ACCESS TO CLEAN WATER AND HEALTH OUTCOMES:
A CASE STUDY OF NG'ARATUKO VILLAGE, BARINGO COUNTY

BY

KIPTISIA KISA DAVID

This dissertation is submitted in partial fulfillment of the requirements for the award of a Master of Development Studies from St. Paul's University.

September, 2016

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Supervisor 1: Dr. Peter M. Koome

Supervisor 2: Dr. David Gichuhi

September , 2016

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DECLARATION

This dissertation is a product of my own work and is not the result of anything done in collaboration. It has not been previously presented to any other institution. I agree that this dissertation may be available for reference and photocopying at the discretion of the University.

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DEDICATION

I dedicate this research project to my loving wife Stella Tero and our children Angela ChepkuruiKiptisia and Emmanuel ChebonKiptisia

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ABSTRACT

Across the globe, approximately 884 million people lack access to safe water sources and more than 2.6 billion people do not have access to sanitation (a system for the collection, transport, treatment and disposal or re-use of human excreta and associated hygiene). This study sought to establish the contribution of access to clean drinking water on the health outcomes of the members of households in Ng'aratuko village Baringo County Kenya. The study aimed at examining the effect of availability of clean water on health outcomes of residents of Ng'aratuko village, to establish the effect of quality of water on health outcome, to determine the effect of affordability of water on health outcome of residents of Ng'aratuko village and to examine the effect of distance to nearest clean water source on health outcome of residents of Ng'aratuko Village. The study adopted a descriptive survey research design. The target population constitutes a total of 172 respondents drawn from 172households in Ng'aratuko village. The study employed a structured questionnaire to collect data from the sampled respondents. Prior to conducting the study the researcher carried out a pilot study with the aim of verifying both the reliability and validity of the research instruments. The obtained data was edited and coded into the SPSS (Statistical Packages for Social Sciences) ready for processing and analysis. The findings were presented in form of frequency tables, descriptive statistics tables and inferential statistics tables. The study revealed that Ng'aratuko village lacks piped water system that supplies the villagers with clean water. It also revealed that water collecting points are not reliably safe and clean. In addition water collection points in Ng'aratuko Village are not protected from health hazards. The study further revealed that quality of water used by Ng'aratuko residents is not monitored for quality: residents are not aware of how they could treat water at home; Ng'aratuko village residents were exposed to health hazard due to water from untreated sources: water sources in this village were regularly polluted and Ng'aratuko village residents do not have access to modern sanitation facilities. Monetary cost of accessing water during the dry season is a concern too for the residents. In addition,Ng'aratuko Village residents thinks collecting water for daily use is an exhausting activity meaning it also affects their psychological health. The study recommends that development agents, the county and national Government and natural resource planners should build a piped water distribution system in Ng'ratuko village in order to improve health for the residents. They should also make water collection points safe so as to improve the health of residents in Ng'aratuko Village while residents of Ng'aratukovillage should be sensitized on how to treat water at home as well as take care of their water collection points. Authorities should develop strategies to control sources of contamination is the study area as well as put in place long term plans sanitation intervention and facilities that would make the village less prone to preventable health hazards. Authorities should support acquisition and installation of water storage among residents to ensure that water storage facilities are clean. The findings of the study will be significant to both the Government, Non-Governmental Organization and Kenyan citizens.

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LIST OF ABBREVIATIONS AND ACRONYMS

AWS: Absolute Water Security

CIC: Commission for the Implementation of the Constitution

CIDPs: County Integrated Development Plans

DALYs: Disability Adjusted Life Years

DWS: Design Water Security

MDGs: Millennium Development Goals

MHI: Median Household Income

NDMA: National Drought Management Authority

SDG: Sustainable Development Goals

UN: United Nations

UNW: United Nation Water

WHO: World Health Organization

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CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Accessibility of clean water in sufficient quantities is vital for human health and development. Water is required for use in among other sectors; industries, commerce, agricultural and domestic. Domestic water is used in households for basic needs such as cooking, drinking, washing, and for basic hygiene and feeding small livestock. There is no substitute for water for these uses. Despite the importance of water, findings and reports on access to clean water and effect of health from various agencies and researches at the global, national and local levels depict critical challenges especially in developing countries (World Health Organization-WHO, United Nation-Water; World Food Programmes).

Interventions on access to clean water and tackling water related ailments has been proposed, undertaken and or are going on at the global, national and local levels. Key among these interventions is the Millennium Development Goals (MDGs), (United Nations, 2015)of which two of the goals targeted access to clean water and improved health by the year 2015. These targets have not been achieved by this year in countries in Sub-Saharan Africa (United Nations Report on Global Issues, 2013).

The global family improved these goals to become Sustainable Development Goals (SDG), (Sustainable Development, 2016) after the global summit. Goal number three and five focuses on access to clean water and health respectively as the global family commits to make these goals a reality by the year 2030 (Sustainable Development, 2016) Signatory countries are expected to translate these goals into actions.

Progress is recorded in some countries on access to water but Sub-Saharan African countries lag behind. According to a Website of the United Nation Water (UNW), facts and figures, people who have access to improved water have risen from 2 billion in 1990 to 6.1 billion in 2010 with highest improvement recorded in China and India. A report by the World Health Organization -WHO, (2013) indicates that over water related diseases cause 3.4 fhuman fatalities, with majority being children in developing countries. These deaths are preventable if they have access to adequate clean water and simple

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interventions to improve access to clean water of adequate quality and quantity (National Academies of Science, 2009).

Kenya is a water scarce country. The resources are unevenly distributed in both time and space (National Climate Change Response Strategy, 2010). The present government's institutional efforts for the management of the scare water resource in Kenya can be traced back to a 1974 Water Act and Chapter 372 of the Laws of Kenya. This was later revised as thethe National Policy on Water Resources Management and Development, that came into effect in 1999 after adoption by Parliament as Sessional Paper No. I of 1999. A new Master Plan (Strategic Plan 2005-2009) was also deemed necessary to effectively address issues of water resource development and management for the people of Kenya.58 Additional amendments and revisions targeting the 1974 Water Act resulted in the 2002 Water Act with far reaching goals and objectives (Ogendi & Ong'oa, 2009).

The countries water resources are managed through five drainage basins namely Lake Basin, Kerio valley, Tana and Athi, EwasoNg'iro North and EwasoNg'iro South river basin.which varies in size and also in surface and ground water resources. Lake Victoria basin is the smallest but holds more than 50% of surface water in the country. Kenya has passed and is passing a number of legislation and putting in place frameworks to guide issues of access to water and health. Key among these is the Constitution of Kenya, (2010), Article 43 of the Constitution part (a) provides for rights to highest standards of health while part (d) is on rights to clean and safe water in adequate quantities. In addition Article 56 part (e) compels the government to make reasonable access to water, health services andinfrastructure, available to marginalized groups as a matter of affirmative action.A number of legislation and regulatory frameworks have been formulated, are being implemented and are being aligned with provisions in the Constitution, the water act of 2002 and the water master plan (Republic of Kenya, 2006, 2002, 2002). Despite existence and provisions in these frameworks, access to water and health remain a major challenge in the Country. According to the world bank in rural is areas, where 78% of the national population lives, access to safe water is between 38% to 52% whereas in urban areas 59% to 83% have easy access to safe water leaving millions of Kenyans without access to clean and safe water (Uwazi, 2010).

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Implementation of devolved government system in Kenya requires that Counties align their legislation and development priorities with those at the national and global levels (Commission for the Implementation of the Constitution-CIC, 2014). Counties like Baringo are in the process of formulating these frameworks to implement their mandate. Counties area expected to develop County Integrated Development Plans (CIDPs) to guide development and present development priorities and resources required to achieve them. The Baringo CIDP was prepared in the year 2013 and has continued to develop the same every financial year to guide it in its development agenda, and it has set among other priorities to access clean water and improve health for its people.

Villages are the lowest level of administration recognized under the devolved system (Republic of Kenya, 2012). Each village is made up of a number of households as per guidelines for their delineation. A household is the basic unit of production, reproduction and consumption and it is where decisions on pooling and allocating resources are made. Access to clean, adequate and affordable water is required for all these activities. A person is expected to use a minimum of 20 litres a day but access to water influence the available amount as revealed in an assessment by the National Drought Management Authority-NDMA, (2014) in various agro ecological zones in Kenya. It is at this unit that positive and adverse issues of adequacy or inadequacy of domestic water manifest. Adverse issues often result to ill health for members of a household spreading to a community and other units. Researcher and practitioners have also suggested that interventions at the household level reduce water related ailments. This research project therefore aimed at finding out the implications of access to clean water on the health issues of household members in Ng'aratuko village Baringo County

1.2 Statement of the Problem

Access to clean water and its impact on health continue to present challenges at different levels; household, village, communities, in Baringo County, neighboring Counties, nationally and globally. There are disparities in these levels as relating to water resources and access to clean water. These challenges are becoming more imminent with the changing climactic patterns resulting into unpredictable rainfall seasons and quantities County Government ofBaringo (2013). These climactic changes result into prolonged dry spells and other times by flooding or heavy rains. For instance during heavy rains and floods, water is available in large quantities but it may result into destruction of facilities,

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infrastructure and sometimes lack of clean water bringing about water related ailments (NDMA, 2014) Millions of people especially children die from water related ailments.

Studies and reports on access to water and health outcomes exist but none focuses on Ng'aratuko Village or its neighboring villages. Organizations and government departments have implemented interventions and documented their experiences on these issues in the County (BCIDP, 2013; Baringo County Government, 2014; NDMA, 2014) these actors need to share findings and experiences to inform and learn from each other and jointly address these challenges. Counties are required to implement their mandate hence presenting opportunities but are facing constraints as inadequate information and data inform policy processes, interventions and guide appropriate investment priorities. Findings of this study present such an opportunity and seek to add and, access information and data to guide decision making and action.

1.3 Study Objectives

The main objective of the researchwas to find out implications of access to clean water on household's health outcomes inNg'aratuko Village in Baringo County.

The specific objectives were:

i) To examine the effect of availability of clean water on health outcomes of residents of Ng'aratuko village
ii) To establish the effect of quality of water on health outcome of residents of Ng'aratuko village
iii) To determine the effect of affordability of water on health outcome of residents of Ng'aratuko village
iv) To examine the effect of distance to nearest clean water source on health outcome of residents of Ng'aratuko Village

1.4 Research Questions

The research questions in the study were as follows

i) What is the effect of availability of clean water on health outcomes of residents in Ng'aratuko Village?

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ii) How does the quality of water affect health outcomes of residents of Ng'aratuko Village?

iii) What are the effects of affordability of water on the health outcomes of residents of Ng'aratuko Residents?

iv) What is the effect of distance from the nearest clean water source on health outcomes of residents in Ng'aratuko Village?

1.5 Justifications of the Study

Access to clean and safe water as well as improvement on health are preconditions for development at the global, national, county and local levels. At the global level, the global family has over the decades proposed and/or implemented interventions to access water and to improve on health for all. The most recent interventions are the SDGs and their predecessor MDGs.

At the national level, policy statements and interventions has sort to reduce the number of persons with inadequate access to clean water. Also child mortality due to preventable causes such as water related diseases has been a concern at all level. At the County and lower levels of governance, leaders and residents aim at improving access to water and quality of life for their populace.

There is need for facts, data and information to inform policy formulation and relevant interventions. Findings from this research will add to this. It will also serve to create awareness to members of households and village on the need to take part in accessing clean safe water in their area and beyond to improve the health outcomes of various individual and groups. Findings will also add to the body of knowledge on access to water and its relation to health outcomes.

1.6 Scope of the study

The scope of this studywas an assessment of access to clean water and their implications on health outcomes on water washed related diseases among household members focusing on Ng'aratuko village in Baringo County.The study was conducted between March and May 2016. The specific objectives set out in the proposal determined the scope area of the study. These included examining the effect of availability of clean water on health outcomes of residents of Ng'aratuko village, establishing the effect of quality of water on health outcome of residents; determining the effect of affordability of water on health outcome and examining the effect of distance to nearest clean water source on health outcome of residents of Ng'aratuko Village.

