

**EFFECTIVENESS OF DEVOLUTION ON SUSTAINABILITY OF
WATER SUPPLY IN KENYA: A CASE OF ATHI WATER WORKS
DEVELOPMENT AGENCY**

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DECLARATION

This project is my original work and has not been submitted for any academic award in any other University.

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ABBREVIATIONS AND ACRONYMS

AWWDA	:	Athi Water Works Development Agency
BLAs	:	Black Local Authorities
CGSDI:	:	Consultative Group on Sustainable Development Indicators
CoK	:	Constitution of Kenya
DEA	:	Data Envelopment Analysis
NP	:	National Party
RSCs	:	Regional Services Councils
WASREB	:	Water Services Regulatory Board
WRM	:	Water Resource Management
WSP	:	Water Service Provider
WSS	:	Water Supply and Sanitation
WWDA	:	Water Works Development Agency

OPERATIONAL DEFINITION OF TERMS

Devolution

The delegation of authority to a lower level, particularly from the federal government to municipal or regional authorities.

Economic sustainability

Economic sustainability is a vital part of manageability that uses, safeguards, and supports assets (both human and material) to foster qualities that are enduring and feasible. Rehearses that guarantee steady Gross domestic product development at the public degree of somewhere around 2% each year while not antagonistically influencing the local area's social, ecological, or social qualities.

Financing.

Giving cash-flow to ventures, buys, or business attempts is the method involved with supporting. Monetary foundations like banks work to help purchasers, organizations, and financial backers arrive at their targets by giving capital.

Technical efficiency

Technical efficiency describes the connection between inputs and outputs of resources. Allocative efficiency, or doing the correct things, is one sort of (in)efficiency (providing highest value health services for available resources)

Water coverage area

In this context, a region is considered to have water coverage if it is accessible and has piped portable water available.

ABSTRACT

Decision-making, management, lobbying, involvement and consensus building, research, and analysis all require careful consideration of sustainability. The Athi Water Works Development Authority's water service providers was the focus in the study's analysis of the effects of devolution on them. Water resource management, strategies frequently include conflicts. The game theory and resource dependence theory assesses how stakeholder actions, often intended to improve things and create a win-win scenario, can instead make things worse for everyone involved. Kenya's water industry has experienced a number of reforms, the most recent of which being the adoption of the Water Act 2016 in April 2017. With regard to the provisions of the 2010 Kenyan Constitution that devolve water and sanitation services to county governments, the new law brought national water management and service provision into compliance. In Kenya, the counties that are the owners of the water service providers mandate is providing water services (WSPs). The 2010 Constitution's implementation and effects are still being felt. This study should help us better comprehend how the county's reality is developing. It is crucial to comprehend how well the decentralized systems offer services. The aim of the study to explore whether devolution has a positive impact on the long-term viability of Kenya's Athi Water's water service providers. The study objectives were; to assess the impact of devolution on financing of water supply, to examine how devolution affects the effectiveness of technical efficiency of water supply and to determine the efficacy of expansion strategies on water coverage on the background of devolution. Cross-sectional survey and descriptive research designs anchor the study. Thirteen Water Services Providers (WSPs), registered and spread out across three counties made up the study's population. Open and closed surveys were the data collection tools. Regression modeling was used in compiling, coding, and evaluating the data gathered from each WSP in order to determine the link between the various variables. Additionally, data presentation was through means and percentages. The study findings established water services are devolved and they are managed by county governments. The study discovered that technical efficiency is significant in providing in water management. The study findings revealed that finance resource is significant in operational by water service provider. The water service providers anticipate using the study's findings to address sustainability-related challenges. The study recommends that the County Governments and other water service agencies should support the organizational capacity of the devolved water suppliers as it contributes positively to service delivery.

CHAPTER ONE

1.0 Introduction

This chapter examines the history of service decentralization throughout the world, particularly in Africa, and most recently in Kenya, in conformity with the Kenyan Constitution of 2010. (COK). The National and County Governments' tasks are listed in Schedule 4 of the Kenyan Constitution. The Development Agency for the Athi Water Works (AWWDA) will also investigate the sustainability of water service providers in the context of devolution.

1.1 Background

Clean drinking water and sanitary conditions are necessary for the achievement of all human rights, according to the United Nations General Assembly, which recognized this right specifically. More than 814 million people lack access to clean water to drink, and more than twice as many don't have it either (WHO, 2017). By 2050, it is anticipated that the demand for water will have increased by almost one third due to the world's expanding population (United Nations, 2018). Around 300 million Africans lack access to clean drinking water. Therefore, compared to the other continents in the globe, Africa has the lowest overall water supply coverage. The poorest 20% of the population in Africa and Asia spend between 3 and 11% of their household income on water. The cost of the time spent by women in pursuit of water is not factored into this figure (UNDP, 2019).

The nations of Latin America had centralized governments (Mitchell, 2009). Although other nations, like Brazil, Mexico, and Venezuela, formally retained federalist or regionalist constitutions, on paper, they tended to be federalist, with states and regions essentially serving as administrative divisions. The situation in the former Soviet Union

(USSR) was comparable to that in Latin America. On paper, the USSR was a federation of independent states, but in practice it was tightly centralized and run from Moscow.

African nations also had powerful national governments. The municipal government structure in South Africa has always been very centralized. The necessity of enforcing apartheid at the local government level has been a fundamental factor in the development of such a centralized regime. The apartheid regime's traditional tenets were abandoned and some minor adjustments were implemented in the 1980s by the National Party (NP) government. Changes to local government policies and the adoption of new institutions were some of these improvements.

Regional Services Councils (RSCs) and Black Local Authorities (BLAs) were established (Cameron, 1995). The maximizing of power devolution, decentralization of administration at the local level, and reduction of administrative authority over local authorities served as one of the primary concepts guiding the local government reform in the 1980s (Rihoy & Maguranyanga, 2007).

Devolution is the operationalization of governance and service delivery at the most fundamental level within a specific jurisdiction. During the past 50 years, devolution has been viewed as the best option for delivering high-quality services. Centralized government is typically viewed as dysfunctional due to bureaucracy. The effectiveness of service delivery devolution must be the subject of ongoing scholarly research (Goodwin *et al.*, 2005).

Access to water is one of the most significant issues facing devolved entities. Kenya is one of those countries where a lack of water resources and poor water infrastructure

threaten public health and the quality of life while preventing the nation from advancing economically and socially (Cherunya *et al.*, 2015). As a result, initiatives to improve water resource management and restructure the country's water sector have a long history. Despite these initiatives, a sizable majority of Kenyans still lack access to enough water for drinking, hygienic needs, and productive uses (Sambu & Tarhule, 2013). This study's goal is to assess how devolution has affected the viability of water service companies.

One of the most common buzzwords in the world's policy agenda, including in devolved areas, is sustainability. As a result, there is a strong political push for a thorough evaluation of changes in social, environmental, and economic conditions (Bossel, 1999). According to a WASREB impact analysis from 2007, just 10 WSPs can support operation and maintenance costs, and only three can (GTZ, 2007).

Kenya chose for devolution as a response to a system of highly centralized administration that had allowed for the abuse of power, spatial inequality, and underdevelopment. The establishment of 47 counties following the general elections in March 2013 allowed for the implementation of this system, which was incorporated in the 2010 Constitution. The core of Kenya's new constitutional system is devolution, which offers a way to remedy historical injustices (Steeves, 2015).

Every Kenyan person has a fundamental right to access to adequate levels of clean, safe water that meets equitable requirements, according to Article 43 of the 2010 Constitution of Kenya (CoK) on economic and social rights (Wasonga, 2013). Since it supports the social and economic, health, and environmental sectors, water is also referred to as a social and economic benefit that is crucial to the country's sustainable

development. The State and every State organization must uphold the human rights outlined in the Bill of Rights, according to the Constitution. This is their main responsibility. The national government, county governments, and the bodies that make up the Kenyan government are all parts of the state.

The development of county public water works and the provision of water and sanitation services are the responsibilities of the county administrations, but the Fourth Schedule of the CoK 2010 mandates the building of national public water works. In addition to carrying out some national government policies on environmental and natural resource protection, such as soil and water conservation, county governments are mandated to provide water and sanitation services (Chinwe & Bitteka, 2017).

There are shared mechanisms under Article 189 (2) of the Constitution, concurrent functions under Article 6 of the Constitution, or unique tasks whose implementation needs consultation and cooperation. Because of this, each level of government must interpret policy directives in light of its constitutional authority. Consultation, cooperation, and intergovernmental channels will be crucial where joint implementation may be required.

The primary topic of 1965's Sessional Paper No. 1 was African socialism. It outlined three priorities: eradicating sickness, ignorance, and poverty. Additionally, it emphasized how crucial watershed preservation and protection are for sustainability. Wide-ranging reforms in Kenya's water and sanitation sector were built on the National Water Policy, Sessional Paper No. 1 of 1999, and the Water Act of 2002.

The Act provided the platform for putting reforms into place that designed to enhance water resources management (WRM) and the sustainable delivery of water supply and sanitation (WSS) services. The management of WSS and WRM in this nation was intended to be significantly impacted by these developments (Sambu & Tarhule, 2013). If not communicated correctly, they also have the potential to lead to political and/or societal resistance. New concerns are addressed by the National Water Policy 2021, which was just adopted.

As it has become obvious that the viability of human society may be in jeopardy as a result of deteriorating environmental circumstances in many parts of the world, sustainability has become a widely accepted objective for human society. It might be difficult to locate suitable sustainable development indicators for a neighborhood, city, region, nation, or even the entire world (Barraque, 2003). It necessitates understanding of what is crucial for the sustainability of the systems involved and how it affects development. Although few in number, the quantity of representative indicators should be as great as necessary.

