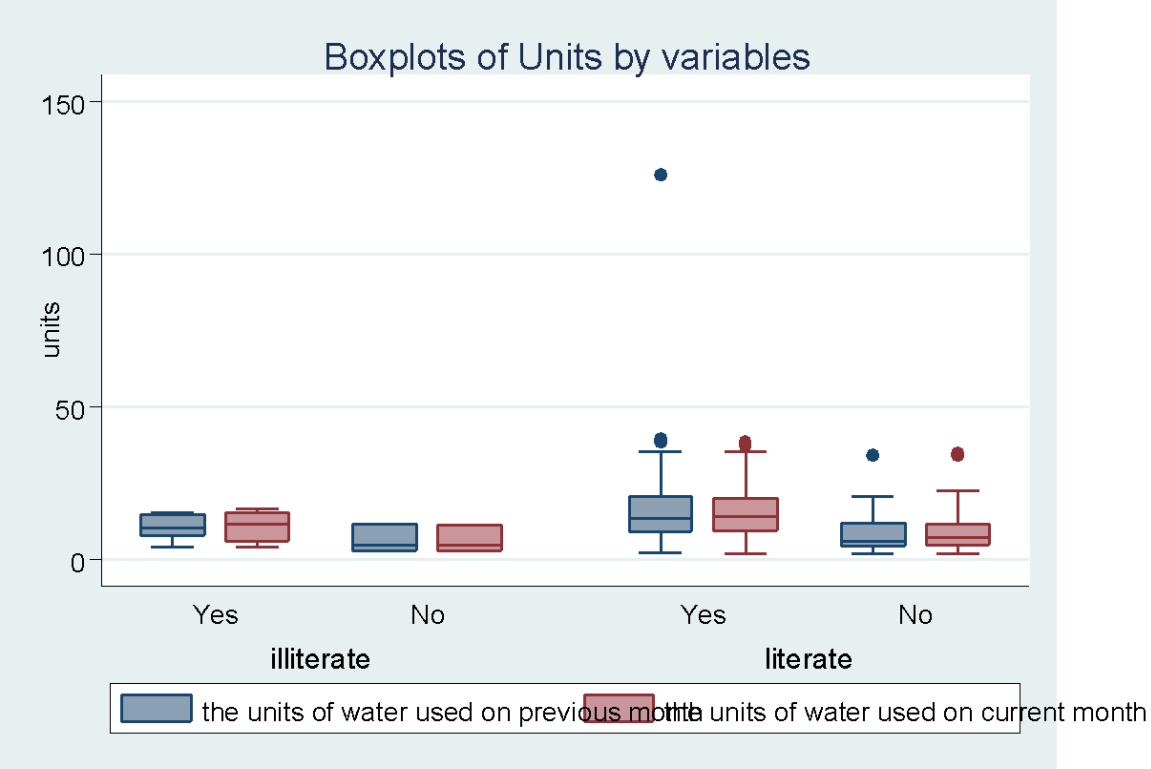

Figure 4.3: Box plot shows comparison between Education level and sanitation facilities with water bills per month

4.4 To Evaluate the Impact of Infrastructures and Geographical Factors on Households to Access Water Supply.

This objective focuses on understanding how factors such as the quality of water infrastructure and the geographical characteristics of the area affect households' ability to access water supply. By examining the condition of infrastructure like pipelines, treatment plants, aim to identify the barriers and challenges that households face in accessing clean and reliable water. This evaluation informs strategies for improving infrastructure, addressing geographical constraints, and ultimately enhancing household access to water supply in the Ubungo Municipal area.

Water Supply, Evaluating the impact of "water supply" involves assessing its effectiveness, reliability, and accessibility in meeting the needs of communities. Here's an evaluation of the impact of water supply:

Effectiveness, the impact of water supply is evaluated based on its ability to provide sufficient quantities of clean and safe water to meet the needs of households. Effective water supply systems ensure consistent delivery of water that meets quality standards for drinking, cooking, sanitation, and hygiene purposes.

The reliability of water supply refers to its consistency and dependability in delivering water services without interruptions or disruptions. Reliable water supply systems are resilient to fluctuations in demand, climate variability, and infrastructure challenges. They minimize downtime, reduce service outages, and maintain continuous access to water for communities.