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1.7 Limitations of the Study

This study used a case study approach focusing on households in a particular village. The research did not cover all households but a representative sample. More detailed research could consider more elements of water access but the current study focused on four elements namely; water availability, water quality, water affordability, distance to water source and its effects on water washed related elements. The research did not focus on all ailments suffered by household members but inclined to water related ailments and related outcomes following an intervention. It also examined outcomes in cases where there have not been any interventions. An encountered limitation in the study included language barrier since most of the respondents did not understand English, the language used in setting the questionnaire. To overcome this, the researcher used a local translator who helped the respondents understand the questions. In addition, this helped build confidence and trust from the respondents since the research was conducted in a language they could understand. In order to overcome the encountered skepticism, the respondents were told that the research was purely academic and that the findings are never to be used for any other purpose. The also never indicated their names in the questionnaire. This enabled giving of honest answers.

1.8 Definition of Terms

Access to water: it is accepted that there is no single definition of 'access to water' however a few definition exist. Some researchers have used aspects such as distance to the water and also the quality of water. In their research Cherutich, J. et al. (2015), focused on four elements in defining access to water namely; water availability, water quality, water affordability, distance to water source. These aspects will inform this study

Health outcome; a change in the health status of an individual or a group of people or population which is attributable to an intervention or a series of interventions

Household; 'refers to a person or groups of persons who reside in the same homestead/compound but necessarily in the same dwelling unit, have same cooking arrangements, and are answerable to the same household head' (KNBS, 2010)

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CHAPTER TWO
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews concepts and empirical studies touching on water accessibility and intervention strategies in remote areas. The study variables which are in tandem with the study objectives are illustrated through a conceptual framework. Theories based on accessibility of social amenities are also reviewed.The reviewed literature is summarized and critiqued with an aim of establishing pertinent research gaps.

2.2 Theoretical Literature Review

The research project was based on the empowerment theory and the Social Constructionism Theory discussed in this subsection.

2.2.1 Empowerment Theory

Empowerment according to Rappaport (1984) is a construct that connects strengths of individuals, natural helping systems, and preemptive action to social policy and change. Empowerment theory links individual well-being with the larger social and political environment. Empowerment research is said to focus on identifying capabilities instead of cataloguing risk factors and exploring environmental influences of social problems instead of blaming victims. Empowerment-oriented interventions enhance wellness while they also aim to ameliorate problems, provide opportunities for participants to develop knowledge and skills, and engage professionals as collaborators instead of authoritative experts (Perkins & Zimmerman, 1995).

Swift and Levin (1987) argue that theories of empowerment include both processes and outcomes, and they in the same breadth suggest that actions, activities or structures may be empowering, and that the outcomes of such processes result in a level of being empowered. A distinction between empowering processes and outcomes is critical in order to clearly define empowerment theory. Empowering processes for individuals might include participation in community organizations. Empowering processes at community level might include collective action to access government and other community resources. Empowered outcomes refer to operationalization of empowerment that allow for the studying of consequences of empowering processes. Empowered outcomes for individuals might include situation-specific perceived control and resource mobilization

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skills. Community level empowerment outcomes might include evidence of pluralism, and existence of organizational coalitions, and accessible community resources (Zimmerman, 1993).

Empowerment suggests that participation with others to achieve goals, efforts to gain access to resources, and some critical understandings of the socio-political environment are basic components of the construct. Applying this general framework to an organizational level of analysis suggests that empowerment includes organizational processes and structures that enhance member participation and improve goal achievement for the organization. At the community level, empowerment refers to a collective action to improve quality of life in a community and to the connections among community organizations. Organizational and community empowerment, however, are not simply a collection of empowered individuals. In the context of this study, empowerment theory is applicable in that it emphasizes on identification of capabilities rather than limiting itself to cataloguing the potential risks.

2.2.2 Social Constructionism Theory

The HBM was originally developed in the 1950s by social psychologists working at the U.S. PublicHealth Service to explain why many people did not participate in public health programs such as TB or cervical cancer screening (Janz et al., 2002). Subsequently, it was extended by Leventhal, Rosenstock, Becker and others to explain differing reactions to symptoms and to explain variations in adherence to treatment. It has subsequently been used to guide the design of interventions to enhance compliance with preventive procedures.

The underlying concept of the original HBM is thathealth behavior is determined by personal beliefs or perception. The following four perceptions serve as the main constructs of the model: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Each of these perceptions, individually or in combination, can be used to explain health behavior (Brown, 1999).

Within the health field susceptibility refers to the risk a person has to a particular disease or health outcome. Within the context of the HBM, perceived susceptibility examines the individual's opinions about how likely the behaviors they partake in are going to lead to a negative health outcome. For example, look at an individual who smokes. Smoking is

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known to have many complications such as lung cancer, bladder cancer, etc. If a smoker does not feel that he is at risk of developing any of these diseases, he has no reason in his mind to make a behavior change. One of the Goals of the HBM is to change perceptions of susceptibility in order to move towards behavior change (Chen et al., 2007).

Most people are familiar with the word severity as how serious a situation or action can be. In the HBM perceived severity addresses how serious the diseases that a person is susceptible to can be. In the case of a smoker, lung cancer is one of the leading causes of death among the American population. A smoker may not understand how difficult lung cancer can be to detect and how difficult it can be to treat. They also may not know how painful and long lasting a disease it can be later in life. The HBM seeks to increase awareness of how serious the outcomes of behaviors can be in order increase the quality of one's life (Lamanna, 2004)

The HBM is generally taken as marking the beginning of systematic and theory-based research on health behavior. It has been widely used and applied to explaining health behaviors as well as used to design intervention programs. It has been used in cross-cultural studies, although its constructs may need to be adapted to each cultural group.

2.3 Empirical Literature Review

2.3.1 Impact of Availability of Clean Water on Health Outcomes

Accessibility of water takes into account water as a commodity, which homes ought to have control over. This means where the water is situated and how quickly it can be accessed. Water usage relates to "entitlement rights" of households, required for basic needs (i.e., for drinking, cooking, hygiene and sanitation) and other purposes such as watering livestock and backyard gardens. In addition to these, the quality of water matters as a means of preventing water-borne diseases. Nevertheless, ease of access to clean water, in sufficient quantities to satisfy basic human needs, is doubtful (Ariyabandu, 1999).

The International WaterDecade's goal, that was set to be achieved by 2015, aimed at reducingthe percentage of individualsthatusuallyaccess their drinking water from unhealthy sources or from faraway places by half. In addition, the goal called for better access to basic sanitation. However, despite there being a consensus on the critical need to supply clean water in order to improve child and population health, the basic provision

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of clean water through municipal or private piped systems has not yielded the anticipatedand immediate health improvements in most developing world countries(Clasen & Cairncross, 2004).

Kenya faces obstacles in realizing its vision for the water and sanitation sector that aims at ensuring improved water and sanitation is available to all by 2030. Access to water and sanitation is enshrined asa right of citizens in the constitution of Kenya that was promulgated in 2010. This is in tandem with the United Nations guidelines that access to water and sanitation is a human right thatobligates all member states to deliberate and take appropriate steps aimedat ensuring the progressive realization of this right (UNCHR 1990). Despite this ambitious national objective the percentage of the Kenyanable to access improved water supply remains low (Ministry of Water and Irrigation, 2007).

The government of Kenya 2008 Poverty Reduction Strategy Paper (PRSP) recognizes the importance of safe clean water in reduction of poverty. The PRSP discusses the water situation, challenges to overcome the water crisis and a multiple approach to tackle the problem.There are huge variations between rural and urban dwellers in terms of their access to safe water. While 68% of urban dwellers are dependent on unsafe water sources, 42.3% of their counterparts in rural areas are dependent on unsafe sources of water. Over 80% of people in West Pokot, Marakwet, Bomet and Mwingi districts depend on water sources considered unsafe, (KIHBS 2005/2006). 87% of people living in informal settlement in Mombasa use drinking water from an improved source and 49% are reportedly treating the water. More than 50% take less than 15 minutes to fetch drinking water(United Nations Children's Emergency Fund, 2009). These figures show there is an urgent need to ensure easy access to clean water sources and awareness on how the community can ensure water is accessible through affordable rates, above all effective operations ensured to streamline the quality of water(Moraa, Otieno, & Salim, 2012).

Unsafe water, sanitation and hygiene are behind almost 4% of the global total in disability adjusted life years (DALYs), and among high mortality countries almost 6% of the total attributable DALYs (WHO, 2002). This is a result of strong and consistent association in developing nations between unsafe water and hygiene, and infant and child mortality arising from diarrheal diseases(Boadi & Kuitunen, 2005) Recent studies of the mortality transitions in the US in the late 19th and early 20th centuries attribute three-quarters of the

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infant mortality decline and two-thirds of the child mortality decline to the development and spread of clean water technologies (Cutle & Miller, 2005).

The unique concept of household water security has been described by various researchers depending on specific research interests and perceptions. The simplest definition is regarding household water security as the ratio of water supply to water demand. In this regard security is achieved when the ratio is greater than unity, practically meaning water surplus. According to Ariyabandu and Dharmalingam (1997) household water security is "having adequate domestic water supply, so that the productive life of peasants can be sustained"(Ariyabandu & Dharmalingam, 1997). Thomas (2001) has improved on this definition by showing that it means the attainment of both Absolute Water Security (AWS) and Design Water Security (DWS), where AWS refers tothe quantity of water supplied to perform culturally normal life in a reliable manner. On the other hand DWS is the quantity of water supplied to achieve the designed daily requirement of waterin a reliable manner.

Central Africa is characterized by an abundance of freshwater resources, except for the northern parts (Chad, northern Cameroon and CAR) where in the past three decades there was a decline in rainfall. The demand for water is rising but it is unlikely that freshwater availability, which is currently well above the water stress threshold of 1 700 m3 per person per year, will be affected much in the short to medium term (Briscoe, .2000).

In parts of Central Africa the quality of water resources is declining due to pollution from industrial effluents and sewage outflows, agricultural run-off and, in coastal areas, from seawater intrusion. Further threats include logging operations (that impair water quality through sedimentation) and mining operations. Drought poses a significant risk to the wetland systems in northern Cameroon and Chad. The impacts include loss of vegetation with conversion to bare soils and eventual erosion and loss of fertility. Improving freshwater management by evolving strategy planning, developing a legal and policy framework for natural resources, developing and facilitating access to the freshwater, and heightening public awareness of water use are challenges Central African governments face in the next decade(Chiuta, Johnson, & Hirji, 2002).

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According to Pereira et al., (2002), availability of water is largely affected by environmental factors. This may be driven by hydrological which lead to brief variations of availability. In this context, water is regarded as a natural resource that requires management and sustainable use. Consequently, the unsustainable consumption of water could have long-term impacts on reducing water available tocommunities concerned. In addition, human factors have influence on water availability since available water should be harnessed and distributed to ensure adequate and reliable flow (Pereira et al., 2002).

2.3.2 Impact of Water Quality on Health Outcomes

The quality of waterhas an important impact on health. This is despite whetherthis water is used for drinking, for domestic purposes, for food productionor for recreational purposes. Poor quality water can causedisease outbreaks and can contribute to various diseasesthat could manifestat different time (World Health Organisation, 2013). Quality of water is impacted by both natural processes (for example seasonal trends, underlying geology and hydrology,weather and climate) and by human activities that includesdomestic, agriculture, industry and environmentalengineering(Pan Africa Chemistry Network, 2011).

Unfavorable managementpractices that are mainly driven by political agendas rather than by profit-orientation shed light on largeinefficiencies and poor quality of services being provided by public companies that provide water services. Inthe 1990s, privatization of water services was hailed as a potential solution to thepoor performance of publicly owned water monopolies that had hitherto seen 1 billion peoplein developing countries without access to clean and safe water. In addition, by then 40 percent of theworld's population did not have access to safe and clean sanitation services (Segerfeldt, 2005)

On the flip side Private companies became widely unpopular and untrusted due to perceptions. They were associated with low and fallingwater quality, as well as the highly prices services.For illustration, a series of highlypublicized episodes of low quality water supplied by Uragua and Aguas de la Costa, which are subsidiary companies of the Spanish water companies Aguas de Barcelona and Aquas de Bilbao, triggereda well publicized request bythe then Minister of Economics and Finance, Alejandro Atchugarry,

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for Uragua to leave thecountry(Borraz, Pampillón, & Olarreaga, 2011)byas early as 2003 (in the middle of a financial crisis).

Household social and economic factors are also associated with types of toilet facility and waste disposal pattern, which directly affect water quality(Cronin, Breslin, Gibson, & Pedley, 2006). Despite the demonstrated importance of more proximate individual behavioural factors on water quality, socio-demographic studies of household water quality may help answer questions about variations at existing tariff structures benefit the most rich as they are the ones who have the highest level of access to piped water and public taps(Banerjee & Morella, 2011) .