The development, maintenance, and delivery of water and sewerage services are the responsibilities of water service providers, which are geographically grouped under water works development agencies. These water service providers in Kenya were constituted as representatives of the previous water service boards following the passage of the Water Act 2002. Water services were given to the County Governments as a result of devolution (Sambu, 2011).

1.1.1 Devolution

Decentralization is generally understood to refer to the redistribution of authority and accountability for planning, making decisions, and managing public operations among various levels of government (Cameron, 1995). The breadth and scope of decentralization definitions might differ greatly. This study focuses on the advantages of decentralization for include non-State entities in the mandate for water service changes.

Decentralization of essential services has drawn more and more attention in recent years as a potential solution to the issue of access to clean water (Varbanets et al., 2009). They suggested that, particularly in areas where both are inadequate, decentralized solutions are frequently the only way to alleviate issues with water quality and quantity. Decentralization has becoming more popular, especially in developing nations, in response to what is generally acknowledged as the inability of highly centralized governments to provide their population with the most basic services.

Kenya's adopted a new constitution in 2010 that established a decentralised government structure with 47 county governments. The county governors, deputy governors, and representatives were chosen in the March 2013 elections, which also marked the beginning of county government operations. The oversight of some operations, including the provision of healthcare, water and storm water management, pre-primary education, and upkeep of local roadways, is now the responsibility of these 47 new county governments (Steeves J, 2015). Previously, Kenya's national government was in charge of these. These county governments in turn get a cut of federal funds. Additionally, the county governments are anticipated to raise funds from

various sources found inside their own counties, such as taxes on real estate and entertainment.

1.1.2 Sustainability

Sustainable development stipulates that present demands must be met without compromising the capacity of future generations to meet their own needs (Bossel, 1999). To characterize and assess sustainability, one must decide how to define and evaluate what is being developed, what is being sustained, and for how long. The sustainability goals, metrics, and targets that are examined are then derived from these decisions.

The development of sustainability characterizations and measurement systems has used a variety of technical approaches. The nomenclature is frequently inconsistent, and there is little discussion of the relative benefits and drawbacks of other ways, despite the fact that most attempts are specific about their own methodologies (Schulz et al., 2012). The most important methodological decisions relate to issues of data accessibility and use, spatial and temporal scale, indicator selection, and indicator aggregation.

Various indices have been created to quantify sustainability. The Consultative Group on Sustainable Development Indicators (CGSDI), which was created by an international panel of twelve subject-matter experts, will be used in this study. It was started in 1996 with financing from the Wallace Global Fund to focus on the difficulty of developing a single sustainability index and to harmonize international work on indicators (Bossel, 1999). A Dashboard of Sustainability, a collection of 46 indicators arranged into 4 clusters for more than 100 nations, was created as a result of this effort.

The consequence of devolution on water service providers' viability will be evaluated independently for each of these four groups of the environment, economy, society, and institutions.

1.1.3 Water Service Providers

There have been continuing attempts worldwide to reform the water sector (Varbanets et al., 2009). This is motivated by the realization that the effectiveness of water reforms directly affects people's quality of life. In an effort to attain a new equilibrium in intersectoral water distribution that is consistent with the shifting needs for water on the social, economic, and environmental fronts, water institutional reforms were adopted in each of the Australian states (McKay, 2005).

Brazil has made various endeavors to take on and set up a coordinated water the executives framework. Universally recognized thoughts like public contribution and water financial matters affected the making of a progressive administrative structure for water utilization and protection in the country. Regardless of changes in approaches and guidelines, the inward irregularities of the continuous institutional changes have commonly made it difficult to address both old and new administration issues.

Among the important water-related articles in the Constitution are affirmative action initiatives to guarantee marginalized groups' access to water, the national government's oversight of the use of international waterways and water resources, and the separation between national and county public works (Wasonga, 2013). The water sector must now concentrate on new prospects and deal with a variety of issues in order to execute the new devolved framework effectively.

The 2010 Kenyan Constitution has had a significant impact on the water sector. In particular, the Constitution assigns responsibility for providing these services to 47 created counties and declares access to clean and safe water to be a fundamental human right. Other significant provisions in the Constitution that deal with water include affirmative action plans to guarantee marginalized groups' access to water, the national government's obligation to manage the use of international waters and water resources, and the distinction between national and county public works (Steeves J, 2015).

In the talks on how to improve the delivery of water services, water reforms are a key topic. Due to industrial and human waste, in many regions of the world, water resources' capability to absorb water has already been surpassed (Cherunya et al., 2015). As a result, humanity will no longer be able to use or drink a certain amount of water in the future. The serious effects of contaminated water and inadequate sanitation are highlighted by a number of the Millennium Development Goals (MDGs). Goals 1, 4, 5, and 6 for health and nutrition, Goal 7 for environmental sustainability, Goal 3 for gender equality, Goal 2 for primary school enrollment, and Goal 1 for overall poverty are all important MDG targets that must be met. They also include improved access to water and proper sanitation. These MDG goals and access to clean water are strongly intertwined.

The Water Act of 2002, which became effective by Legal Notice No. 31, was created to solve water-related issues service delivery and access. The Act aims to facilitate the streamlined and unified administration of sewage, water, and resource services. In order to more effectively improve service delivery, it was necessary to provide access to portable water and sanitation services and ring fence water and sewerage income for

reinvestment in the infrastructure. The water sector must now concentrate on new prospects and overcome a number of obstacles in order to execute the new devolved framework effectively. This brief examines relevant concerns and options for national leadership and local government (Sambu & Tarhule, 2013). Technically, the Water Act 2002 was abolished by the Water Act 2016. In order to improve services and align service delivery with the COK 2010 principles, the Act proposes a variety of changes in the water sector.

1.1.4 Athi Water Works Development Agency

This is one of the nine (9) Water Works Development Agencies (WWDA) formed by the Ministry of Water, Sanitation & Irrigation (AWWDA). The Water Act of 2016 formed it, as stated in Legal Notice No. 28 of April 26, 2019. The focus of the investigation will be the Athi Water Works Development Agency. Nairobi, Kiambu, and Muranga counties' water and sewage infrastructure is created, managed, and maintained by the Agency, which together span 5,800.4Km² and have an estimated population of 8,012,390. Currently, the Agency's capacity for producing bulk water is 664,337 m³/day, and its capacity for treating wastewater is 210,500 m³/day.

The Agency works closely with Water Service Providers to manage the development of water and sanitation infrastructure and to maintain it. The Water & Sewerage Companies (often referred to as WSPs) in her area of jurisdiction have been designated by the AWWDA to provide the service.

1.2 Statement of the Problem

The water and sanitation companies saw significant modifications as a result of the Constitution. County governments were given primary responsibility for providing water and sanitation services, with the national government generally continuing to formulate policies and oversee the sector. The counties were additionally tasked with the duty of ensuring and coordinating community involvement in local governance. The old laws have to be adjusted to conform to the new constitution's provisions as a result of this change. Kenyans also anticipated institutional responsiveness to water service delivery, which would address the issue of counties' limited water access.

Recently, academic interest in devolution as a method of governance has increased (Steeves, 2015). However, evaluating how well the devolved system is working in the field is a continuous effort. Notwithstanding evident intuitive connections, there is no comparable data on how and why decentralization matters for institutional performance in specific sectors. By examining the connections between decentralization and water institutional transformation throughout the counties, we aim to close the evidence gap. The success of Kenya's decentralised water systems should be clarified by this study.

Studies on water service providers in underdeveloped nations (Zekri & Easter, 2007) revealed a negative association between planned outcomes, actual outcomes, and the amount of resources used. Data Envelopment Analysis based on water reforms was utilized to evaluate the success of WSPs (Sambu & Tarhule, 2013) in order to meet the MDGs by 2015. 44 WSPs were chosen and evaluated on a variety of efficiency metrics, including technical efficiency and scale efficiency, based on the availability and trustworthiness of the data. All WSPs were found to be running at far below capacity

and were unlikely to achieve the MDGs. In the context of devolution, this study investigated the causes of the discrepancy between the resources available and the sustainability outcomes predicted.

1.3 Objectives of the Study

The survey objectives were:

- i. To assess the impact of devolution on sustainability of water supply.
- ii. To examine how effectiveness of technical efficiency affect sustainability of water supply.
- iii. To determine how water coverage affects sustainability of water supply.

1.4 Research questions

The survey questions:

- i. What has been the effect of devolution on sustainability of water supply?
- ii. How does the effectiveness of technical efficiency affect sustainability of water supply?
- iii. How does water coverage affects sustainability of water supply?

1.5 Justification and Significance of the Study

Water supply must be able to meet current demands for water quantity and quality without jeopardizing their ability to do so in the future. Although water systems in the context of sustainable development might not actually involve the usage of water, they do include those where it has historically been necessary.

The intended results of devolution have not been achieved in many governmental sectors, including water service providers (Zekri & Easter, 2007). The degree of service does not meet the demands of customer expectations and resource input. The parameters for providing water must constantly be reviewed, and recommendations must be made

for ways to enhance service delivery and create viable water service providers. The primary decision-makers in the water sector, including the Ministry of Water, Sanitation and Irrigation, WASREB, and WWDAs, stand to gain from this study's analysis of how the Water Act of 2016 has affected the delivery of water services. The users, Kenyan development partners, and water sector NGOs are the other beneficiaries. The study will attempt to articulate the current effects of devolution on the provision of water services sub-sector with a focus on sustainability, funding, and efficiency.

This study paper will be written with the intention of examining data from WSPs under the Athi Water Works Development Agency to summarize important implementation challenges for the water sector reform. The study will examine how water supply and sanitation have changed as a result of devolution of water services in Kenya. It will also highlight significant problems that have had a significant impact on these two areas as well as the lessons that have been learnt.

The study is anticipated to help the government increase productivity by enhancing service delivery across all of its water utility firms. The study is also anticipated to help other researchers who might be interested in conducting additional research on this subject. The outcomes of this survey will be crucial for Kenya's water sector development partners as they clarify their approach or plan for transformation. This will expedite the time it takes for reforms to have a meaningful positive impact on the target populations.

