FACTORS INFLUENCING ACCESS TO DOMESTIC WATER SUPPLY AMONG RURAL COMMUNITIES: THE CASE OF MWINGI WEST SUB-COUNTY IN KITUI COUNTY, KENYA.

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DECLARATION

This research project is my original work and has not been presented for the award of a degree in any other university

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DEDICATION

This research work is dedicated with a lot of love, respect and appreciation to my wife Dorcas Kiteme, son Joel and daughter Anita as an inspiration to their quest for education.

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LIST OF ABBREVIATION AND ACRONYMS

NACOSTI	National Commission for Science Technology and Innovation
WHO	World Health Organization
ADF	Application Development Framework
USAID	United States Agency for International Development
NGO’s	Non Governmental organizations
JMP	Joint Monitoring Programme
BWR	Basic water requirements

ABSTRACT

The purpose of this study was to investigate the factors influencing the access to domestic water supply among rural communities. The study was guided by the following research objectives i.e to examine the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County , to access the influence of cost of water to assess the influence of cost of water on access to domestic water supply among the rural community in Mwingi West Sub county ,to establish the influence of maintenance of supply systems on access to domestic water supply in Mwingi west sub county and to examine the influence of conflict due to competing uses on access to domestic water supply in Mwingi West Sub County The study employed a descriptive survey design aimed at analysing the factors influencing access to domestic water supply among the rural population in Mwingi West Sub-County. The study targeted rural community in Mwingi West Sub County(630), i.e five county government water officers, 25 water technical experts and 600 Households in Mwingi West Sub County. A total of 126 respondents participated in the study. Interview schedules and questionnaires were used to obtain data from the respondents. The data was analysed per each piece of information and organised as per research questions ,coded the data and developed a code sheet .The data was analysed using statistical package for social sciences system (SPSS).For qualitative data, patterns or themes were indentified and for all the research questions data was analysed descriptively. The analysis showed that conflict has the strongest positive influence on access to water. In addition, Maintenance of supply systems are positively correlated to access to water. The correlation matrix implies that the independent variables: conflict and Maintenance of supply systems are very crucial determinants of access to water as shown by their strong and positive relationship with the dependent variable i.e. access to water. The study recommends that stakeholders such as the government, NGOs, community self help groups and faith based organizations should come up with strategies on how to improve water access to the rural community. These strategies may include Construction of more earth dams, drilling of bore holes, put in place more community water tanks at each household for harvesting rain water from the house roofs.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Throughout history, people have devised systems to make getting and using water more convenient Admassu (2009). According to Demeke, (2010) the early Romans had indoor plumbing, meaning a system of aqueducts and pipes that terminated in homes and at public wells and fountains for people to use. Until the enlightenment era, little progress was made in water supply and sanitation and the engineering skills of Romans were largely neglected throughout Europe. It was in the 18th century that a rapidly growing population fuelled a boom in the establishment of private water supply networks in London (Bhandari, 2007).According to Binder (2008) dozens of countries around the world have established regulatory agencies for infrastructure services, such as water supply and sanitation, in order to better protect consumers and to improve efficiency. Regulatory agencies can be entrusted with a variety of responsibilities, including in particular the approval of tariff increases and the management of sector information systems, including benchmarking systems.

Gebrehiwot (2006) noted that sometimes the agencies also have a mandate to settle complaints by consumers that have not been dealt with satisfactorily by service providers. These specialized entities are expected to be more competent and objective in regulating service providers than departments of government ministries. Regulatory agencies are supposed to be autonomous from the executive branch of government, many countries have not been able to exercise a great degree of autonomy. In the United States, regulatory agencies for utilities have existed for almost a century at the level of states, and in Canada at the level of provinces. In both countries they cover

several infrastructure sectors. In many US states they are called Public Utility Commissions. For England and Wales, a regulatory agency for water (OFWAT) was created as part of the privatization of the water industry in 1989 (Gleick, 2006). According to Harvey & Reed (2007) in many developing countries, water regulatory agencies were created during the 1990s in parallel with efforts at increasing private sector participation.

According to a report of USAID (2009) in Latin America more than one billion people do not have access to safe drinking water and over 2.5 billion people have inadequate sanitation. In Africa around 300 million people do not have access to safe drinking water and 313 million have no access to sanitation. According to ADF (2005) Africa has the lowest total water supply coverage of the other continents in the world. Water is life and especially portable water is essential for life and health. So, access to drinking water, improves overall socio-economic and environmental existence (Gebrehiwot,2006).In developing countries national and regional governments, local and international NGOs and other concerned organizations invest large sums every year for the implementation of rural water supply projects (Gebrehiwot, 2006). However, construction of water projects does not help if they fail after a short time. In order to make the investment in water supplies more effective, failure rates of these systems should be reduced. According to Admassu (2009) this can be accomplished by better integration of people who receive the water and water project suppliers in decisions concerning planning construction and management of water supply systems. The Africa Development Fund 2005 report shows that about 33% of rural water supply projects in Ethiopia were non-functional due to lack of funds for operation and maintenance, inadequate community mobilization and

commitment, less community participation in decision making as well as lack of spare parts. Harvey and Reed (2007) report showed that community issues like perceived lack of ownership, lack of education on water supply and sanitation, poor management system and limited demand are related to low sustainability rates of water supply systems in Sudan.

A summary of rural water supply sustainability challenges by Well (2008) in Zambia revealed that "Insufficient water facilities, poor physical structures, low reliability of the service and facility designs, distance and time needed to collect water and low awareness about their uses are some of the factors that affect the continued functioning of the rural water supply systems. In addition to these inappropriate technologies use is also one of the factors. The sustainability of rural water supply systems is correlated with institutional, social, technical, environmental and financial dimensions" (Bhadari,2007). Enhancing the capacity of the community in planning, implementation, development maintenance of rural water supply systems are the first step towards the sustainability development of rural water supply schemes. In 2010, about 85% of the global population (6.74 billion people) had access to piped water supply through house connections or to an improved water source through other means than house, including standpipes, water kiosks, spring supplies and protected wells. However, about 14% (884 million people) did not have access to an improved water source and had to use unprotected wells or springs, canals, lakes or rivers for their water needs. In the U.S, the typical single family home uses about 69.3 gallons (262 litres) of water per day (2008 estimate). This includes (in decreasing order) toilet use, washing machine use, showers, baths, tap use, and leaks (USAID, 2012).

According to Mbithi & Rasmuson (2007) water supply and sanitation in Kenya is characterized by low levels of access, in particular in urban slums and in rural areas, as well as poor service quality in the form of intermittent water supply. Only 9 out of 55 water service providers in Kenya provide continuous water supply. Seasonal and regional water scarcity exacerbates the difficulty to improve water supply. Niyi & Feli (2007) observed that the Kenyan water sector underwent far-reaching reforms through the Water Act No. 8 of 2002. Previously service provision had been the responsibility of a single National Water Conservation and Pipeline Corporation as well as of a few local utilities established since 1996.

Water supply estimates from the Joint Monitoring Programme for Water Supply and Sanitation (JMP) show that in 2008, 59% of Kenyans (83% in urban areas and 52% in rural areas) had access to improved drinking water sources. Approximately 19% of Kenyans (44% in urban areas and 12% in rural areas) are reported as having access to piped water through a house or yard connection. According to the JMP estimates, access to improved water sources in urban areas decreased from 91% in 1990 to 83% in 2008. In rural areas, however, access increased from 32% to 52% during the same period (Mbata,2011). In Mwingi West District, according to 2009 Impact Report estimates that in 2006–2007 only 37% of inhabitants had access to sufficient and safe drinking water close to their homes at an affordable price. Significant regional differences in access were reported: the highest level was registered in Migwani Central Division (72%) whereas the lowest was recorded in some parts of lower Thitani Division (4%). In Migwani town, the district head quarters, access for the same period was reported at 35%, as opposed to a less realistic figure of 46% reported for 2005–2006 (Maende,2012).

1.2 Problem Statement

Water supply for basic domestic requirements in Mwingi west district lucks priority that should enjoy in relation to access, demand ,pricing and costing which translates to other health related hazars (Mutua,2011).water scarcity in the district forces women and girls to walk upto 20kilometres during biannual dry seasons of the year (Jan-march and June –October) to get drinking water from the water sources such as earth dams, boreholes and scooped wells on riverbanks of dry seasonal rivers which is usual contaminated (WHO 2010) despite the many initiatives made by NGOS, community and government through the ministry of Water and irrigation ,access to adequate water supply remains a challenge in the District. Apparently as far as the current researcher is concerned the available literature reveal that limited studies have been conducted in the district to investigate the factors influencing domestic water supply among rural local community. There has been a significant disparity in Tharaka Nithi district especially among the rural local community and in poverty stricken areas where accessibility to domestic water supply is scarce (Mutungi, 2012). Previous studies by Mutui (2006),Mutua (2011)and Mayoli (2008)investigated a relationship between culturally appropriate public health and safe water use, factors contributing to contamination of water sources among local communities and escalating people's participation. Based on this knowledge, the study aimed at establishing the link between access to water and domestic water supply. It is against this state of affairs that the current has investigated the factors influencing domestic water supply among the rural communities the case of Mwingi west sub county.

1.3 The purpose of the study

The purpose of this study was to investigate the factors influencing access to domestic water supply among rural population of Mwingi West Sub County.

1.4 Objectives of the study

The study was guided by the following specific objectives:-

i. To examine the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County.
ii. To assess the influence of cost of water on access to domestic water supply among the rural l community in Mwingi West Sub County.
iii. To establish the influence of maintenance of supply systems on access to domestic water supply among the rural community in Mwingi west Sub County.
iv. To examine the influence of conflict due to competing uses on access to domestic water supply among the rural community in Mwingi West Sub County.

1.5 Research Questions

The study was guided by the following research questions:-

i. What is the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County?
ii. How does cost of water influence access to domestic water supply among the rural community in Mwingi West Sub County?

iii. How does maintenance of water supply systems influence access to domestic water supply among the rural community in Mwingi Sub County?

iv. What is the influence of conflict due to competing water uses on access to domestic water supply among the rural community in Mwingi West Sub County?