Othercontributinginfluencersespecially in rural areas include spatial factors such as origin and distance to water sources (Jagals et al. 1999), and location of households settlements along the rural-urban continuum (Wright et al. 2004). Densely populated urban areacould too lack access to safe drinking water or get water that is transported long distances which arepoor quality and safety (Wright et al. 2004). In addition, household socio-economic status measures such as education and occupation may be associated with exposure to, and perceived salience of, health education about water quality and sanitary habits. For example, detailed evidence from behavioral studies of water use and quality indicates the roles played by variations in household storage of water and sanitary habits, such as hand washing, on microbiological contamination of household water supply (Clasen & Bastable, 2003)

It is estimated that around half of all patients occupyingAfrican hospital beds suffer from water-borne illnessesdue to lack of access to clean water and sanitation. This isreducing the overall health and productivity of the adultworkforce(Pan Africa Chemistry Network, 2011).

The water resources that Africa has are being degradeddue to high demand and untreated waste water enteringthe environment from industry and domestic sources.Adaptation and planning of water resources is difficult,as many African countries have no established waterquality monitoring programmes. Most of the rivers andwater courses are non-gauged and the rural and peri-urban water supply is not considered to be an essentialpart of most water treatment systems(Pan Africa Chemistry Network, 2011)

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Specifically in Kenya, as much as groundwater is one of water supplies in many parts of the country, for its potable needs in most of its parts, the information available on its quality suggests that aquifer contamination due to use of onsite sewage disposal and seawater intrusion is rampant (Munga, 2004). Munga argues this in the report about pollution and vulnerability of water supply aquifers in Mombasa but gives no suggestion on a way of improving the quality of this great supply of water.

Quality of water has been shown to be a reliable indicator of overall well being. The satisfaction of Sub-Saharan Africanwith their communities' water quality is connected to their overall view on life. Dissatisfaction with water quality is almost twice as likely to be present in those who rate their lives as 'poor' enough to be considered as 'suffering,' than residents satisfied with their water quality. Further, those who are dissatisfied with water quality are substantially less likely to rate their lives well enough to be "thriving(Rzepa & Pugliese, 2012)

2.3.3 Impact of Affordability of Water on Health Outcomes

The affordability of clean drinking water in most parts of the world is mostly a result of the service charges that a household may have to pay to a water service provider, to enable it to provide water services in a sustainable fashion.Water Affordability can also touch on the cost a household incurs in setting up and maintaining its own clean water sources.

Generally speaking, affordability of water is measured through the cost of accessing clean water as a proportion of the household incomes. Median Income households, in industrialized countries, spend about 1.1% of their income on water and sanitation bills. These bills take up 2.6% of poor households' income. This is higher still for someregions and for very poor people. In order to help vulnerable people, public authorities often takemeasures aiming to reduce water bills to less than 3%(Smets, 2009)

A specific example of this is seen in a study of the cost of drinking water and waste water management systems on household in North Eastern USA. This study accessed cost information on drinking water and water for 66 communities, and found that projected annual costs ranged from 3,592 to 333 US Dollars. As a percentage of median household

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earning, this was 0.6% to 8.4% of MHI. Also evident from the data, was that 87% of two-media communities had combined household communities greater than 500 US Dollars per annum, while approximately 50% had projected costs in excess of 800 US Dollars annually (New England Interstate Water Pollution Control Commission, 2006).

A study of water affordability found that, higher values for water affordability of are often normal in developing countries. The study noted thataffordability indicesexceeding 10% are observed for a small minority of poor people. While affordability benchmarks of 3 to 5% are promoted by international organizations, such limits will not be achieved unlesstargeted social measures are implemented and funded. In some cases such benchmarks are notrealistic at all because in order to implement them there would be a need to provide aid for waterto a large fraction of the population (Smets, 2009)

More specifically research into water affordability in found that Uganda water payments represent as much as 22% of the average income of households in the poorest 20% of the income distribution (UNDP 2006). More urban dwellers turn to unimproved sources of water supply (wells and Boreholes) but dilapidation of access and lack of maintenance of these sources render many of them unsuitable to secure safe drinking water. For example only 10% of the wells, and boreholes,in the Central African Republic, provide safe water (Dominguez & Foster, 2011).

2.3.4 Impact of Distance to Clean Water Source on Health Outcomes

The UN highlighted to policy makers a ‘global water crisis’ stating, in the 2006 Human Development Report, that waterborne disease related illnesses account for 2 million child fatalitiesper annum, and millions more women and children spend hours just collecting water, restricting their opportunities to do other things (UNDP, 2006).

For numerous vulnerable livelihood people, daily water accessibility problems deplete energy, health, money and time. Wealth inequalities, location, added to flawed policies;result in the poor spending the most money and travelling the greatest distance. Accessing the basic minimum standard of 20 litres of safe water, from an improved source within a kilometer from home remains a large challenge for 1.1 billion people.

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This includes half of all people in Sub Saharan Africa, unable meet this requirement (UNDP, 2006).

Not only are, opportunity costs, social costs, and economic costs (stemming from ill health and energy expenditure), related to water collection, costs related to water collection are also concerns. Dufaut (1988) mention vertebral column injuries among adults, scoliosis among children, and limitation of inflexion and arthritis (degenerative rheumatism) as common injuries. Energy costs of water collection are estimated at 8-10% of daily calorie intake in Sub-Saharan Africa (Rosen & Vincent, 1999). An example of this isMehretu and Mutambirwa (1992), who observe that in Chiduku communal of Zimbabwe a mean of 217 calories per day is used up per water carrier, which is approximately 10% of the carrier's daily calorie intake.

Locating improved water supplies within reasonable distances to households saves time and possibly increases total water consumption. Although the World Health Organisation (WHO) considers 200 metres as a convenient distance, Sharma et al., (1996) as cited by Rosen and Vincent (1999) points out that when rural households' perceptions of accessibility is considered, the percentage of households with safe water supply access could substantially reduce and may approach zero in some cases. Huttly et al. (1990) find that improving accessibility by constructing boreholes in villages in Nigeria reduced daily water fetching times from 360 minutes to 45 minutes. Through rain water harvesting, women in Sri Lanka saved 2 hours (opportunity costs) daily by a reduction in the number of trips to dug wells and springs from 8 to 3 per day. As a result, rainwater consumption increased in dry and wet seasons between 50 to 70%. Such substantial amount of time saved could improve women's welfare through time and energy availability for education, high-status work and civic activities (WHO, 1995) when it has been estimated that as much as 25% of women's productive time in developing countries could be allocated to this task (Sullivan, 2002)

To further enhance water security, multiple water sources are utilized depending on the season and geographic location. Ariyabandu (2001) report that between 2 and 6 sources of water have been used among the rainwater harvesting community in rural Sri Lanka. The burden of domestic water provision by women and children (usually girls) in developing countries is well known (Sullivan, 2002).

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Mehretu and Mutambirwa (1992) observe that in the Chiduku communal area in Zimbabwe, approximately 91% of total time devoted to water collection is carried out by women and girls whilst in Arusha, Tanzania, they account for 75% of this time (Makule, 1997). In 8 rural communities in Madagascar, Minten et al., (2002) indicate that women constitute 87% of water carriers and spend an average of 12 minutes (one-way) undertaking this daily activity. Bevan, Collier, and Gunning (1989) give more insight by indicating that in the Central and

Nyanza Provinces in Kenya, younger women generally spend less time than older women in fetching water from the same distance: in the Central Province, women aged 20-29 spend 56 minutes daily; age 30-49 (69 minutes); over 50 years (77 minutes). In a village in Mozambique(Bevan, Collier, & Gunning, 1989), Cairncross and Cliff (1987) indicate that about 5 hours is devoted to water collection (return trip) from a public standpipe located 4 kilometres (average of 131 minutes per carrier per day) whilst a similar source located 300 metres takes an average of 25 minutes per carrier per day. Women in Oyo State, Nigeria spend about 58 minutes daily collecting water at an average distance of 537 metres(Sangodoyin, 1993).

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2.4 Conceptual Framework

A framework that illustrates variables (independent and dependent) relative access to clean water and health outcomes is shown in Figure 2.1.

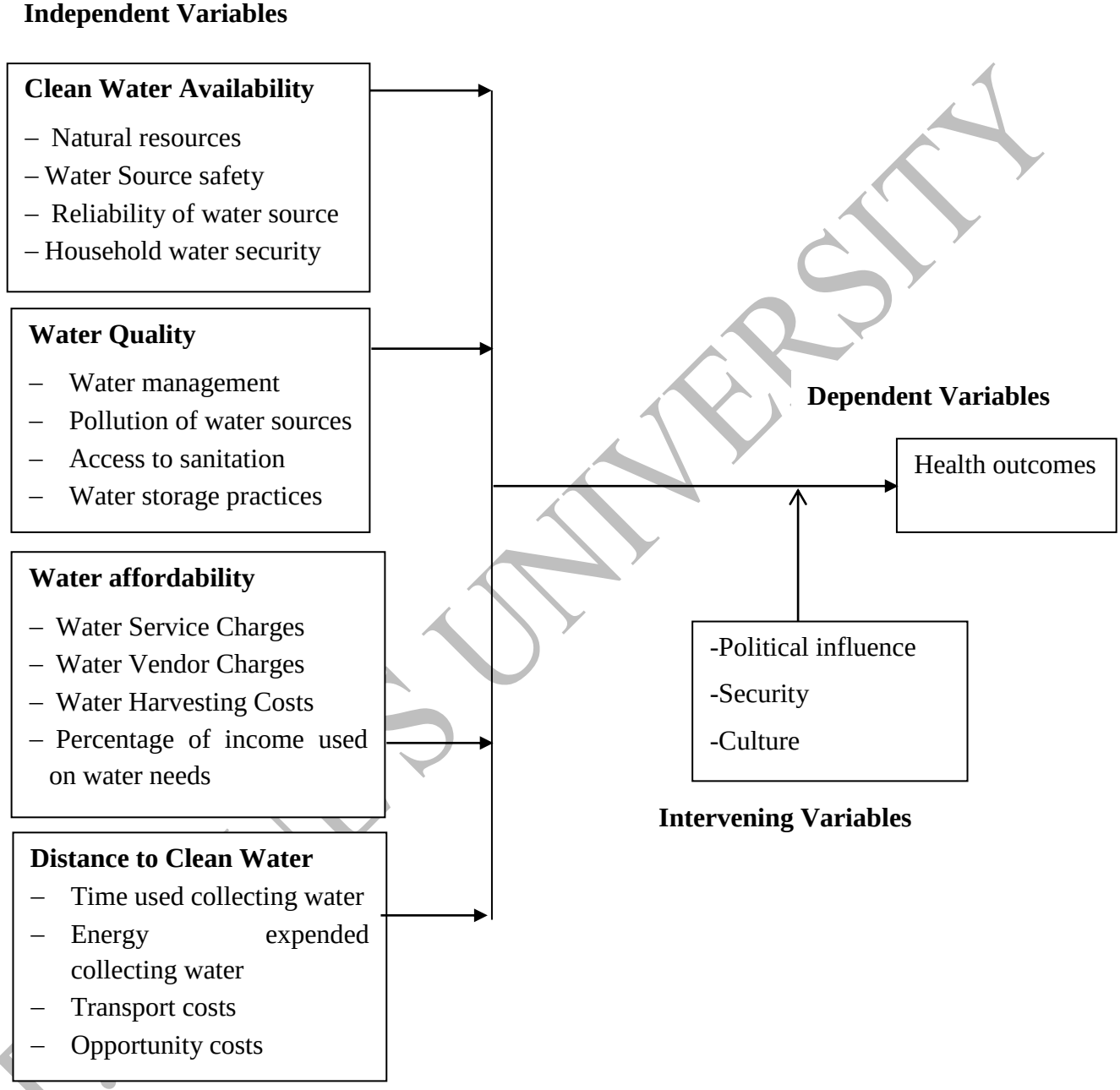


Figure 2:0:1: Conceptual Framework

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CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design and methods that the researcher employed in order to achieve the objectives of the study. It also looks into the population of the study, sample and sampling technique, research instrument, data collection procedure, pilot study and also how the researcher processed and analyzed the collected data.