1.6 Scope and limitation of the Study

The study focused on sustainability of water supply by Athi Water Works Development Agency. The study concentrated on devolution, effectiveness of technical efficiency and water coverage.

The some of limitations during this study includes; some respondents were non-cooperative and refused to provide the required information for the study but the researcher assured them of the confidentiality. Some of the workers were reluctant to participate in the study because of their busy schedule this was overcome by administering the questionnaire at their own convenient time.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The assessment and critique of the literature review on the impact of devolution on the long-term viability of the water sector providers is the focus of Chapter 2. Before reviewing the variables under consideration, it critically examines the theoretical underpinnings of the investigation, pointing out knowledge gaps along the conceptualization. Finally, a conceptual framework for empirical study is suggested, and hypotheses are derived from the framework.

2.1 Devolution of Water Services

Devolution is a multifaceted and difficult process. Global initiatives to decentralize have taken on a variety of shapes, from the highly decentralized nature of some federal states, like Germany and several Spanish regions, to the more constrained authority of regions in France or, until recently, Mexico (Pranab, 2002). As a result, conceptualizing devolution is not at all straightforward. Typically, it entails legitimacy, decentralization of power and resources, and decentralization of resources. The study suggests looking for a lowest common denominator that would describe the devolutionary process as being composed of three distinct elements.

The actors involved in the devolution process have competing interests, and their shared claims to legitimacy make the process difficult. Most crucially, devolution's component aspects tend to conflict between subnational and national governments' interests. Regardless of the way that public legislatures would; *ceteris paribus*, really like to move obligations and position to their territorial or state states with minimal measure of assets conceivable, subnational state run administrations would favor what is going on. The

harmony between these limits will rely upon the relative strength, or, in political terms, authenticity, of the two levels of power (Warner and Pratt, 2005). Care should be utilized while looking at the proof, however, as a straightforward rundown based approach might ignore how the parts interface.

Devolution has likewise become ordinary beyond Europe, especially in enormous, various states. Provincial independence has periodically been given. This is what is going on with Indonesia, which executed independence rules in 1999 to turn around many years of profoundly unified organization and to alleviate rebel opinions (Aspinall and Berger, 2001). In China, there has been far and wide monetary decentralization, giving provincial and nearby states huge power and empowering strategy advancement at the local level, in spite of the way that political devolution has not formally occurred the Chinese Socialist coalition actually keeps a solid handle on political turns of events. The article recommends differentiating one kind of devolution with others in various locales.

Different times, local independence levels that generally existed have been expanded. The cases from Latin American countries have been the most eminent. In Mexico, the 1982 financial breakdown and the following political turmoil brought about tremendous changes to legislative issues in light of an area. Regardless of the way that Mexico's constitution has been officially government since fundamentally the 1910 change, movements in political structures of depiction, obligation, versatility, and a larger part runs framework during the past 20 years have provoked a critical update of provincial regulative issues for more noticeable federalism.

For quite a while, Africa and other arising countries have encountered wasteful public help conveyance because of unreasonably incorporated government organizations (Mwabu & Kibua, 2008). To expand the viability of offering types of assistance to the general population, various drives have been made in Kenya to eliminate excess degrees of government. This paper recommends extra investigation into explicit businesses to decide the impacts of devolution.

A study by Ngigi and Nekesa (2019) established that Kenya's inhabitants sought access to public services near to where they lived, which led to the creation of a decentralized system of government. Devolution aims to promote democracy and accountability in the exercise of power, foster national unity by recognizing diversity, improve people's self-governance, give communities the power to manage their own affairs, and ensure equitable resource distribution, as stated in Articles 174 and 175 of the Constitution. The report suggests creating a framework and a supportive atmosphere for all parties involved in the implementation of devolution.

Devolution has not, however, been implemented in an atmosphere that has been free of difficulties for the previous five years. A few of the problems are poor or nonexistent consultation on matters affecting County Governments, corruption, a lack of public participation, gender inequality, inadequate funding allocations and delayed disbursements of funds by the National Treasury to Counties, disagreements between the National Government and County Government over funding for County functions, and lack of funding for County functions. The research recommended that it was critical to evaluate how these challenges have affected Kenya's implementation of devolution (Steeves J, 2015).

2.2 Sustainability

Even though there has been a lot of work done to produce quantitative indicators of sustainable development, definitional ambiguities still exist. Systems where nature or the environment acts as a source of products and services for the practical support of humans are given a lot of attention in the literature. Contrarily, a substantial body of literature focuses more on the underlying qualities and biodiversity of nature than on its utility. Recent theories suggest that in order to attain sustainability, three very distinct categories people, economy, and society should be fostered (Parris & Kates, 2003).

The economy, with its productive sectors supplying both work and desired consumption and wealth, was the subject of the majority of early writing. The economy is portrayed in this literature as providing both financial resources for environmental upkeep and restoration as well as incentives and means for investment. In recent years, the emphasis has switched to people, with a focus on human development, longer life expectancies, education, equity, and opportunity (Bossel, 1999). There are calls for society to advance with a focus on the safety and well-being of states, localities, and entities in addition to the social capital of interpersonal connections and ties to the local community. In actuality, organizations and groups frequently accept the several, contradictory goals that must be met in order to maintain and advance development.

2.3 Water Supply

International freshwater law is still in its infancy, and current legal frameworks like the 1997 UN Convention only cover a small number of pertinent concerns (Cherunya et al., 2015). However, the international framework for freshwater law and policy is becoming more crucial in guiding national law reforms, particularly in emerging nations. Most

poor countries have profited immensely from non-binding resolutions like the Dublin Statement on Water and Sustainable Development in reforming their water laws (1992).

A thorough investigation of the environmental, social, economic, and human rights elements of water as a natural resource has been done, going beyond a straightforward analysis of the country's current water laws and regulations. 2009 (Cullet) (Cullet). An assessment of freshwater regulation in a broader context either applauds or condemns continuing water sector advances, providing a philosophical framework for the reforms that all nations will need to implement in the short- to medium-term.

Only a portion of Kenya's water reform initiative through water service providers involves decentralization. National water planning, changing the perception of water from a social good to an economic one, and implementing innovative methods are some of the other reforms (Sambu & Tarhule, 2013). Access to water is a significant issue for underdeveloped countries. Kenya is one of those countries where a shortage of water resources and poor water infrastructure endanger the health and standard of living of the populace and limit its economic and social development.

2.4 Devolution and Sustainability

One of the most common buzzwords in the world's policy agenda, including in devolved areas, is sustainability. Almost all governments have vowed to promote sustainable development by fusing social coherence, environmental quality, and economic welfare. As a result, there is a strong political push for a thorough evaluation of changes in social, environmental, and economic conditions (Bossel, 1999).

Identification of operational indicators that give manageable units of information on economic, environmental, and social situations is necessary for tracking progress toward sustainability (Barraque, 2003). Country-specific data on economic, environmental, and social circumstances are among the three pillars of sustainable development, are evaluated using sustainability indices for countries, which offer a one-dimensional statistic.

2.5 Devolution and Water Service Providers

Devolution and water reforms were discussed in *Decentralization, Devolution and Development: Reflections on the Water Reforms Process in Zimbabwe* (Derman et al., 2000). They concluded that managing natural resources, especially water, necessitates comprehending the intricate intersections of international, national, and local management regimes located within a background of intense economic, political, and institutional change. Water is a naturally fluctuating resource that is impacted by both short-term and long-term climate changes. Changes in the management of water are especially important because water is necessary for all life. Zimbabwe chose to decentralize water management in response to both internal and international circumstances, and it began a wide-ranging water reform effort that included changes to its legal system, institutions, economy, and political system. The study recommended greater research to determine how money allocated for reforms in the water sector may be used more efficiently.

A critical analysis of some of the gendered features of emerging water governance regimes focused in particular on those relating to the privatization, marketization, and devolution of water resources management (Harris, 2009). It was determined that neoliberalization discourses and trends are having an impact on how resources are used,

accessed, managed, and under what circumstances. Reconsideration of the main themes of the scholarly discussion has also been stimulated by contributions from nature-society viewpoints. The analysis put gender and neoliberalism front and center. It urges additional research on devolution and water service providers.

2.6 Sustainability and Water Service Providers

There have been many reactions to the need to increase the water industry's sustainability. Efforts have been made to improve corporate planning by including regional and global environmental challenges, in addition to efforts made to identify and address some of the most glaring environmental issues in the area, as demonstrated by blatantly obvious adverse ecological reactions (Lundie et al., 2004).

This has encouraged the creation of novel ways to communicate the problems and the rate of work being made to solve them (Schulz et al., 2012). the creation of guidelines for corporate environmental reporting, such as those set forth by the Global Reporting Initiative (GRI), a multi-stakeholder process and independent body operated by the United Nations Environment Program, has been one of the major advancements in the water industry's sustainability information over the past ten years.

2.7 Theoretical Foundation of the Study

A formal, peer-reviewed theoretical model (or models) that describe the problem that motivates any research serves as a theoretical foundation. The resource dependence theory and game theory are both used in this work.

2.7.1 Game Theory

The game theory was created by John von Neumann and Oskar Morgenstern in 1940. The use of Game Theory (GT) to address problems with water asset the board has steadily increased since Ransmeier's famous application of GT to the Tennessee Valley Authority speculative project in 1942. (Heaney, 1979). Kenya, however, has not utilized this system similar to water management companies. "Game theory" is the study of scenarios in which there are multiple decision-makers, and each decision-maker is impacted by the decisions of the other decision-makers. The mathematical social sciences have mostly investigated game theory as a paradigm for modeling; nevertheless, as a controller may be viewed as a decision-making entity, there is a strong connection to control systems. Thus, when there are multiple cooperating controllers, game theory can be used. Even when none of the agents may have intended the effects in question, game theory examines how interdependent actions made by economic actors result in outcomes that are related to their preferences (or utilities).

