

**ASSESSMENT OF THE CHALLENGES OF WATER DISTRIBUTION TO
HOUSEHOLDS AT KIMARA WARD, UBUNGO DISTRICT**

SCOLASTICA SAMSON

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT FOR THE
REQUIREMENTS OF THE DEGREE OF MASTER OF ARTS IN
MONITORING AND EVALUATION OF THE OPEN UNIVERSITY OF
TANZANIA**

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CERTIFICATION

The undersigned certifies that he has read and here by recommends for acceptance by the Open University of Tanzania a thesis titled; “Assessment of the challenges of water distribution to households at Kimara ward, Ubungo District”, in fulfilment of the requirements for degree of Masters of Arts in Monitoring and Evaluation of the Open University of Tanzania.

.....

Dr. Emmanuel Patroba Mhache

(Supervisor)

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DECLARATION

I, **Scolastica Samson**, do hereby declare that this dissertation is my own original work and that it has, not been presented and will not be presented to any other University for a similar or any other degree award.

.....

Signature

.....

Date

DEDICATION

This research is mainly dedicated to my beloved parents, Samson Gibson Mwaipyana and Tunsume Ilembo who tirelessly supported me since my childhood. It is their continuous efforts' which made me have a conducive learning environment which was essential for the accomplishment of this research. May the Almighty God bless them all.

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ABSTRACT

The study assessed the challenges of water distribution to the households at Kimara ward in Ubungo District. The data collection techniques included; questionnaires, interviews (individual interviews) and literature review. The literature review was undertaken to see how water distribution is a challenge for the households in Kimara ward. The study findings revealed that the challenges of water distribution to the households at Kimara ward include; logistics, delivery of water bills, urbanization, infrastructure and lack of awareness about the policy governing water distribution. The areas where immediate interventions were recommended include; adherence to distribution theory so as to meet the existing demand for water to the households in Kimara Ward and ensure supply according to increasing demand as per “Demand Management Theory” in order to address the challenges of water distribution to the households in Kimara ward. The key findings from the study established that 57% of water distributed is undertaken by DAWASCO and 43% utilized water from other sources such as rain water, bore holes, water kiosk and water vendors. The conclusion and recommendations were proposed to improve water distribution to the households of Kimara ward. It was recommended that DAWASCO should carry on and distribute water to the remaining 43% respondents who represented community members in Kimara ward. It was recommended further that this can be done by undertaking monitoring and evaluation at each and every step of the water distribution project so as to adhere to the criteria of equal distribution and justice.

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LIST OF ABBREVIATIONS AND ACRONYMS

COWSO	Community Owned Water Supply Organization
DAWASCO	Dar es salaam Water Sewerage Corporation
EWURA	Energy Water Utilities Regulatory Authorities
MDGs	The Millennium Development Goals
MEO	Mtaa Executive Officer
NAWAPO	National Water Policy
NBS	Nature-based solutions
NGOs	Non Governmental Organizations
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
UNECA	United Nations Economic Commission for Africa
UN water	United Nations Water
URWSA	Urban Rural Water Supply Authorities
URT	United Republic of Tanzania
WDO	Ward Development Officer
WSDP	Water Sector Development Programme
WWDR	World Water Development Report
WSP	Water Safety Plan
WEO	Ward Executive Officer
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Overview

The main purpose of this study is to assess the challenges of water distribution to the households at Kimara Ward in Ubungo District in Dar es Salaam. The study aimed to identify and assess the routine water supply challenges encountered by community members in Kimara ward. The authorities such as Dar es Salaam Water and Sewerage Corporation (DAWASCO) and local government at district and ward level were also involved in the study. The study focused on the challenges in dealing with distribution of water as well as to identifying the effects of push and pull factors influencing water distribution in the community in Kimara ward.

1.2. Background of the Problem

Water is one of the most widely distributed substances found in the natural environment and constitutes the earth's oceans, seas, lakes, rivers and underground water sources. This substance is crucial for various aspects of human health, development and well-being. The United Nations has recognized the importance of this resource by incorporating it into the Millennium Development Goals (MDGs) and by proclaiming the years 2005-2015 as the International Decade for Action 'Water for Life' (UN Water, 2011).

The importance of water distribution has continued to be recognized with incorporation into the new Sustainable Development Goals (SDGs) which are Global Goals primarily set to transform the world form part of the 2030 Agenda for sustainable development. Water distribution has been recognized as a fundamental

human right internationally and it is vital that it should be managed effectively and efficiently on a global and national scale. United Nations Economic Commission for Africa (UNECA) goal is to better understand the role of water distribution in reducing poverty in Sub Saharan Africa (UNECA, 2006).

Africa faces huge challenges with multiple issues that adversely affect social cultural activities and economic activities. One major challenge is the ability for both rural and urban Africans to access clean water. According to WHO (2006), only 59% of the world's population have adequate access to clean water. The African water vision for 2025 and the framework for action suggest that, water distribution must double from the current 12 to 20 million hectare, and water productivity from irrigated and rain- fed agriculture must increase by 60% to meet future food needs in Africa. Water distribution is important for poverty reduction thus has a global as well as regional focus (UNECA, 2006).

In Tanzania rural drinking water distribution came on high, on the agenda in 1971, and the ruling party stated that since 1991 all population (both rural and urban) had access to safe water (Kyessi, 2005). Sustainability of rural water supply programs in developing countries is still an elusive goal. It is widely accepted that as a rule they have failed to deliver benefits to society in the long run. Emphasis has frequently been given on the short-term activities. Fast production of new schemes is thus a common strategy, prioritizing the engineering component, while side stepping social and participatory issues and community empowerment (URI, 2002)

In 2006, the Government of Tanzania launched a national program to meet water sector targets set out in the Millennium Development Goals by the year 2015

(Foguet, 2008). There is evidence that the Government is promoting more sustained facilities, focusing on cost recovery and on 'decentralization by devolution'. There are several shortcomings which threaten the long-term functionality of the infrastructure that has to be built. In light of the Implementation of the program, and based on the outputs of its pilot phase, the factors that can determine its sustainability were reviewed (Foguet, 2008).

In the mid 1970s, foreign donors started developing water distribution programs both in rural and urban areas. During this decade and the following International Drinking water distribution in the 1980s, considerable efforts were made to improve water distribution in the country. Facilities were rapidly built and then transferred to regional water engineers who had neither budget nor capabilities to operate them. The early efforts to provide sustainable water distribution service proved a failure (Therkildsen, 1988; URT, 2002; Kyessi, 2005). In response to the poor performance of water schemes, the Government introduced a new National water policy (NAWAPO) in 1991. Since then, Tanzania has been in a transition from a socialist economy- based on the principle of "free water for all"- to a more liberal economy where cost- recovery has become a priority.

Over the past decades, the people in Dar es Salaam have been confronted with severe water related problems, which are the result of unsustainable water distribution, arising from human interventions in the physical infrastructure of the water distribution and water management style (Brugge and Loarbach, 2005). In spite of the challenges, significant progress has been made in the country. The Water Sector

Development Programme (WSDP 2006 – 2025) with its sector wide approach to planning arrangement was prepared by the Government of Tanzania, to facilitate the management and development of water sector.

The program development objective is to strengthen sector institution for integrated water resources management and improve access to water distribution services. This effort was in line with the National Water Policy (NAWAPO, 2002) and the National Water Sector Development Strategy (2006), which aimed at developing a comprehensive framework for sustainable development of the country's water resources. The legal and institutional frameworks, which guide sector performance and development, have been in place since 2009 through enactment of the Water Resources Management Act and the Water Distribution Act (Water Sector Status Report, 2012).

1.3 Statement of the Problem

According to a report , household surveys regularly return lower water distribution coverage than estimates by the Ministry of Water and Irrigation(which are collected by district water engineers and Urban water and sanitation authorities (Wikipedia, 2013).The increased demand of water for rural citizens has risen from 35% to 51% (Twaweza 2014). In the past two decades many people have not have access to clean water, since it has declined slightly from 55% to 53% and for rural citizens from 46% to 44% (Twaweza, 2014). A plan of water distribution as per household demand should be done effectively (Msikula, 2017). However, the government has enacted a number of reforms toward improving water distribution services in the

country. For example, the establishment of Water Development Policy of 2002 and National Water Sector Development Strategy of 2006, were geared to promote integrated water management.

Problems related to water distribution is significant in several countries around the world. Thus water distribution becomes a key issue, especially in developing countries, where the institutional and regulatory context is not always properly designed (Florensa, 2012). As per claim of the community member of Kimara ward The limitations of water distribution are money, time and material resources, knowledge and skills and organization and leadership. Similarly, the government established Urban and Rural Water Supply Authorities (URWSA) and Energy Water Utilities Regulatory Authority (EWURA) in 2006 with the mandate to supply service and regulate the provision of water supply services (URT, 2010).

Dar es salaam Water Sewarage Corporation is putting up a plan to build clean water points in all city gathering places mostly schools, health centres, community bus stops, and markets(Msikula, 2017) Since few studies have been done on water distribution in Tanzania, there is need to conduct research on assess the challenges of water distribution to the households of Kimara Ward so that to meet effective water distribution.