3.2 Research Design

Burns and Grove (2001) opine that a research design is the tool that researchers employ to optimize the validity of the research findings(Burns & Grove, 2001). The researcher usedthe descriptive research design which is an example of quantitative research design. Given that the data collected was quantitative, then this type of research design was the most appropriate. Descriptive research design according to Kothari (2004) attempts to answer the "what?" question and the general research question is "What are influences of access to clean water on the health outcome of household members in drought stricken areas?" It is further posited that descriptive research provides an account of individuals, groups or situations that may form the first stage of more complex designs (Carter, 2000). The overall object of this kind of research design according to Walker (2007) is to discover the meaning, describe what exists, determine the frequency with which something occurs and categorize information.

Rybarova (2006) adds that descriptive research design is non-experimental and no attempt is made to manipulate or control or interfere with the variables. A descriptive strategy according to the scholar measures a variable(s) as they exist naturally; the goal is to describe the variable(s). In line with the assertion of Mbwambo (2005), the descriptive research design chosen will enable the study realize the research objectives. The researcher used quantitative methods of data collection. The most appropriate quantitative research method in the context of this study as asserted by Olsen and George (2004) is survey research because this method is ideally used to study a population at a certain point in time. A survey is a structured set of questions given to a group of people in order to measure their attitudes, beliefs, values or tendencies to act.

3.3 Target Population

The population is an aggregate of subjects who have shared characteristics. In other words, it is a set which includes all measurements of interest to the researcher(Shroenher & Tumalla, 2007). In the context of the current study, the population includedhousehold members in Ng'aratuko village in Baringo County. The village is comprised of 172 households.The researcher collected information related to the study from the heads of the families or the next adult in case of absent heads. The target population, on the other hand, comprised of the villages in the dry and semi-arid areas in Kenya. The target population is the population to which the findings of the study will be generalized.

3.4 Sample and Sampling Technique

A sample is a subset of the target population and is necessitated when the latter is too large to be included in the study. Sampling is essential as it reduces research costs and time, but more importantly when it is impossible to study the whole population. Nassiuma (2000) formula was utilized to estimate a sample size, n, from a known population size, N and a coefficient of variation (V.C) of 30%.

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

Where

n = sample size;

N = population size;

C = coefficient of variation and

e = error rate (margin)

Substituting these values in the equation, estimated sample size (n) was calculated as follows.

$$n = \frac{172 \times 0.3^2}{0.3^2 + (172-1)0.02^2}$$

= 98 respondents

The study therefore, involved a total of 98 respondents who were drawn from 98 households. The respondents were identified through simple random sampling method.

3.5 Research Instrument

The study employed a structured questionnaire to collect data from the sampled respondents. This means that the study will depend on findings from analysis of primary

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data. The interview questions captured brief demographic information of the respondents. However, greater emphasis was in capturing data on all the study variables (independent and dependent variables) in line with the study objectives. The questions were drafted in a simple, explicit and understandable language.

3.6 Validity and Reliability of Research Instrument

Prior to embarking on the main study, the researcher carried out a pilot study with the aim of verifying both the reliability and validity of the research instruments. The pilot study involved collecting data from 10% (10 respondents) who were randomly selected from the target population. These respondents were excluded from the main study.

Reliability is said to be the degree to which an instrument can be dependent upon to secure consistent results upon repeated application. The reliability was carried out by use of Cronbach alpha and the instrument had a score of alpha 0.7 ($\alpha \geq 0.7$) which was reliable. On the other hand, the researcher sought to determine the content validity of the instrument. Since this validity cannot be put into a statistical test, expert opinion from the University supervisors was sought (Kimberlin&Winterstein, 2008). Only after their successfully assessing the instrument, were they deemed to be valid.

3.7 Data Processing and Analysis

The collected interview scheduleswere thoroughly looked into to ensure that they were appropriately filled. The data was then edited and coded into the SPSS (Statistical Packages for Social Sciences) ready for processing and analysis. Data analysis was carried out through both descriptive and inferential statistics. The descriptive statistics covered frequencies, percentages, means, and standard deviations while inferential statistics wasused in form of Pearson's correlation coefficient. Inferential statistics were used to measure the strength and direction of the influence of independent variables (clean water availability, water quality, water affordability and distance to clean water) on the dependent variable (health outcomes of residents). The findings were presented in form of frequency tables, descriptive statistics tables and inferential statistics tables.

3.8 Ethical considerations

The researcher was first cleared to undertake the research the Director, Board of Postgraduate Studies ofSt. Paul's University. Further permission was sought from the National Commission of Science, Technology and innovation which gave the research

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authorization and permit; from the County Commissioner and from the County Director of Education, Baringo County. The questionnaires were issued to the sampled respondents by the researcher. The respondents were allowed time to fill in the questionnaires after which the researcher collected the filled questionnaires at a time agreed upon with the respondent.

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CHAPTER FOUR
DATA INTERPRETATION, ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter interprets, analyzes and presents data inform of tables graphs and charts. The findings of the study are done according to the objectives of the study.

Response rate

Out of 98 targeted respondents 95 responded. This marks a 96.94% response rate.

4.2 Background Information

The study sought to establish the background information of the respondents. The findings are presented in the sections below.

4.2.1 Gender

The study aims at establishing the gender of the respondents in the area of study. The results are presented in Table 4.1.

Table 4:1:Gender of Respondents

Responses	percent	Number
male	54.7	52
female	45.3	43
Total	100.0	95

Source: author (2016)

Table4.1 show that majority (54.7%) of the respondents are males while 45.3% of the respondents are females. This shows that males were more represented in the sample than females. This suggests that both men and women are involved on matters related to water in the target area.

4.2.2 Age group

The study sought to find out the age group of the respondents. The findings were presented in table 4.2.

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Table 4:2: Percentage distribution of respondents by age

Responses	Percent	Number
less than 25 years	5.3	5
25-35 years	15.8	15
36-45 years	35.8	34
46-55years	30.5	29
56 years and above	12.6	12
Total	100.0	95

Source: author (2016)

The findings in Table 4.2 show thatmajority (35.8%) of the respondents was between36 years and 45 years while 30.5% of the respondents are in the age bracket of (46-55). This shows that most respondents are in the mid life. It suggests that most of the households in the area are headed by individuals in the middle life.

4.2.3 Period lived in the village

The study aimed at finding out the length of time the respondents have lived in the village. The results were presented in Table 4.3

Table 4:3:Percentage distribution of respondents bylength of time respondents had lived in this village

Responses	Percent	Number
less than 1 year	10.5	10
2-5 years	42.1	40
more than 5 years	47.4	45
Total	100.0	95

Source: author (2016)

The findings in Table 4.3 show that the majority (47.4%) of the respondents have lived in the village for more than 5 years while 42.1% of the respondents have lived for a period between 2-5 years. This shows that most of the respondents had lived in the village for more than 2years. This implies that the information obtained from the respondents is likely to be reliable since it is based on substantial experience.

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4.3Availability of Clean Water in Ng'aratuko Village

The first objective of this study was to examine the effect of availability of clean water on health outcomes of residents of Ng'aratuko village. The study obtained data on the availability of clean water in Ng'aratuko village. The findings were presented in the sections below.

4.3.1 Availability of sufficient natural water sources in Ng'aratuko Village.

The study aims at knowing if there are sufficient natural water sources in and around Ng'aratuko village. The findings are in Table 4.4.

Table 4:4: Percentage of respondents who that there are sufficient natural water Sources in Ng'aratuko

Responses	Percent	Number
strongly agree	3.2	3
Agree	5.3	5
Neutral	17.9	17
Disagree	45.3	43
Stronglydisagree	28.4	27
Total	100.0	95

Source: author (2016)

The findings in Table 4.4 show that the majority (43.3%) of the respondents disagreed that there were sufficient natural water sources in Ng'aratuko village while 28.4% strongly disagreed on the same. Cumulatively this showed that a high of 73.7% of respondents disagreed that there are sufficient water sources in the village. This implies that the available natural water sources in Ng'aratuko village are not sufficient. This suggests that the area suffers from water scarcity. According to Pereira, Cordery, & Iacovides (2002), water scarcity contributes enormous problems for societies subsequently affectingfood production and frustrates hunger andpoverty alleviationin these regions. More often than not the population growth in affected areas is larger than thecapability for sustainable use of the natural resourcesthat includes water.

4.3.2 Availability of local piped water system.

The study aims at accessing the availability of piped water system locally. The findings are presented in Table 4.5.

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Table 4:5: Presence of local piped water system

Responses	Percent	Number
strongly agree	1.1	1
Agree	5.3	5
Neutral	17.9	17
Disagree	47.4	45
strongly disagree	28.4	27
Total	100.0	95

Source: author (2016)

The findings in Table 4.5 show that majority (47.4%) of the respondents disagreed while 28.4% strongly disagreed that there is presence of local piped water. Cumulatively this shows a total of 75.8% of the respondents disagreed that there were local piped water system inNg'aratuko. This shows that Ng'aratuko village lacks piped water system that supplies the villagers with clean water. This implies that there is need for installing piped water system of Ng'aratuko village. According to World Health Organization (2004) pressurized pipe networks are a means of supplying drinking-water to individual homes, buildings and communities' public taps. A widespread adoption of piped networks contributes to reduction andcontrol of water-related diseases significantly. In addition, they reduce the burden of water collection, which is usually borneby women and children, and which is also a potential source of diseaseand injury(WHO, 2004). This therefore suggests that development of piped water distribution is critical toimproving health and progressing development in Ng'aratuko village.

4.3.3 Safe and clean water collection points

The study sought to find out if the water collection points of Ng'aratuko residents were safe and clean. The findings are presented in Table 4.6.

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Table 4:6: Water Collection points for Ng'aratuko residents are safe and clean

Responses	Percent	Number
strongly agree	14.7	14
Agree	13.7	13
Neutral	16.8	16
Disagree	54.7	52
Total	100.0	95

Source: author (2016)

The findings in Table4.6 show that majority (54.7%) of the respondents disagreed that the water collection points of Ng'aratuko residents were safe and clean. This suggests that to most of residents the collection points for water in Ng'aratuko village are not clean. This shows that the water collecting points of Ng'aratuko residents was not reliable as safe and clean. These findings suggest that the residents of Ng'aratuko village face a hazard in form of water borne diseases. According to an article by National Academy of Sciences (2007) polluted water from being dirty, it is deadly. The report shows that 1.8 million people die annually as a result of diarrheal diseases such as cholera while tens of millions of others are seriously sickened many of water-related ailments. The results therefore suggests there is need for authorities to consider making water collection points safe so as to improve the health of residents in Ng'aratuko Village.

4.3.4 Protected water collection points

The study sought to find out if water collection points in Ng'aratuko village were well protected. The findings were presented in table 4.7.

Table 4:7: Water collection points for Ng'aratuko village are well protected

Responses	Percent	Number
strongly agree	7.4	7
Agree	11.6	11
Neutral	48.4	46
Disagree	32.6	31
Total	100.0	95

Source: author (2016)

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The findings in Table 4.7 show that majority(48.4%) of the respondents neither disagreed nor agreed that water collection points were protected.However, 32.6% of the respondents who were significant disagreed that water collection points were protected. This implies that to a considerable extent water collection points in Ng'aratuko Village are not protected. Protection of water is important as it contributes to lowering of hazard of water borne diseases. According to the Clean Water Action of California USA, water collection points can be protected avoiding use antibacterial soaps or cleaning products at water source, never throwing unwanted or out-of-date medicines in the water source, never putting contaminants such as motor oil, detergents, lawn fertilizers, and pesticides down storm drain; and choosing non-toxic household products whenever possible(Clean Water Action, 2015). This therefore suggests that there is need for the villagers in Ng'aratuko to be sensitized on how to take care of their water collection points.

4.3.5 Sufficient water through-out the year in water supply points.

The supply sought to find out if the water supply points for residents of Ng'aratuko had enough water through-out the year. The findings were presented in table 4.8.

Table4:8: Water Supply Points Have Sufficient Water Through-Out the Year

Responses	Percent	Number
Agree	9.5	9
Neutral	31.6	30
Disagree	31.6	30
strongly disagree	27.4	26
Total	100.0	95

Source: author (2016)

The findings in Table 4.8 show that majority (31.6%) of the respondents disagreed that the water supply points for residents of Ng'aratuko had sufficient water through-out the year while 27.4% of the respondents strongly disagreed. Cumulatively the findings shows that 59% of the respondents disagreed that water supply points in Ng'aratuko village would supply water throughout the year. This implies that the water sources were not permanent and thus at times getting water for the residents was a challenge for some time in the year.