The game theory predicts a fight between competing users and purchasers due to the water constraint. Conflicts frequently occur between industries that use water at different times of the year, such as water systems and hydropower (Dinar and Hogarth, 2015). Water is frequently mentioned as a common pool resource (CPR), which nudges customers to take immediate action. The second and most pertinent idea is that different externalities might have an impact on water assets. One type of externality, the clog externality, is related to the CPR notion of water. Another sort of water externality is linked to pollution and is more obvious when upstream-downstream relationships are dominant. Third, water is more strongly linked to uncertainty and information asymmetry, which has an impact on how the agents involved behave strategically.

Water services are just one example of how decentralization frequently alters institutional structures in a nation. Decentralization has been used by several nations to improve service delivery outcomes, especially in the area of water access (Resnick, 2014). Theoretically, decentralization can facilitate service delivery by enhancing administrative effectiveness, localizing decision-making authority, better resourcing for implementation, and better awareness of local requirements and conditions (Conyers, 2007). Empirical research reveal contradictory effects in actual use (Combos et al., 2017; Channa, 2016; Ahmad, et al., 2005). Decentralization doesn't always lead to better service delivery because the results depend on the following variables: (a) the project's specifics (its scope and form); (b) how these interact with more general variables like the country's political, social, and economic framework; and (c) the service being provided (Conyers, 2007; Boex & Simatupang, 2015).

Conflicts can arise when managing water resource systems. Stakeholder actions that may otherwise result in improvements and a win-win scenario occasionally make things worse for everyone. Game theory can help to identify and comprehend the activities of the parties involved in water resource problems and can explain how the interactions of various parties that prioritize their personal goals over the goals of the system lead to the evolution of the system (Madani, 2010). According to game theory, both sides must share a shared reform agenda and be able to convey it in order to reach an agreement.

Conflicts over devolution and water changes go beyond the question of benefit- or cost-sharing, which is where many water professionals stand out. Conflicts frequently result from the organization, management, and executives of social and political water changes (Zekri and Easter, 2007). Before surveying, conducting, or setting up water

changes, the project must be truly, naturally, fiscally, and financially feasible as well as socially and politically plausible. This is a challenge for individuals in charge of developing and implementing strategies because they frequently evaluate implementation in terms of the economy, finances, and well-being.

This theory has attracted attention since game hypothesis conclusions frequently deviate from those suggested by streamlining approaches, which depend on everyone operating in the overall best interests of the framework (Dinar, 2004). Additionally, game theory has not been fully incorporated into the analysis of broad systems for water resources. Due to a lack of comprehension of this theory's fundamental ideas, the water resources community may continue to be unsure of its value. Therefore, the effectiveness of devolution on water reforms will be evaluated using this theory in the Athi Water Development Works Agency.

2.7.2 Resource Dependence Theory

The theory was developed by Jeffrey and. Salancik (1978). It covered the origins of power and dependence as well as how organizations might utilize this power to control other organizations that are dependent on them. The resource dependence theory suggests that between authoritative linkages can be used to increase control over asset supply and secure the necessary assets. The two main areas of concern for researchers are the successful management of asset conditions and power cooperation (Ebers & Oliver, 1998).

An investigation into how the external resources of organizations influence their behavior led to the development of the Resource Dependence Theory (RDT). In other words, the idea looks at how businesses interact with the goods they require to function.

Raw materials, funding, and staff are just a few examples of the various types of resources. Obtaining these outside resources is a crucial component of any company's strategic and tactical management. Other businesses become reliant on a corporation when it holds all of the stock in a certain external resource. A symbiotic relationship is so created. Uncertainty, vulnerability, and the possibility of external checks being placed on the organization are all effects of too much dependence. Governments and other organizations have the power to impose external checks, and doing so can have a big impact on how a firm conducts its daily operations, such recruiting and funding. The Resource Dependence Theory (RDT) is founded on the idea that resources are essential to an organization's performance and that power is built on having access to and control over these resources. (Hillman et al., 2009)

This theory proposes a study of water service providers focused on the five approaches that minimize environmental dependences: mergers/vertical convergence, partnerships as well as other trans linkages, boards of directors, collective participation, and executive succession (Hillman et al., 2009). Directors can take action to lessen ecological vulnerability and reliance even though they are constrained by their environment since the hypothesis acknowledges the role of external factors on hierarchical behavior. Power, defined as the possession of essential resources, is essential to these behaviors.

For comprehending intercorporate connections and society, it is crucial to recognize that firms are constrained by a web of interdependencies with various relationships rather than being free (Drees & Heugens, 2013). Even if these actions are obviously never totally successful and give rise to new patterns of reliance and interdependence, organizations must take action to manage external interdependencies. This

interdependence results in a situation where survival and ongoing success are uncertain since there is uncertainty surrounding the behavior of people who the organizations are interdependent with. The hypothesis has drawn criticism because these inter- and intra-organizational power-producing patterns have been shown to have some influence on organizational behavior.

2.8 Conceptual Framework

The proposal has conceptualized a framework shown in the next page as revealed by literature on devolution and sustainability of water service providers.

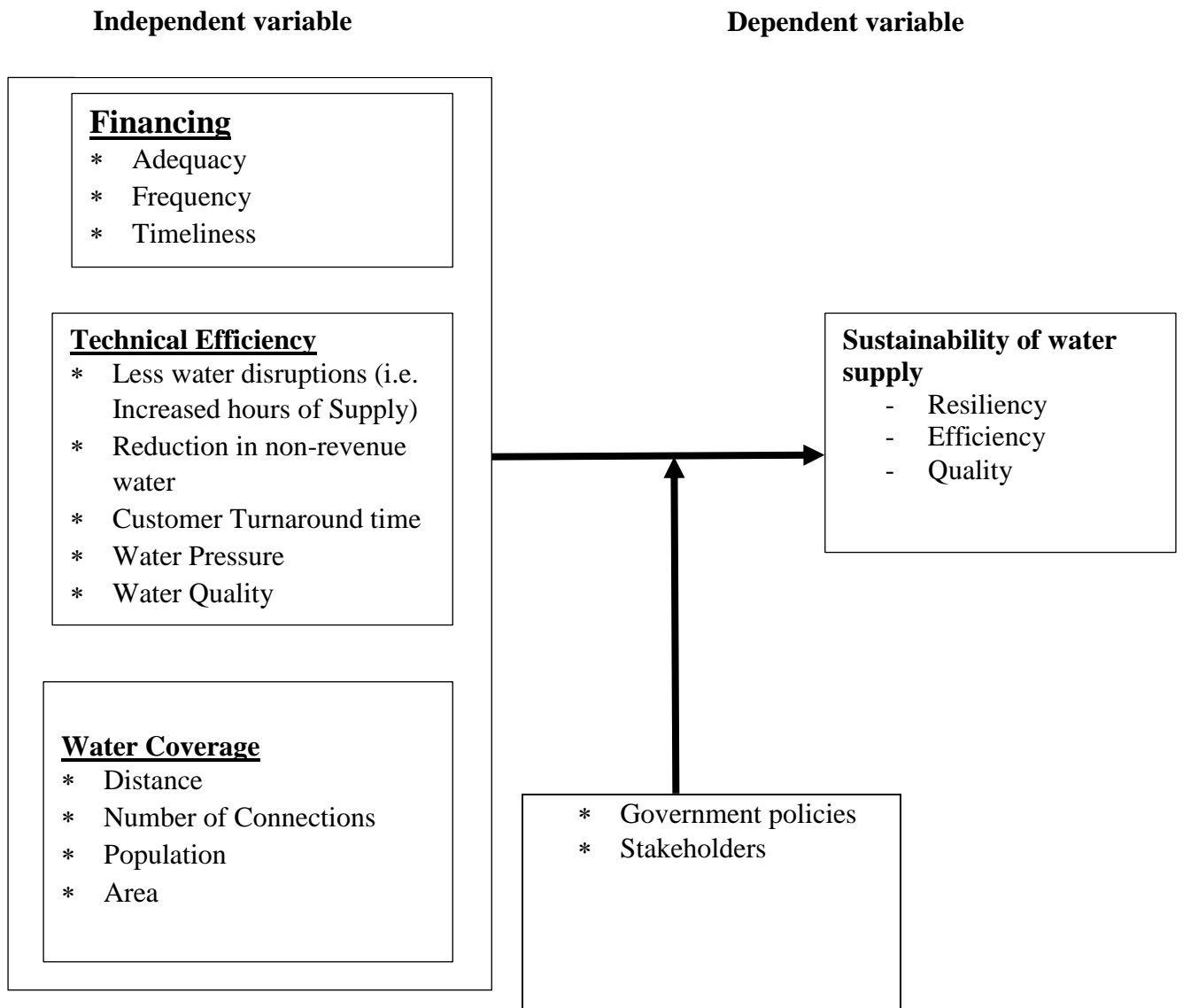


Figure 2.1: Conceptual Framework

Source: Researcher 2022

CHAPTER THREE: METHODOLOGY

3.1 Introduction

The proposed methodology is covered in detail in this chapter. The topic includes data processing and analysis as well as the research design, population, data collection method, pilot testing, and operationalization of research variables.

3.2 Research Design

Both cross-sectional surveys and descriptive research designs were utilized in the review. With the utilization of the clear review plan, the scientist will get the opportunity to assemble data from all divisions inside the Athi Water Works Advancement Organization and experimentally inspect the connections between the factors. Given the extent of the request, the idea of the measurements, and the approach of the examination to be directed, this exploration configuration is additionally remembered to be the most appropriate (Cooper and Schindler, 1998). A cross-sectional survey design was used for the study, which entails gathering information on the phenomenon being studied at the time of the study and allowing conclusions to be made. A huge number of response units are captured in a single point in time by the cross-sectional survey methodology (Zhang & Creswell, 2013). These designs are deemed appropriate since data was gathered on the topics, which portrayed a sense of their reality.