1.4 General Objective

The general objective of this study is to assess the challenges of water distribution to the households in Kimara Ward.

1.4.1 Specific Objectives

- i. To determine the availability of water distributed by DAWASCO to the households of Kimara Ward.
- ii. To determine challenges to the effective water distribution to the households of Kimara ward
- iii. To identify the role played by Local Governmental and DAWASCO to ensure effective water distribution in Kimara Ward.

1.4.2 Research Questions

- i. Is the water distributed by DAWASCO available to the households of Kimara Ward?
- ii. What are the challenges to the effective water distribution to the household of Kimara ward?
- iii. What are the roles played by Local Governmental and DAWASCO to ensure effective water distribution to the household of Kimara Ward?

1.5 The Significance of the Study

The study is significant since it will contribute knowledge to the existing body of knowledge on water distribution to the household. The study finds room to attract further studies on issues related to the means of water distribution to households. The empirical results from the field will help as an immediate indicator on the factors contributing to water distribution to the households in Kimara Ward. The study will help policy makers improve water distribution strategies.

1.6 The Scope of the Study

The study conducted at Kimara ward in Ubungo District. A sample size of 100 respondent used. The selection of the respondents was randomly selected from a total of households, WEO, MEO, WDO, WC Member and” 6” ten cells representatives.. The study assessed the challenges of water distribution to the house hold at kimara ward in Ubungo district. Structured questionnaire and interview used as data collection tool. The study assess the challenges of water distribution to the households at kimara ward in Ubungo district.

1.7 Limitation of the Study

Time constraints; Obvious time used to be short due to other duties as per distance learning meanwhile studying while working. So it collected needed self despline in order maintain time management. Lack of awareness on the type of research to the respondent, other respondent expect payment when respond to the questionnaire, since they didn't know that the research was just for partial fullfil of masters degree and not for project purpose thus no fund at all. Weather; The study conducted during heavy sun season which lead to difficulties in data collection activities from one household to another.

1.8 Organization of the Study

This research proposal has four chapters, which include: 1) Chapter one: Introduction, 2) Chapter two: Literature Review, 3) Chapter three: Research Methodology, 4) Chapter 4: Data analysis and Discussions of the findings and 5) Chapter 5: Conclusion and recommendations.

The second chapter provides literature review on water distribution, the associated theories and the conceptual framework as well as research gap of this study. Chapter three presents research methodology including research type, research design, information which will be collected as well as sampling techniques that were used in the research which focused on the adequacy of the responses given by the selected sample. 4) Chapter 4 presents the data analysis and discussions of the findings and 5) Chapter 5 focuses on the Conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter reviews literature related to water distribution which is the focus of this study. The chapter is organized into the following parts; introduction, definition of main concepts, theoretical literature review and empirical literature review. It further presents the conceptual framework and research gap.

2.2 Definition of the Concepts

2.2.1 Water

Water is natural resource which is in liquid form and it is found in rain, oceans, rivers, lakes, ponds and underground. Underground water can be made available through springs and wells. More than 71% of the earth's surface is covered by water (Mafiga & Aikande, 2007).

2.2.2 Water Distribution

Water distribution refers to the process of delivering water to consumers with appropriate quality, quantity and pressure (Adeosun at al,2014). Water distribution is defined as the process of distributing water to communities, institutions and individuals for different uses (Kurian at al, 2010) Water can be distributed for agricultural use, domestic use, fishing, industries, for recreational purposes such as swimming, surfing, diving and other use (Mafiga & Aikande, 2007). Water distribution can be defined as the delivery of water services to the community from the main stream to the targeted user (Hutson *et al*, 2000).

2.2.3 Water Resources

As per Kireri, 2017, water resources are natural resources of water that are potentially useful. The uses of water include agricultural, industrial, household, recreational and environmental activities. Water resources can be grouped into three groups which are atmospheric water, surface water and groundwater. Water resources can be defined as any place or location through which water can be obtained. Some water resources include oceans, lakes, rivers, wells, dams, springs, ponds, swamps and rainfall (Kireri, 2017).

2.2.4 Water Management

According to Mafiga & Aikande, 2007, water management is defined as the whole process of its effective supply, utilization and conservation to ensure that the sources of water do not dry up or that water is not polluted. Good water resource management maintains a balance between the growing social and economic demands and continued ability of fresh water resources to support them (Crofton, 2017) Water management refers to control measures in the exploitation and improvement of water as a resource (Mafiga & Aikande, 2007).

2.3 Theoretical Literature Review

This study focuses on assessing the challenges of water distribution services and the study will use various water theories based on water utilization services that determine the behaviors and factors for individuals to make use of the water distribution services. Three different theories on water distribution services utilization are reviewed in this study.

2.3.1 Distribution Theory

Distribution theory states that the price of a factor of production is governed by its marginal productivity (Kaldor, 1955). According to Cannon “Distribution like production is a social phenomenon, in production we study the creation of social income and in distribution study its distribution and in one case we regard it as national output and in the other as national dividend. “In economics, the systematic attempt to account for the sharing of the national income among the owners of the factors of production; land, labor, and capital,” might be effective and efficient if we would adhere to the theory of distribution.

Traditionally, economists have studied how the costs of these factors and size of their return, rent, wages, and profits are fixed. At present under the study of economics the study of ‘distribution’ has occupied a very important place. The methods have high effect on the economic life of the nation. Therefore, where the work of distribution is done with equity and justice the various channels of distribution are satisfied with workings. The main problem of distribution is how much is the product to be distributed? Among what factors should it be distributed? What should be the theory of distribution? This theory relates with this topic since water distribution should adhere equity and justice but up to date water is unevenly distributed due to underpinning factors which dominate water distribution. The study will contribute to this theory by determining the socio-economic theory as well as the factors affecting water distribution.

2.3.2 Water Supply Reliability Theory

Water supply reliability can be defined in terms of the shortages that result from

failures in a distribution's physical components. In 1972, Damelin, et al. outlined the considerations involved in assessing water supply reliability. They developed a computer simulation model that was used to evaluate reliability for specific water supply systems and defined a reliability factor in terms of shortages in annual delivery volumes. Because the system is subject to random failures of pumping equipment and of electrical power supply, the reliability factor is a random variable.

Analysis of its random nature was performed through repeated runs of the stochastic simulation. An economic model was based on this analysis (Howard *et al.*, 1972). A reliability factor for a single failure or for a selected time period can be defined in terms of the capacity lost during failure, which is measured as a fraction for demand rate or the demand volume. Since the lost capacity is a random variable, so is the reliability factor, and its possibility density function can be derived analytically from that of the lost capacity. Reliability, defined as the probability that a given reliability factor will be achieved, can be increased by adding facilities, storage, pumping capacity, pipelines. The least cost combination of facilities can be identified from the cost functions and the probability distributions of the reliability factor (Shamir and Howard, 1981).

Instead of creating water supply systems that fully insulate mankind from climate imposed water deficiencies, it is possible that for municipal water system a non-zero probability of water supply shortfall is efficient. Perfect water supply reliability, meaning no chance of future shortfall, is not optimal when water development costs are high. Designing an efficient strategy requires an assessment of consumer preferences pertaining to the reliability of water supply. Contingent valuations of

both current and future shortfalls are reported. The consistency of these measures is gauged using an expected utility model (Griffin and Mjelde, 2000). This theory relates to the study due to the existing demand of water. The study will therefore contribute to explore the role of water service providers to understand reliability as the factor affecting water distribution.

2.3.3 Demand Management Theory

In the era of global finance, the theory of aggregate demand management is alive and unwell, says (Bhaduri, 2014). In this policy brief, Bhaduri describes what he regards as a prevalent contemporary approach to demand management. Detached from its Keynesian roots, this “vulgar” version of demand management theory is being used to justify policies that stand in stark contrast to those prescribed by the original Keynesian model. Rising asset prices and private–debt-fueled consumption plays the starring roles, while fiscal policy retreats into the background. Returning to foundations lay down by Keynes and Kalecki, Bhaduri sets out to clarify whether there is any place for traditional demand management policies, featuring an active role.

Demand management is an alternative to increase water supply to meet growing demand as per Strpnenson, 1999. Control of water usage can be affected by the supplier or the consumer. The supplier can use physical methods to limit supply or economic, and the consumer can adjust his way of living either voluntarily or under pressure by the supplier. The classical supply-and-demand curves are applied to water distribution, considering the effects of metering, and marginal vs. average

costing. (Stephenson, 1999). Water distribution can be limited by physical, sociological or economic means (instruments). Physical means include cutoffs or pressure control by reducing pumping or constrictions in pipes, for example orifices or washers.

On the other hand, it may even out the water draw off variations by making consumers take water over more hours per day and provide in-house storage to meet peak consumption. The former (curtailing supply over periods of hours), could result in higher peaks when supply is resumed, but this will in turn reduce pressure and therefore peak draw off. Demand control by pressure reduction could result in different draw off patterns. Roof tanks could be filled at night. This will save water distribution pipe costs but not necessarily reduce total volume of use. It may also be possible to reduce supplies to uneconomical, no longer valued consumers with compensation, in preference to newer consumers. In the long term, water-saving plumbing devices could be installed. These include small and double action cisterns, low-volume showers and automatic tap closers.