Accessibility of water supply considers the ease of obtaining water services for all segments of the population, including marginalized and underserved communities. Accessible water supply systems ensure equitable distribution of water resources, minimize disparities, and address barriers such as geographic remoteness, affordability constraints, and institutional obstacles.

Infrastructure refers to the physical components and systems that facilitate the delivery of water supply services to households in Ubungo Municipal. This includes water distribution networks, treatment plants, storage facilities, and household connections. Evaluating the impact of infrastructure entails assessing the adequacy, reliability, and efficiency of existing water supply infrastructure in meeting the needs of households. Factors such as infrastructure maintenance, investment, and expansion efforts are considered to determine their influence on the accessibility and quality of water supply for households within the community.

Geographical factors encompass the spatial characteristics and environmental conditions that affect water availability and distribution within Ubungo Municipal. This includes considerations such as proximity to water sources (e.g., rivers, lakes, ground water), terrain and topography. Evaluating the impact of geographical factors involves analyzing how these aspects influence the reliability, sustainability, and vulnerability of water supply systems serving households. Factors such as seasonal variations in precipitation, geological features, and urbanization patterns are examined to understand their implications for water access.

4.4.1 Binomial test

The binomial test is a statistical method used to determine if an observed proportion or frequency differs significantly from a hypothesized value. It's particularly useful when dealing with categorical data with only two possible outcomes, such as success or failure, yes or no, or heads or tails.

Proportion of maintained water taps

The proportion of maintained water taps is statistically significant from the hypothesized value of 50%.
Pr (k >= 376) = 0.000000 (one-sided test)
Pr (k <= 376) = 1.000000 (one-sided test)
Pr (k <= 63 or k >= 376) = 0.000000 (two-sided test)

Table 4.25: Proportion of maintained water taps

Variable	N	Observed k	Expected k	Assumed p	Observed p
Maintained	439	376	219.5	0.5	0.85649

Proportion of distance from main water source

The proportion of distance from the main water source is statistically significant from the hypothesized value of 50%.
Pr (k >= 208) = 0.000000 (one-sided test)
Pr (k <= 208) = 1.000000 (one-sided test)
Pr (k <= 13 or k >= 208) = 0.000000 (two-sided test)

Table 4.26: Proportion of distance from main water source

Variable	N	Observed k	Expected k	Assumed p	Observed p
Away	221	208	110.5	0.5	0.94118

Proportion of sanitation facility

The proportion of sanitation facility is statistically significant from the hypothesized value of 50%.

Pr (k >= 330) = 0.000000 (one-sided test)
Pr (k <= 330) = 1.000000 (one-sided test)

Pr (k <= 109 or k >= 330) = 0.000000 (two-sided test)

Table 4.27: Proportion of sanitation facility

Variable	N	Observed k	Expected k	Assumed p	Observed p
Sanitized	439	330	219.5	0.5	0.75171

Proportion of water supply

The proportion of water supply is statistically significant from the hypothesized value of 50%.

Pr (k >= 338) = 0.000000 (one-sided test)
Pr (k <= 338) = 1.000000 (one-sided test)
Pr (k <= 101 or k >= 338) = 0.000000 (two-sided test)

Table 4.28: Proportion of water supply

Variable	N	Observed k	Expected k	Assumed p	Observed p
Regular	439	338	219.5	0.5	0.76993

4.4.2 Chi-square

Chi-square (χ^2) is a statistical test used to determine whether there is a significant association between two categorical variables. It compares observed frequencies of data with expected frequencies to assess if the differences between them are due to chance or if there's a meaningful relationship.

A chi-square test is used when you want to see if there is relationship between two categorical variables. It compares observed frequencies with expected frequencies to assess if any differences are statistically significant.

Due to the impact of infrastructure and geographical factors that affect water supply we consider relationship between relationship between household size and maintenance of water taps as shown below

Relationship between household size and maintenance of water taps

There is statistically significant relationship household size and the maintenance of water taps

Pearson Chi2 = 5.07 Prob = 0.0244

Table 4.29: Relationship between household size and maintenance of water taps

Maintenance of water taps	Number of people living in household		
	small	Large	Total
Yes	251	125	376
No	51	12	63
Total	302	137	439

Relationship between income-level and sanitation facility

There is statistically significant relationship income level (income level of household per month) and the sanitation facility

Pearson Chi2 = 59.03 Prob = 0.0000

Table 4.30: Relationship between income-level and sanitation facility

Sanitation facility	Income level (Income level of household per month)		
	Poor	wealthy	Total
Yes	104	226	330
No	80	29	109
Total	184	255	439

4.4.3 Logistic regression

Logistic regression model is utilized to evaluate the impact of infrastructure and geographical factors on household access to water supply in Ubungo Municipal.