1.6 Significance of the Study

The findings of this study should be of practical value to persuade various stake holders such as ,policy makers /planners, ministry of water and irrigation and public health Ministry of Water and Irrigation and Public Health and professionals with new ideas on access to safe water and sanitation conditions that should be taken into account in supplying water to the local rural community ,since efficient and effective maintenance of water supply systems offers an opportunity to sustainable and reliable water supply. The findings of the study may be useful to the county government water officials and the civil society by equipping them with facts and knowledge necessary to ensure effective partnership and collaboration in helping people to have access to enhanced safe and adequate water supply. The key results of this valuable investment should be seen in the lives of the beneficiaries of the rural population and the nation large.

1.7 Limitations of the Study

Most of the Mwingi West sub county is a rural setting, whose cultural, climatic, economic and religious factors have influence on success to water supply especially those from families of the low socio-economic status in the community, who are hardest hit. The results may not apply to rural population from other parts of the

county with different climatic and economic conditions. In addition, the area is a semi-arid region with harsh climatic conditions; poor infrastructure and water sources are few and sparsely distributed hence accessibility to some pose a big challenge. The availability of respondents due to their busy schedules may also be a challenge since some may see it as a disturbance. This will require the researcher to take precautionary measures in order to overcome these limitations

1.8 Delimitations of the study

This study was delimited by the following:

i. The study was delimited to the factors influencing access to domestic water supply among the rural community in Mwingi west sub county.
ii. The study targeted the rural population of Mwingi West Sub County

1.9 Basic Assumptions of the Study

This study was based on the assumption that the relevant stakeholders are aware of the water accessibility and adequate supply and they are making efforts to implement this noble task. Also, it is assumed that all respondents were cooperative and gave honest and accurate responses.

1.10 Definition of Significant Terms

Access to water refers to the ability of the community members to be within reach to water sources and get adequate water for their domestic purposes.

BWR refers to Basic water requirements.

Community water system refers to a public-water system which serves at least 15 service connections used all year-round.

Domestic water use refers to water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.

Local community refers to the number of persons who live in a particular area and share common public facilities and utilities and consider the area to be their usual place of residence. **Public supply refers to w**ater withdrawn by public and private water suppliers and delivered to groups of users. **Public water use refers to** water supplied from a public-water supply and used for such purposes as cooking, washing, cleaning, watering domestic animals and irrigating flowers and kitchen gardens. **Safe Water** refers to treated water from well managed hygienic source and reduces chances of contamination from its source until its consumption with an aim of ensuring a free health risk of predisposing the community to waterborne diseases.

Stakeholders refer to government water officers, water technical experts, government, NGOs and wider community who actively participate towards supply of domestic water and making it accessible to the rural community.

1.11.Organization of the Study

This study is organized into five chapters. The first chapter consists of the background to the study, statement of the problem, objectives of the study, research questions, and purpose of the study, significance of the study, scope/organization of the study, basic assumptions of the study, theoretical framework, conceptual framework and operational definition of terms. Chapter two consists of the influence of distance on access to water supply, the influence of costs and financing on access to water supply, the influence of maintenance of supply

systems on access to water supply and the influence of government policies on access to water supply .Chapter three consisted of the research methodology, that is, the research design, location of study, target population and sample size , sampling procedures, research instruments, pilot study, administration of research instruments and data collection procedures, internal validity and reliability, data analysis and ethical considerations. Chapter four consists of data analysis, presentation and interpretation. Chapter five consists of summary of findings, Discussions, Conclusions and recommendations for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In order to review literature, text books, journals, magazines, news papers and e-learning materials were reviewed to clarify the variables of the study such as the concept of access to domestic water supply, influence of distance from water sources, costs of water use and access to domestic water supply, maintenance of water supply systems and access to domestic water supply and influence of conflict due to competing uses on access to domestic water supply. The literature review established knowledge gaps and developed a conceptual framework to guide the study and also gave summary of literature review

2.2 The Concept of Access to Domestic Water Supply from a Theoretical and Conceptual Perspective

Research has shown that rural water supplies in sub-Saharan Africa, particularly those relying on hand pumps, often demonstrate low levels of sustainability hence poor accessibility by the communities. The key causes for this include inappropriate policy or legislation; insufficient institutional support; unsustainable financing mechanisms; ineffective management systems; and lack of technical backstopping. (Niyi & Felix, 2007).

In the last three decades, literature in the water supply sector has shown that sustainability of rural water supply structures in the developing countries has become positively associated with small-scale initiatives, which maintain public participation (Davis and Liyer, 2002). Involving the users in the planning, implementation,

operation, protection and maintenance of water supply systems meaningfully is the key to sustainability. Community members' contributions might take the form of money, labour, material, equipment, or participation in project-related decision-making and meetings (Harvey & Reed 2007).

Over the past three decades, experience has shown that water and sanitation activities are most effective and sustainable when they adopt a participatory approach that acts in response to genuine demand, builds capacity for operation and maintenance and sharing of costs, involve community members directly in all key decisions, develop a sense of communal ownership of the project, and uses appropriate technology that can be maintained at the village level. Also important are educational and participatory efforts to change behavioural practices (USAID, 2009).According to WHO (2011) the international acceptable standards for water requirements for basic needs, commonly referred to as basic water requirement (BWR) are 20 litres per capita per day. This concurs with the theory by Maslow (1971) who contends that the hierarchy of human needs, as a classification of needs from the basic ones to higher order of needs, consisting of the first level of the physiological needs, access to water is crucial for the daily survival and development. When springs are used for multiple purposes such as domestic use, livestock watering, irrigation and tanker supply, care should be taken to prevent contamination of water used for human consumption (Muthusi et.al. 2007).

Relative to hand dug wells natural or developed springs is easily contaminated by different contaminant agents. The effective operation and maintenance of rural water supply systems is crucial element for the sustainability of the water sources. The

community management of rural water supply systems on operation and maintenance (is not successful, if financing resources are not available and frequent supports are not provided (Binder, 2008).

2.3 Influence of distance from water sources on access to domestic water supply

The distance from water supply sources has issues that have specific adverse effects on women in developing nations (Cabral, 2010), In Latin America for instance, women are often the primary family member responsible for providing water as well as collecting it.

Inclusion of women in the design and implementation of water supply projects is an area of concern currently being addressed by multiple world organizations (Adekunle., Adetunji, Gbadebo, and Banjoko,2011),A report from Water Service Providers in 2006–2007 in Kenya on continuity of water supply among the urban dwellers in 55 towns weighted for distance, waiting time and affordability. The average number of service hours that Kenyan water utilities provide is 14 hours. Only in seven WSPs water supply is continuous (Nyeri, Othaya, Eldoret, Malindi, Meru, Tuuru and Tachaasis). In Nairobi water is provided on average for 16 hours a day and in Mombasa for 6 hours. Nonetheless, instances of water scarcity (defined as more than five days without or with insufficient water supply) still occur in Kenya. In 2006 in Kisumu over 40% of households (both poor and non-poor) connected to water mains reported scarcity. The greatest difference between the poor and non-poor was recorded in Nairobi, where poor households were more than twice as likely to say they experienced scarcity. A higher percentage of kiosk users reported scarcity than households with mains connections, suggesting that in times of scarcity kiosks are

less likely to receive water than domestic connections hence forcing the consumers to travel for long distances to access water (Mwenda, 2012).According to (Mayoli, 2008) in Ethiopia, the poor, and in particular women and girls, spend a significant amount of time travelling to fetch water in both rural and urban areas. For example, the 2007 Citizen Report Card survey showed that users of water kiosks in cities fetch water 4–6 times per day. In Kisumu, this meant that a poor household spent 112 minutes per day to fetch water at normal times, and as much as 200 minutes per day during times of scarcity and some people could travel a distance of 24 kilometres to and fro the water sources each day.

2.4 Influence of cost of water on access to domestic water supply

The cost of supplying water consists to a very large extent of fixed costs (capital costs and personnel costs) and only to a small extent of variable costs that depend on the amount of water consumed mainly energy and chemicals (Mara, 2009). In Australia for instance, the full cost of supplying water in urban areas in developed countries is about US$1–2 per cubic meter depending on local costs and local water consumption levels. These costs are somewhat lower in developing countries. Throughout the world, only part of these costs is usually billed to consumers, the remainder being financed through direct or indirect subsidies from local, regional or national governments (Mintz, Bartram, Lochery, and Wegelin, 2011).

In Florida, operating costs have remained low because of older more heavily depreciated capital equipment, and the higher volume of production (Lynne, 2011). Additionally, the use of ground water, which generally requires little treatment before distribution, generally lowers the cost of water in Florida. Because of outside funding

or revenues, rates may not truly reflect the actual cost of these factors. Therefore, water customers generally pay for the cost necessary to process and convey the water to where it is ultimately used, as the rates used by most utilities have been set to cover these costs and net a normal profit. However, rates typically do not include fees for water scarcity or replacement cost of limited water supply (United Nations, 2010).

According to Kimani and Ngindu (2012), in Kenya several factors can be given to show the influence, or lack thereof, that the cost of water has on public-supply water use. These factors include the cost of producing water, water-rate structures, and sewage charges. Many factors affect the cost of producing water form public-water systems. Some of the most prevalent factors include: availability and quality of the water resources, geographic or physical location, demand, customer constituency, level of treatment, age of system, size of storage and distribution systems, and the level of general funding or grants (Wandai 2012).Generally, utilities in Kitui West District which neighbours Mwingi West District, where potable water is scarce, water rates are higher than areas where potable water is abundant, During the 1990's and early 2010's, areas where potable water was less abundant often had the same or lower water rates than areas where water was more abundant. For example, Mutonguni, and Kabati, located in areas that may have problems with water availability or water quality some of the lowest water rates per 1,000 gallons in the State (table 7). This implies that these water rates do not truly reflect the cost of potable water as a generally scarce commodity (Mutua, 2011). However, Tana Athi Water Authority, which imports water from nearly 150 miles away for public-supply use in Matinyani town has a higher water rate than those of other areas with deficient resources (Maende,2012). Price paid by public-supply water users in Kitui West town

dwellers is comparable to prices of other small towns and villages that are near water Kiosks (Maende, 2012).