The relevance of demand management theory to this current study is in the sense of assessment of the effect of water distribution to the households in Kimara ward, whereby assessment of water distribution depends on supply to meet demand meanwhile without increasing supply to meet growing demand, hence the assessment of water distribution is said to be insufficient. Furthermore this study will contribute to this theory by identifying the role of water service providers to distribute water to the household's per demand.

2.4 Empirical Analyses of Relevant Studies on Water Distribution

2.4.1 Water Distribution Situation Globally and Sub-Saharan Africa

Globally, drinking water distribution is a problem. The world's population is growing by about 80 million people per year, implying increased water distribution demand of about 64 billion cubic meters per year (WWDR, 2015). In 2006, 54% of the world's population had a piped connection to their dwelling, plot or yard, and 33% used other advanced water sources (WWDR, 2015). The remaining 13% (884 million people) relied on unimproved sources of water. (The United Nations World Water Development Report, 2015).

World Water Assessment Program seeks to inform policy and decision-makers, inside and outside the water community, about the potential of nature based solutions (NBS) to address contemporary water management challenges across all sectors, and particularly regarding water for agriculture, sustainable cities, disaster risk reduction and improving water quality (WWDR, 2018). In sub-Saharan Africa, 68% of the population has access to advanced sources of water (WWDR, 2018). Some regions are influenced by gynogenic contaminants for example fluoride and arsenic and lack of water distribution to sanitation facilities and hygiene practices causes high microbiological contamination of drinking water in the distribution chain (Haziq, 2017).

The Water Safety Plan (WSP) approach introduced by the World Health Organization (WHO) in 2004 is up to date under development in several developing countries in order to face up to these problems. The WSP approach was elaborated within two cooperation projects implemented in rural side areas of Burkina Faso and

Senegal by two Italian NGOs. In order to assess its sustainability, a questionnaire based on five different sustainability elements and a cost and time utilization assessment were carried out and applied in both the case studies.

Results showed that the questionnaire can provide a useful and interesting overview concerning the sustainability of the WSP; however, further surveys in the field were recommended for collecting more information. Time and costs related to the WSP elaboration, implementation, and management were demonstrated to be negligible and above all strongly dependent on water quality and water distribution (Rondi, 2015). In developing countries the picture is complicated by the widespread use of informal and small scale private water distributors charging full market prices; in these cases the poorest households can pay 3%-11% of income on water (UN WATER, 2007).

2.4.2 Water Distribution Services in Tanzania

In Tanzania, like in many other countries in the Sub-Saharan region, the government is implementing an ambitious rural water supply and sanitation plan (RWSSP) to increase access to water from 53% in 2005 to 90% by 2025 (Jimenez,2011). The exploited water mapping data assessed the principles underlying the design of the program and identified some challenges for the rapid increase of access to water. The data set of water points analyzed accounts for 15% of the country's total rural population (Perez-Foguet, 2010).

The results show, that the inaccuracy of the baseline used for the program design, difficulties faced by underserved districts in keeping the water points functional, the

differences between the expected and real long-term functionality of the water distribution, especially for hand pumps, are the primary threats to the achievement of the targets of the program. It is suggested that more effort should be put into capacity building, particularly the supervision of construction, and the support of community-owned management during the first year of operation (Jimenez, 2011).

2.4.3 Gender Perceptions toward Water Distribution

According to Beal, (2013) found that householders' perceptions on water use are often not well matched with their actual water use. There has been less research however, investigating whether this bias, concerns general perceptions on water use, especially on gender issues related to specific categories of end use and or specific types of socio-demographic and socio-psychological household profiles. A high resolution smart metering study producing a detailed end use event registry as well as psycho-social and socio-demographic survey, stock inventory audits and self-reported water diaries was completed for 252 households located in South-east Queensland, Australia.

The study assessed the contributions of end users to total water use for each group that self-identified water usage group including age, income, percentage of water efficient stock for example low-flow taps, family size and composition and water conservation intentions and attitudes (UN, 1996) The level of information the consumer receives on their water bill as well as diurnal end use patterns were also assessed as per Berkoff, 2014 The paper concluded with a discussion of the general characteristics (That is, income, age, gender and family composition of groups that tended to overestimate or underestimate their water use and how this knowledge can

be used to inform demand management policy such as targeted community education program and community-based social marketing. Further, the potential for economic and sustainable development outcomes of the research was also discussed as well as the factors affecting water distribution (Bruvold, 1988).

2.4.4 Awareness Level of Water Distribution to the Household

Within the research field of urban water demand management, understanding the link between environmental and water conservation attitudes and observed end use water consumption has been limited. Through a mixed method research design incorporating field-based smart metering technology and questionnaire surveys, this paper reveals the relationship between environmental and water conservation attitudes and a domestic water end use break down for 132 detached households located in Gold Coast city, Australia (Wu

Using confirmatory factor analysis, attitudinal factors were developed and refined; households were then categorized based on these factors through cluster analysis technique. Results indicated that residents with very positive environmental and water conservation attitudes consumed significantly less water in total and across the behaviorally influenced end uses of shower, washing clothes, irrigation and tap, than those with moderately positive attitudinal concern. The paper concluded with implications for urban water demand management planning, policy and practice (Willis *et al*, 2011).

Nyanza Province, Kenya is characterized by poor water quality and high diarrhea prevalence. To address these problems, nurses in a maternal and child health clinic in

Homa Bay, Kenya were trained in household water chlorination with a locally available, social marketed product and in six steps of proper hand washing. They were asked to communicate this information to their clients. Interviews immediately following the training by nurses were conducted on 220 clients, of whom 168 (76%) reported being taught both procedures during their clinic visit. After 2 weeks, free chlorine residuals were present in stored drinking water in 67 out of 98 (68%) clients' homes and 1 year later, in 36 out of 51 (71%) clients' homes. After 2 weeks, all six hand-washing steps were correctly demonstrated by 41 (44%) out of 93 clients and by 17 out of 51 (34%) 1 year later. This brief, practical intervention shows promise for vulnerable populations (Parker, 2006).

In recent decades, many changes have occurred in the approach to financing and operating water services in developing countries. The demand- responsive approach is now adopted in many countries in a context of donor- supported decentralization processes, which gives more responsibility to end users. However, the government's responsibility at different levels is enforced by the international recognition of the human right to water. This paper examines specific actions that build the role of local government authorities in this scenario. The collaboration between an international NGO and a rural district in Tanzania from 2006 to 2009 was used as an action research case study that is representative of local capacity- building needs in decentralized contexts and rural areas.

The three main challenges that were detected included: i) lack of reliable information, ii) poor allocation of resources in terms of equity, and iii) lack of long- term community management support from the district. Two mechanisms

were established: i) water point mapping as a tool for information and planning and ii) a District Water and Sanitation Unit Support (DWUS) for community management. The results show how the framework provided by the goal of human right to water helps to define useful strategies for equity - oriented planning and post - project support at the local level (Jimenez, 2010).

2.4.5 Socio-Economic Effects of Water Distribution to the Households in Kimara Ward

Dismas, (2018) found that urbanization in poverty is the key factor underpinning and catalyzing changes in land use, land transactions, increased rural–urban immigration and the overall change of land use in the peri-urban areas, this affects water distribution. Dismas (2018) study pointed out that unregulated peri-urban land development has given rise to complex organic urban structures which predominantly expanding horizontally. According to him the emerging land use pattern, by and large, indicates a mismatch with the widely cherished planning norms and standards and land value theories which, underpin urban land use planning instruments such as zoning, density distribution and principles like equitable provision of basic services and complimentarily in urban land development.

However, it was argued that for an unforeseeable future, organic urban growth is likely to remain an indispensable reality depicting urban land development in resource starved situations such as Tanzania because of the severe resource constraints facing local and central governments, the nature of the subsisting land

tenure structure in most peri-urban areas, poor national economic performance and looming poverty in rural and urban areas. Therefore, planners and policy makers have little choice but to establish and combine the emerging form. Decentralized land management anchored on the subsisting local government administrative structures, introduction of user-friendly and pro-poor land regularization systems, and embarking on land banking by local authorities are some of the key and immediate policy action areas of concern.

2.4.6 Policy Review

The Government introduced the National Water Policy (NAWAPO) in 1991. The policy was meant to address the poor act of water scheme. The revised NAWAPO was launched in 2002 (URT, 2002) as a starting point of a new policy framework, which was to be developed at a national scale. NAWAPO (URT, 2002) is based on (i) the process of decentralization by devolution, (ii) cost recovery and (iii) the issue of ownership. Implementation of these principles has entailed significant implications for agencies of the rural water sector and the way they operate. The Government's new role ('hands off, eyes on') is one of policy and guideline formulation, coordination, monitoring and regulation (Jiménez and Pérez-Foguet, 2013).