The logistic regression model is constructed with the objective of assessing the influence of infrastructure and geographical factors on the likelihood of households accessing water

supply. Predictor variables, such as the condition of water infrastructure (e.g., well-maintained, storage contained) and geographical characteristics are selected based on their relevance to the research objective.

The logistic regression model is estimated using statistical software, where the binary outcome variable (access to water supply) is regressed on the predictor variables (infrastructure and geographical factors). The coefficients associated with each predictor variable are estimated, along with their standard errors, Z-scores, and p-values.

The estimated coefficients in the logistic regression model provide insights into the impact of infrastructure and geographical factors on household access to water supply. A coefficient greater than zero indicate a positive association among variables which suggests that an increase in the predictor variable is associated with higher odds of households accessing water supply. Conversely, a coefficient less than zero indicate a negative association.

The significance of each coefficient is assessed using p-values. Coefficients with p-values below a predetermined significance level (e.g., 0.05) are considered statistically significant, indicating that the corresponding predictor variable has a significant impact on household access to water supply.

The logistic regression model is a valuable tool in Objective 2 for assessing the influence of infrastructure and geographical factors on household access to water supply in Ubungo Municipal. By analyzing the estimated coefficients and their significance, researchers can identify key determinants of water supply access and inform targeted interventions to improve infrastructure, address geographical constraints, and enhance water accessibility for households within the community.

Odds Ratio (OR): The odds ratio indicates the change in odds of the outcome variable for a one-unit change in the predictor variable. For example, a coefficient of 1.020935 for "Well-maintained" suggests that for each unit increase in the "Well-maintained" variable, the odds of the outcome variable (likely binary in logistic regression) increase by a factor of approximately 1.021, holding other variables constant.

Std. Err. (Standard Error): This represents the standard deviation of the coefficient estimate. A smaller standard error indicates more precise estimation of the coefficient.

Z-score (Z): The Z-score is the ratio of the coefficient to its standard error. It indicates how many standard deviations the coefficient is from zero. Larger absolute Z-scores suggest more significant effects.

P-value (Pz): The p-value associated with each coefficient indicates the probability of observing the coefficient value if the null hypothesis (no effect) is true. A p-value below a predetermined significance level (e.g., 0.05) suggests that the coefficient is statistically significant.

[95% Conf. Interval]: This provides the 95% confidence interval for the coefficient estimate. It indicates the range within which we are 95% confident that the true coefficient lies.

Interpretation of the coefficients: For the "Storage contained" variable, the odds of the outcome variable increase by a factor of approximately 1.658 for each unit increase in "Storage contained," holding other variables constant. This effect is statistically significant at the 0.05 level ($p = 0.012$).

Similarly, for the "Local authorities" variable, the odds of the outcome variable increase by a factor of approximately 2.742 for each unit increase in "Local authorities," holding other variables constant. This effect is also statistically significant at the 0.05 level ($p = 0.003$).

On the other hand, the "Sanitation_fac" variable has a coefficient of 0.1237952, suggesting that for each unit increase in "Sanitation_fac," the odds of the outcome variable decrease by a factor of approximately 0.124, holding other variables constant. This effect is statistically significant at the 0.05 level ($p < 0.001$).

Overall, these coefficients and their associated statistics provide insights into the relationship between the predictor variables and the outcome variable in the logistic regression model.

Table 4.31: Logistic regression

Regular	Odds Ratio	Std. Err.	Z	P>z	[95% Conf.	Interval]
Well-maintained	1.020935	0.4802112	0.04	0.965	0.4060914	2.566686
Storage contained	1.657982	0.3327812	2.52	0.012	1.118745	2.457131
Local authorities	2.741676	0.9226694	3	0.003	1.417612	5.302432
Sanitation facilities	0.1237952	0.0604489	-4.28	0	0.0475405	0.322362
Constant	1.191078	1.158481	0.18	0.857	0.1770248	8.013943

4.4.4 BOX PLOT

Box plots can be used to visually represent the distribution and variability of predictor variables in the logistic regression model. Here's how box plots can be applied:

Infrastructure Variables, for predictor variables related to infrastructure (e.g., condition of water infrastructure such as well-maintained and storage contained), box plots can be used to compare the distribution of these variables between households with and without access to water supply. Each box plot would represent the distribution of a specific infrastructure variable, with one box plot for households with water supply access and another for households without access. This allows for visual comparison of the infrastructure conditions between the two groups.