2.5 Maintenance of supply systems on access to domestic water supply

Water supply systems get water from a variety of locations, including groundwater (aquifers), surface water (lakes and rivers), conservation and the sea through desalination (United Nations, 2010), The water is then, in most cases, purified, disinfected through chlorination and sometimes fluoridated. Treated water then either flows by gravity or is pumped to reservoirs, which can be elevated such as water towers or on the ground for indicators related to the efficiency of drinking water distribution see non-revenue water (World Health Organization (2011).

According to Kimani and Ngindu (2012) once water is used, wastewater is typically discharged in a sewer system and treated in a sewage treatment plant before being discharged into a river, lake or the sea or reused for landscaping, irrigation or industrial use. Many of the 3.5 billion people having access to piped water receive a poor or very poor quality of service, especially in developing countries where about 80% of the world population lives. Water supply service quality has many dimensions: continuity; water quality; pressure; and the degree of responsiveness of service providers to customer complaints (Mutui, 2006). The renewable freshwater resources of Kenya are estimated at 20.2 km^3 per year, which corresponds to 647 m^3 per capita and year. The total yearly water withdrawal is estimated to be over 2.7 km^3, or less than 14% of resources. However, water resources availability varies significantly in time and between regions. Most parts of the country have two rainy seasons. The long rains are typically from March to May while short rains are

typically from October to November. In addition, the country experiences every three to four years droughts and floods, which affect a large number of the population. The latest severe drought was from 2007 to the end of 2009, which had impacts on all sectors of the economy. The average annual rainfall is 630 mm, but it varies between less than 200 mm in northern Kenya to over 1,800 mm on the slopes of Mount Kenya. (Mbithi, & Rasmussen, 2007).

2.6 Influence of conflict of competing uses on access to domestic water supply

As demand for water hits the limits of finite supply, potential conflicts are brewing between nations that share transboundary freshwater reserves. More than 50 countries on five continents might soon be caught up in water disputes unless they move quickly to establish agreements on how to share reservoirs, rivers, and underground water aquifers. Many countries have experienced international water disputes, civil disturbances caused by water shortages, and potential regulatory solutions to diffuse water conflict (Binder2008). Acute conflict violence whether among individuals or among states obviously results in human casualties; on the other hand, structural conflict also results in human carnage and can in fact, be much larger in scale. The problem of access to water is a structural conflict problem that results in thousands of deaths every day. If security is defined, at least partly, by number of deaths, then clearly water is a security issue (Mbata, 2011). According to Gleick (2006) the specific impact of access to water supply on intra-state security is far more complex and less easily ascertained. Although the potential for conflicts among countries over shared water resources receives much attention in the popular media, its impacts within nation-states are far more insidious and indirect. Water insecurity constrains economic development due to competing uses such as industrial, domestic, irrigation and livestock which contributes to a host of corrosive

social behaviours that can, in turn, produce violence within societies. Fresh water scarcity, often causally related with other factors, such as poverty, population growth, infrastructure problems, environmental degradation, can escalate the aforementioned "human security" problem into a national security issue. Water security can be the catalyst for large-scale migration and ethnic conflicts, which ultimately, in more dire situations, can result in a decline in effective governance, potentially leading to a "failed state." According to WHO (2011) disputes among nations solely over water resources are not likely to spark violent conflict. Nevertheless, there was an understanding that water security issues can have a destabilizing effect on regional and international security. Spawned by globalization, the increasing economic and political interdependence of nations ultimately means greater potential for spill over of problems. Ethnic unrest, mass migration, and declining economic conditions, fanned by water scarcity, are not likely to be confined neatly within a country's borders. Political conflicts between nation-states over access to water rights is partly the result of unsettled questions in international law. For many years, India and Bangladesh for instance, have exchanged sharp accusations over shared river resources. Water disputes between the two countries have been subsumed under the overall difficult relations that have persisted between the two nations. The tensions may appear to be sparked by conflict over water (ADF,2005). In Africa, for instance there are numerous tensions among various social and economic groups over what should be done with the shared water sources. A severe reduction in water resources can damage a nation's economy and food supply. Such a scenario could potentially lead to social unrest and exacerbate existing ethnic, racial and societal conflicts. A parallel problem is that these same economic and social problems may systematically erode a government's ability to deal with them. In

extreme cases governance itself may be undermined, resulting in internal chaos and national collapse (Hervey & Reed, 2007).

2.7 Theoretical framework

Abraham Maslow (1971) developed the Theory of Hierarchy of Human needs,(figure 1) which is a classification of needs from the basic ones to higher order of needs. When lower needs are met, people move to higher needs. The first level is the physiological needs which include food, clothing, shelter and water. The second level is safety needs which include safety, protection, security, education and investment. Level three involves love and belonging needs. People desire to belong to a family or an institution. The fourth level is concerned with esteem needs. After people have been accepted and belong to a group of people, then they are able to develop a sense of self worth. The fifth level is self-actualization which is the ultimate goal or purpose of human behaviour. At this level, people want to realize their full potential and continuous self development so as to die when their energy is in creative ability. In relation to this study, if the local communities do not have access to adequate domestic water supply and they will get stressed because their basic needs are not well met. As a result they their domestic water requirements are negatively affected. They therefore, need to be helped to value themselves by enabling them access safe and adequate domestic water supply so as to ensure their growth and development.

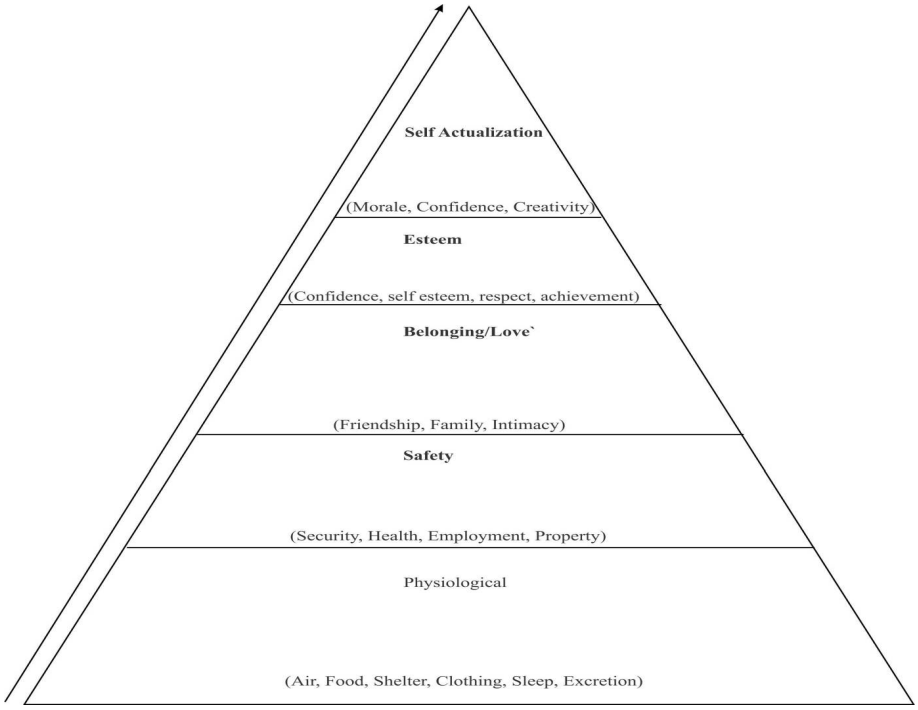


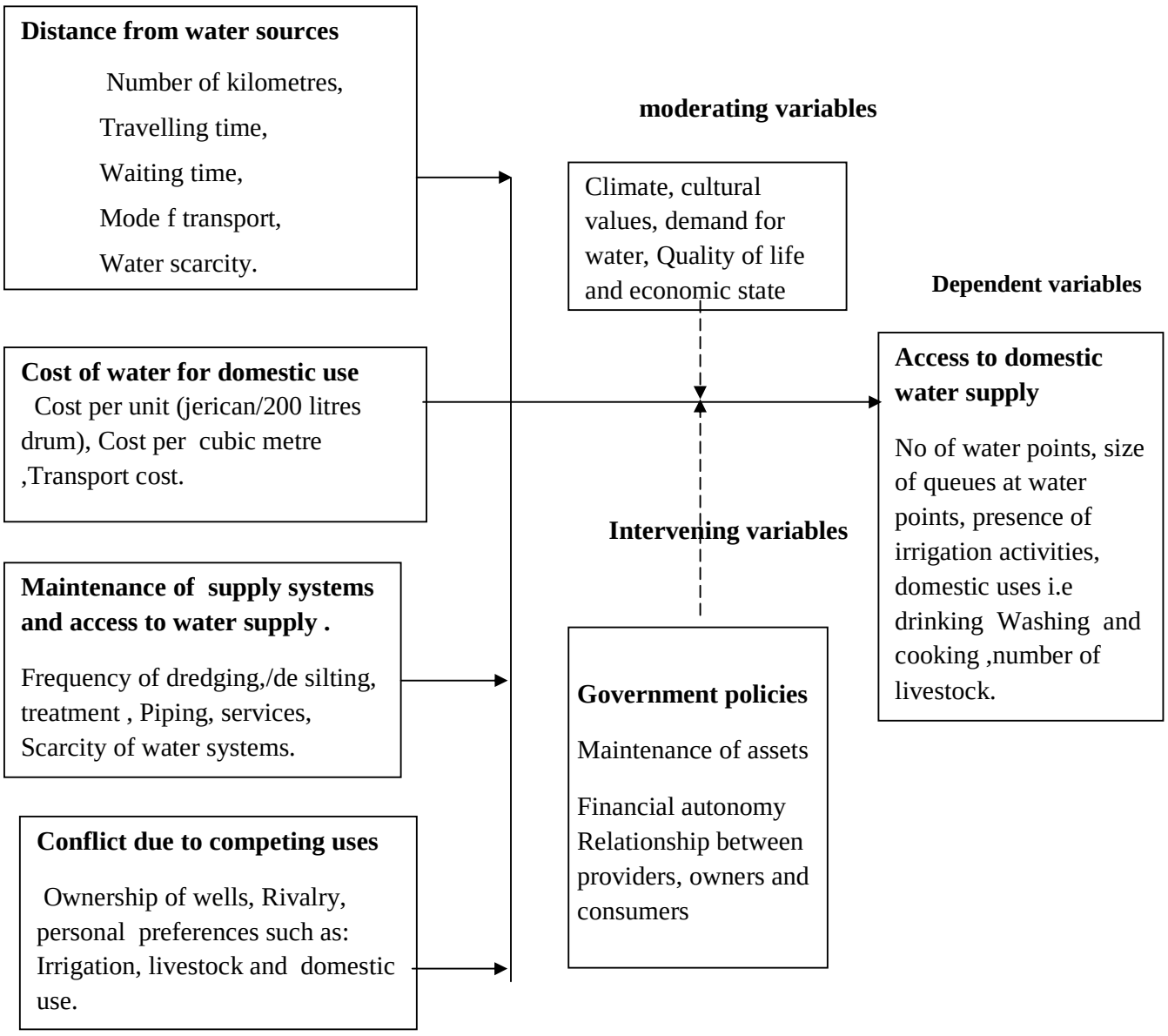
Figure 1: Maslow's Hierarchy of Needs (Gabral,2010)