3.3 Variable description and Analysis

	Independent variables	Level of measurement	Dependent variable	Level of measurement	Test
1	Financial	Nominal	Sustainability of water supply	Nominal	CHI SQUARE
2	Technical efficiency	Nominal			CHI SQUARE
3	Water coverage	Nominal			CHI SQUARE

Source: Researcher 2022

3.4 Location of the Study

The Athi Water Works Development Agency consists of thirteen water service providers (WSP's) in Nairobi, Kiambu and Muranga Counties as presented in Appendix III. This is the location of the study.

3.5 Population of the Study

The study targeted all the managing directors of 13 water service providers. The water service providers are located within the community and its operations are directed in improving the lives of the community in which they serve. Newbert (2008) asserts that at least one participant who is knowledgeable about the subjects of a study is qualified to serve as a key informant.

3.6 Sampling

Kothari (2004) defined sampling as the process of selecting a sample from a population. Researchers select a sample because of several limitations that may hinder examining the complete population (Mugenda & Mugenda, 2003). A portion of the population that is chosen to represent the complete population is sampling. In cases where the target

population is tiny, a census is deemed necessary. Given that the estimated time and cost are within the researcher's budget, this is deemed suitable (Kothari, 2004). However, 13 employees each from water service provider form the sample size.

3.7 Pilot study

A pilot study was conducted at Nyeri Water and Sanitation Company Ltd (NYEWASCO) to check the validity and reliability of research instruments. Four workers were involved in pilot study.

3.7.1 Validity

Pilot testing increased validity, and the research instrument was developed and improved using expert feedback gathered during various proposal examination phases at Kenyatta University. Validated instruments were utilized in conjunction with the measurement scales for the variables under study.

3.7.2 Reliability

The consistency of the outcomes across trials is what is meant when something is said to be reliable (Davicik, 2014). Results produced through reliability are error-free. To determine the internal consistency of the items under review, the Cronbach's (alpha) coefficient was applied. A score close to 1 denotes high correlation and consequent consistency among items in assessing the idea of interest. The Cronbach's (alpha) coefficient values range from 0 to 1. A value of 0.7 for Cronbach's Alpha Coefficient is regarded as strong (Nunnally, 1978). The alpha coefficient was reduced to 0.7. The preliminary test results are displayed in Table 3.1.

Table 3.1: Pre Test Results

Variable	α=Alpha	Comment
Financing	0.716	Reliable
Technical efficiency	0.725	Reliable
Water coverage	0.743	Reliable
Sustainability of water supply	0.708	Reliable

(Source: Field Data, 2022)

Pretest results in Table 3.1 showed that financing, technical efficiency, water coverage and sustainability of water supply had Cronbach coefficient value of 0.716, 0.725, 0.743 and 0.708 in that order. The Cronbach coefficient value for the items was more than the minimum requirement values of 0.7 hence the tool was deemed to be reliable.

3.8 Research Instruments

By distributing a semi-structured questionnaire on devolution and sustainability, primary data was gathered. The data collecting tools must be used in a drop and pick later fashion. Four sections made up the data collection tool. The organization's and the participants' respective profiles were covered in sections A and B of the first report. Part D, which is an adaptation of Part C on sustainability, concentrated on devolution as operationalized by Bressolles (2006). (Murithi, 2019).

3.9 Data Analysis

The collected data was analyzed descriptively and inferentially. The descriptive analysis involve mean, standard deviation and frequency. Inferential analysis in this study involves correlation analysis, model summary and chi-square. After analysis, data was presented using text, tables, graphics, and prose.

Multiple regression model is considered appropriate because it provides an opportunity to test the strength of the relationship between variables. Multiple regression was conducted at 95% confidence level. Multiple regression equation is presented below.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \text{ where:}$$

- Y = Sustainability of water supply
- X₁ = Financing
- X₂ = Technical efficiency
- X₃ = Water coverage
- α = Constant
- ε = Error term

3.10 Logical and Ethical Considerations

The researcher sought authorization from Graduate School, Kenyatta University. Moreover, a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) was sought. Informed consent was sought from respondents prior to involving them in the study. The researcher explained that the study is for academic purposes only and the respondents were assured that the study would not cause any danger directly or indirectly and that their participation was voluntary. Confidentiality was ensured during data collection by safely keeping the information obtained from the respondents away from people who are not part of the study. Respondents were also inquired not to write their names in the research instruments administered to them for purposes of observing anonymity of the respondents.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This section presents research discoveries and discussions. The review objective was to effectiveness of devolution on sustainability of water supply in Kenya: An instance of Athi Water works improvement organization. The review depended on secondary and primary information. The examined data were introduced in type of figures and tables.

4.2 Response Rate

The researcher sent 13 surveys to selected participants. A total of 11 surveys were honestly completed and returned to the scientist. This resulted in a satisfactory reply rate for the review of 84.6%. According to Mugenda & Mugenda (2008), a reaction pace of 50% is adequate for examination, a reaction pace of more than 50% is fantastic, and a reaction pace of more than 70% is normally good. As a result, the reaction rate was sufficient for the review to draw significant conclusions from the reactions. The results were presented in Figure 4.1.

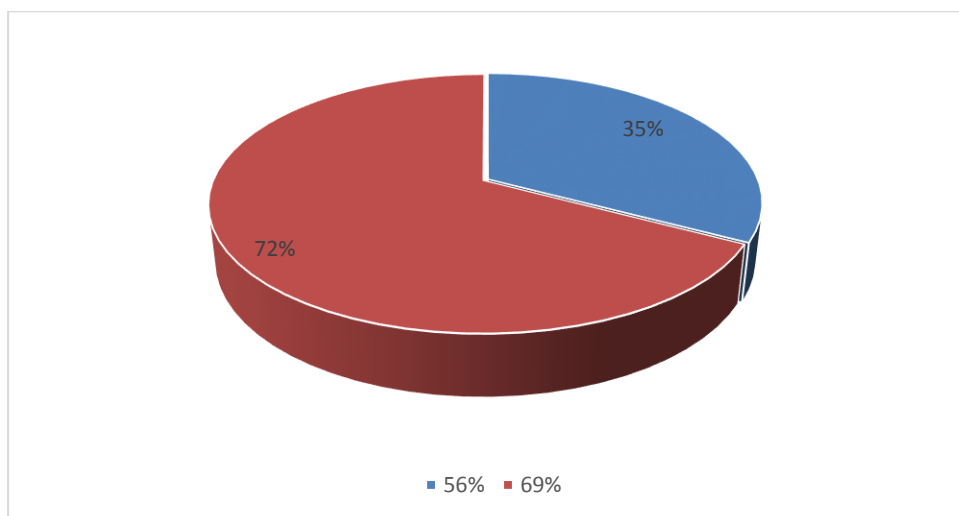


Figure 4.1 Response Rate
Source: Review Data (2022)

4.3 Institution Profile

The study sought to explore the institution profile such as level of Non-Revenue Water and percentage of Water Coverage.

4.3.1 Level of Non-Revenue Water and Water Coverage

The study sought to explore the level of non-revenue water and water coverage by the water service provider. The findings were presented in Figure 4.2 below.