Geographical Variables, for predictor variables related to geographical factors (e.g., proximity to water sources), box plots can be used to compare the distribution of these variables between households with and without water supply access. The box plots would depict the distribution of geographical factors for both groups, allowing for visual assessment of any differences in geographical characteristics between households with and without water supply access.

Outliers, Box plots also provide a visual indication of outliers, which are data points that fall significantly outside the overall pattern of the data. Outliers in predictor variables may indicate extreme values or anomalies that could impact the logistic regression model's estimates. By examining the box plots, researchers can identify and investigate potential outliers, ensuring the robustness and validity of the model results.

Additionally, box plots can be used to compare the distribution of predictor variables across different categories of the outcome variable (e.g., urban vs. rural areas, different

administrative zones). This allows for a comprehensive assessment of how infrastructure and geographical factors vary across different contexts and their implications for household access to water supply.

By using box plots to visually represent the distribution of predictor variables in the logistic regression model, researchers can gain insights into the relationship between these variables and household access to water supply. This graphical representation enhances understanding and facilitates interpretation of the model results, supporting evidence-based decision-making and policy development in addressing water accessibility issues within the community.

The graph shows people who has sanitation facilities and their water taps are well maintained has high level of water supply in households compares to others.

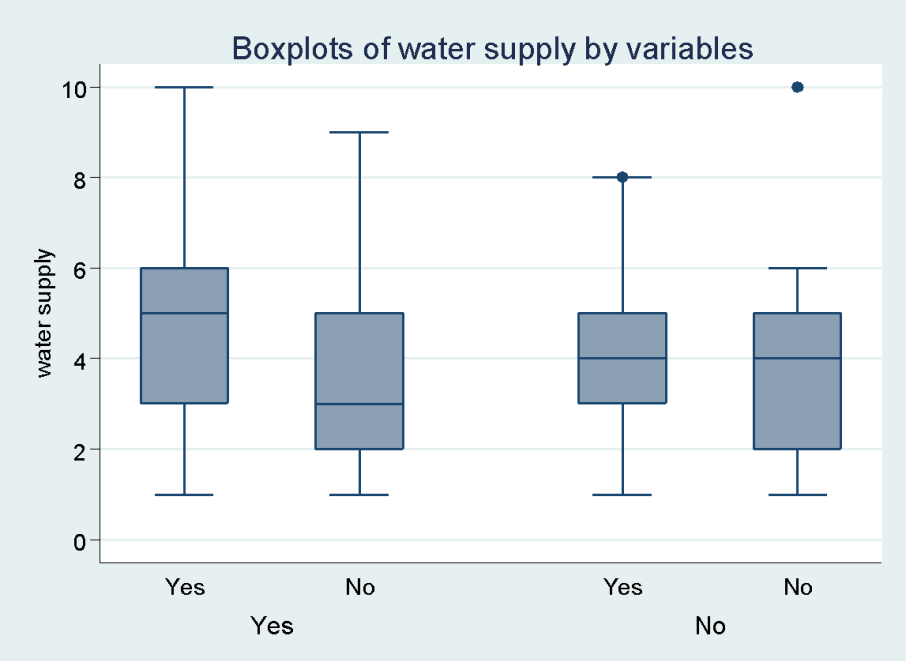

Figure 4.4: Box plot shows comparison between sanitation facilities and maintenance of water taps with household size

4.5 To Analyze the Existing Barriers and Challenges Hindering Household Access to Water Supply

Aims to investigate and understand the existing barriers and challenges that hinder household access to water supply in Ubungo Municipal. By analyzing these obstacles, researchers seek to identify the root causes of water accessibility issues and inform targeted interventions and policy measures to overcome these challenges and ensure equitable access to clean and safe water for all households within the community

Existing: This term refers to the current state or condition of barriers and challenges faced by households in Ubungo Municipal regarding their access to water supply. It implies that there are already identified obstacles or difficulties that hinder households from accessing adequate and reliable water services.