2.8 Conceptual framework

The conceptual framework for the study was based on the objectives of the study. Figure 2 shows various factors influence access to domestic water supply to rural communities. It diagrammatically describes the interrelations and connection between the independent variables and dependent variable. The access to rural domestic water supply may be influenced by factors such as distance from water sources, costs, maintenance and conflicts. Though the government, and the rural community may put great efforts in access to adequate domestic water supply, such intervening such as government policies on maintenance of water systems as well as moderating variables such as climatic conditions, cultural values, demand for water quality of water provided and economic state of the residents may influence access to water supply.

Figure 2 Conceptual framework*:* access to domestic water supply among the rural community**.**

Figure 2: Conceptual framework



2.9 Summary of literature review and research gap

Although much has been written about the individual variables access to domestic water supply and the interrelationships among them, a survey of literature, however, revealed that very little empirical studies on this subject exist, especially regarding Kenyan situation where few water supply sources exist especially in arid and semi-arid regions and among the rural poor. Previous investigations into the water supply have provided insights into the range of influences on its access by various groups of people. However, few studies have been carried out focusing factors influencing access to domestic water supply among the rural communities. The current research addresses similar issues from rural communities'' perspective and the supply of domestic water. It is anticipated that further insight into factors influencing access to domestic water supply among rural communities has been revealed by this study. There is no similar study known to the current researcher has been carried out in the area where the current study was conducted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The methodology section of the research project describes the procedures that were followed in conducting the study. The steps involved in conducting the study are described in details. In doing so, the following are discussed; research design, target population, sampling techniques and sample size, instruments for data collection, validity of the research instruments, reliability of the research instruments, data analysis, techniques and operationalization of the variables.

3.2 Research Design

The study employed a descriptive survey design aimed at analysing the factors influencing the access to domestic water supply among the rural population in Mwingi West District. Mugenda and Mugenda (2008) define descriptive survey as an approach in research that describes the characteristics or behaviour of a particular population in a systematic and accurate fashion. Both qualitative and quantitative approaches were used. The descriptive survey design was used to collect data from the target population in order to determine the current status of the population in relation to topic of study. Best and Kahn (2003) postulated that survey is the most appropriate design in the behavioural sciences as it seeks to find out factors associated with occurrences of certain events and conditions of behaviour. It enables the researcher to collect in-depth information including sensitive and personalized experiences concerning the issue being investigated. The descriptive survey design allows the researcher to study variables, as they exist. The researcher is not able to manipulate such variables as distance from water sources, cost and financing,

government policies and maintenances of water sources. Gay (2002) concurs that descriptive research is good enough as it involves a process of collecting data in order to test hypotheses or answer questions concerning the status of the subject in the study. It attempts to describe such things as possible behaviour, attitudes, values and characteristics.

3.3. Target Population

The study targeted rural community in Mwingi West Sub County, ie 600 households and five county government water officers and 25 water technical experts.(Mwingi rural water facilities water report ,2012)

3.4 Sampling procedure and sample Size

Mugenda and Mugenda (2008) defined a sample as a representative part of a population. Thus by studying the sample, one can be able to know more about the population without having to study the entire population. The selection process of the sample is the sampling technique (Kothari, 2004). Wersma (2005) observed that due to limitation of time, funds and energy required, a study could be carried out from a carefully selected sample to represent the entire population. Gay, (2002) argued that at least 20 percent of the population is a good representation because the characteristics of the 20% sample are true of the entire population.

Mwingi West Sub County was purposively selected because of the large growing rural population and increasing rate of establishment of water sources. Purposive sampling was used to select the five county government water officers based on the virtue of being in charge of water services in their divisions, when the population is

small, the whole population is taken as the sample according to Krejcie and Morgan table (2003) Gay, (2002) argued that participant can be purposively taken based on convenience and by the virtue of being in charge of a particular group of people or activity.5 county government water officers, and 5 water technical experts were selected to participate in the study. Random sampling technique was used to select 120 household heads. This gave a total of 130 respondents.

Table 3.1: Sampling Matrix

Category Of the respodents.	**Target Population**	**Sample (n) size**	**Percentage (%)**
County Government water Officers	5	5	100
Water technical experts	25	5	20
Household respondents	600	120	20
Total	630	130	21

Source: Mwingi rural water facilities report(2012)

3.5 Data Collection Instruments

This section describes the instruments which the researcher developed to collect the necessary information. The researcher used an interview schedules and questionnaires to obtain data from the respondents. The researcher administered the interview schedule for government water officers. The questionnaires for the water technical experts and the household were given to the respondents and the respondents were

allowed a period of two weeks to respond to the questions after which the researcher collected the questionnaires back.

3.5.1 Interview Schedule for county government water officers

An oral interview which was a face to face encounter with the respondents was administered. In order to obtain accurate information through interviews, the researcher established a friendly relationship with respondents prior to conducting the interview so as to obtain maximum co-operation. An interview schedule was administered to county government water officers which allowed the interviewer to follow up the respondents' answers to obtain more information and clarify vague statements. Kothari (2004) contends that interview schedule is the best because it allows room for clarification and following up of unclear answers. The researcher used this method to seek classification to some responses pertaining to the factors influencing the implementation of strategic plans in secondary schools.

3.5.2 Questionnaires for water Technical experts and households

A questionnaire was developed for the water technical experts. The questionnaires had both open ended and closed questions; the questionnaires consisted of a set of answers that closely represent their views to choose from. In the closed ended questions, the likert type of scale was used in rating, which helped in the reduction of subjectivity and also make it possible to quantitatively analyze the data. The open-ended questions allowed the respondents to communicate their views without being forced to get within the pre-conceived answers. Orodho (2004) contends that the questionnaire is a suitable method, indeed, the easiest and the cheapest way of data collection. It has both the ability to collect a large amount of information in a

reasonable quick span of time. Kothari (2004) observes that questionnaire is free from bias of the respondents who are not easily approachable can also be reached conveniently.

3.6 Validity of research instruments

Kothari (2004), states that validity indicates the degree to which an instrument measures what it is supposed to measure, that is, the extent to which differences found with measuring instruments reflect true differences among those who are tested. This tests the construct validity of the instruments which is the measure of the degree to which data obtained from an instrument meaningfully and accurately reflects or represents a theoretical concept. Two different instruments that measure the same concept were used. A validity coefficient of 8.0 was computed by correlating measurements from the two instruments. Data was obtained simultaneously from the same subjects. To ascertain this, the instrumentswas subjected to analysis by the supervisors and a team of specialists in the area of project planning and management. They assessed the relevance of the content used in the instruments and made structured changes for the purposes of improvement and refinement before the actual data collection. A pilot study was done which ensured that the items consistently measured the variables in the study and produced reliable results. The piloting was important because it identified vague questions, unclear instructions and insufficient spaces for writing responses, clustered questions and wrong phrasing of questions was detected and refined in good time.

3.7 Reliability of research instruments

According to Kothari (2004) reliability is the consistency of instruments in producing reliable results. The pilot study was done to ensure that the items consistently measure the variables in the study and produce reliable results on repeated trials. The split half technique of assessing reliability will be used. The research instrument was designed in such a way that they will have two parts. Subject scores from one part was correlated with scores from the second part. A correlation coefficient of 0.8 was established. According to Mugenda & Mugenda a correlation coefficient of between 0.7 to 1 is sufficient. Orodho (2004) contents that this method is good enough because it eliminates error due to differing test conditions. It focused on the degree to which empirical indicators are consistent across two or more attempts to measure the theoretical concept. Mugenda and Mugenda (2008), contend that the piloting procedure helps to ascertain that the instruments of data collection are free from any pitfalls and mistakes that would have surfaced in the main data collection process if the piloting of the instruments had not been done.

3.8 Data Collection procedure

The researcher obtained a permit from national council for science technology and innovation (NCSTI). He then paid a courtesy call to the County commissioner Kitui County to alert him of his intention to carry out a research in Mwingi West sub county. The researcher paid a pre-visit to the county government water offices to familiarise himself with exercise of data collection the water officers in order to make the respondents free and open to issues. The researcher will administer the interview schedule for water officers. The questionnaires for the water technical experts and household women will be given to the respondents and will be allowed a period of

two weeks to respond to the questions after which the researcher will collect the questionnaires.