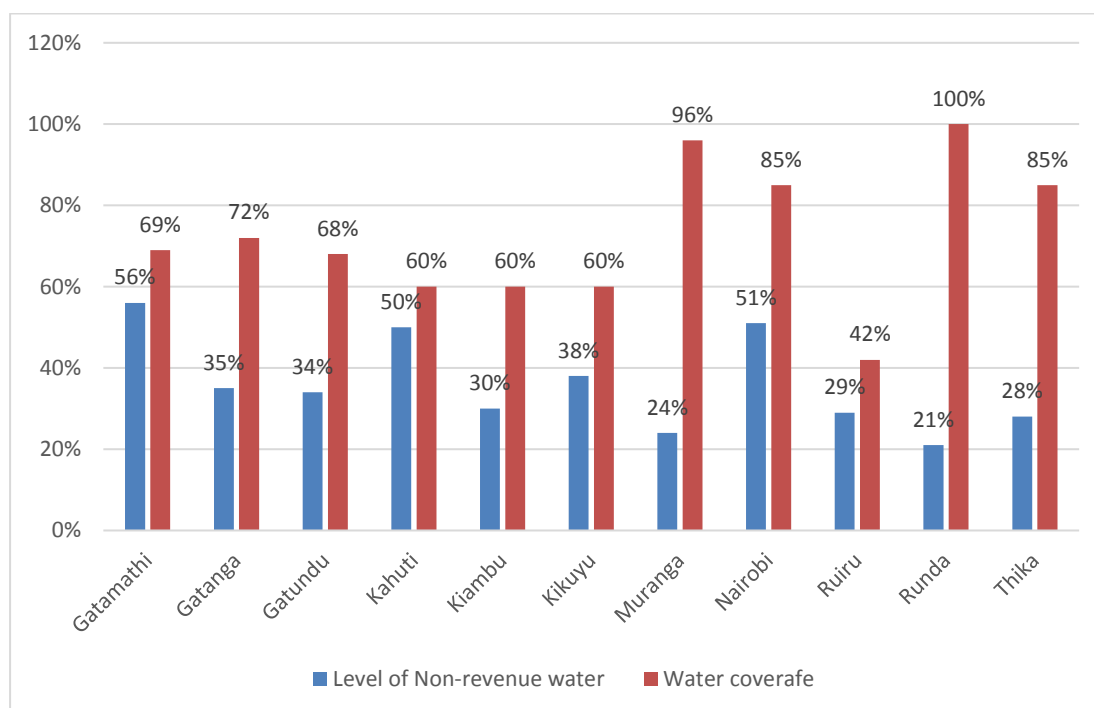


Figure 4.2 Level of non-revenue water and water coverage

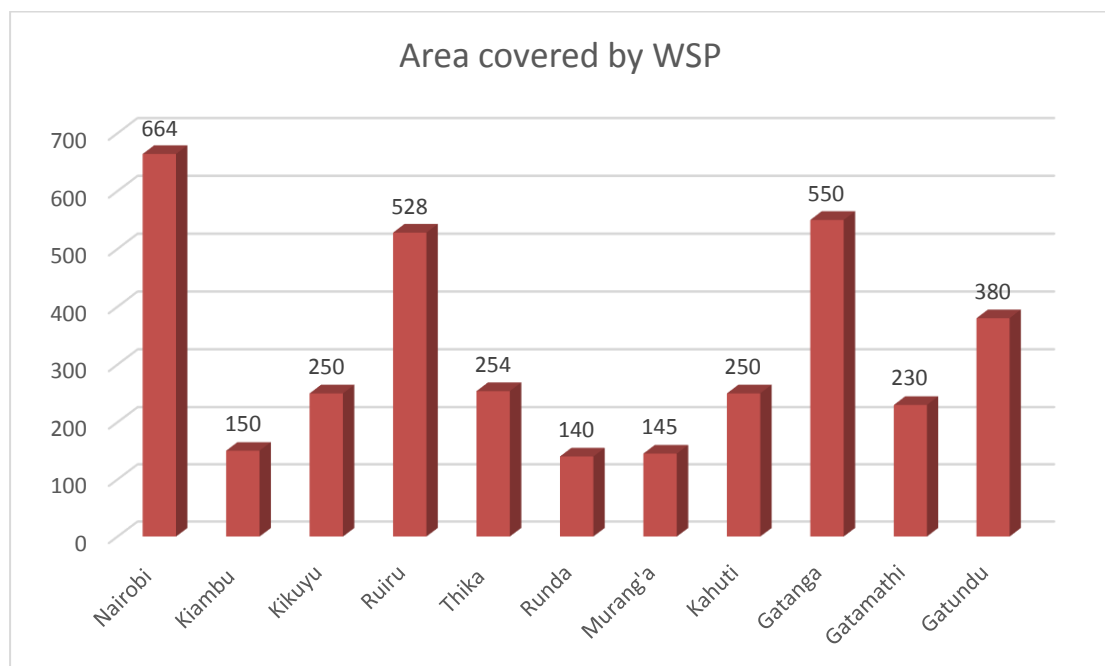
Source: Review Data (2022)

From the outcomes exhibited in Figure 4.2, it was uncovered that Runda, Muranga, Nairobi and Thika has the highest water coverage as presented by 100%, 96%, 85% and 85% respectively. In Kenyan locations serviced by water service providers, 53% of people have access to water (World Bank, 2019). Establishing, maintaining, and modernizing the water supply system, which typically includes treatment, collection, distribution, sewage, quality control, and reuse of water, is the responsibility of service providers.

Also, the findings established that Gatamathi, Nairobi and Kahuti has the highest level of non-revenue water as indicated by 56%, 51% and 50% respectively. The amount of non-revenue water has an impact on the water companies' clients. The high percentage of non-revenue water (NRW), which is projected to account for an average of 45% of water coverage, is one of the obstacles to realizing the Kenyan dream. High Non-Revenue Water (NRW) continues to be a problem for Kenyan water companies, leading to devastating revenue losses.

4.3.2 Area covered by WSP

The study sought to determine the area covered by water service provider. The findings were presented in Figure 4.3



From findings presented in Figure 4.3, it was revealed that Nairobi water and sewerage company cover the largest area indicated by 664km², followed by Gatanga with 550 km² and Ruiru with km². This is an indication that the area has high population density compared with other area such as Murang'a, Runad and Kiambu.

4.3 Participants Profile

In order to examine whether the review participants are a representative sample of the objective populace for speculative purposes, participants were asked to demonstrate their segment data. The discoveries are presented in the following sections.

4.3.1 Job Designation

The study sought to determine employee current job designation. The outcomes were exhibited in Table 4.1.

Table 4.1 Distribution of participants by job designation

	Frequency	Percentage
Managing director	5	45.4
Technical manager	2	18.2
Engineer	2	18.2
GIS analyst	1	9.1
Non-revenue water coordinator	1	9.1
Total	11	100

Source: Review Data (2022)

The outcomes in Table 4.1 uncovered that large part of participants were managing director of the water sector as indicated by 45.4%. Those working as technical manager and engineer are presented by 18.2% each. Also, the outcomes discovered that 9.1% of the participants work as GIS analyst which tie to those working as Non-revenue water coordinator. The execution of a project is inextricably linked to the supervisor's ability to recognize and make use of ad hoc connections, arrangements, and communication channels. The use of background connections and movements is also used to explain why things work or don't work. The ability to recognize and control incidental elements is what distinguishes exceptional managers.

4.3.2 Work Experience

The scholar dissected the information gathered on the work experience span of the representatives engaged with the concentrate as introduced in Table 4.2.

Table 4.2 Participants' working experience

Working experience	Frequency	Percentage
Over 16 years	6	54.5%
11 – 15 years	1	9.1%
6 – 10 years	2	18.2%
Less than 5 years	2	18.2%
Total	11	100.0

Source: Review Data (2022)

The outcomes shown in Table 4.2 demonstrate that 54.5% of respondents had worked in the water sector for more than 16 years. 9.1% of the population had worked for between 11 and 15 years, though. Also comparable to those who had worked for fewer than five years were the 18.2% of participants who had worked between six and ten years. According to this survey, the majority of Athi Water employees possessed the necessary experience to deal with the problems facing Kenya's water sustainability.

4.4 Descriptive Statistics

This study introduced the general proportions of the observed example using the mean, standard deviation, and coefficient of variety. Based on the data acquired on the factors at the center of this review, investigation of several insights was led. The fundamental idea of the observed case served as the framework for the justification for this review's quantitative information research.

4.4.1 Devolution on financing of water supply

The objective one of the survey was to assess the impact of devolution on financing of water supply. The responses from the participants were presented in Table 4.3

Table 4.3 Descriptive Statistics for implementation of performance contracts

Statements	n	Mean	Std Dev	CoV
The water services are devolved	11	3.75	0.56	0.12
The devolution of water services has been successful	11	3.69	0.59	0.13
The devolved resources are adequate	11	2.32	1.63	0.16
The water resources are released to counties in a timely manner	11	2.53	1.45	0.15
The county government is supportive to water service provider	11	3.66	0.55	0.12
Average scores		3.19	0.96	0.14

Source: Review Data (2022)

The outcomes presented in Table 4.3 established that numerous participants noted that water services are devolved (mean = 3.75; standard deviation = 0.56). Participants also noted that devolution of water services has been successful as indicated by a mean of 3.69 with standard deviation of 0.59. The responsibility for providing water has been devolved to democratically elected county governments, who now have to balance meeting the demands of their constituents with upholding the constitutional mandate to gradually offer water services to everyone. The new Kenyan Constitution (Constitution of Kenya 2010, which came into effect in 2013) made access to water supply and sterilization benefits a fundamental right and transferred significant water and disinfection responsibility to the provincial level. Two key pieces of legislation that have paved the way for profound reforms are the Metropolitan Regions and Urban Communities Demonstration of 2011 and the County Government Demonstration of 2012.

The participants also noted that devolved resources are inadequate as represented by a mean of 2.32 and standard deviation of 1.63. Furthermore, water resources are not released to counties in a timely manner as supported by a mean of 2.53 and standard deviation of 1.45. Water resources are a basic figure creating feasible water and sterilization administrations. In the framework of devolution, it will be necessary to assess both new and existing money flows for investment and come to agreements between the federal government and county governments about how these investments are reformed. To sustain and increase the level of financing in the sector and achieve the established targets, it is crucial that devolution of capital funding arrangements be carefully handled (Rutto, 2017).

Furthermore, the participants noted that county governments are supportive to water service provider with a mean of 3.66 and standard deviation of 0.55. County legislatures with the authority to provide water administrations are currently required to develop WSPs in accordance with The Water Act of 2016. The WSPs are responsible for setting up water services within the boundaries of the licenses they have and for developing county resources. This is supported by Nancy (2018) who established County governments still need assistance to improve their capacity to properly supervise the delivery of water services. To increase county governments' capacity to strengthen their regulatory authority, significant investments are required. Good governance cannot be replaced; thus it is crucial to get it correctly.

4.4.2 Effectiveness of Technical Efficiency

The objective two of the study was to explore how change in technical efficiency affect water supply after devolution. The responses were tabulated in Table 4.4.

Table 4.4 Effectiveness of technical efficiency

Statements	n	Mean	Std Dev	CoV
There is significantly reduction of non-revenue water	11	3.89	0.67	0.13
There is improvement of customer satisfaction index	11	3.95	0.69	0.12
Quality of water has gone up	11	3.78	0.61	0.11
There is reduction in water interruptions	11	3.86	0.73	0.16
Average scores		3.87	0.68	0.13

Source: Review Data (2022)

From the outcomes in Table 4.4, participants noted that there is significantly reduction of non-revenue water (mean = 3.89; standard deviation = 0.67). Reducing NRW is very important for overall productivity and financial viability because it increases money and reduces water hardship. When compared to supply expansion, NRW executives frequently offer better expense viability.

The participants also noted that there is improvement of client contentment index as presented by a mean of 3.95 and standard deviation of 0.69. Maintaining the balance between clients' interests and utility execution depends greatly on customer loyalty. According to consistency with the limits set by controllers, clients' satisfaction with normal water quality isn't actually related to the water quality itself (Ochoo et al., 2017).