Barriers: Barriers are obstacles or impediments that prevent or hinder households from accessing water supply. These may include physical, financial, institutional, or social factors that limit the availability, affordability, or quality of water services. Examples of barriers include inadequate water infrastructure, lack of financial resources, bureaucratic procedures, and social inequalities.

Challenges: Challenges are difficulties or problems that households encounter in obtaining access to water supply. They may arise from various sources, such as environmental constraints socio-economic disparities. Challenges can manifest in different forms, including water scarcity, pollution, service disruptions, and inequitable distribution.

Hindering: This term indicates that barriers and challenges act as impediments or obstacles that hinder or restrict households' ability to access water supply. It implies that these factors create difficulties or limitations that negatively impact the availability, affordability, or reliability of water services for households in Ubungo Municipal

4.5.1 Binomial test

The binomial test is a statistical method used to determine if an observed proportion or frequency differs significantly from a hypothesized value. It's particularly useful when dealing with categorical data with only two possible outcomes, such as success or failure, yes or no, or heads or tails.

The proportion of affordable is statistically significant from the hypothesized value of 50%
Pr (k >=312) = 0.000000 (one-sided test)
Pr (k <= 312) = 1.000000 (one-sided test)
Pr (k <= 127 or k >= 312) = 0.000000 (two-sided test)

Table 4.32: Proportion for the cost of water supplied

Variable	N	Observed k	Expected k	Assumed p	Observed p
Affordable	439	312	219.5	0.5	0.71071

4.5.2 Chi-square

A chi-square test is used when you want to see if there is relationship between two categorical variables. It compares observed frequencies with expected frequencies to assess if any differences are statistically significant.

Relationship between of wealthy and water cost

Pearson Chi2 = 35.09 Prob = 0.0000

There is statistically significant relationship between income level of household and water cost at 0.05 level of significant

Table 4.33: Relationship between of wealthy and water cost

Income level of household per month	Water cost		
	Not affordable	Affordable	Total
Poor	81	103	184
Wealthy	46	209	255
Total	127	312	439

Relationship between water cost and local authorities' initiatives
There is statistically significant relationship between water cost and initiatives of community addressing water supply challenge at 0.05 level of significant

Pearson Chi2 = 4.90 Prob = 0.0269

Table 4.34: Relationship between water cost and local authority's initiatives

Water cost	community led initiatives addressing water supply challenge		
	Aware	Not aware	Total
Not affordable	20	51	71
Affordable	61	78	139
Total	81	129	210

4.6 To Analyze the Existing Barriers and Challenges Hindering Household Access to Water Supply

Aims to investigate and understand the existing barriers and challenges that hinder household access to water supply in Ubungo Municipal. By analyzing these obstacles, researchers seek to identify the root causes of water accessibility issues and inform targeted interventions and policy measures to overcome these challenges and ensure equitable access to clean and safe water for all households within the community

Existing term refers to the current state or condition of barriers and challenges faced by households in Ubungo Municipal regarding their access to water supply. It implies that there are already identified obstacles or difficulties that hinder households from accessing adequate and reliable water services. Barriers are obstacles or impediments that prevent or hinder households from accessing water supply. These may include physical, financial, institutional, or social factors that limit the availability, affordability, or quality of water services. Examples of barriers include inadequate water infrastructure, lack of financial resources, bureaucratic procedures, and social inequalities. Challenges are difficulties or problems that households encounter in obtaining access to water supply. They may arise from various sources, such as environmental constraints socio-economic disparities. Challenges can manifest in different forms, including water scarcity, pollution, service disruptions, and inequitable distribution. This term indicates that barriers and challenges act as impediments or obstacles that hinder or restrict households' ability to access water supply. It implies that these factors create difficulties or limitations that negatively impact the availability, affordability, or reliability of water services for households in Ubungo Municipal.

4.6.1 Binomial test

The proportion of affordable is statistically significant from the hypothesized value of 50%
Pr (k >=312) = 0.000000 (one-sided test)
Pr (k <= 312) = 1.000000 (one-sided test)
Pr (k <= 127 or k >= 312) = 0.000000 (two-sided test)

Table 4.35: Proportion for cost of water supplied

Variable	N	Observed k	Expected k	Assumed p	Observed p
affordable	439	312	219.5	0.5	0.71071

Relationship between water cost and local authorities' initiatives

Pearson Chi2 = 4.90 Prob = 0.0269

There is statistically significant relationship between water cost and initiatives of community addressing water supply challenge at 0.05 level of significant, therefore water can be affordable or not affordable due to the awareness of community led initiatives addressing water supply challenge.