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This suggests that water supply in Ng'aratuko village is not reliable and especially during dry seasons. According to Griffin & Mjelde (2014) an importantdimensionof the waterscarcityproblemis the managementof watersupplyrisk, especiallyas it relates to drought. The findings suggest that planners of water supply in the area should put in place strategies that would cushion residents of Ng'aratuko village against drought seasons. This would ensure a constant and reliable supply of water throughout the years. In addition, within the context of defining sustainable development as a development that meets the needs of the present without compromising the ability of future generations to meet their own need(IISD, 2016) there is a need of policy formulators to look at how the villagers of Ng'aratuko Village can access water to is residents and also without compromising the future capacity of the villagers to access water. This implies that sustainable strategies that look at holistic concerns should be a priority so that they village is safe even in the future.

4.4Water Quality in Ng'aratuko Village.

The study sought to find out the water quality in Ng'aratuko village. The findings were in the categories below and were presented in form of bar graphs.

4.4.1 Access to treated water.

The second objective of the study was to establish the effect of quality of water on health outcome of residents of Ng'aratuko village.The study obtained data on whether the residents accessed treated water. The findings were presented in the graph in Figure 4:1.

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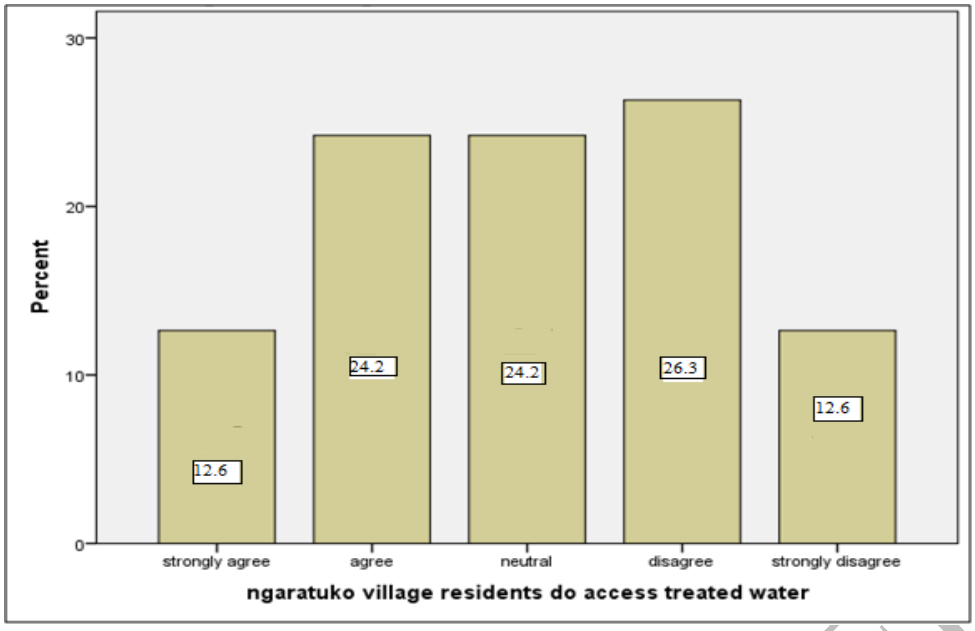


Figure 4:1: Finds on access to clean water by Ng'aratuko residents

Source: author (2016)

The findings in the Figure 4.1 show that a majority (26.32%) disagreed that the village residents did have access to treated water. When combined with those who strongly disagreed, a total of 38.9% disagreed that the village residents did have access to treated water. This shows that a majority of the residents do not have access to treated water.Water treatment and purification is criticalto ensure water is ready for use by individuals. During the process, bacteria and waterborne pathogens must be completely removed before the water to make it ready for consumption. Methods used include chlorination, filtration and distillation(U.S.Water, 2016).The presence of properly designed and maintained water purification devicesoffers some level of protection to the consumer(WHO, 2004). These findings show that development planners in the Ng'aratuko should aim at installing water treatment facilities to ensure that the health of residents is taken care of.

4.4.2 Consumed water appears clean and without floating particles.

The study aimed at establishing whether the water consumed by Ng'aratuko villagers appeared clean and without floating particles. The findings were presented in the Figure 4.3.

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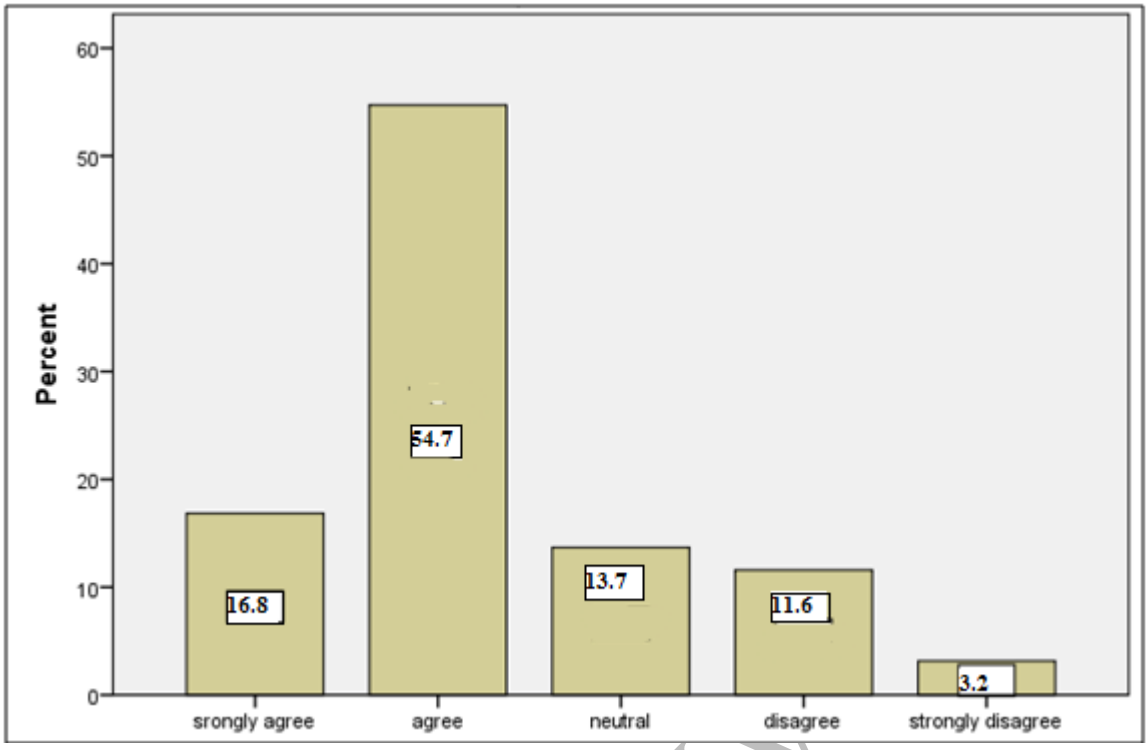


Figure 4:2: Ng'aratuko villagers consume clean water

Source: author (2016)

The findings inFigure 4.2 show majority (54.74) of the respondents agreed that water consumed in Ng'aratuko village appeared clean and without floating particles while 16.54% strongly agreed. Cumulatively, a total of 71.58% agreed that water consumed by Ng'aratuko village appears clean ad without floating objects. This shows that water consumed by Ng'aratuko village appeared clean and without floating objects. Particles floating in water can be of various types including brown or orange particles, black particles or white or tan particles. According to(Coulter, 2015)Particles floating in water can be unpleasant, though the concerns are usually not harmful to health. White particles or cloudy water usually result from organic materials picked up as the water flows through the ground or minerals that are suspended in water. A recently dug well can causebrown sediment in water though this could indicate a problem with the well. Most kinds of the floating particles can stain water fixtures, sinks and tubs, or even laundry. Inorganic particles can corrode plumbing systems, such as pipes and fittings. These finding shows that water in Ng'aratuko Village does not stain laundry or even fixtures.

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4.4.3 Regular checking of water.

The study aims at finding out if the quality of water used by Ng'aratuko village residents is regularly checked. The findings were presented in Figure 4.3.

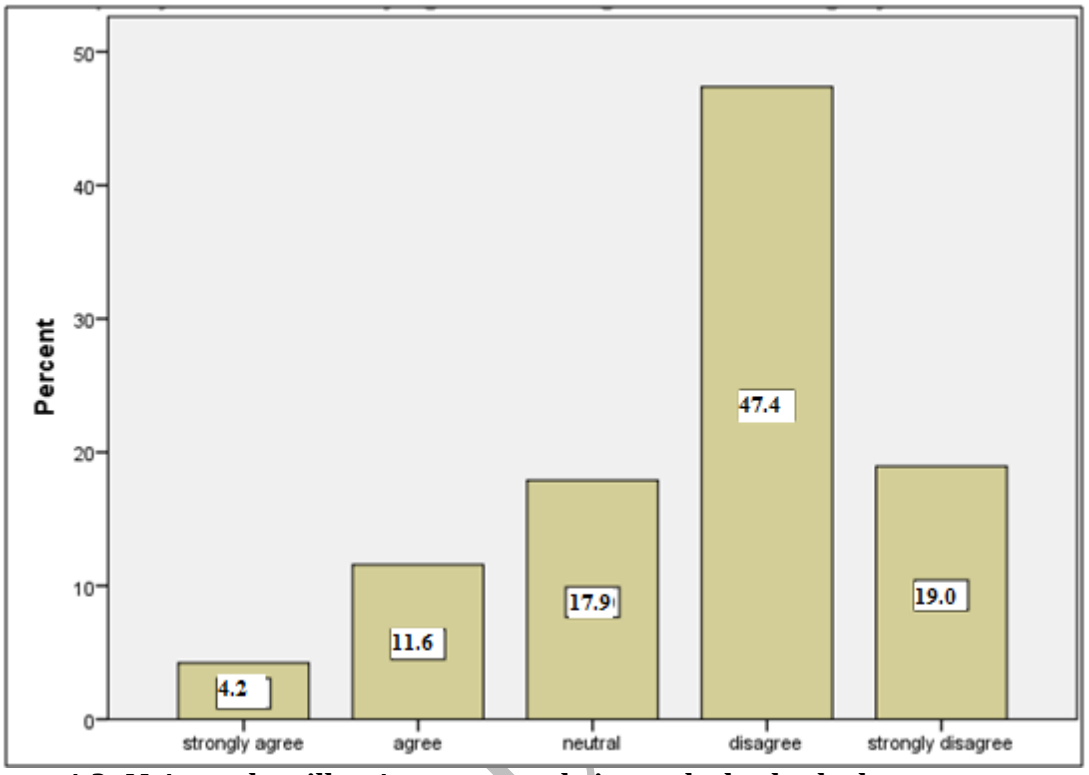


Figure 4:3: Ng'aratuko village's water supply is regularly checked

Source: author (2016)

The findings in the Figure 4.3 show that majority (47.37%) of the respondents disagreed that the water consumed by Ng'aratuko Village is regularly checked while 18.95% strongly disagreed. Cumulatively this shows that 66.32% of respondents disagreed that water quality is regularly checked. This suggests that the quality of water used by Ng'aratuko residents is not monitored for quality.Monitoring the quality of surface water helps protect waterways from pollution. Obtained data could be useful to farmers inmanaging their land and crops while thecounty and national governments could the information to help control pollution levels(South Western Florida Water Management District, 2016). The findings shows that pollution of water in Ng'aratuko could occur and it be unreported. This would put the health of the villagers at risk. It is therefore imperative that the authorities, the policy makers and water service providers put mechanisms for monitoring water quality in order to minimize the risk of pollution and subsequent effect of health of residents, either through direct consumption or through effect on the food chain.

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4.4.4 Ng'aratuko residents awareness to treat water at home.

The study aimed at knowing if Ng'aratuko village residents were aware of how to treat water at home. The results were presented in a bar chart in figure 4.4.