3.9 Data Analysis techniques

Mugenda and Mugenda (2008), contend involves summarizing the collected data and putting it together so that the researcher can meaningfully organize, categorize and synthesise information from the data collecting tools. In the data analysis, the researcher examined each piece of information in each instrument for completeness, organized data as per research questions, coded the data and developed code sheet. For qualitative data, patterns or themes were identified and for all the research questions and data was analysed descriptively. The data was processed using Statistical Package for Social Science version eighteen.

3.10 Ethical Issues

Mugenda and Mugenda (2008) contend that ethical issues and logistical considerations are an important component for studies that involve human beings. First and foremost, the researcher obtained a permit from the National Commission for Science and Technology that allowed him to carry out the research in the targeted area. Ethical issues and consideration were put in place by the researcher to ensure that all respondents participate in the study with informed consent. Privacy and confidentiality was ensured by stating clearly the purpose of the study at the introduction of each questionnaire.

3.11 Operationalization of the variables

The variables of the study were described in terms of the type of variable, their various indicators, measurement and measurement scale and data analysis procedure.

Table 3.2: Operationalization of the variables

Objective	**Variables**	**Type of variable**	**Indicators**	**Measurement**	**Measure-ment scale**	**Data analysis procedure**
1.To examine influence of distance from water sources on access to domestic water supply among the rural community	Social class Economic status Family support Time taken and energy to access water	Independent	Access water supply Financial status Time taken to access water	Number of kilometres from water sources Financial expenditure Period of time	Ordinal	Descriptive statistics
2.To determine the	Amount of money per 20	Independent	Value placed on clean	Water sourcing technical	Ordinal	Descriptive statistics

influence of costs of water use on access to domestic water supply among the local community	litres Number of water supply sources Delivery of quality services		domestic water Need for adequate water supply sources value placed on quality service	skills Demand for domestic water supply Quality and quantity of water and services		
3. To establish the influence of maintenance of water supply systems on access to domestic water supply among the	Up to date and well maintained bore holes, wells, earth dams, spring, community water tanks	Independent	Continuous domestic water supply Treatment of water storages Piping of water to homes,	Water accessed easily, women and girls walking for short distances, Reduces water borne diseases, Clean community facilities	Ordinal	Descriptive statistics

rural community						
4.To determine the influence of conflict of competing uses on access to water supply	Number of water points Owners of water sources	Independent	Value placed on conflict resolution Method of conflict resolution	Harmonious sharing of water points Peaceful co-existence	Ordinal	Descriptive statistics Descriptive statistics

CHAPTER FOUR

DATA ANALYSIS,PRESENTATION AND IN INTERPRETATION

4.1 Introduction

In this chapter, the researcher presented the results of findings obtained from field responses and data, broken into two parts. The first section deals with the background information, while the other section presents findings of the analysis, based on the objectives of the study as explored by the questionnaires where both descriptive and inferential statistics have been employed.

4.2 Response Rate

From the data collected, out of the 130 questionnaires administered, 126 were filled and returned. This represented a 94% response rate, which is considered satisfactory to make conclusions for the study. According to Mugenda and Mugenda (2003) a 50% response rate is adequate, 60% good and above 70% rated very good. This also collaborates Bailey (2000) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion; the response rate in this case of 94% is very good. This high response rate can be attributed to the data collection procedures, where the researcher pre-notified the potential participants and applied the drop and pick method where the questionnaires were picked at a later date to allow the respondents ample time to fill the questionnaires.

Table 4.1 Response Rate

Category	Questionnaires administered	Questionnaires filled & returned	Percentage (%)
County Government water Officers	5	5	100 %
Water technical experts	5	5	100%
Household respondents	120	116	82%
Total	130	126	94%

4.3 Demographic Information

The study sought to find out the demographic information of the respondents which included gender, level of education, years worked and age. The findings of the study are discussed in the subsections below.

4.3.1 Respondents Gender

Further the study sought to determine the gender distribution of the respondents in order to establish if there is gender parity in the positions. From the findings as indicated in Table 4.2, majority (67.46%) were male respondents with (32.54%) being females respondents. This implies there were more males than female among the positions of water technical experts, government water officers and households. This implies that more men than women are involved in water related activities.

Table 4.2 Respondents Gender Distribution

Gender	Frequency	Percent
Male	85	67.46
Female	41	32.54
Total	**126**	**100**

4.3.2 Age Distribution

The study further established the respondent's age distribution. From the findings in Table 4.3, majority (38%) indicated that they ranged between 36 to 40 years, followed by 25% who indicated that their age range was between 41 to 45 years. Further findings revealed that 15% of the respondents were aged between 31 to 35 years while 11% were between 46-50 years of age. It is also worth noting that a small (6%) and (5%) of the respondents ranged between 25-30 years respectively. From the findings, it can be inferred that the respondents were old enough to provide reliable insights relevant to the study.

Table 4.3 Respondents Age Distribution

Age	Frequency	Percent
25-30 years	8	6
31-35 years	19	15
36-40 years	47	38
41-45years	32	25
46-50 years	14	11
Above 50 years	6	5
Total	**126**	**100**

4.3.3 Professional qualification

The study further found it to be of paramount importance to determine the respondents' level of education in order to ascertain if they were well equipped with the necessary knowledge and skills in their respective areas of specialization. From the study findings majority (52%) indicated that they had diploma in water engineering, followed by 30% of the respondents who indicated that they had bachelor's degree with few (10%) and 8% indicating certificate and masters in water engineering as shown in Table 4.4. The findings therefore indicate that the respondents have the capacity, skills and management acumen to conduct water access activities successfully among rural communities in Mwingi West District.

Table 4.4 Professional qualification

Qualification	Frequency	Percent
Certificate in water Engineering	1	10
Diploma in water Engineering	5	52
Bachelors Decree in Water Engineering	3	30
Master of water Engineering	1	8
	10	**100**

4.3.4 Respondents Work Experience

The study found it necessary to find out the number of years in which the respondents had worked as government water officer and water technical experts. Based on the findings, majority (60%) of the respondents had worked as government water officer and water technical experts for over 6 years followed by 30% of the respondents who

had 4-6 years experience as government water officer and water technical experts. It was also revealed that 6% and 4% of the respondents had worked as government water officer and water technical experts for a period between 2 to 4 years. A small proportion of the respondents had an experience of 1 to 2 years and less than one year as evidence by 6% and 4% respectively. The findings implies that the respondents were experienced enough to provide valuable responses concerning conduct water access activities successfully among rural communities in Mwingi West District. Table 4.5 displays the findings of the study.

Table 4.5 Respondents Work Experience

Work experience	Frequency	Percent
Less than 1 year	0.4	5
1-3 years	0.6	6
4 -6 years	3	30
Above 6 years	6	60
	10	**100**

4.4 Distance from the water source

The study examined the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County.

First it sought to get first hand information from the households. The distance covered by the households in kilometers was determined. The findings were as indicated in Table 4.6.

Table 4.6 Distance covered to access water

Distance covered	Frequency	Percent
Less than 1 Km	20	17
1-3 Kms	65	56
4-6 Kms	17	15
6-9Kms	9	8
Over 9 Kms	5	4
	116	**100**

The study revealed that majority 56% of the respondents indicated that they cover 1-3 Kms to access water sources, 17% indicated less than 1 Km, 15% indicated 3-6 Kms with few 8% indicating 6-9 Kms and 4 over 9 Kms. This implies that water sources are located at an average long distance from majority of the households.

4.5 Influence of distance to water access

The study then sought respondents opinion if they think distance from water sources influences access to water supply among the rural population. The findings were as indicated in Table 4.7.

Table 4.7: Influence of distance to water access

Influence to water access	Frequency	Percent
Strongly agree	40	34
Agree	50	43
Neutral	15	12
Disagree	6	6
Strongly disagree	5	5
	116	100

From the study findings majority 43% agreed that distance from the water source influence water accessibility, 34% strongly agreed 12% were neutral with 6% disagreeing and 5% strongly disagreeing respectively. This implies that a higher percentage 76% agreed and therefore distance should be taken in to consideration in enhancing accessibility to water by rural households in Mwingi west district.

4.6 Strategies to be put in place to enhance ease access to water supply

The study further assessed the strategies to be put in place to enhance easy access to water supply. The findings were as indicated in Table 4.8.

Table 4.8 Strategies to be put in place to enhance ease access to water supply

Strategies to be put in place	Frequency	Percentage
Construct more earth dams	44	35
Dig more bore holes	35	28
Piping water to each home	20	16
Construct community water tanks	10	8
Storing rain water into tanks	17	13

From the study findings majority of the respondents agreed with the strategies to be put in place i.e. Construct more earth dams, Dig more bore holes, Piping water to each home, Construct community water tanks and Storing rain water into tanks as shown by their frequencies and percentages. 44 (35%) agreed with construction of more earth dams, 35 (28%) agreed with digging more bore holes, 20 (16%) agreed with piping water to each home, 10(8%) agreed with construction of community water tanks and finally 17 (13%) agreed with storing rain water in to tanks. This implies that the strategies proposed are very crucial in enhancing water access among poor rural communities in Mwingi West District.

4.7 Water Costs and Access to Water Supply

The study found it necessary to assess the influence of cost of water on access to domestic water supply among the rural community in Mwingi West Sub County. First it sought to determine if the community pay for water. The findings were as indicated in Table 4.9.

Table 4.9: Whether the Community pays for Water

Does the community pay for water?	Frequency	Percent
Yes	93	80
No	13	20
	116	**100**

From the study findings majority 80% indicated that the community pay for water with only few 20% indicating that the community do not pay for water.

4.8 Cost of water per jerrican

The study then sought to determine from the households the cost of water per jerican. The findings were as indicated in Table 4.10.