Table 4.36: Relationship between water cost and local authorities' initiatives

Water cost	Community led initiatives addressing water supply challenge		
	Aware	Not aware	Total
Not affordable	20	51	71
Affordable	61	78	139
Total	81	129	210

Proportion of affordable water cost

The proportion of affordable is statistically significant from the hypothesized value of 50%

Pr (k >= 127) = 1.000000 (one-sided test)
Pr (k <= 127) = 0.000000 (one-sided test)
Pr (k <= 127 or k >= 312) = 0.000000 (two-sided test)

Table 4.37: Proportion of affordability and cost of water

Variable	N	Observed (K)	Expected (K)	Assumed (p)	Observed (p)
Affordable	439	127	219.5	0.5	0.28929

Proportion of government effectiveness

Pr (k >= 278) = 0.000000 (one-sided test)
Pr (k <= 278) = 1.000000 (one-sided test)
Pr (k <= 161 or k >= 278) = 0.000000 (two-sided test)
The proportion of effective is statistically significant from the hypothesized value of 50%

Table 4.38: Proportion of government effective

Variable	N	Observed (k)	Expected (k)	Assumed (p)	Observed (p)
Effective	439	278	219.5	0.5	0.63326

Table 4.39: Tabulation of affordable cost of water and local restriction

Local Restriction	Water Cost		
	Affordable	Not affordable	Total
Yes	139	71	210
No	173	56	229
Total	312	127	439

From the above chi-square table, probability value 0.0308 is less than level of significance 0.05 thus we reject the null hypothesis, therefore there is significance difference between water cost, in other ward there is significance relationship between local restriction and water cost, mean that increase or decrease can due to increase or decrease in water cost.

4.6.2 Analysis of variance (ANOVA)

ANOVA (Analysis of Variance) is a statistical technique used to compare means across multiple groups to determine if there are statistically significant differences between them. Here's a brief overview of how ANOVA is applied in analysis.

ANOVA allows researchers to assess whether there are statistically significant differences in the means of a dependent variable (water access) across different groups defined by socio-economic factors. By analyzing these differences, researchers can identify the socio-economic determinants that significantly influence household access to water supply and inform targeted interventions to address disparities and promote equitable access within the community.

The F-value of 13.89 and the associated p-value of 0.0000 indicate that the overall model is statistically significant. This means that at least one of the independent variables is significantly related to the current monthly water bill. Water Affordability, the water affordability variable has a highly significant impact on the current monthly water bill (p-value < 0.001). The high F-value (30.63) suggests that this variable is a strong predictor of the water bill. Thus, the affordability of water substantially affects the monthly water bill, with more affordable water potentially leading to lower bills. Government Effectiveness, does not have a statistically significant impact on the current monthly water bill (p-value > 0.05). This suggests that variations in perceived or actual government effectiveness do not significantly influence the water bills in this sample. Restrictions on Water Usage, Restrictions on water usage have a statistically significant impact on the current monthly water bill (p-value < 0.01). This indicates that when restrictions are imposed, it significantly affects the water bill, possibly by either increasing costs due to penalties or fines or decreasing costs due to reduced usage. Residual and Total, the residual sum of squares (26728.339) represents the variability in the water bill that is not explained by the model. The total sum of squares (29288.955) is the total variability in the water bill data. The ANOVA results reveal that water affordability and restrictions on water usage significantly influence the current monthly water bill, while government effectiveness does not have a significant effect. The model explains a modest proportion of the variability in water bills, indicating that other factors not included in this analysis may also play a substantial role. This insight can help policymakers and stakeholders focus on improving water affordability and managing water usage restrictions to better address household water supply challenges.

Number of observations	= 439	R-squared	= 0.0874
Root MSE	= 7.83874	Adj R-squared	= 0.0811

Table 4.40: ANOVA table showing significance of household access to water supply.

Source of variation	Partial (SS)	Df	MS	F	Prob>F
Model	2560.016	3	853.3387	13.89	0
Affordable	1882.106	1	1882.106	30.63	0
Effective	101.89154	1	101.8915	1.66	0.1985
Yes	451.21763	1	451.2176	7.34	0.007
Residual	26728.939	435	61.44584		
Total	29288.955	438	66.86976		

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This chapter presents the conclusion and recommendations based on research questions and objectives and information derived from literature review and key field survey findings. The purpose of this study was to access the determinants to household access to water supply in Ubungo district.