The main objective of the National Water Policy of 2002 is to develop a comprehensive framework for sustainable development and management of the nation's water resources and putting in place an effective legal and institutional framework for its implementation. The policy aims at ensuring that beneficiaries participate fully in all stages of water resource development. The Policy recognizes

the fundamental but intricate linkages between water and socio-economic development, including environmental requirements. The Policy expounds on the importance of water for domestic use, agriculture, livestock keeping, mining, energy, fisheries, environment, human health, wildlife and tourism, forestry, navigation and trans-boundary requirements. In view of this, the Policy calls for an Integrated Water Resource Management approach in Tanzania so that “there is equitable and sustainable use and management of water resources for socioeconomic development, and for maintenance of the environment” (URT, 2002).

The government enacted a number of reforms toward improving water distribution services in the country. For example the establishment of water Development policy of 2002 and National water Sector Development Strategy of 2006, were geared to promote integrated water management. Similarly ,the government established Urban and rural water supply Authorities (URWSA) and Energy Water Utilities Regulatory Authority(EWURA) in 2006 with the mandate to supply service and regulate the provision of water supply services (URT, 2010).

However later on, the responsibility of water supply services provision shifted from local government authorities to specific utilities called ‘Urban and Rural Water Supply Authorities’, By the end of 2010, they were about 20 Urban water Utilities, 100 districts water utilities, and Community Owned Water Supply Organization (COWSO) in rural areas (URT, 2010). Despite government initiatives to enhance water availability, access to clean water and safe water remain fairly low (URT, 2007). In Dar es Salaam for example, despite heavy investment by international organizations like World Bank and European Union, the utility remains the worst

performing water entity (GZT, 2008).

2.4.7 Three Key Lessons from Reviewed Literature

Water distribution to the household in particular is critical and vital for the development of human beings requiring appropriate strategies and related approaches to maintain sustainable distribution of water as per demand. Water distribution to the household typically depends on physical, sociological and economical means as portrayed by demand management theory. Reviewed theories did not consider awareness/knowledge and role of water service providers as among of the factors influencing water distribution and therefore this provides research knowledge and understanding room for the study in particular.

2.6 Conceptual Framework

Ndunguru (2007) defined conceptual framework as an assembly of research concepts or variables with their logical relationship represented in diagrams, charts graphs, pictographs, flow charts and mathematical sets. It involves both dependent and independent variables. Based on figure 2.1 the conceptual framework of the study depicts the relationships between independent, intervening and dependent variables. Independent variables is water distribution achieved by the assistance of water pipe, water pump as well as storage pump meanwhile without water pipe, water pump, storage tanks, water may be undistributed.

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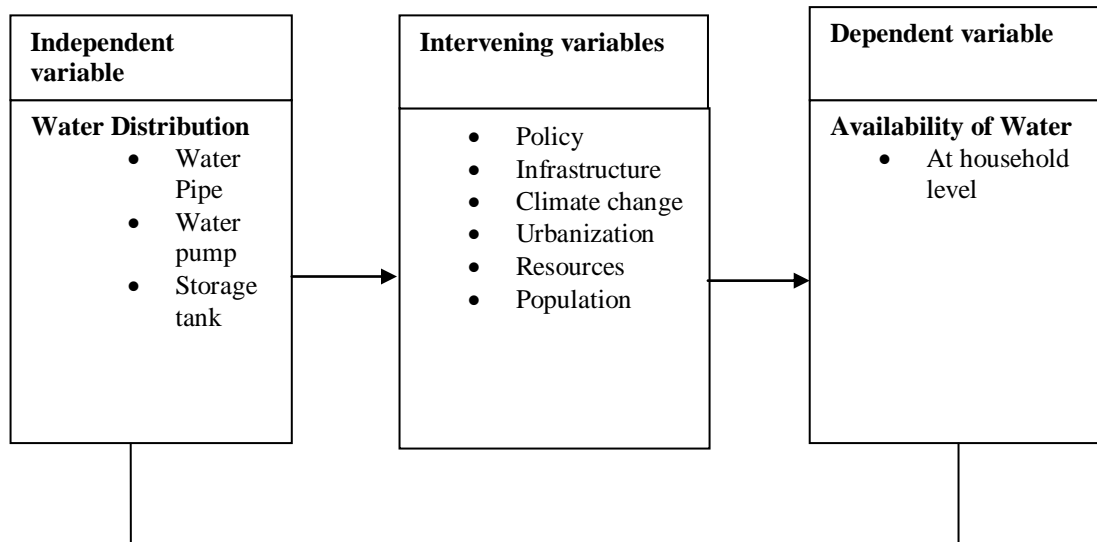


Figure 2.1: The Relationship between Variables

Source: Researcher (2018)

Intervening variables are policy, infrastructure, climate change, urbanization, population and resource. With good policies, infrastructure, urbanization and resources, water distribution can be said to be achieved. If good policies on water distribution are not in place, water distribution is affected.

The dependent variable is availability of water. Water distribution may be affected by those intervening variables that led to availability or unavailability of water at house hold level. This conceptual framework is linked to Demand Management Theory which proposes addressing three pillars to enable effective and efficient transformation of water distribution in the country. These pillars include physical, sociological and economic means.

2.5 Research Gap

While reviewing literature, it seems clear that many studies have put much focus on the participatory approach and sustainability in which concepts like delivery, consumption, and use have been addressed. None of the studies focused on assessment of challenges of water distribution to the households of Kimara Ward. Therefore this study will focus on assessing challenges of water distribution to the households in Kimara Ward to cover the existing gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter consists of study area, research design, target population, sampling procedures, sampling frame and the sample size. It also contains sources of data, data collection methods, analysis, interpretation and presentation. The chapter also presents the validity and reliability as well as ethical consideration and the summary of the chapter.

3.2 The Study Area

Kimara is an administrative ward in Ubungo district, west of the Dar es Salaam's central business district, east of Tanzania. According to the 2012 census, the ward has a total population of 76,577 (36,654 male and 39,923 female), 16,886 households and six streets, which are Gorani, Mavulunza, Kirungule A, Kirungule B, Kimara Baruti and Baruti. The ward is part and parcel of Kinondoni District as per division of administrative district, thus Kimara Ward is one of the wards of Ubungo District (see Figure 3.1).

3.3 Research Design

Research design is a plan, roadmap and blueprint strategy of investigation conceived so as to obtain answers to research questions (Kothari, 2004). According to (reswell 2003), research design helps to structure the collection, analysis and interpretation of data. A research design is the framework or plan for a study and it is used as a guide in collecting and analyzing data (Coyne, 1997)