Table 4.10: Cost per jerican

Cost per jerrican	Frequency	Percent
Less than 1 Shilling	24	20
1-3 shillings	27	23
4 -6 shillings	42	35
7-9 shillings	17	14
Over 10 shillings	6	8
	116	**100**

From the study findings majority 35% indicated that they access water at 4-6 shillings, 23% indicated 1-3 shillings, 20% indicated less than 1 shilling with few 14% and 8% indicating 7-9 shillings and over 10 shillings respectively. This implies

that accessing water in rural community in Mwingi West District involves a cost which is deemed by the community as expensive. This was further agreed by the technical experts and government officers who indicated as a high cost to the community in their interview indicating that access to water in rural communities should be free of charge since most of the community households in rural set ups cannot afford water charges.

4.9 Influence of water inaccessibility due to cost on domestic activities

The study further carried out an assessment of the degree of influence of water inaccessibility due to cost on domestic activities. The findings were as indicated in Table 4.11.

Table 4.11 Influence of water inaccessibility due to cost on domestic activities

Domestic activities	**Frequency**	**Percentage**
Delays food preparation	25	19.84
Accumulation of dirty clothes	30	23.80
Utensils are rarely washed	15	11.90
No bathing daily for households	45	35.72
Domestic animals lack drinking water	11	8.730
	126	**100**

From the study findings higher proportion 45 (35.72%) agreed that inaccessibility to water leads to no bathing daily for households, 30 (23.80%) indicated accumulation of dirty clothes, 25 (19.84%) indicated delay in food preparation with few 15(11.90%) and 11(8.730%) indicating utensils are rarely washed and domestic animals lack

drinking water. This means inaccessibility to water has major impacts on food preparation, washing clothes and bathing of households. It is therefore necessary to increase the strategies in order to enhance water accessibility among the rural community in Mwingi west district.

4.10 Maintenance of supply systems

The study further established the influence of maintenance of supply systems on access to domestic water supply among the rural community in Mwingi Sub County. The findings were as indicated in Table 4.12.

Table 4.12 Maintenance of supply systems

Stakeholders	Frequency	Percentage
Rural community	51	40.47
Government	20	15.87
NGOs	30	23.81
Faith Based Organizations	6	4.76
Self Help Groups	19	15.08
	126	**100**

The study further revealed that stakeholders such as Rural community 51(40.47%), Government 20(15.87%), NGOs 30(23.81%), Faith Based Organizations 6(4.76%) and Self Help Groups 19(15.08%) play a vital role in enhancing accessibility of water to the community citing government, NGOs and rural community development groups as the most supportive as indicated by the higher frequencies and percentages in Table 4.12.

4.11 Conflicts and Access to Domestic water Supply

The study examined the influence of conflict due to competing uses interest on access to domestic water supply among the rural community in Mwingi West Sub County. First it found it necessary to determine if there are conflicts among the rural community that influence access to domestic water supply. The findings were as indicated in Table 4.13.

Table 4.13 Water conflict

Water Conflict	Frequency	Percentage
Yes	83	65.2
No	43	34.48
	126	**100**

The study revealed that there are water conflicts that influence access of water in Mwingi west Districts as shown by majority 65.25%.

4.12 Influence of rural community conflicts on access to domestic water supply

The study further evaluated the degree of influence of rural community conflicts on access to domestic water supply. The findings were as indicated in Table 4.14.

Table 4.14 Influence of rural community conflicts on access to domestic water supply

Conflict source of competing uses	Frequency	Percentage
Domestic use	52	41.27
Water for livestock	20	15.87
Water for irrigation	38	30.16
Water for industrial use	16	12.69

The study findings revealed that majority 52(41.27%) agreed on the domestic use as the main source of competing uses, 38(30.16%) agreed with water for irrigation, 20(15.87%) agreed on the water for livestock with only few 16(12.69%) agreeing on water for industrial use. This implies that most rural community household in Mwingi West District strive to get water for domestic use, irrigation and for livestock.

4.13 Overcoming the water conflict

The study further determined how the community overcome the mentioned conflicts. The findings were as indicated in Table 4.15.

Table 4.15: Overcoming conflicts

Overcoming Conflicts	Frequency	Percentage
Conserving environment	12	9
Actively participating in community water projects	33	26
Rationing the amount of water per household	51	42
Intervening by local administrator	40	23
	126	**100**

From the study findings majority 42% of the respondents indicated that the community overcome the conflict through rationing water per household, 26% indicated actively participating in community water projects, 23% indicated intervening by local administrator with few 9% indicating conserving the environment. This implies that community does all the necessary to overcome conflicts.

4.14 Regression and Correlation Analysis

Regression analysis was utilized to investigate the relationship between the variables. These included an error term, whereby a dependent variable was expressed as a combination of independent variables. The unknown parameters in the model were estimated, using observed values of the dependent and independent variables.

4.15 Correlation Analysis

Pearson correlation was used to measure the degree of association between variables under consideration i.e. independent variables and the dependent variables. Pearson

correlation coefficients range from -1 to +1. Negative values indicates negative correlation and positive values indicates positive correlation where Pearson coefficient <0.3 indicates weak correlation, Pearson coefficient >0.3<0.5 indicates moderate correlation and Pearson coefficient>0.5 indicates strong correlation.

Table 4.16 Correlation Coefficients

	Distance	**Cost**	**Maintenance of supply system**	**Conflict**	**Access to water**
Distance	1				
Cost	0.631	1			
Maintenance of supply system	0.551	0.451	1		
Conflict	0.611	0.391	0.413	1	
Access to water	0.511	0.524	0.614	0.713	1

*. Correlation is significant at the 0.05 level (1-tailed).

The analysis above shows that conflict has the strongest positive (Pearson correlation coefficient =.713; P value 0.000) influence on access to water. In addition, **Distance, Cost** as well as **Maintenance of supply system** are positively correlated to access of water (Pearson correlation coefficient =.511, .524 and .614). The correlation matrix implies that the independent variables: conflict, **Distance, Cost and Maintenance of**

supply system are very crucial determinants of access to water as shown by their strong and positive relationship with the dependent variable i.e. access to water.

4.16 Regression Analysis

Regression model is used here to describe how the mean of the dependent variable changes with changing conditions. Regression Analysis was carried out for conflict, Distance, Cost and Maintenance of supply system and access to water. To test for the relationship that the independent variables have on access to water, the study did the linear regression analysis.

The study ran the procedure of obtaining the coefficients, and the results were as shown on the table below.

Table 4.17 Multiple regression analysis

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	11.132	0.332		2.311	0.023
conflict	0.231	0. 65	0.002	1.532	0.081
Distance	0.321	0.332	0.076	1.256	0.022
Cost	0.553	0.273	0.063	1.599	0.053
Maintenance of supply system	0.734	0.281	0.025	2.145	0.013

According to the regression equation established, taking all factors into account (conflict, Distance, Cost and Maintenance of supply system, access to water will be 11.132. The Standardized Beta Coefficients give a measure of the contribution of each variable to the model. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. The t and Sig (p) values give a rough indication of the impact of each predictor variable – a big absolute t value and small p value suggests that a predictor variable is having a large impact on the criterion variable. At 5% level of significance and 95% level of confidence, conflict had a 0.231 level of significance, distance had a 0.321 level of significance, cost had a 0.054 level of significance and maintenance of supply system had a 0.734 level of significance.

Table 4.18 Coefficient of determination (Regression)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.777[a]	.785	.776	.43829	.975	108.505	3	8	.000
a. Predictors: (Constant), conflict, Distance, Cost and Maintenance of supply system									

Looking at the variables collectively, it's evident from the table that 77.6% of variation or change in the access of water is explained by the variables considered in the model i.e. conflict, Distance, Cost and Maintenance of supply system as indicated by the coefficient of determination (R^2) which is also evidenced by F change 108.505>p-values (0.05). This implies that these variables are very significant (since

the p-values< 0.05) and therefore need to be considered in any effort to boost access of water in Mwingi West District. The study therefore identifies conflict, Distance, Cost and Maintenance of supply system as critical determinants of access to water.

Table 4.19: Analysis of Variance (ANOVA) results

	Sum of Squares	df	Mean Square	F	F-critical value	Significance
Regression	52.55	4	14.93	18.33	88.33	0.00
Residual	3.34	19	4.22			
Total	55.89	23				

NB: F-critical Value 88.33 (statistically significant if the F-value is less than 88.33: from table of F-values).

a. Predictors: (Constant), conflict, Distance, Cost and Maintenance of supply system.

The value of the F statistic, 18.33 indicates that the overall regression model is significant hence it has some explanatory value i.e. there is a significant relationship between the predictor conflict, Distance, Cost and Maintenance of supply system (taken together) and access to water.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter is a synthesis of the entire study, and contains summary of research findings, exposition of the findings, commensurate with the objectives, conclusions and recommendations based thereon.

5.2 Summary of Findings

This section has summarized research findings based on key objectives i.e. to examine the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County, to assess the influence of cost of water on access to domestic water supply among the rural community in Mwingi West Sub County, to establish the influence of maintenance of supply systems on access to domestic water supply among the rural community in Mwingi Sub County and to examine the influence of conflict due to competing uses on access to domestic water supply among the rural community in Mwingi West Sub County and interprets the results in the best way possible commensurate with the objectives.

5.2.1 Influence of distance from water sources on access to domestic water supply among the rural community

The study examined the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County. First it sought to get first hand information from the households. The distance covered by

the households in kilometers was determined. The study revealed that majority 54% of the respondents indicated that they cover 1-3 Kms to access water sources, 17% indicated less than 1 Km, 13% indicated

3-6 Kms with few 8% indicating 6-9 Kms and over 9 Kms respectively. This implies that water sources are located at an average distance from majority of the households. The study then sought respondents opinion if they think distance from water sources influences access to water supply among the rural population. From the study findings majority 43% agreed that distance from the water source influence water accessibility, 33% strongly agreed 12% were neutral with 6% disagreeing and strongly disagreeing respectively. This implies that a higher percentage 76% agreed and therefore distance should be taken in to consideration in enhancing accessibility to water by rural households in Mwingi west district. The study further assessed the strategies to be put in place to enhance easy access to water supply. From the study findings majority of the respondents agreed with the strategies to be put in place i.e. Construct more earth dams, Dig more bore holes, Piping water to each home, Construct community water tanks and Storing rain water into tanks as shown by their frequencies and percentages. This implies that the strategies proposed are very crucial in enhancing water access among poor rural communities in Mwingi West District.