5.2 Conclusion

This study focused on the Determinants of households' access to water supply in Ubungo district with the main objective of studying the determinants of households' access to water supply. To achieve these objectives, the questionnaire focused on how households' access water especially those connected to DAWASA water supply system, Local government involvement in water supply and reliability of the water supply system in general.

The study has revealed that 87.8% of households in Ubungo district are connected to DAWASA water supply system and only 12.2% of the households use alternative water sources such as wells and buying water from their neighbors since they are not connected to DAWASA water supply systems, this shows that most of the residents in Ubungo district depend on water from DAWASA. From the study findings it is clear that only being connected to water supply systems from DAWASA is not enough to get adequate water supply yet other related determinants such as plumbing systems, water pressure, frequency of water distribution, number of authorities on water services provision, reliability of application and bill payments systems and equality in water distribution.

However, despite the realization that the main determinant of households' access to water supply is being connected to DAWASA water supply system and other determinants related to DAWASA yet there are other determinants that affects households' access to water supply such as household's income level and affordability, water supply infrastructures, urbanization, climate change and Local government intervention.

5.3 Recommendations

The following are recommendations to the Local Government, DAWASA, policy makers and community members (water users).

The Local Government Authorities should create a user-friendly environment which will motivate local and external donors to invest in water distribution, especially registered companies so that they invest in water distribution to the households of Ubungo district. This is due to the fact that since at the time of the study DAWASA had met the existing demand of the water users. This also will remove the monopoly of DAWASA as the "Sole water distribution and service provider." DAWASA does not experience any challenge, as well as competition from other providers. Competition in business encourages improvement and quality of the services.

DAWASA should start campaigns and advertise on the application process to make sure that the 12.2% of households are connected to DAWASA water supply systems. DAWASA should send water bills in hard copy to their respective households instead of online messages since not all DAWASA clients know how to read and operate mobile phones but also water bills should be sent in hard copies for reference and future uses.

Policy makers should disseminate the currently water policy as well as implement to the beneficiaries, thus not only be on blue print but also improve their living standard of people. Sensitization on issues should involve the community and their role in development by using their labor as well as their income. This will change the perspective that, the government is the one who responsible to bring water to the level of household, although there is a government campaign is to bring water for 99% per household level until 2026.

Community members should be encouraged to be involved in cost sharing of water equipment such as water tap, water pipes, water tank, so that to improve water services as per water policy. The community should be aware that, they are responsible for contribution for social service development such as water either by giving in kind (labour) as well as their resources.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

THE DETERMINANTS OF HOUSEHOLD'S ACCESS TO WATER SUPPLY IN UBUNGO DISTRICT

SECTION O; INTRODUCTION

The aim of the research is to gain knowledge about household's water supply and sanitation facilities and related issues. Your household has been chosen for the interview by random and only a certain number of households in this town will be interviewed. The purpose is to obtain a general view of the situation and all the information your give remains strictly confidential

SO1

Name of enumerator

SO2

- KIMATH JENIFER
- MOSHI ARK
- MLAY ALPHA
- MKOREHE AZIZA
- KIDASA MWANAIDI
- MWAKWIJANGALA PHANUEL
- JUMA MICHAEL
- NHENANGULA NTUGWA

Identification number

SO3

_____

Date of interview

SO4

yyyy-mm-dd hh:mm

_____ _____

Record your current location
SO5

Ward
SO6

- Ubungo
- Kimara

Street
SO7

- Msewe
- Kisiwani
- Mavurunza
- Kimara baruti
- Golani

SECTION A; DEMOGRAPHIC INFORMATION
Number of people living in household (household size)
SA01
Gender of respondent
SA02

- Male
- Female

Age of respondent
SA03

- Below 18 yrs
- 18-24
- 25-34
- 35-44
- 45-54
- Above 55 years

Marital status
SA04

- Single
- Married
- Divorced
- Separated
- Widow or widower

Occupation status
SA05

- Business own private
- Employee public sector
- Employee private sector
- Farmer
- Casual worker
- unemployed
- other