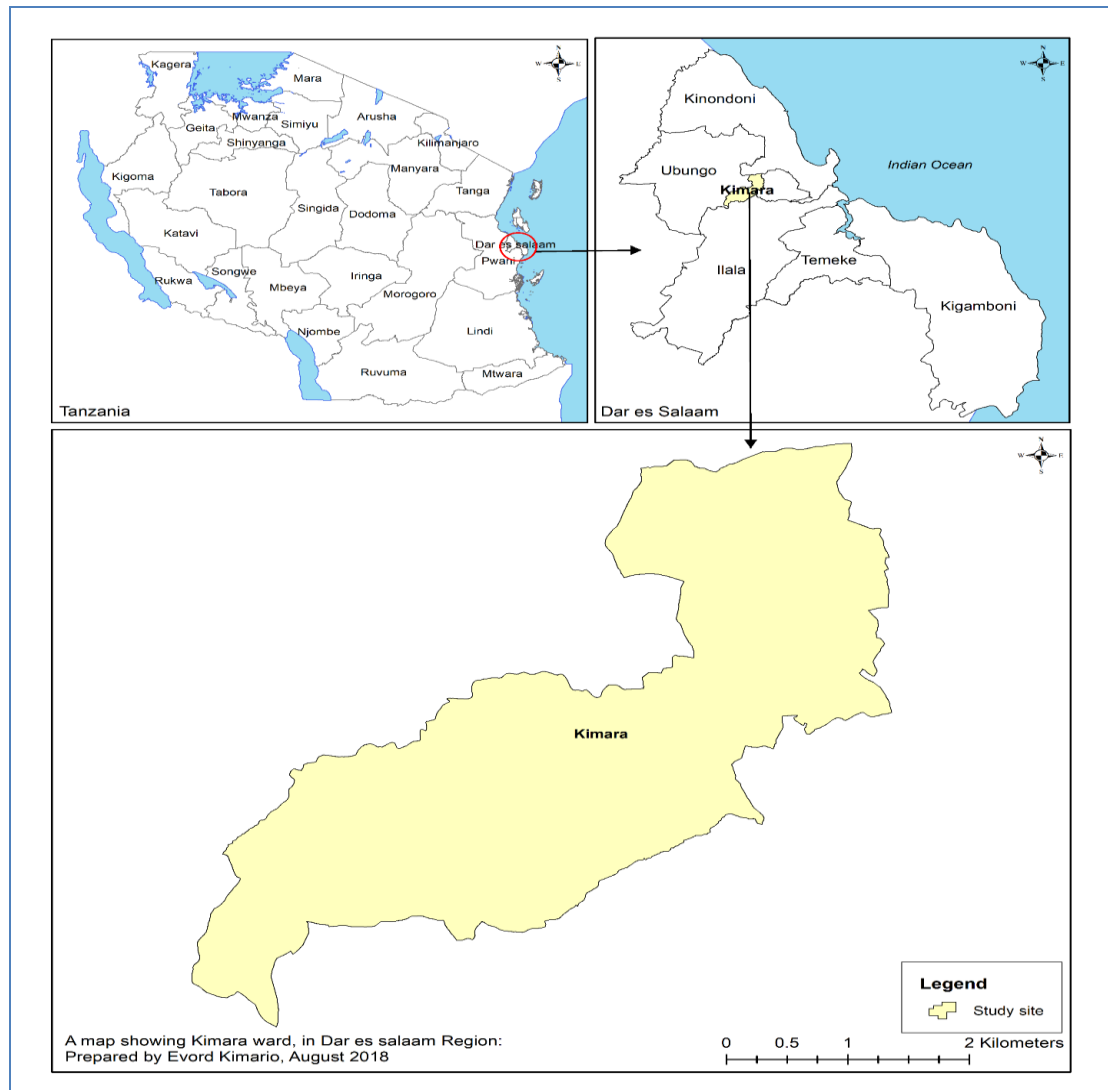


Figure 3.1: A Map of Kimara Ward in Ubungo District
Source: Kimario, 2018

This study employed descriptive research design where both quantitative and qualitative methods were used in assessing the challenges of water distribution in Kimara Ward. The research design avoided frequent errors that are obtained through generalization and reasoning. Generalization of issues was also avoided by not making conclusions without wide-ranging analysis. In addition, the study avoided reasoning errors by not making conclusions without verification. Flexibility was used to change previous conclusion in light of new discovery.

3.4 Target Population

3.4.1 The survey population for this study included all households which were provided with or without water service by the water services provider (DAWASCO) in Kimara ward during the period of nine months from January 2017. It involved households in Gorani, Mavulunza, Kirungule A, Kirungule B, Kimara Baruti and Baruti. The study involved WEO, WDO, MEO, WC Member and “6” Ten Cells representatives (Shina Leader).

3.5 Sampling Procedure

According to the American Heritage College Dictionary (1993), sampling is the process of selecting a portion, piece, or segment that is representative of a whole. This is an important step in the research process because it helps to inform the quality of inferences made by the researcher that stem from the underlying findings. Kothari (2004), argued that the respondents selected should be as representative of the total population as possible in order to produce a miniature cross-section.

The selected respondents constitute what is technically called a ‘sample’ and the selection process is called ‘sampling technique.’ Sample refers to the exact number of individuals or items drawn from the populations to represent the same (Adam and Kamuzora, 2008). Sampling techniques provide methods that help to reduce the amount of data needed for collection by considering only data from sub-group rather than all possible elements, (Saunders et al, 2000). In this study, purposive sampling was used to select units of inquiry for the study; the main reason was easy accessibility.

3.5.1 Random Sampling Technique

Random Sampling technique is a probability sampling whereby all members in the population have equal chance of being selected to form a sample (Kothari, 2004). This technique was used to select 100 households from the streets of Kimara Ward. The households were selected randomly from each street, until 100 households were reached, within all six streets which are Golani, Mavulunza, Kilungule A, Kilungule B, Kimara Baruti and Baruti. The sample was drawn, using a sampling frame.

3.6 Sampling Frame and Sample size

This study employed a sample size of 100 respondents and questionnaires were administered to these 100 respondents. Whereas the 10 respondents interviewed included the WEO, MEO, WDO, WC Member and “6” Ten Cells representatives.

Sample size computation

The sample size was calculated based on (Yamane’s formula Israel, G.D. 1992)

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

Where,

n = the sample size

N = the size of population (76,577)

e = the level of error 10 percent that is sampling error (level of precision)

$$n = \frac{76577}{1 + 76577(0.1)^2}$$

$$n = \frac{76577}{766.77}$$

$$n = 99.869582795$$

$$n = 100$$

3.7 Sources of Data

The study involved two sources of data, which are secondary and primary sources of data.

3.7.1 Secondary Data

Secondary data was collected from reserved and stored literature which are books, journals, previous dissertation, articles in libraries and from the internet. Water bills from DAWASCO were used as a source of data for identifying households samples on their cell phones. . Additional data was obtained from Kimara ward office.

3.7.2 Primary Data

Kothari (2004) defined primary data as information collected afresh and for the first time and thus happen to be original in character. This study employed structured questionnaires and interviews.

3.8. Data Collection Methods and Tools

The study involved the collection of both quantitative and qualitative data. The data collection tools used was questionnaires and interviews. Structured questionnaires were distributed to 100 respondents. Questionnaires and interview tools were drafted in English and translated into Kiswahili language. This was very essential to allow the respondents to understand and be able to respond easily. The interviews involved other 10 respondents at ward level and this was important for triangulation of data.

3.8.1 Questionnaire

The structured questionnaire was distributed to 100 respondents. The questionnaire was written in Kiswahili language with a very simple expressions and language so as enable the respondents to understand and be able to respond easily. The questionnaires were distributed to the respondents who were included in the sample. The questionnaires were drafted in English but for the purpose of easy understanding in the field they were translated into Swahili. This facilitated easy data collection.

3.8.2 Interview

An interview is a set of questions administered through oral or verbal communication or it is a face to-face conversation (Kothari, 2008). Questions were developed to guide such interviews and plan for interview schedules. 10 semi structured interviews were used to collect information from officers such as the WEO, WDO, MEO, WC Member and 6 ten cell representatives. The technique was preferred as it creates room for probing for more information from respondents. This method was also adopted because the researcher believed that it helps to get first-hand information from respondents as respondents get a chance to exhaust their views. The method is effective in overcoming resistance from respondents and probing for more information as it is flexible and the respondents feel to be part of the team since no rigidity is displayed.

3.8.3 Document review

Documentary sources of data were collected from the reserved and stored literature which are books, journals, previous dissertation, articles in libraries and from internet as well as DAWASCO Customer Bills on their cell phones.. These play an

important role in disseminating knowledge to all disciplines about the research study. The documentary sources for the study include published books, past research reports, journals and articles.

3.9 Data analysis, Interpretation and Presentation

In order to suit the design and meet study expectations, the field data collected was summarized and categorized for easy presentation and interpretation purposely to establish the similarities and differences of the responses. The analysis of data was conducted by using Statistical Package for Social Science (SPSS) and the data was presented in tables.

3.10 Validity and Reliability

According to James (1997) validity can be defined as the degree to which a test measures, what it is supposed to measure. Researchers in qualitative studies generally determine validity by asking a series of questions and often look for the answers in the research of others (Joppe, 2000). Pre testing of the instrument was conducted so as to check the validity of the instrument.

The reliability of a research instrument concerns the degree to which the instrument brings the same results on repeated trials (James, 1997). According to Saunders, Lewis & Thornhill, 2012 reliability refers to the extent which your data collection and analysis procedures yield consistent findings. To ensure reliability all errors and bias minimized, all respondents are treated equally. None of the names of the respondents appear on questionnaire for confidentially reasons. In this study, coding categories were connected to the context, situation, ways of thinking, perspectives,

processes, activities, events, strategies and relationships used in order to ensure consistency of data reduction methods assessed.

3.11 Ethical Issues

The data collection exercise has done per willingness and cooperation of respondents. Respondents were informed about the objectives of the study. The respondents were informed about their rights and assured that the data collected would be confidential and would not be discussed with anyone who was not concerned. In the situation that requires mentioning names, letters and number would be used instead. This would be done in order to maintain confidentiality since other respondents do not need their names to be mentioned.

3.12 Chapter Summary

This chapter was about study area, research design, target population, sampling procedures, sampling frame and sample size. It also consisted of sources of data, data collection methods and tools, analysis, interpretation and presentation. Finally it had validity and reliability as well as ethical consideration.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Overview

This chapter presents the findings and discussion of the findings. The study assesses the challenges of water distribution to the households of Kimara ward in Ubungo District. The chapter is organized in themes, based on research objectives and questions which were used to guide the investigation.

4.2 Demographic Characteristics of the Respondents

The fieldwork comprised administration of questionnaires and interviews. The rate of response of the administered questionnaires was good because 100% of the respondents responded to the questionnaires. A total number of 100 questionnaires was distributed to the respondents on the study.

4.2.1 Gender

Table 4.1 reveals that, 38% of the respondents were males and 62% of the respondents were females. The large percentage of women is explained by their availability during data collection. In most traditional households a woman is a housekeeper tending to the house chores while men engaged in waged labor or employment. On top of that, women are easier to recruit in a survey due to their willingness to respond to things (Gefen, 1997).

Table 4.1: Distribution by Gender

Sex	Frequencies	Percentages
Female	62	62
Male	38	38
Total	100	100

Source: Field survey 2018

4.2.2 Age of the Respondents

The distribution of respondent's by age is presented in Table 4.2. Majority of respondents' age ranged between 18 to 52. Only 22% were above 53.