From the findings, the participants noted that quality of water has gone up (mean = 3.78; standard deviation = 0.61). Water managers and utilities can view their partners' exhibitions from both a creation and a nature of administration standpoint by using creative views. Utilizing modern infrastructure and utilities improves water production and customer preservation initiatives, hence increasing the water supply's ability to be maintained. According to Romano (2011), increasing water efficiency reduces

operating costs (such as siphoning and treatment) and reduces the need to build additional sources and broaden our water basis.

The participants also noted that use of technical efficiency reduces water interruptions (mean =3 .86; standard deviation = 0.73). Water use proficiency refers to technical and financial strategies for reducing the amount of water consumed to complete a specific task. A study by Buafua (2015) that claimed that managing water utility duties through execution contracts results in higher specialized expertise supports this.

Also, the research sought to determine the association between effectiveness of technical efficiency and water supply sustainability through chi-square. The findings were presented in Table 4.5.

Table 4.5 Chi-square test of technical efficiency and sustainability of water supply

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.45 ^a	3	.036
Continuity Correction ^b	3.64	1	.027
Likelihood Ratio	1.27	2	.05
Fisher's Exact Test			
Linear-by-Linear Association	.16	1	.218
N of Valid Cases	11		

The outcomes displayed in Table 4.5 uncovered that chi-square test statistics (χ^2) is 21.45, with p-value of 0.036 which is less than 0.05 indicating that there is a significant relationship between the technical efficiency and sustainability of water supply. The use of technology in water supply reduces water loss thus enhancing sustainability of water supply.

4.4.3 Financing

The survey aimed sought to explore how financing influence the devolution of water service providers. The outcomes are exhibited in Table 4.6.

Table 4.6 Descriptive Statistics for Financing

Statements	n	Mean	Std Dev	CoV
There is adequate allocation of resources for projects	11	2.42	1.41	0.11
Projects are completed within projected time and cost.	11	2.49	1.53	0.14
Reported incidences of misappropriation of funds have reduced	11	3.47	0.59	0.15
System checks and controls are effective	11	3.56	0.57	0.12
Average scores		2.99	1.03	0.13

Source: Review Data (2022)

From the outcomes in Table 4.6, participants noted that there is inadequate allocation of resources for projects (mean = 2.42; standard deviation = 1.41). The results of this study were consistent with those of Owino (2018), who concluded that citizens' access to water was hampered by the national and county governments' insufficient funding of stakeholders in the water and sanitation sector. The results corroborated a study by Zakayo (2017) that found that the distribution of resources, notably money, had a significant impact on the execution of water projects and, consequently, on people's access to clean water. The results concurred with those of Orina (2014), who found that a lack of resources was the main obstacle to ensuring increased access to clean water. The participants noted that projects are not completed within projected time and cost (mean = 2.49; standard deviation = 1.53). Preferably, all the resources required for the construction work should be available if the water project is expected to be completed within a short period. The water project needs to have financial and human resource

predictions associated with its completion for it to be successful. The findings are supported by those made by Mweke (2016), who highlighted that the key test was the lack of resources to aid in the program's execution.

Also, the participants noted that incidences of misappropriation of funds have reduced (mean = 3.47; standard deviation = 0.59). The use of technological in water metering and piping, digital documentations have reduced funds misuse. The county ability to access water was significantly impacted by the county government's resource allocation. According to Zakayo (2017), increased anomalies in the delivery of reserves, the fact that many water projects were not completed on time and that execution exercises were aggravated by sporadic task work stops delayed benefits for targeted residents, particularly access to clean water.

Furthermore, the participants noted that system checks and controls are effective as indicated by a mean of 3.56 and standard deviation of 0.57. Viability of water administration connects with the commitment of administration to characterizing clear. Further developed productivity advances administration conveyance and monetary security.

The study also aimed in determining the association between financing and water supply sustainability. A chi-square was used to show the association and findings presented in Table 4.7.

Table 4.7 Chi-square test of financing and sustainability of water supply

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.34 ^a	3	.043
Continuity Correction ^b	4.78	1	.023
Likelihood Ratio	1.43	2	.03
Fisher's Exact Test			
Linear-by-Linear Association	.19	1	.224
N of Valid Cases	11		

The outcomes displayed in Table 4.7 uncovered that chi-square test statistics (χ^2) is 23.34, with p-value of 0.043 which is less than 0.05 indicating that there is a significant relationship between the financing and sustainability of water supply. Gedi (2019) claims that the water specialist organizations are financially irrational and are hampered by subpar management cycles, frameworks, and income collection systems.

4.4.4 Water coverage

The study also sought to determine how water coverage influence the sustainability of water supply. The outcomes were exhibited in Table 4.8

Table 4.8 Descriptive Statistics for water coverage

Statements	n	Mean	Std Dev	CoV
The number of water connections has gone up proportionately to financing	11	3.71	0.69	0.14
The population under water coverage has gone up after devolution	11	3.53	0.64	0.15
The area under water coverage has gone up after devolution	11	3.79	0.72	0.12
Average scores		3.68	0.68	0.14

Source: Review Data (2022)

From the outcomes exhibited in Table 4.8, participants noted that the number of water connections has gone up proportionately to financing as indicated by a mean of 3.71 and standard deviation of 0.69. The applicability of key financing concepts and conventional formulas that have been widely used in the water supply has enhanced water connections. According to World Bank (2020) water providers that collect only 70% of their allotted tariffs, or have non-revenue water rates of 40%, are simply not financially viable or creditworthy.

Also, the participants noted that population under water coverage has gone up after devolution (mean = 3.53; standard deviation = 0.64). In the decayed structure, there is still a major need for water and disinfection. Due to factors like the dry season, struggle, and provincial neediness, it is disturbed by amazing urban population growth that is driven by country metropolitan movement. According to UNICEF (2019), the percentage of the population using improved sanitation facilities and clean water is generally low, at only 45% in 2019 and an increase of just 5 percentage points since 2010.

Lastly, the participants noted that the area under water coverage has gone up after devolution (mean = 3.79; standard deviation = 0.72). Changes in the management of water are especially important because water is necessary for all life. In order to more effectively improve service delivery, it was necessary to provide access to portable water and sanitation services and ring fence water and sewerage income for reinvestment in the infrastructure. The water sector must now concentrate on new prospects and overcome a number of obstacles in order to execute the new devolved framework effectively (Sambu & Tarhule, 2013).

Also, the survey aimed to explore the association between the water coverage and

sustainability of water supply. The outcomes were exhibited in Table 4.9

Table 4.9 Chi-square test of water coverage and sustainability of water supply

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.15 ^a	3	.013
Continuity Correction ^b	5.63	1	.040
Likelihood Ratio	1.51	2	.05
Fisher's Exact Test			
Linear-by-Linear Association	.23	1	.415
N of Valid Cases	11		

The outcomes exhibited in Table 4.9 show that chi-square test statistics (χ^2) is 26.15, with p-value of 0.013 which is less than 0.05 indicating that there is a significant relationship between the water coverage and sustainability of water supply. This shows that the existence of water coverage affects the water supply sustainability.

4.5 Inferential Statistics

The researcher conducted regression analysis to establish the effectiveness of devolution on sustainability of water supply in Kenya. The outcomes of Model Summary and correlation analysis are exhibited below.

4.5.1 Model Summary

The outcomes of coefficient of correlation R and coefficient of adjusted determination R^2 is exhibited in Table 4.10

Table 4.10 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.926	0.857	0.846	0.103

a. Predictors: (Constant), Technical efficiency, financing, water coverage

b. Dependent Variable: Sustainability of water supply

Source: Review Data (2022)

The results uncovered showed that the factors had a decent relationship, with a coefficient of connection (R) of 0.926. The outcomes additionally showed that the coefficient of adjusted R2 was 0.857, or 85.7%. This shows how the accompanying elements specialized viability, funding, and water inclusion can make sense of 85.7% of the supportability of the water supply. Different variables outside the domain of the ongoing review can represent the lingering of 14.3%.

4.5.2 Correlation Analysis

To decide the nature, strength and bearing of connection between concentrate on factors, relationship investigation was directed. The coefficients range between 0 and 1 and they were interpreted as weak if they were below 0.3, moderated if they were 0.3-0.5 and any value above 0.5 was considered strong. Table 4.11 presents the correlation analysis results.

Table 4.11 Correlation Analysis

			Water supply sustainability	Technical efficiency	Financing	Water coverage
Water sustainability	supply	Pearson Correlation Sig. (2-tailed)	1.0000			
Technical efficiency		Pearson Correlation Sig. (2-tailed)	0.3120* 0.0043	1.0000		
Financing		Pearson Correlation Sig. (2-tailed)	0.2900* 0.014	0.143 0.296	1.0000	
Water coverage		Pearson Correlation Sig. (2-tailed)	0.2314* 0.0144	.0214 0.156	0.1590 0.254	1.0000

As shown in Table 4.12, it is observed that technical efficiency and water supply sustainability in Kenya were moderately and negatively correlated ($r=-0.212$). The p-value (0.0043) was below 0.05 which is an indication that the relationship was significant.

The findings also show that financing and water supply sustainability in Kenya have weak, negative relationship ($r=-0.2900$). The p-value (0.0140) suggests significance of the relationship since it was less than selected significance level of 0.05.

Finally, water coverage has a moderately strong negative relationship with water supply sustainability in Kenya ($r=-0.2314$). The p-value (0.0144) was below 0.05 which is an indication that the relationship was significant.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section presents the synopsis of the discoveries, end and suggestions depend on the on the discoveries. Ideas for additional investigations are likewise drawn.

5.2 Summary of Study Findings

The aim of this study was to explore the effectiveness of devolution on sustainability of water supply in Kenya. According to the study's findings, county administrations are in charge of managing water services, which are decentralized. The results also showed that good devolution of water services but insufficient devolution of resources. The county government's release of water resources is delayed, which has an impact on its functionality. Nevertheless, the county governments offer additional forms of assistance to the water provider.