5.2.2 Influence of cost of water on access to domestic water supply among the rural community

The study found it necessary to assess the influence of cost of water on access to domestic water supply among the rural community in Mwingi West Sub County. First it sought to determine if the community pay for water. From the study findings

majority indicated that the community pay for water with only few indicating that the community do not pay for water. The study then sought to determine from the households the cost per jerican. From the study findings majority indicated that they access water at 4-6 shillings. This implies that accessing water in rural community in Mwingi West District involves a cost which is deemed by the community as expensive. This was further agreed by the technical experts and government officers who indicated as a high cost to the community in their interview indicating that access to water in rural communities should be free of charge since most of the community households in rural set ups cannot afford water charges.

The study further carried out an assessment of the degree of influence of water inaccessibility due to cost on domestic activities. From the study findings higher proportion 45(35.72%) agreed that inaccessibility to water leads to no bathing daily for households, 30(23.80%) indicated accumulation of dirty clothes, 25(19.84%) indicated delay in food preparation with few 15(11.90%) and 11(8.730%) indicating utensils are rarely washed and domestic animals lack drinking water. This means inaccessibility to water has major impacts on food preparation, washing clothes and bathing of households. It is therefore necessary to increase the strategies in order to enhance water accessibility among the rural community in mwingi west district.

5.2.3 Influence of maintenance of supply systems on access to domestic water supply among the rural community

The study further established the influence of maintenance of supply systems on access to domestic water supply among the rural community in Mwingi Sub County. The study further revealed that stakeholders such as Rural community, Government,

NGOs, Faith Based Organizations and Self Help Groups play a vital role in enhancing accessibility of water to the community citing government, NGOs and rural community development groups as the most supportive as indicated by the higher frequencies and percentages.

5.2.4 Influence of conflict due to competing uses on access to domestic water supply among the rural community

The study examined the influence of conflict due to competing uses interest on access to domestic water supply among the rural community in Mwingi West Sub County. First it found it necessary to determine if there are conflicts among the rural community that influence access to domestic water supply. The study revealed that there are water conflicts that influence access of water in Mwingi west Sub County as shown by majority 65.25%. The study further evaluated the degree of influence of rural community conflicts on access to domestic water supply. The study findings revealed that majority 52(41.27%) agreed on the domestic use as the main source of competing uses, 38(30.16%) agreed with water for irrigation, 20(15.87%) agreed on the water for livestock with only few 16(12.69%) agreeing on water for industrial use. This implies that most rural community household in Mwingi West District strive to get water for domestic use, irrigation and for livestock. The study further determined how the community overcome the mentioned conflicts. From the study findings majority 42% of the respondents indicated that the community overcome the conflict through rationing water per household, 26% indicated actively participating in community water projects, 23% indicated intervening by local administrator with few 9% indicating conserving the environment. This implies that community does all the necessary to overcome conflicts.

5.3 Discussion

The study examined the influence of distance from water sources on access to domestic water supply among the rural community in Mwingi West Sub County. The study revealed that majority 54% of the respondents indicated that they cover 1-3 Kms to access water sources, 17% indicated less than 1 Km, 13% indicated 3-6 Kms with few 8% indicating 6-9 Kms and over 9 Kms respectively. This implies that water sources are located at an average distance from majority of the households. The study then sought respondents opinion if they think distance from water sources influences access to water supply among the rural population. From the study findings majority 43% agreed that distance from the water source influence water accessibility, 33% strongly agreed 12% were neutral with 6% disagreeing and strongly disagreeing respectively. This implies that a higher percentage 76% agreed and therefore distance should be taken in to consideration in enhancing accessibility to water by rural households in Mwingi west sub county.

This agrees with cabral(2010) who said that the distance of water supply has issues that have specific adverse effects on women in developing nations.

The study found it necessary to assess the influence of cost of water on access to domestic water supply among the rural community in Mwingi West Sub County. From the study findings majority 67% indicated that the community pay for water with only few 33% indicating that the community do not pay for water. This agrees with Kiamani and Ngindu(2012)in Kenya several; factors can be given to show the influence or lack thereof ,that the cost of water has on public supply water use The study further established the influence of maintenance of supply systems on access to domestic water supply among the rural community in Mwingi West Sub County. The

study further revealed that stakeholders such as Rural community 51(40.47%), Government 20(15.87%), NGOs 30(23.81%), Faith Based Organizations 6(4.76%) and Self Help Groups 19(15.08%) play a vital role in enhancing accessibility of water to the community citing government, NGOs and rural community development groups as the most supportive. The study examined the influence of conflict due to competing uses on access to domestic water supply among the rural community in Mwingi West Sub County. The study revealed that there are water conflicts that influence access of water in Mwingi west sub county as shown by majority 65.25%,this agrees with Binder (2008) who said that many countries have experienced international water disputes, civil disturbances caused by water shortages and potential regulatory solutions to diffuse water conflict.

5.4 Conclusion

The analysis showed that conflict has the strongest positive influence on access to water. In addition, Distance, Cost as well as Maintenance of supply system are positively correlated to access of water. The correlation matrix implies that the independent variables: conflict, Distance, Cost and Maintenance of supply system are very crucial determinants of access to water as shown by their strong and positive relationship with the dependent variable i.e. access to water. Regression model was used to describe how the mean of the dependent variable changes with changing conditions. Regression Analysis was carried out for conflict, Distance, Cost and Maintenance of supply system and access to water. To test for the relationship that the independent variables have on access to water, the study did the linear regression analysis. Looking at the variables collectively, it's evident from the study that 77.6% of variation or change in the access of water is explained by the variables considered

in the model i.e. conflict, Distance, Cost and Maintenance of supply system as indicated by the coefficient of determination (R^2) which is also evidenced by F change 108.505>p-values (0.05). This implies that these variables are very significant (since the p-values< 0.05) and therefore need to be considered in any effort to boost access of water in Mwingi West sub county. The study therefore identified conflict, Distance, Cost and Maintenance of supply system as critical determinants of access to water.

5.5 Recommendations

The study recommends that stakeholders such as the government, NGOs, community self help group and faith based organization should come up with strategies on how to improve water access to the rural community. This strategies may include Construct more earth dams, Dig more bore holes, Piping water to each home, Construct community water tanks and Storing rain water into tanks. The study further recommends that the community should come up with their own initiatives e.g. water conservation, tree planting and initiating fund mobilization to build more community dams and also purchase water tanks to harvest rain water.

5.6 Suggestions for future research

The following are the suggestions for further research

i. The study should be replicated using a larger sample.
ii. The study should be conducted in other sub counties in Kenya so that the findings can be generalized, so that informed decisions can be made and therefore ease the problem of domestic water supply among the rural communities.

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APPENDIX I

TRANSMITTAL LETTER

Nicholas Kiteme Mithumbi
P.O Box 100-90400
Mwingi

To The Respondents
Mwingi West Sub-County
Kitui County

Dear/sir Madam,

RE: TRANSMITTAL LETTER

I am congratulating you for having been selected to participate in this study. I am a post graduate student at university of Nairobi pursuing a masters Degree in project planning and management .As part of the requirements for the award of this degree, I am conducting a study on the *factors influencing access to domestic water supply among rural communities: the case of Mwingi West Sub county ,Kitui county,Kenya.*Therefore I humbly request you to cooperate and assist in filling the questionnaire. The information you will provide will be strictly used for the purpose of this study and your identity will be kept confidential.

Thank you in advance.

Yours faithfully,

Nicholas Kiteme Mithumbi
Ref:L50/62805/2013
University of Nairobi

APPENDIX II

INTERVIEW SCHEDULE FOR COUNTY GOVERNMENT WATER OFFICERS

This study intends to investigate the factors influencing access to water supply among the rural local community in Mwingi West District. As government water officer, your resourcefulness in this study will be very important.

PART A: Demographic information of the respondents

1.a) Please indicate your gender

Male ( )

Female ( )

b) Age bracket

25 – 30 years ( )

31 – 35 years ( )

36 – 40 years ( )

41 – 45 years ( )

46 – 50 years ( )

c) Above 50 years ( )

c) What are your professional qualifications?

Diploma in water engineering ( )

Bachelors Degree water engineering ( )

Master of water engineering ( )

Any other (specify)_____

SECTION B: Distance from Water Sources and Access to Water Supply

2. a) What are the main sources of water in your sub county?

3.a) Do people from your division travel for long distances to access water?

Yes ( )

No ( )

b) If yes, approximately what is the average distance in kilometres do they travel?

---

4. a) In your own opinion, do you think distance from water sources influences access to water supply among the rural population?

Yes ( )

No ( )

If yes, in which ways does it influence access to water supply?

5.What strategies do you think could be put in place to enhance easy access to water supply?

SECTION C: Water Costs and Access to Water Supply

6 a) Do the rural community access water at a cost?

Yes ( )

No ( )

b) Are there challenges associated with the costing of water?

Yes ( )

No ( )

C) If yes, what type of challenges?

SECTION D: Maintenance of Supply Systems and Access to Water Supply

7 a) Do the water sources require maintenance?

Yes ( ) No ( )

If yes, what type of maintenance do the water sources require?

---

b) Who finances the maintenance of the water sources?

---

8 a) In your own opinion, do the challenges influence access to water supply?

SECTION F: Conflict of Competing uses and Access to Water Supply

9 a) Do social conflicts occur in your area?

Yes ( ) No ( )

b) If yes, what type of conflicts?

---

c) What are the causes of these conflicts?

---

11. How does conflict of competing sources influence access to water supply?

---

c).What suggestions would you recommend to be put in place by various stakeholders to ensure access to adequate water supply.

APPENDIX III

QUESTIONNAIRE FOR WATER TECHNICAL EXPERTS

This study intends to investigate the factors influencing access to water supply among the rural local community in Mwingi West District. As a water technical expert, your resourcefulness in this study will be very important. Your responses will be treated with a lot of confidentiality and will be used for academic purposes only. Do not write your name or that of your division.