Table 4.2: Age Categories of the Respondents

Age category	Frequencies	Percentages
18-35	39	39.0
36-52	39	39.0
53+	22	22.0
Total	100	100.0

Source: Field survey, 2018

4.2.3 Level of Education of the Respondents

As per Table 4.3, the level of education of the respondents indicated that 7% were illiterate, 40% were primary school leavers, 39% were secondary school leavers, 9% were certificate and diploma holder, and 5% were degree holders.

Table 4.3: Education Level

Education level	Frequency	Percentages
Illiterate	7	7.0
Primary	40	40.0
Secondary	39	39.0
Certificate/Diploma	9	9.0
Degree	5	5.0
Total	100	100.0

Source: Field survey, 2018

4.2.4 Marital Status

Table 4.4 shows the distribution of respondents by marital status. The result shows that 71% of the respondents were married while 16% are single, 3% were divorced and 10% were widows.

Table 4.4: Marital Status

Marital	Frequency	Percentages
Single	16	16.0
Married	71	71.0
Divorced	3	3.
Widow	1	10.0
Total	100	100.0

Source: Field survey, 2018

4.3. Water Distribution by DAWASCO to the Households in Kimara Ward

To address the question of water distribution by DAWASCO to the households of Kimara Ward, three aspects were looked unto. One, whether the respondents were getting piped water from DAWASCO or not, second, whether the pipes provided enough water and third, whether the distribution was by ration or not. The responses are summarized in the sections below.

4.3.1 Accessibility to DAWASCO Piped Water

The respondents were asked whether their houses were connected to DAWASCO piped water. Fifty seven percent of respondents acknowledged to receive water services from DAWASCO, the remaining 43% obtained water from other sources, this percentage is against to “Distribution like production is a social phenomenon, in production we study the creation of social income and in distribution study its

distribution one case we regard it as national output and in the other as national dividend, (Canon, 2017)” “In economics, the systematic attempt to account for the sharing of the national income among the owners of the factors of production- land, labor, and capital (Canon, 2017),” might be effective and efficient if would we adhere to the theory of distribution.

Traditionally, economists have studied how the costs of these factors and size of their return-rent, wages, and profits-are fixed. According Canon (2017), Public expenditure should be incurred in such a way that the glaring inequalities in the distribution of income and wealth are minimized. The expenditure pattern of the government should be designed to benefit the poorer sections of the community. The methods have high effect on the economic life of the nation.

According to Canon (2017), where the work of distribution is done with equity and justice the various channels of distribution are satisfied with workings. The main problem of distribution is how much is the product to be distributed? Among what factors it should be distributed? What should be the theory of distribution? This theory relates with this topic since water distribution should adhere equity and justice but up to date water is unevenly distributed due to underpinning factors which dominate water distribution.

As per Canon (2017), scarcity of resource is the one of the factors, that hinder equal distribution, meanwhile if there is enough resource water distribution is said to be even. This relates to the government of Tanzania adoption of the MDG definition and reports accordingly that “the proportion of people served by the 19 urban water

authorities using drinking water from improved sources increased from 74% in 2005 to 84% in December 2009 (United Republic of Tanzania, 2010, 48). Another definition used is the percentage of population with access to improved sources of water within 400m/30 minutes” (United Republic of Tanzania, 2013). Table 4.5 shows water distributed by DAWASCO and other water sources.

Table 4.5: Water from DAWASCO and other Sources

Water sources	Frequencies	Percentages
DAWASCO water	57	57
Water vendors	15	15
Boreholes (Wells)	7	7
Rainwater	3	3
Water Kiosk	18	18
Total	100	100

Source: Field survey, 2018

These findings imply that DAWASCO needs to do more than it has done so that to achieve the plan of Ministry of water that people must receive water for 99% up to 2026. One respondent from Mafulunza Street said: “We neither receive water service nor see DAWASCO staff, water is a problem for us.” Undertaking this study in the study in the area seemed to bring hope and appreciation expressed by respondents.

4.3.2 Availability of DAWASCO Piped Water

The respondents who received water from water from DAWASCO were asked whether the supply of DAWASCO piped water met their demand. According to Table 4.6, a large proportional of respondents who were supplied water by DAWASCO (74%) showed dissatisfaction as far as DAWASCO meeting their

demand for water. Twenty six percent (26%) showed high level of satisfaction with DAWASCO supply. Based on these findings, the DAWASCO distribution of water does not meet water demand of most of the household it supplies. This relates to the literature reviewed that, “...despite government initiatives to enhance water availability, access to clean water and safe water remain fairly low” (URT, 2007).

In Dar es salaam for example, “Despite heavy investment by international organizations like World Bank and European Union, the utility remains the worst performing water entity” (GZT, 2008). This shows that the increase in demand for water, which is caused by high population growth, is the factor affecting water distribution. Meanwhile, when the population increases, the demand for water also increases, even if the government invests more, the distribution is still said to be uneven. Therefore, in order to meet effective and efficient water distribution, “Demand Management Theory” should be put into practice, that is, increasing demand results in increasing supply (Stephenson, 1999).

Table 4.6: Whether the distribution of water by DAWASCO meets your demand?

Response	Frequency	Percentages
No	42	74.0
Not aware	0	0.0
Yes	15	26.0
Total	57	100.0

Source: Field survey, 2018

One respondent complained regarding the delayed connection as follows: “I have paid for water service to DAWSCO and I have a water tap at home but up to date, I have not received water from my own tap, I just fetch from my neighbor” (Respondent from Kilungule B” Street). Another respondent from Kilungule B Street complained of disconnection as a result of construction activities as follows: “Since the construction of road from Korongwe to Kilungule B Street we have not received water.”

4.3.3 Frequency of Water Distribution

The respondents were asked whether the distribution of water by DAWASCO was by ration and whether they get supply regularly. Fifty nine percent of the respondents responded negative about the frequency distribution of water ,while thirty three percent of the respondent responded positively about the frequency of water distribution. This implies that the distribution of water at Kimara Ward is uneven. This is against with distribution theory (Kaldor, 1955), yet infrastructure is the pull factor of water distribution meanwhile portable infrastructure encourages frequent water distribution. This relates to, “accommodation strategies to adjust behavior to accommodate the unreliable supply of water, such as consuming less water by using it twice or using pit latrines rather than flush toilets even when the latter are available” (Kudat, Bell, 1993).

Table 4.7: Frequency of Water Distribution

Response	Frequency	Percentages
No	33	59.0
Not aware	5	8.0
Yes	19	33.0
Total	57	100.0

Source: Field survey, 2018

One of interview respondents from Kilungule B Street stated that, “In my street, we have enough water. Surely the campaign of “Kumtua mama ndoo kichwani” has been successful. But other streets such as Golani and Mavulunza are still suffering.” (The leader of Shina No.1 of Kilungule B).

4.3.4 The Need to Alter Water Pressure

The respondents were asked whether they need to have a pump in order to get water. These findings imply that 89% of the people receive water without pumps especially at Kimara Baruti, Baruti, Kilungule A, Kilungule B. However, the remaining ten percent access water with pump, this implies that there is still a gap which DAWASCO need to address.

Table 4.8: Accessing Get Enough Water without Water Pump

Response	Frequency	Percentages
No	6	10.0
Not aware	1	1.0
Yes	50	89.0
Total	57	100.0

Source: Field survey, 2018

One of the respondents from Kilungule B stated that, “we get water without a pump in our street, but the neighboring streets of Golani and Mafulunza are struggling, let the government assist them.”

4.4 Challenges to Effective Water Distribution to The Households of Kimara Ward

The second objective of this study aimed at identifying challenges to effective water distribution to the households of Kimara ward. Information was sought on a number

of factors that could possibly pose a challenge to water distribution to the households. These factors include: the customers' ability to pay bills (affordability), conflicts over the accessibility, fairness in distribution and mode of distribution. The responses are summarized in the sections below.

4.4.1 Customers' Ability to Pay Bills

The respondents were asked whether they could afford to pay water bills. The findings are presented in Table 4.9. Fifty four percent (54%) of the respondents could not afford to pay their water bills while 37% of the respondent could afford (agreed) to pay the prescribed water bills and 9% were not aware. This implies that majority were uncomfortable with the water bills they were charged. This relates to UN WATER, 2007, in developing countries the picture is complicated by the widespread use of informal and small scale private water distributors charging full market prices; in these cases the poorest households can pay 3%-11% of income on water. Detailed studies into citizens' strategies for accessing water exist for other locations (Adeniji-Oloukoi et al., 2013, Hackenbroch and Hossain, 2012, Nyarko *et al* , 2008, Pattanayak *et al* , 2005, Virjee and Gaskin, 2010).

Depending on the authors' theoretical focus, they describe just one or two aspects of access: affordability, cost recovery, consequences of poor access, water vendors and other intermediaries (Kristof's 2005) dimensions of reliability, convenience, adequate quantity and adequate quality are not detailed enough to evaluate access strategies. Kjellén's PhD research on water supply in Dar es Salaam focused on a project for privatisation of official water services, and presents rich descriptions of water access and distribution in this city (Kjellén, 2006).