The study discovered that technical efficiency is significant in providing in water management. The use of technology has resulted to significantly reduction of non-revenue water. The technology has led to improvement customer satisfaction index, raising water quality and reduction in water interruptions.

From the findings, it was established that finance resource is significant in operational by water service provider. The survey results revealed that there was inadequate allocation of funds for projects. The completion of projects also takes longer than expected and costs more money. The focus then discovered that financial resources were seen as being crucial in determining the viability of the Water Undertaking. Furthermore, the research revealed that using innovation reduced the incidences of asset theft.

5.3 Conclusion

From the outcomes, the survey remarked that for water services to be delivered in an efficient and effective, it is imperative that water service providers (WSPs) are commercially viable. This in turn requires the realization of economies of scale, which can only be achieved where utilities reach a certain minimum size. Devolution provides an opportunity to increase water service delivery and increase water coverage to meet universal water access and Sustainable Development Goal No. 6. It is clear that Kenya's long-term water strategy has evolved to support decentralization, but much more work has to be done in terms of correcting and approving existing regulations. According to the analysis, financial resources are important factors in the manageability of the water supply. To meet the demand for water among all Kenyans, devolution of capital funding plans must figure out how to stay up with and increase the level of subsidies in the region. In many countries, a major barrier to achieving water supply and disinfection goals is the inability to handle financial problems. For the costs of operating and maintaining facilities, there is typically a serious underfunding.

5.4 Recommendation

From the findings, the following recommendations are deduced;

The County Governments and other water service agencies should support the organizational capacity of the devolved water suppliers as it contributes positively to service delivery.

Following the discovery that the public government lays out approach structures for the district to adopt, the review suggests that various partners, particularly those in the province government, emerge as at ease with the official and strategy system directing water the board in the region for effectiveness in execution. As it turned out, despite their leadership roles, some county leaders are not familiar with the county's policy

structure. The study also suggests that county stakeholders create policies that take particular water needs for growth into account.

To improve the effectiveness of service delivery, the study also suggests that the roles and responsibilities of the various stakeholders in the county's water sector be properly clarified. Water institutions should also have the staff members they need to perform the various tasks that hinder productivity.

5.5 Suggestions for further Study

Comparable research can be conducted in the other areas in Kenya to ascertain if consistent results can be achieved. Therefore, further comparative research of the effects of devolution on water sustainability is required, specifically one that compares the pre- and post-devolution eras.

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APPENDIX 1: LETTER OF INTRODUCTION

Daniel Ng`ang`a
Kenyatta University,
School of Humanities and Social
Sciences,
P.O. Box 43844-00100, Nairobi,
Kenya.

11 July 2025

Dear Sir/Madam,

Re: Masters Research

I am a postgraduate student undertaking a masters degree at Kenyatta University. I am undertaking a study titled “**EFFECTIVENESS OF DEVOLUTION ON SUSTAINABILITY OF WATER SUPPLY IN KENYA: A CASE OF ATHI WATER WORKS DEVELOPMENT AGENCY**”. To this end, I kindly request you to provide the requested information. The information required is purely for academic research purposes only and in no way will your name be implicated in the research findings. Your cooperation shall be highly appreciated.

Yours respectfully,

Engineer Daniel Ng`ang`a

APPENDIX 2: QUESTIONNAIRE

SECTION A: INSTITUTION PROFILE

1. When was the water service provider established

.....

2. What is the nature of the Water Service Provider?

Public { } Private { }

Urban { } Rural { }

3. What is the size of the WSP?

Very Large { } Large { } Small { }

4. What is the

Area covered by the WSP in KM2

.....

Customer Base (Water Connections)

.....

Number of Sewerage Connections

.....

Level of Non-Revenue Water

.....

Percentage of Water Coverage

.....

Number of Technical Staff

.....

Number of Non-Technical/Support Staff

.....

SECTION B: PARTICIPANT PROFILE (Tick as appropriate ✓)

5. How long have you been employed in the water sector?

Less than 5 years { } 6-10 years { } 11-15 years { } Over 16 years { }

6. How long have you been employed in your current WSP?

Less than 5 years { } 6-10 years { } 11-15 years { } Over 16 years { }

7. What is your current job designation?.....

SECTION C: DEVOLUTION

Kindly show your agreement level on the following statements.

8. The water services are devolved to the county government.

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

9. The devolution of water services was successful

10. Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

11. The devolved resources are adequate

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

12. The resources released to counties in a timely manner

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

13. The county government supportive of your Water Service Provider

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

SECTION D: SUSTAINABILITY

The statements below are intended to measure sustainability of the water service provider you represent. Kindly show your agreement level on the following statements.

Financing

14. There is adequate allocation of resources for projects.

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

15. Projects are completed within projected time and cost.

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

16. Reported incidences of misappropriation of funds have reduced. Yes { } No { }

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

17. System checks and controls are effective

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

Technical Efficiency

18. Non-revenue water has reduced significantly

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

19. Customer satisfaction index has improved

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

20. Quality of water has gone up

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

21. Water interruptions have reduced

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

Water Coverage

22. The number of water connections has gone up proportionately to financing

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

23. The population under water coverage has gone up after devolution

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

24. The area under water coverage has gone up after devolution

Strongly agree [] Agree [] Neutral [] Disagree [] Strongly Disagree []

THANK YOU FOR COOPERATION

APPENDIX 3: POPULATION OF THE STUDY

WATER SERVICE PROVIDERS UNDER ATHI WATER DEVELOPMENT AGENCY

No.	NAME	CODE
1)	Nairobi Water and Sewerage Company	PU001
2)	Kiambu Water and Sanitation Company	PU002
3)	Kikuyu Water and Sanitation Company	
4)	Ruiru Juja Water and Sanitation Company	PU003
5)	Limuru Water and Sanitation Company	PU004
6)	Karuri Water and Sanitation Sewerage Company	PU005
7)	Githunguri Water and Sanitation Company	PU006
8)	Gatundu Water and Sanitation Sewerage Company	PU007
9)	Muranga Water and Sanitation Company	PU008
10)	Muranga South Water and Sanitation Company	PU009
11)	Kahuti Water and Sanitation Company	PU0010
12)	Gatanga Water and Sanitation Company	PU0011
13)	Gatamathi Water and Sanitation Company	PU0012
Total 13		

Source: WASREB, 2021.

APPENDIX 4: SECONDARY DATA SOURCES

Secondary data will be obtained from various sources as follows;

1. WASREB Impact Report
2. Annual Audited Accounts for WSP's within AWWDA.
3. Annual Water Sector Report, Ministry of Water, Sanitation and Irrigation.

APPENDIX 5: WORK PLAN

ACTIVITY	DURATION	TIME
1. Literature Review	1 month	January 2022
2. Knowledge Gaps Identification	2 weeks	January 2022
3. Topic Construction	2 weeks	February 2022
4. Proposal Development and Presentation	1 month	November 2021
5. Chapter 1 to 3 development (in consultation with supervisor) 2022	5 months	January 2022-May
6. Presentation (Preparation and actual)	1 Month	June 2022
7. Corrections and Authority to proceed to field	1 Month	July 2022
8. Data Collection	1 Month	September 2022
9. Data Analysis and Presentation	2 Months	October 2022
10. Final Presentation	1 Week	October 2022

APPENDIX 6: BUDGET

ACTIVITY	COST(Kshs)
1. Literature Review	-
2. Knowledge Gaps Identification	-
3. Topic Construction	-
4. Proposal Development and Presentation	-
5. Chapter 1 to 3 development (in consultation with supervisor)	-
6. Presentation (Preparation and actual)	-
7. Corrections and Authority to proceed to field	-
8. Data Collection	20,000
9. Data Analysis and Presentation	-
10. Final Presentation	-
11. Printing and Binding	<u>5,000</u>
Total	<u>25,000</u>

APPENDIX 6: RESEARCH APPROVAL



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 27th September, 2022

TO: Daniel Ng'ang'a
C/o Public Policy & Administration Dept.

REF: C153/CTY/PT/28305/2019

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

We acknowledge receipt of your revised Project Proposal as per our recommendations raised by the Graduate School Board at its meeting of 19th October, 2022, Entitled, "Effectiveness of Devolution on Sustainability of Water Supply in Kenya; Case of Athi Water Works Development Agency".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you,

ELIJAH MUTUA
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Public Policy & Administration

Supervisors:

1. Dr. Patrick Mbataru
C/o Public Policy and Administration
Kenyatta University

APPENDIX 7: RESEARCH AUTHORIZATION



KENYATTA UNIVERSITY GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA

Tel. 8710901 Ext. 57530

Our Ref: C153/CTY/PT/28305/2019

DATE: 27th October, 2022

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR DANIEL NG'ANG'A REG.NO.
C153/CTY/PT/28305/2019

I write to introduce Mr. Daniel Ng'ang'a Ali Mohamed who is a Postgraduate Student of this University. He is registered for MPPA degree programme in the Department of Public Policy & Administration.

Mr. Ng'ang'a intends to conduct research for a MPPA Project Proposal entitled, "Effectiveness of Devolution on Sustainability of Water Supply in Kenya: Case of Athi Water Works Development Agency".




Any assistance given will be highly appreciated.

Yours faithfully,


PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

DK/mt

APPENDIX 8: NACOSTI PERMIT

 <p>REPUBLIC OF KENYA National Commission for Science, Technology and Innovation</p>	 <p>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION</p>
<p>Ref No: 444681</p>	<p>Date of Issue: 02/November/2023</p>
<p>RESEARCH LICENSE</p>	
	
<p>This is to Certify that Mr. NGANGA DANIEL of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: EFFECTIVENESS OF DEVOLUTION OF SUSTAINABILITY OF WATER SUPPLY IN KENYA: A CASE OF ATHI WATER WORKS DEVELOPMENT AGENCY for the period ending : 02/November/2023.</p>	
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<p>Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION</p>	
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