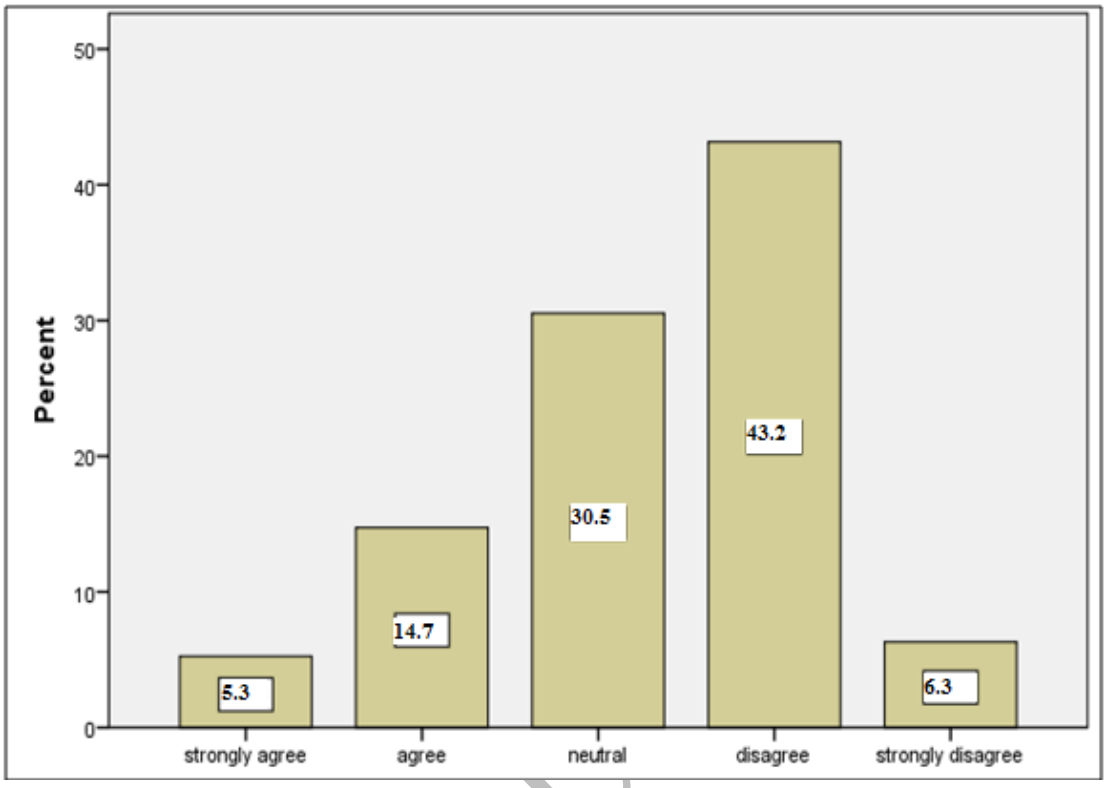


Figure 4:4: Ng'aratuko residents aware how to treat water at home

Source: author (2016)

The findings in the Figure 4.4 show that a majority (43.16%) of respondents disagreed that the residents were aware how to treat water at homewhile 6.32% strongly disagreed giving a total of 49.48% of the residents were not aware of how they could treat water at home.Water sources such asrivers and springs provide water that would contain a lot of pollution including garbage unfit for consumption(Street Directory, 2015). To be clean, the water should undergo a number of treatments necessary to make it drinkable including boiling. The findings suggestthat there is need for educating Ng'aratuko residents on how to treat water at home. This would reduce the possibility of occurrence of water borne diseases caused by organisms such as *Eschirichia coli* bacteria and*Giardia*parasite) which may be in a drinking water supply. Drinking water contaminated with thesegerms could make people very sick(Alberta Health Services, 2014).

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4.4.5 Fetchingwater from untreated water Sources

The study aims at knowing if Ng'aratuko village residents had to fetch most of their own water from untreated water sources such as rivers, stream and boreholes. The findings were presented in the Figure 4.5.

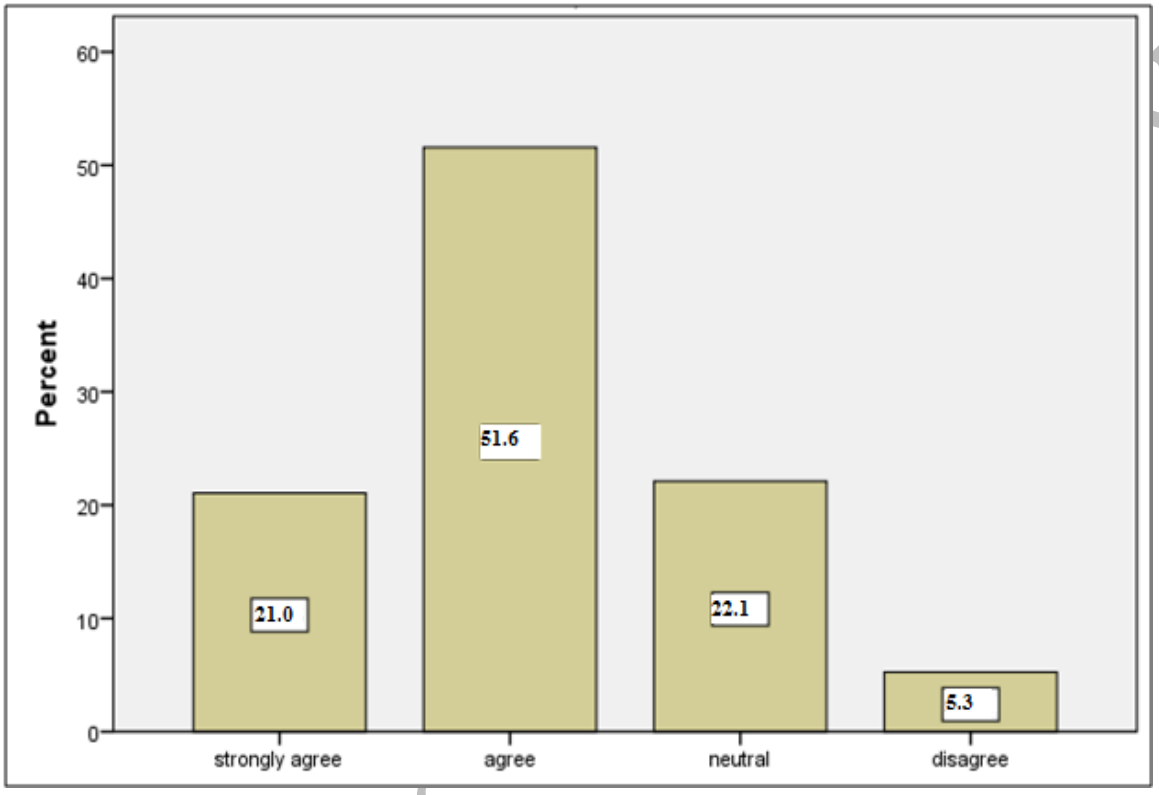


Figure 4:5:Ng'aratukoResidents Depend on Untreated Water

Source: author (2016)

The findings in the Figure 4:5 show that majority (51.58%) of the respondents agreed that they depended on untreated water while 21.05% strongly agreed. Cumulatively a total of 72.63% agreed showing most of residents consumed untreated water. This implies that Ng'aratuko village residents were exposed to health hazard dueto water from untreated sources. This is because drinking untreated water from water sources used by both humans and animals and living in close proximity to domestic animals are factors that put people at the highest risk of being infected by mycobacteria(bacteria that cause diseases such as tuberculosis in humans and animals).Infections caused by mycobacteria have a great impact on public health, animal health and the health of ecosystems in rural areas(Kankya, 2011).

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4.4.6 Polluted water source.

The study sought to find out if the water sources in Ng'aratuko villagewas regularly polluted with either, dirt from runoff, sewerage and other pollutants. The findings are presented in the Figure 4:6.

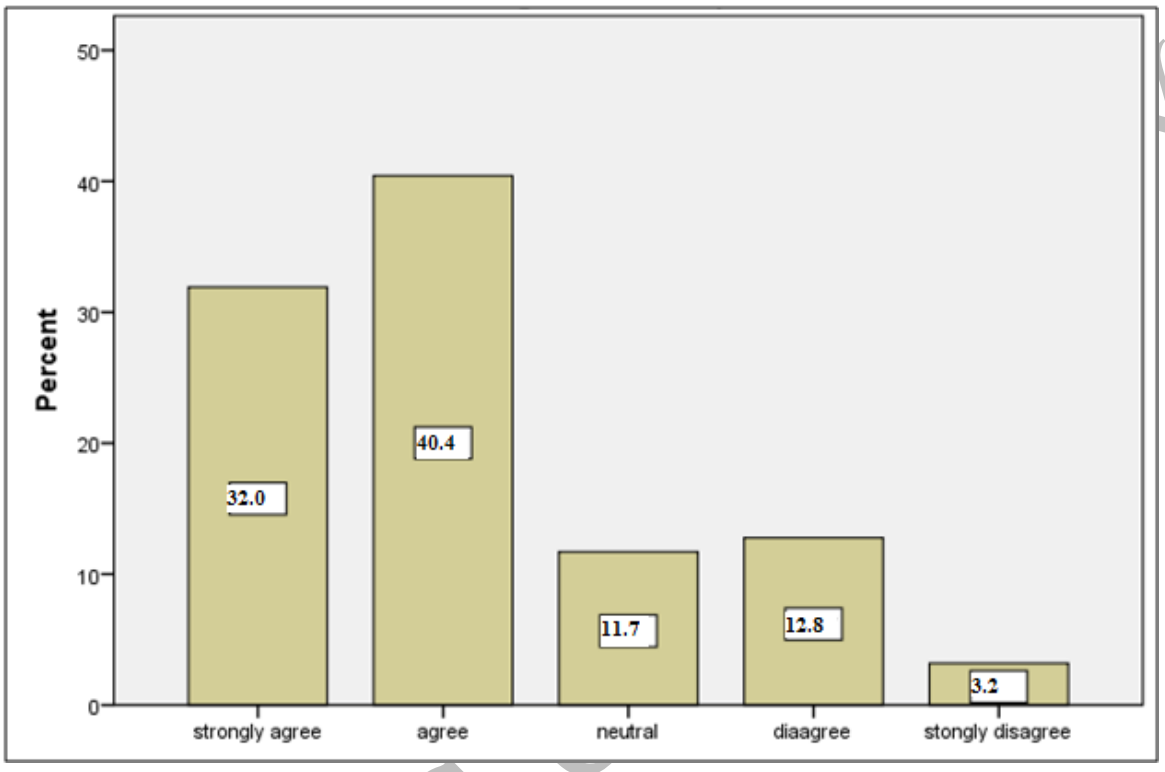


Figure 4:6: Pollution in Ng'aratuko water sources

Source: author (2016)

The findings Figure 4.6 show that majority (4.43%) of the respondents agreed while 31.91% strongly agreed. Cumulatively a total of 72.34% therefore agreed that water source in Ng'aratuko are regularly polluted with either, dirt from runoffs, sewerage and other pollutants. This shows that the water sources in this village were regularly polluted. Any form of water pollution is a source of disease that could affect the residents' health. Water contaminants include a wide range of compounds, including agricultural chemicals, effluents from industrial and municipal wastewater facilities, water treatment and distribution byproducts. It also includes naturally occurring substances whose levels rise as a result of sprawl and deforestation. Whatever the sources of water pollution, these contaminants pose potential health risks to the public, especially infants and children and other vulnerable populations(Environmental Working Group, 2009). This emphasizes the need to therefore consider strategies that would control sources of contamination is the

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study area. This approach would be preventive in the management of health hazards in the study area.