Table 4.9: Afford To Pay Water Bill without Problems

Response	Frequency	Percentages
No	31	54.0
Not aware	5	9.0
Yes	21	37.0
Total	57	100.0

Source: Field survey, 2018

One of the respondents from said that, “the water bill from DAWASCO is too expensive to pay.” Sometimes water bills are sent to customers even without significant supply of water. A respondent from Kilungule B Street stated that, “We are paying the bill per month but our tap, do not provide any water. I don’t know what is wrong?”

4.4.2 Scrambling for Water

Household conflicts are common where there is scarcity of water in Sub Saharan Africa, Tanzania inclusive. This tendency created curiosity to assess the same in this study. Respondents were asked whether they scramble for water during the scarcity periods. The findings are presented in Table 4.10. Majority of Kimara ward people (70%) acknowledged that they scramble for water. This implies that there is need on push for water distribution for Kimara ward households. However, there was a significant proportional of households (29%) who asserted that they do not scramble for water. “We do not scramble for water at all, since we are get water for our daily needs,” the (Shina no. 1 leader of Kilungule B)

Table 4.10: Whether Scrambling Occurs When Accessing Water from DAWASCO

Response	Frequency	Percentages
No	16	29.0
Not aware	1	1.0
Yes	40	70.0
Total	57	100

Source: Field survey, 2018

4.4.3 Fairness on Distribution of Water

Respondents were asked whether the distribution of water from DAWASCO was fair. The findings are presented in Table 4.11. Fifty eight percent (58%) showed a negative response to fairness on water distribution, 42% showed a positive response on fairness on water distribution. This implied that there was uneven distribution of water, thus DAWASCO needed to push on and improve the distribution of water at Kimara ward, especially at Golani Street and Mafulunza Street.

Table 4.11: Whether the Distribution of Water is Fair

Response	Frequency	Percentages
No	33	58.0
Not aware	1	1.0
Yes	23	41.0
Total	57	100.0

Source: Field survey, 2018

One respondent from Golani Street complained that, “other streets, especially Kimara Baruti, have better water service compared to us. Our street is in trouble.”

4.4.4 Poor Logistics

One of the common challenges of water distribution identified in literatures is poor logistics by service providers. In this study, respondents were asked several questions regarding the water distribution logistics including application processes, water bills delivery, execution of penalties and communications in case of emergencies.

4.4.4.1 Application Processes

The findings show that 53% responded negatively as to whether they had filled in the application form for water service while 31% respondent positively about filling in the application form for water service. This implies that the households of Kimara ward neither know nor follow the procedure of application for water services.

Table 4.12: Filled forms for Water Distribution

Response	Frequency	Percentages
No	31	53.0
Not aware	9	16.0
Yes	17	31.0
Total	57	100.0

Source; Field survey, 2018

“I went to DAWASCO office to fill the form for water service application” (respondent from Kilingule B) and another respondent from Kimara Baruti stated that *“I filled water application form that the DAWASCO staff brought to me.”* Therefore according to the findings on water bill payment, scrambling for water, fairness on water distribution as well as poor logistic prove on the challenges on water distribution to the households of Kimara ward.

4.4.4.2 Water Bills Delivery

The table 4.13 shows that 68% of the household respondents responded negatively about payment of bills administered at home while 24% of the household respondent respond positively about administered payment bill at home.

Table 4.13: Payment of Bill is Administered at Home

Response	Frequency	Percentages
No	39	68.0
Not aware	5	8.0
Yes	13	24.0
Total	57	100.0

Source: Field survey, 2018

“I received my water through cell phone message,” claimed one of the respondent from Kilungule B.

4.4.4.3 Execution of Penalties

The study shows that 60% of household respondents responded positively about penalty for none payment water bill while 24% responded negative about the penalty for none payment of water bills as per Table 4.14. This implies that the minority of the households afford to pay water bills.

Table 4.14: Penalty for None Payment of Water Bills

Response	Frequency	Percentages
No	13	24.0
Not aware	9	16.0
Yes	35	60.0
Total	57	100.0

Source: Field survey, 2018

“I don’t receive water bill at home, since up to date my water tap, does not bring me water, ... I don’t know about water bill, because I pick water from my neighbor, and pay 100/= per 20 litres.” (Kilungule B respondent).

4.4.5 Poor Infrastructure

Respondents were asked whether the water problems can be attributed to pipe network being too old. Table 4.15 summarizes the findings. Forty percent of the respondents respond negative plumbing system while 30% respond positive on plumbing system. This implies that there is poor plumbing system, hence DAWASCO needs to improve the plumbing system in all the streets in Kimara Ward. The results showed presence of weak water governance structures and institutions that cannot influence water users’ behaviour.

The basin level was unable to control and monitor water quality because of lacking human resource and adequate funding. The formal and informal institutions were interlinked in their operations. However, village governments and village water committees were unable to resolve water conflicts because of being colluded by those who breached the rules. Therefore, concerted efforts are needed to build capacity of the governance structures to enforce institutions in governing water resource (Kabote *et al*, 2017).

Table 4.15: The Water Distribution Can be Attributed to Pipe Network Being Too Old

Response	Frequency	Percentages
No	23	40.0
Not Aware	17	30.0
Yes	17	30.0
Total	57	100.0

Source: Field survey, 2018

“ The plumbing system is not yet up to date, we just heard that, the officers of DAWASCO are doing plumbing but for us this is as a dream,” (respondent from Mafulunza). “Up to date, it is the third day since they started to spread water pipes.” (respondent from Golani).

4.4.6 Urbanization

Respondents were asked whether the growing urbanization was a factor that affected water connection and distribution negatively in the Kimara ward. He said;

“Since the road constriction from Kologwe passed to Kilungule, our water pipe not bring us water, this support to influence of urbanization on water distribution”

Tanzania’s urban population that has more than doubled in size since 1990, this relate to, and more than 3.6 million users have been served improved water supply, access rates have not kept up with the pace of urbanization. As a result, the percent of urban population with access to improved water supply has declined the period 1990–2006” as per Kyessi, 2005.

4.4.7 Unplanned Housing Limit Successful Water Distribution

The study shows that 48% respondent confirmed that unplanned housing limits water distribution while 48% respondent respond negatively on unplanned housing limiting successful water distribution as per Table 4.16. It has been argued that a universal definition of improved access and a focus purely on quantifying infrastructure provision underestimate problems such as affordability of services and quality (Zawahri *et al.* , 2011). From their research in the Middle East and North Africa, the authors observe that the diffusion of the MDG universal definition “has reinforced and magnified pre-existing incentives among domestic leaderships to hide their deficiencies” and “provided governments with perverse incentives, to prioritize

reporting of aggregate coverage rates rather than investing in more adequate metrics to gauge quality, accessibility and affordability of services” (Zawahri, Sowers, 2011).

Table 4.16: Unplanned Housing Limit Successful Water Distribution

Response	Frequency	Percentages
No	27	48.0
Not aware	3	4.0
Yes	27	48.0
Total	57	100.0

Source: Field survey, 2018

“Since the road constriction from Korogwe passed through Kilungule, our water pipes do not bring us water” (respondent Kilungule). This shows the effects of urbanization on water distribution.

4.4.8 Climate Change

Climate change is among the factors that affect water distribution in Sub-Saharan Africa. The adverse weather resulted from climate change has been a cause for scarcity of water in many places including Tanzania. In this study, respondents were asked whether the distribution of water was stable regardless the climatic change. The findings are summarized in Table 4.17.

4.4.8.1 Water Distribution is not Affected by Climate Change

According to the Table 4.17, 54% of the respondents were not affected by climate change while 30% of the respondents were affected by climate change.

Table 4.17: Water Distribution is not Affected by Time Change 54% are Not Affected by Climate Change

Response	Frequency	Percentages
No	31	54.0
Not aware	9	15.0
Yes	17	30.0
Total	57	100.0

Source: Field survey, 2018

4.4.9 Absence of Other Water Distributors

As per Table 4.18, sixty percent of the respondents responded negatively when asked about existence of other water distributors. This implies that Kimara ward lacks other registered companies that can distribute water in Kimara ward.

Table 4.18: Existence of Other Registered Company Water Distributors

Response	Frequency	Percentages
No	40	69.0
Not aware	4	7.0
Yes	13	24.0
Total	57	100.0

Source: Field survey, 2018

*“ I don ’t know any other water service providers other than DAWASCO, ”
(respondent from Baruti street)*

4.5 The Role Played by Local Government and DAWASCO to Ensure Effective Water Distribution in Kimara Ward

4.5.1 Water Policy

The government is responsible for formulation and implementation of policies regarding various sectors in the country including the water policy. As part of policy

implementers, individual citizens are expected to be aware of the policy. The respondents in this study were asked whether they were aware of the current water policy. Table 4.19 summarizes the findings. More than half of respondents gave a negative response to the question (53%) while 33% respondent gave a positive response to the question. Although majority of respondents were not aware of water policy, which put much emphases on community involvement in social service such as water as per NAWAPO, 2002 “The policy aims at ensuring that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes.