PART A: Demographic information of the respondents

1.a) Please indicate your gender

Male ( )

Female ( )

b) Age bracket

25 – 30 years ( )

31 – 35 years ( )

36 – 40 years ( )

41 – 45 years ( )

46 – 50 years ( )

c) Above 50 ( )

2. What are your professional qualifications?

Certificate in water engineering ( )

Diploma in water engineering ( )

Bachelors Degree water engineering ( )

Master of water engineering ( )

Any other (specify)_____

3. How many years have you served as water technical expert?

i. Less than one year ( )

ii. 1 – 3 years ( )

iii. 4 – 6 years ( )

iv. Above six years ( )

4.) In your own opinion, do you think distance from water sources influences access to water supply among the rural population?

i. Strongly agree ( )

ii. Agree ( )

iii. Neutral ( )

iv. Disagree ( )

v. Strongly agree ( )

5. Please give an assessment of the strategies that you think could be put in place to enhance

easy access to water supply. (Tick where appropriate)

Difficulties experienced	**Strongly agree**	**agree**	**neutral**	**disagree**	**Strongly disagree**
i) Construct more earth dams	☐	☐	☐	☐	☐
ii) Dig more bore holes	☐	☐	☐	☐	☐
iii) Piping water to each home	☐	☐	☐	☐	☐
iv) Construct community water tanks	☐	☐	☐	☐	☐
v) Storing rain water into tanks	☐	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐	☐

SECTION C: Water Costs and Access to Water Supply

6..a) Does the community pay for water?

Yes ( )

No ( )

b) If yes, give an assessment of the water charges per 20 litre jerican.

Very high ( )

High ( )

Average ( )

Low ( )

Very low ( )

7.Please give an assessment of the degree of influence of water inaccessibility due to cost on domestic activities (Tick where appropriate)

Domestic activities	**Highly influences**	**Influences**	**Neutral**	**Lowly influences**
i) Delays food preparation	☐	☐	☐	☐
ii) Accumulation of dirty clothes	☐	☐	☐	☐
iii) Utensils are rarely washed	☐	☐	☐	☐
iv) No bathing daily for households	☐	☐	☐	☐
v) Domestic animals lack drinking water	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐

SECTION D: Maintenance of Supply Systems and Access to Water Supply

8. a) Do the water sources require maintenance?

Yes ( ) No ( )

If yes, Please give an assessment of the type of maintenance the water sources require.

(Tick where appropriate)

Type of maintenance the water sources require	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
i) De silting of earth dams	☐	☐	☐	☐	☐
ii) Replacing old/broken water pipes	☐	☐	☐	☐	☐
iii) Deeping the bole holes	☐	☐	☐	☐	
iv) Constructing river dykes	☐	☐	☐	☐	☐
v) Servicing water metres	☐	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐	☐

9. Please give an assessment of the degree of support given by various stakeholders in maintenance of water sources (Tick where appropriate)

Stakeholders	**Very supportive**	**Supportive**	**Neutral**	**Lowly supportive**
i) Rural community	☐	☐	☐	☐
ii) Government	☐	☐	☐	☐
iii) NGOs	☐	☐	☐	☐
iv) Faith Based Organizations	☐	☐	☐	☐
v) Self Help Groups	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐

SECTION E : Conflicts and Access to Domestic water Supply

10 (a) Are there conflicts among the rural community that influence access to domestic water supply? Yes ( ) No ( )

11. If yes, please give an assessment of degree of influence of rural community conflicts on access to domestic water supply. (Tick where appropriate)

Conflict due to competing uses	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
i)Domestic use	☐	☐	☐	☐	☐
ii) Water for livestock	☐	☐	☐	☐	☐
iii) Water for irrigation	☐	☐	☐	☐	☐
iv) Any other (specify)	☐	☐	☐	☐	☐

12. How do they overcome these conflicts?

i) Intervention by local administrator ( )

ii) Rationing the amount of water per household ( )

ii) Actively participating in community water projects ( )

iii) Conserving environment ( )

iv) Any other (specify)

_____

13. What suggestions would you recommend to be put in place by various stakeholders to ensure access to adequate water supply?

APPENDIX IV

QUESTIONNAIRE FOR HOUSEHOLDS

This study intends to investigate the factors influencing access to water supply among the rural local community in Mwingi West District. As someone involved in fetching and utilizing domestic water, your resourcefulness in this study will be very important. Your responses will be treated with a lot of confidentiality. Do not write your name or that of your village.

PART A: Demographic information of the respondents

1.a) Please indicate your gender

Male ( )

Female ( )

Age bracket

b. Please state your age bracket.

Less than 25 years ( )

25 – 30 years ( )

31 – 35 years ( )

36 – 40 years ( )

41 – 45 years ( )

46 – 50 years ( )

c) Above 50 years ( )

2. What is your level of education?

Never been to school ( )

Primary school leaver ( )

Form 4 graduate ( )

Diploma holder ( )

First Degree ( )

Any other (specify)_____

SECTION B: Distance from Water Sources and Access to Water Supply

3. Please indicate the distance in kilometers that you cover to access water supply

i) Less than I km ( )

ii) 1-3 Kms ( )

iii) 3-6 Kms ( )

iv) 6-9 Kms ( )

v) Over 9 Kms ( )

4) For how many years have lived in this area?

i. Less than one year ( )

ii. 1-3 years ( )

iii. 4-6 years ( )

iv. Above 6 years ( )

5.) In your own opinion, do you think distance from water sources influences access to water supply among the rural population?

vi. Strongly agree ( )

vii. Agree ( )

viii. Neutral ( )

ix. Disagree ( )

x. Strongly agree ( )

6. Please give an assessment of the strategies that you think could be put in place to enhance easy access to water supply. (Tick where appropriate)

Difficulties experienced	**Strongly agree**	**agree**	**neutral**	**disagree**	**Strongly disagree**
i) Construct more earth dams	☐	☐	☐	☐	☐
ii) Dig more bore holes	☐	☐	☐	☐	☐
iii) Piping water to each home	☐	☐	☐	☐	☐
iv) Construct community water tanks	☐	☐	☐	☐	☐
v) Storing rain water into tanks	☐	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐	☐

SECTION C: Water Costs and Access to Water Supply

7..a) Does the community pay for water?

Yes ( )

No ( )

b) If yes, give an assessment of the water charges per 20 litre jerican are?

Less than I shilling ( )

1-3 shillings ( )

4-6 shillings ( )

7-9 shillings ( )

Over 10 shillings ( )

8. Please give an assessment of the degree of influence of water inaccessibility due to cost on domestic activities (Tick where appropriate)

Domestic activities	**Highly influences**	**Influences**	**Neutral**	**Lowly influences**
i) Delays food preparation	☐	☐	☐	☐
ii) Accumulation of dirty clothes	☐	☐	☐	☐
iii) Utensils are rarely washed	☐	☐	☐	☐
iv) No bathing daily for households	☐	☐	☐	☐
v) Domestic animals lack drinking water	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐

This section should be answered by the technical experts10. Please give an assessment of the degree of support given by various stakeholders in maintenance of water sources (Tick where appropriate)

Stakeholders	**Very supportive**	**Supportive**	**Neutral**	**Lowly supportive**
i) Rural community	☐	☐	☐	☐
ii) Government	☐	☐	☐	☐
iii) NGOs	☐	☐	☐	☐
iv) Faith Based Organizations	☐	☐	☐	☐
v) Self Help Groups	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐

SECTION D: Maintenance of supply systems and access to water supply

9 a) Do the water sources require maintenance?

Yes ( )

No ( )

b) If yes, Please give an assessment of the types of maintenance the water sources require (Tick where appropriate)

Type of maintenance the water sources require	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
i) De silting of earth dams	☐	☐	☐	☐	☐
ii) Replacing old broken water pipes	☐	☐	☐	☐	☐
iii) Deeping the bole holes	☐	☐	☐	☐	☐
iv) Constructing river dykes	☐	☐	☐	☐	☐
v) Servicing the water metres	☐	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

10. Please give an assessment of the degree of support given by various stakeholders in maintenance of water sources (Tick where appropriate)

Stakeholders	**Very supportive**	**Supportive**	**Neutral**	**Lowly supportive**
i) Rural community	☐	☐	☐	☐
ii)County Government	☐	☐	☐	☐
iii) NGOs	☐	☐	☐	☐
iv) Faith Based Organizations	☐	☐	☐	☐
v) Self Help Groups	☐	☐	☐	☐
vi) Any other (specify)	☐	☐	☐	☐

SECTION E : Conflicts and Access to Domestic water Supply

11 (a) Are there conflicts among the rural community that influence access to domestic water supply?

Yes ( ) No ( )

12. If yes, please give an assessment of degree of influence of rural community conflicts on access to domestic water supply. (Tick where appropriate)

Conflict due to competing uses	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
i)Domestic use	☐	☐	☐	☐	☐
ii) Water for livestock	☐	☐	☐	☐	☐
iii) Water for irrigation	☐	☐	☐	☐	☐
v) Any other (specify)	☐	☐	☐	☐	☐

13. How do they overcome these conflicts?

i) Intervention by local administrator ( )

ii) Rationing the amount of water per household ( )

ii) Actively participating in community water projects ( )

iii) Conserving environment ( )

iv) Any other (specify)

_____

14. What suggestions would you recommend to be put in place by various stakeholders to ensure access to adequate water supply?_____

_____

SECTION F: Access To Water Supply

15 a) How many water points are there in your area?

1-3 ( )

3-6 ( )

6 and above ( )

b) For how long do you wait before you can fetch water ?

1. 10 -15 minutes
2. 15-20 minutes
3. 20-25 minutes
4. 25-30minutes
5. Above 30 minutes

c) How long are queues at the water points? (In metres)

1-3 ( )

3-6 ( )

6 and above ( )

d) Are there irrigation activities in your area?

Very many ( )

Many ( )

Few ( )

Very few ( )