4.4.7 Access to modern sanitation facilities.

The study sought to find out if Ng'aratuko village residents had access to modern sanitation facilities. The Findings were presented in the bar graph in Figure 4:7

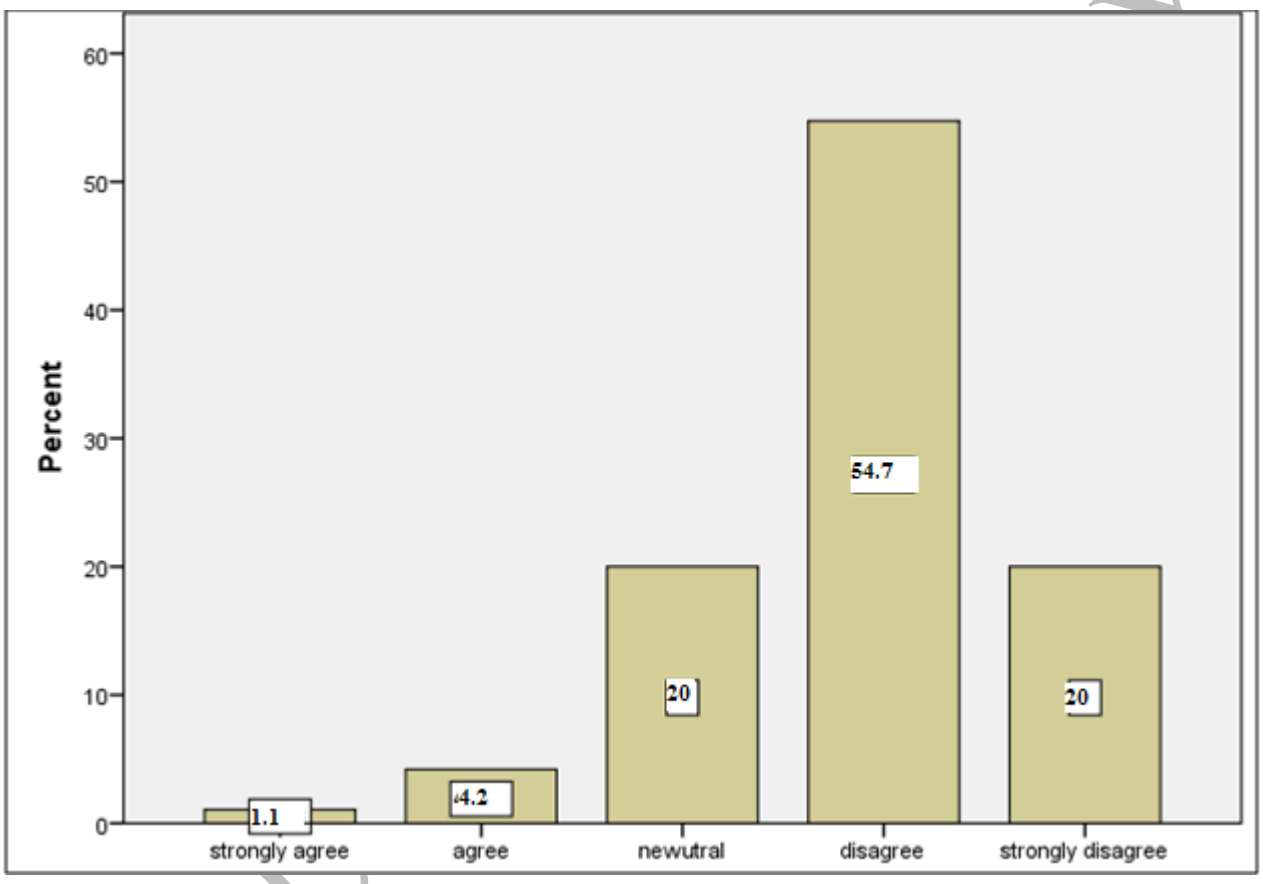


Figure 4:7: Access to modern sanitation facilities

Source: author (2016)

The findings in the Figure 4.7 show that a majority (54.74%) of the respondents disagreed that they had access to modern sanitation facilities while 20% strongly disagreed. This showed that a total of 74.74% of the respondent either strongly disagreed or disagreed that Ng'aratuko village residents had access to modern sanitation facilities. This shows that Ng'aratuko village residents do not have access tomodern sanitation facilities. By the United Nations estimates 2.5 billion people globally do not use improved sanitation facility while little over 1 billion practice open defecation(United Nations, 2005) significantly putting a risk on the health of individual communities.This suggests there is

a need to plan long term for practical sanitation projects for Ng'aratuko that would make it less prone to preventable health hazards.

4.4.8 Clean water storage capacity for later use

The study aimed at finding out if Ng'aratuko residents capacity to store clean water of significant amounts of clean water for later use. The study results were presented in the graph in Figure 4.8.

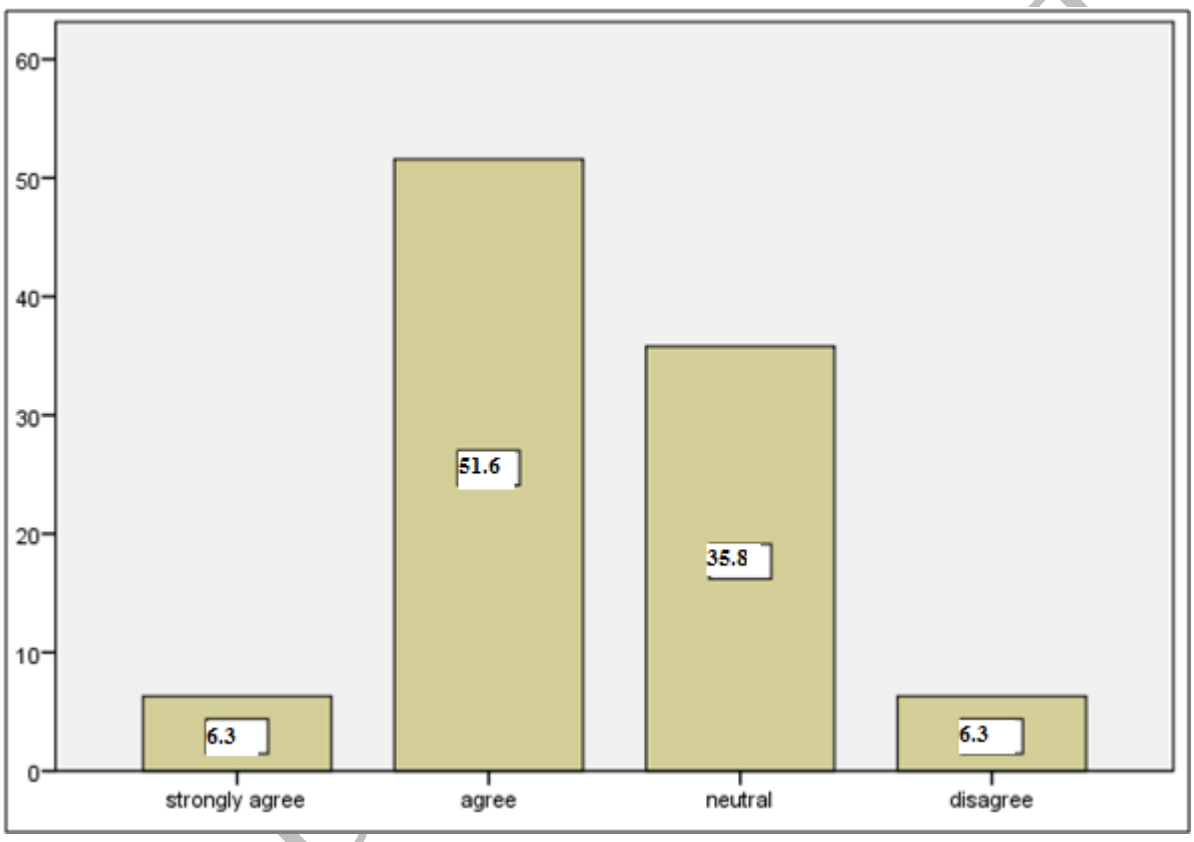


Figure 4:8Clean Water Storage Capacity For Later Use

Source: author (2016)

The findings in the Figure 4.8 show majority (51.58%) of the respondents agreed that Ng'aratuko residents have a significant capacity to store clean water for later use. This shows that the residents in the area have a capacity to store clean water significantly for later use. Capacity to store water is important since it helps in managing scarcity of water especially during dry seasons. It should be clean since water should be protected against viruses, contamination, and bacteria(Emergency Essentials, 2013). The practice of supporting water storage should be encouraged but efforts should be made to ensure that water storage facilities are clean. This would ensure that stored water does not pose a health risk to residents of Ng'aratuko village.

4.4.9 Treatmentof Harvested Water before Consumption

The study sought to find if harvested water was treated before consumption in Ng'aratuko village. The findings were represented in the Figure 4:9.

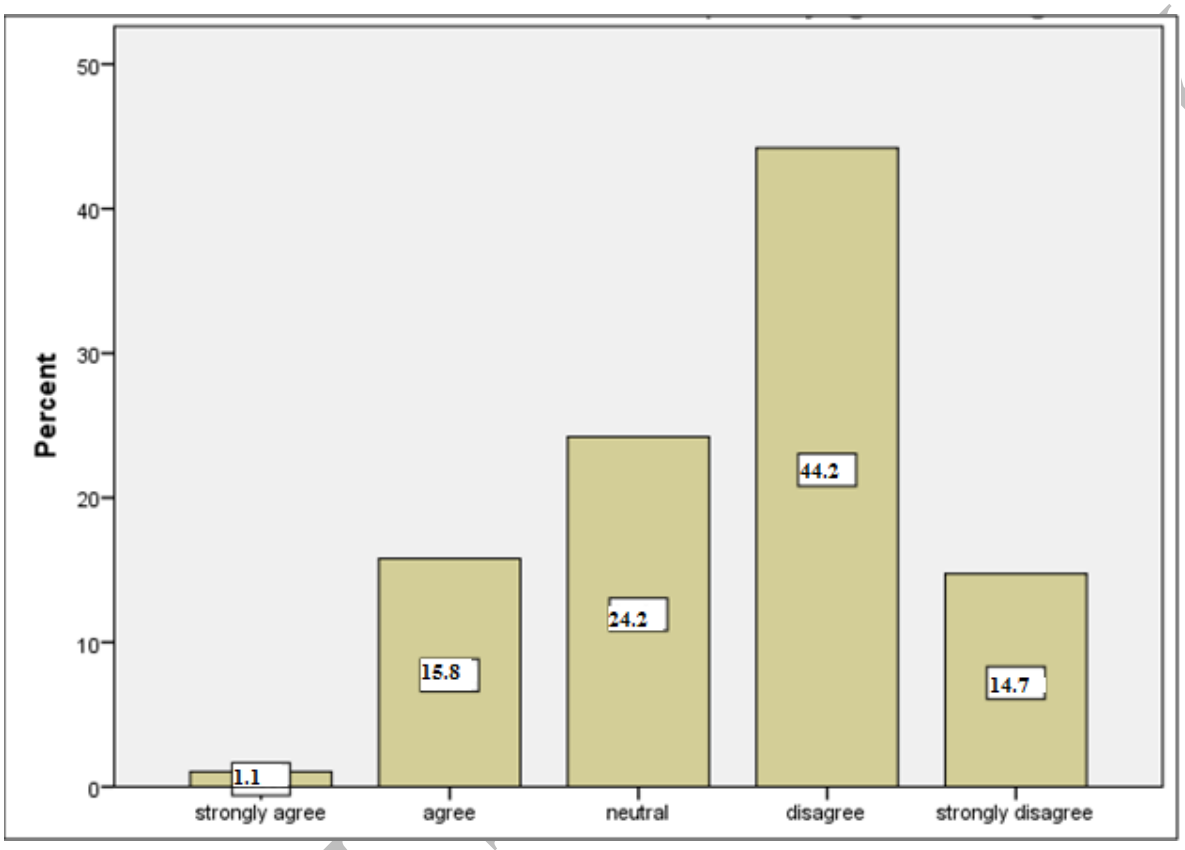


Figure4:9Treatment of harvested water before consumption

Source: author (2016)

The Findings in Figure 4:9 show that majority (44.21%) of the respondents disagreed that harvested water was treated before consumption in this village while 14.74% strongly disagreed. This shows that cumulatively 59.75% of the respondents disagreed that harvested water was treated before consumption by Ng'aratuko village.Rainwater harvesting is the practice of collecting the water producedduring rainfall events before it has a chance to run off into a river or stream orsoak into the ground and become groundwater. Often, roof-based rain harvesting produce water with lower levels of chemical and biological contaminants. However, the harvested water is subject to contamination and must be properlytreated before it can be used(White, Soward, & Shankle, 2007). This therefore implies that there is need for residents of Ng'ratuko to treat harvested water. If this is not done this would pose a source of infection to residents.

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4.5Affordability of Water in Ng'aratuko Village

The study sought to find out the affordability of water in Ng'aratuko village. The findings are presented in the categories below and will be presented on table form.

4.5.1 Household could afford the cost of paying water bills to local water services provider.

The third objective of the study aimed at determinng the effect of affordability of water on health outcome of residents of Ng'aratuko village. This study sought to find out if the households in Ng'aratuko village could afford the cost of paying water bills to local water services provider. The findings were presented in Table4.9

Table 4:9Household Can Afford The Cost Of Paying Water Bills

Responses	Frequency	Percent
strongly agree	4	4.2
agree	5	5.3
neutral	22	23.2
disagree	49	51.6
strongly disagree	15	15.8
Total	95	100.0

Source: author (2016)

The findings in Table4.9 show that majority (51.6%) of the respondents disagreed that their households could afford the cost of paying water bills to local water services provider while 15.8% strongly disagreed meaning that 67.4% disagreed. According to Rain Harvesting (2016) the cost of supplying water varies significantly between western and developing nations, but prices are rising all around the world. This is inhibitive and would make accessing clean water hard for those in the low income bracket.The findings suggests that households in Ng'aratuko village might not afford the cost of paying water bills to local water services provider. This is indicative that would come along with a plan to supply cleaner water to the community in that unless sponsored the village residents may not be able to finance installation of a water supply system in the area. This means that the policy formulators should look at looking for external donors and financiers in order to finance the project.