This policy seeks to address cross- sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Also, the policy lays a foundation for sustainable development and management of water resources in the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation.

Table 4.19: Awareness about Tanzania Water Policy

Response	Frequency	Percentages
No	30	53.0
Not aware	8	14.0
Yes	19	33.0
Total	57	100.0

Source: Field survey, 2018

One of the respondents from Golani Street stated: “I don’t know about water policy, what is that?” Another response from an informed respondent was: “I know there is

water policy on paper, but it is not implemented at all”(Respondent from Kilungule B).

4.5.2 Local Government Address Water Problem at Kimara

The study show that 34% respondent responded positively when asked if the Government solves water problem at Kimara ward while 58% responded negatively as seen in Table 4.20. This is against, argument, that the universal definition of improved access and focus on purely quantifying infrastructure provision underestimates problems such as affordability of services and quality (Zawahri *et al* , 2011). From their research in the Middle East and North Africa, the authors observe that the diffusion of the MDG universal definition “has reinforced and magnified pre-existing incentives among domestic leaderships to hide their deficiencies” and “provided governments with perverse incentives, to prioritize reporting of aggregate coverage rates rather than investing in more adequate metrics to gauge quality, accessibility and affordability of services” (Zawahri, Sowers, 2011 Published in Habitat International 44 (2014).

Table 4.20: Local Government Solves Water Problem at Kimara

Response	Frequency	Percentages
No	32	58.0
Not aware	6	8.0
Yes	19	34.0
Total	57	100.0

Source: Field survey, 2018

“The Municipal contributed approximately 31 million for constructing 6 water kiosks for Golani street” (Kimara ward Ward Executive Officer), he added that “we mobilize the community members to create water committee, so that to address water problem as well as to protect water infrastructure at street level, as at Kimara Baruti street”.

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 assess the challenges of water distribution to the households of Kimata ward in Ubungo district.

5.2 Conclusion

The study investigated the assessment of the challenges of water distribution to the households of Kimara ward in Ubungo District. The main objective of this study was to assess the challenges of water distribution to the households of Kimara ward in Ubungo District. In order to achieve this objectives the study questions focused on the availability of water distributed by DAWASCO to the households of Kimara Ward, challenges to the effective water distribution to the households of Kimara ward and the role played by Local Government and DAWASCO to ensure effective water distribution in Kimara Ward.

Water distribution is a problem for the households of Kimara ward in Ubungo District. The study intended to assess the challenges of water distribution of Kimara ward in Ubungo District, since there was uneven distribution of water by DAWASCO. As per the findings 57% of water was distributed by DAWASCO water pipes while other 43% of water was from other water sources as per Table 4.1. Both qualitative and quantitative information collected was subsequently used in the analysis. Both positive and negative aspects were studied, issues affecting water

distribution such as water pipes, logistics tap, climate changes, infrastructure, urbanization and policy were assessed. Having noted the key findings of the assessment study established;

The findings on availability of water distributed by DAWASCO to the households in Kimara Ward, show that 57% of the households access water distributed by DAWASCO water while 43% of the households consume water from the other sources of water such as boreholes ,water vendors, water kiosk and rain water. Meanwhile there is uneven distribution of water in Kimara ward, therefore DAWASCO needs to go on distributing water in Kimara ward especially at Golani and Mavulunza streets. The challenges to the effective water distribution to the households of Kimara ward: the findings show that the challenges of water distribution to the households in Kimara ward include water pipes, water bills payments logistics, climate change, infrastructure, urbanization and policy.

The role played by Local Governmental and DAWASCO to ensure effective water distribution in Kimara Ward include; to report to DAWASCO the demand of water, motivate household members about the importance having water service provided by DAWASCO, to mobilize the street members to create a water committee in order to address water problem and maintain water infrastructure at the street level and sensitize the households about the water policy.

5.3 Recommendations

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

Local Government Authorities: 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 Kimara ward especially Golani and Mavulunza Streets. This is due to the fact that since at the time of the study DAWASCO had met the existing demand of the water users. This also will remove the monopoly of DAWASCO as the “Sole water distribution and service provider.” DAWASCO does not experience any challenge, as well as competition from other providers. Competition in business encourages improvement and quality of the services.

DAWASCO: Water bills should be sent to the customer in hard copy not by network message of Tigo as well as Maximalipo. This is the ideal gap because some of DAWASCO clients do not know how to read the message, so even if they want to pay on time they fail to do so. So far in order to maintain sustainable water distribution the bill should be sent in hard copy for reference purposes. This may keep the running cost of water distribution services low.

DAWASCO should go on to distribute water to remaining 43% especially at Golani and Mavulunza Streets. ‘It should increase the number of water kiosks in Golani and Mavulunza so as to reduce the current problem of water distribution, since there are only six water kiosks’ (Respondent Golani). DAWASCO should advertise to the community the procedure of delivery water service form DAWASCO since most of them were not aware about the application form for water services from DAWASCO.

Policy Makers: 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 (Water Users): 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 (lab our) as well as their resources.

The community should have a water committee in the street, so that share ideas on sustainable water services. The community should make the by-laws of maintaining water infrastructure at the street as well as the ward level so that the household members are vigilant and careful in keeping water infrastructure safe.

Further research should be done on challenges of water bill collection to the households.

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APPENDICES

Appendix I: Households Structured Questionnaire

My name is Scolastica Samson, student of the Open University of Tanzania, studying Masters of Arts in Monitoring and Evaluation (MA M&E). Dear respondents I am currently conducting a research on the assessment of the effects of water distribution to the household of Kimara ward in Ubungo district. I request you to respond by filling the questions provided in this questionnaire. The information you will provide is for academic purpose only and not otherwise.

SECTION A. Demographic Characteristics of Respondents

Please put a tick (✓) where applicable

1. Gender

i) Female ii. Male

2. Age

25-35

36-52

53+

3. Education Level

i) Illiterate ii) Primary iii) Secondary iv) Diploma

v) Degree vi) Postgraduate

4. Marital Status

i) Single ii) married iii) Divorced/separated iv) Widow

5. Are your House/neighbors' house connected with water tap from DAWWASCO? i) YES ii) NO If Niif No, which other source?

.....

SECTION B: Water Distribution to the households of Kimara ward

The following statement seeks your views on the effects of water distribution to the household at Kimara ward in Ubungo district. Please put a tick of your level of agreement on the following statement below that range from 1 to 5.

1= Strongly Disagree, 2= Disagree 3=Neutral, 4 = Agree 5=Strongly Agree

Water distribution to the households of Kimara Ward						
QN.	STATEMENT	1=SD	2=D	3=N	4=A	5=SA
6	Water pipes you have at Kimara ward provides enough water					
7	Water distributed is frequently not for chance					
8	You have enough place to store water provided by DAWASCO which will serve you for a long time					
9	You get enough water without the use of water pump					
10	Water tap you have was a result of your desire previously instead of free from DAWASCO.					
12	You pay a bill with low cost even if water reach your house at minimal					
Challenges to the effective water distribution to the households of Kimara ward						
13	You are fighting with your neighbors because of getting water to satisfy your needs					
14	There is equal distribution of water to all residents and not discriminatory					
15	Your income make you capable of paying a water bill					
16	The water distributed at Kimara ward make you to be one among beneficiaries of it.					
17	The per day water service you receive is used to satisfy your need.					
18	Water distribution is per application					

19	Water bills brought at home					
20	Water service stopped for unpaid bill.					
The role played by Local Governmental and DAWASCO to ensure effective water distribution in Kimara Ward. (Policy, Climate, Infrastructure, Urbanization and Resources)						
QN.	STATEMENT	1=SD	2=D	3=N	4=A	5=SA
21	Plumbing system is by DAWASCO					
22	There is other authorities that provides water services rather than DAWASCO					
23	There water policy in Tanzania is effective to the population of Tanzania					
The roles played by local Government and DAWASCO to ensure effective water distribution to the households of Kimara ward						
24	Local government helps to encounter water problem at Kimara ward as per resource					
25	Infrastructure in Kimara ward for water distribution is sufficient					
26	Urbanization including houses location allow the water connection and distribution at Kimara Ward					
27	Regardless the climatic change water distribution at Kimara is stable					

Appendix II: Interview Guide

The following interview guide is for academic purpose. Kindly answer it. Any information provides will remain confidential and will be used for academic reasons.

1. What is the role of the ward administration in the availability of water in the ward?
2. What is the role of the ward administration for effective water distribution to the household?
3. Do you see DAWASCO contribution on improving water distribution to the Ward- why?
4. What is the contribution of the local government on water distribution to the household of Kimara Ward?
5. What is the Ward plan for improving water distribution to the household of Kimara ward as per water service provider?
6. How does the Ward administration monitor the water distribution as per household?
7. Any plans for improving water distribution to the household of Kimara Ward?
8. What are the effect water distributions to the household of Kimara Ward especially in their daily routine?
9. What are the changes did you see due to water distribution to the household of Kimara Ward?
10. Any plans for improving water service so that to meet the existing water demand of the household of Kimara Ward?