Education level
SA06

- Never attended school

- Primary school
- O'level sec school
- A'level sec school
- Diploma
- University

Income level of household per month
SA7

- less than 50000
- 50000-200000
- 200000-500000
- 500000-1000000
- 1000000-3000000
- 3000000 and above

SECTION B; HOUSEHOLD WATER ACCESS

What is the primary source of water for daily basic household requirements
SB1

- Stream/river/pond
- Public taps
- Borehole
- tanker truck
- others
- if others
  SB1_1

_____

SB2
Is the water from main supplier piped inside your building

- Yes
- No

Is the water from main supplier piped outside your building
SB3

- Yes
- No

If Yes
SB3-3

- its 500m away
- its above 500m away

Is water currently available (within 24 hrs)
SB4

- Yes
- No

Is water tap at your household well maintained?
SB5

- Yes
- No

In the case that the main piped water supply is not available or insufficient, what is the alternative source of water for domestic purpose

SB6

- Tanker truck
- Rain
- Packaged bottled
- water
- streem/river/pond
- others

How many days on average per week is water supplied

SB7

- once
- Twice
- Thrice
- More than 3 times

How often do you experience interruptions or shortages in water supply

SB8

- Daily
- Weekly
- Monthly
- Rarely
- Never

SECTION C; WATER QUALITY AND STORAGE

Does your household have access to safe water source?

SC1

- Yes
- No

How do you rate the quality of your water from the main source

SC2

- very Good
- good
- Moderate
- Bad
- very bad

Do you treat the water before use?

SC3

- Yes
- No

What is the method of treatment.

SC4

- Boiling
- Chemicals
- Filtration
- Others

Do you have access to sanitation facilities in your household

SC5

- Yes
- No

How would you rate the overall cleanliness and hygiene of your water storage and handling practices?

SC6

- Very good
- Good
- Fair
- Poor
- Very poor

Type of storage contained used

SC7

- below 60 liters
- 60-500 liters
- 500-2000 liters
- 2000-10000 liters 10000 liters and above

SECTION D; CHALLENGES AND AWARENESS ON GOVERNMENT POLICIES

Is there any challenge that you face in acquiring water from your nearest water source to your household

SD1

- Yes
- No
- if yes how often
- *SD1_1*
- Daily
- weekly
- monthly
- rarely

To what extent do you consider the cost of accessing water services to be affordable for your household?

SD2

- Very affordable
- Affordable
- Somewhat
- affordable Not
- affordable at all

How effective do you think government initiatives have been in addressing water supply challenges in your area

SD3

- Very effective
- Effective
- Neutral
- Ineffective

Are there any restriction on water usage imposed by the local authorities?

SD4

- Yes
- No

If yes, are there any community led initiatives addressing water supply challenges in your locality

SD4_1

- Aware
- Not aware

APPENDX II: RESEARCH CLEARANCE LETTER

2/24/24, 4:42 PM RIMS - Research Information Management System

THE UNITED REPUBLIC OF TANZANIA
President's Office
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DAR ES SALAAM REGION
Phone Number: 2203158
Fax number: 2203158
email: ras@dsm.go.tz
website: www.dsm.go.tz

In reply please quote:
Ref. No. .....

REGIONAL COMMISSIONER'S OFFICE,
3 RASHID KAWAWA ROAD,
P.O. BOX 5429,
12880 DAR ES SALAAM

04/03/ 2024

District Administrative Secretary,
UBUNGO,
P. O. Box .....,
DAR ES SALAAM.

RE: RESEARCH PERMIT

Prof/Dr/Mrs./Ms/Miss AZIZA MKOREMI AND OTHERS is student/Research from UNIVERSITY OF DAR-ES-SALAAM. has been permitted to undertake research on THE DETERMINANTS OF HOUSEHOLD'S ACCESS TO WATER SUPPLY IN UBUNGO DISTRICT.

From 04/03 2024 to 30/3 2024.

I Kindly request your good assistance to enable her/his research.

.....
For; REGIONAL ADMINISTRATION SECRERTARY
DAR ES SALAAM

Copy: Municipal Director,
UBUNGO
DAR ES SALAAM.

« Principal/Vice Chancellor
UNIVERSITY OF DAR-ES-SALAAM.

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE,
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

UBUNGO MUNICIPAL COUNCIL

In reply please quote:

TUNAOMBA MUUWAPE USHIRIKIANO