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4.5.2 Household could afford the cost of water transport when need be.

The study obtained data on whether households in the area of study could afford the cost of water transport should a need for it. The findings are in Table4.10

Table 4:10Household Can Afford the Cost of Water Transport

Response	Frequency	Percent
agree	7	7.4
neutral	22	23.2
disagree	42	44.2
strongly disagree	24	25.3
Total	95	100.0

Source: author (2016)

The findings in the Table4.10 show that the majority (44.2%) of the respondents disagreed while 25.3% strongly disagreed. Cumulatively this shows that 69.5% of respondents disagreed that household can afford the cost of water transport should it be needed. This shows that the households of Ng'aratuko village cannot afford the cost of water transport. It implies that the income of residents in the Ng'aratuko is low for them to afford water transport costs. This suggests without any external support, the residents would continue trekking and using their man hours in search of water instead of contracting mechanized means of carry water. This would have implication on their health due to risk of injury (WHO, 2004) as a result of carrying water for long distances. This suggests that the fact that they cannot afford to pay for water transport in case a need arises is a factor that can affect their health.

4.5.3 Households able to purchase and install water harvesting equipment.

The study aimed at finding out if the households in the area of study could manage to purchase and install water harvesting equipment. The findings were presented in Table4.11.

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Table 4:11 Household Able To Purchase and Install Water Harvesting Equipment

Response	Frequency	Percent
strongly agree	4	4.2
agree	14	14.7
neutral	26	27.4
disagree	43	45.3
strongly disagree	8	8.4
Total	95	100.0

Source: author (2016)

The findings in Table4.11 show that majority (45.3%) of the respondents disagreed that their households could manage to purchase and install water harvesting equipment while 8.4% disagreed. Cumulatively 53.7% of the respondents disagreed that households are able to purchase and install water harvesting equipment. This implies that households cannot afford to purchase the equipment and thus water harvesting is low in the area. This contributes to low accessibility of clean since a significant part of the villagers may not be having the right equipment to harvest and subsequently store water. This implies one strategy of improving access to water for the residents of Ng'aratuko is to enable them increase number of water harvesting equipment in the household. This would boost capacity of accessing water especially during the dry season.

4.5.4 Struggle to get water due to unaffordable costs.

The study obtained data on whether when water was scarce the residents did struggle to get water because those who sold it charged what they could not afford. The findings were presented in Table 4.12 below.

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Table 4:12When Water is Scarce Households Struggle to Get Water Due to High Cost

Responses	Frequency	Percent
Strongly Agree	14	14.7
Agree	49	51.6
Neutral	30	31.6
Disagree	2	2.1
Total	95	100.0

Source: author (2016)

The findings in the Table 4.12 shows that majority (51.6%), agreed that when water is scarce households struggle to get water due to high cost while 14.7% strongly agreed. Cumulatively 66.3% of the respondents agreed that cost of getting water when its scarce is a struggle.This therefore shows that the residents of Ng'aratuko village do struggle to get water when it was scarce. This has a bearing on their psychological health since increased expense for water eats into their income. Since water is a basic requirement in household its scarcity could compromise the ability of residents to cater for other family obligations such as meeting medical care costs. This implies that enabling residents of Ng'aratuko to access water even during the dry season could have a direct bearing on the income status and subsequently capacity to pay for their health services without worry on water sources.

4.6 Distance to Clean Water Source inNg'aratuko Village

The fourth objective of the study aimed at examining the effect of distance to nearest clean water source on health outcome of residents of Ng'aratuko Village. The study sought out data on the distance to clean water in the area of study and presented the findings in the section below in the form of in form of pie charts.

4.6.1 The Primary Water Point is Close enough to my Home

The study sought data on whether the residents of Ng'aratuko village felt whether the closest was too far away from their home. The findings were presented in the pie chart in Figure 4:10.

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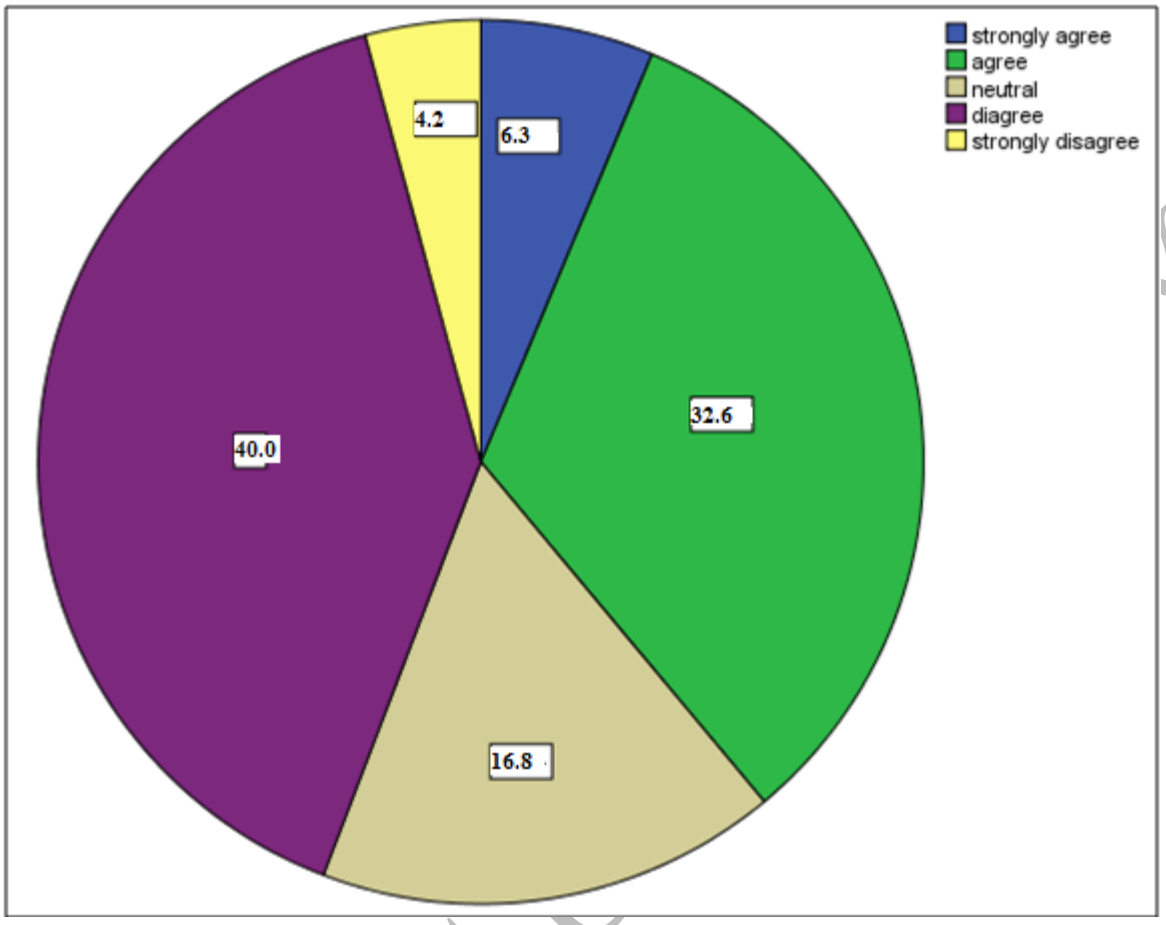


Figure 4:10:The primary water Point is close enough to my Home

Source: author (2016)

The findings in Figure 4:10 show that majority (40%) of the respondents disagreed while 4.21% strongly disagreed that the closest water point is close to home. This shows that most (44.21%) of the respondentsdid not agree that their primary source of water. This indicates that the primary water source is not close to most homes in the study area. To reduce the time and energy required for fetching water and to encourage the use of safe water sources, the Sphere Project states that water access points should be a maximum of 500 meters from every household(London School of Hygiene and Tropical Medicine, 2009). By these standards, the study suggested that the distance that is covered by residents is far from ideal. This would reduce the propensity of having injuries due to injuries when transporting water.

4.6.2 People often spend more than 2 hours fetching water for domestic use

The study sought data on whether Ng'aratuko residents often spend more than 2 hours of their day fetching water for domestic use. The findings were presented in the Figure 4:11.

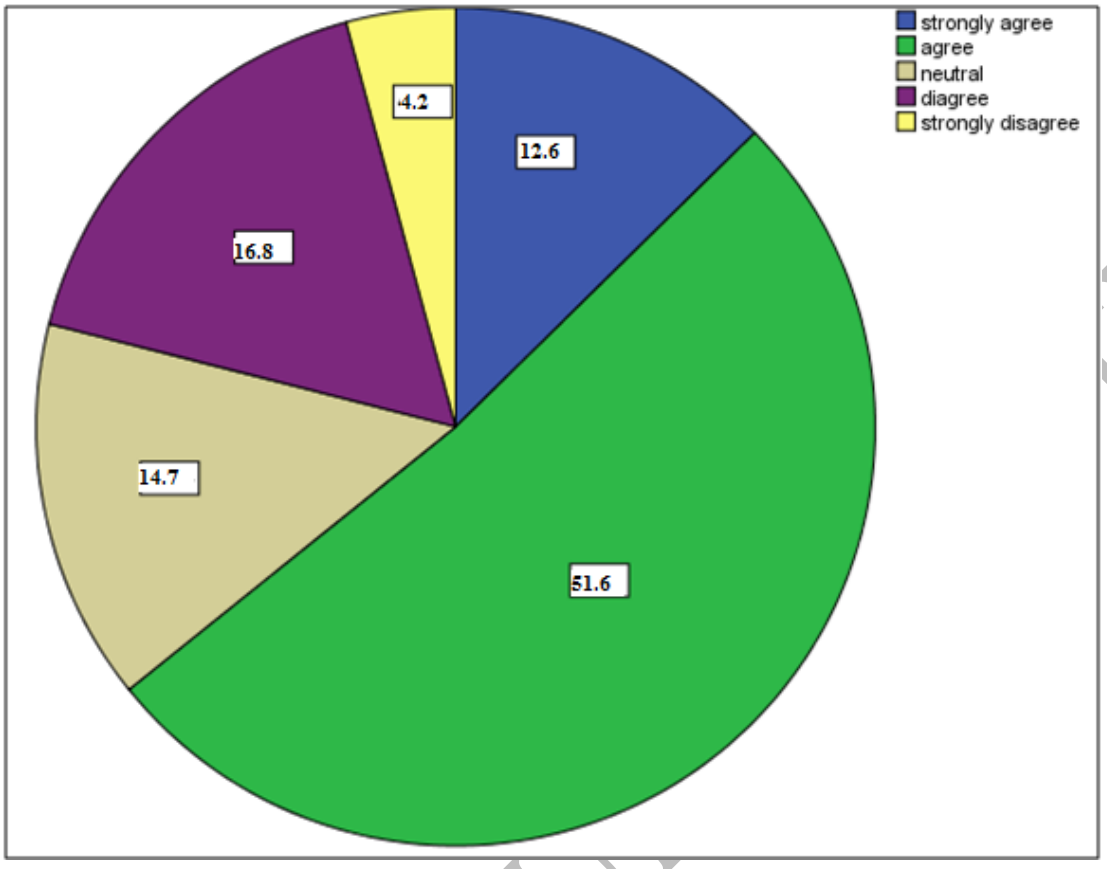


Figure 4:11Individuals often spend more than 2 hours fetching water for domestic use

Source: author (2016)

The findings in the Figure4.11 show that majority(51.58%) of the respondents agreed that Ng'aratuko residents often spend more than 2hours of their day fetching water for domestic use while 12.63% strongly agreed, cumulatively giving a total of 64.21%. This implies that the residents of Ng'aratuko village spend more than 2hours of their day fetching water for domestic use. When compared with 8 hours a day work, this suggests that 25% of working time is spent on fetching water. This is substantially many hours. It suggests that individuals involved in fetching water have limited time to attend other duties and chores. It suggests that fetching is a daily routine that could put a mental stress on the individuals. This suggests that time spent for fetching has an effect on mental health of the individuals concerned.

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4.6.3 Water Collection is an Exhausting Daily Routine

The study obtained data on whether collecting water for daily use was an exhaustive activity in the daily routine of Ng'aratuko residents. The findings were presented in the pie chart in Figure 4:12.

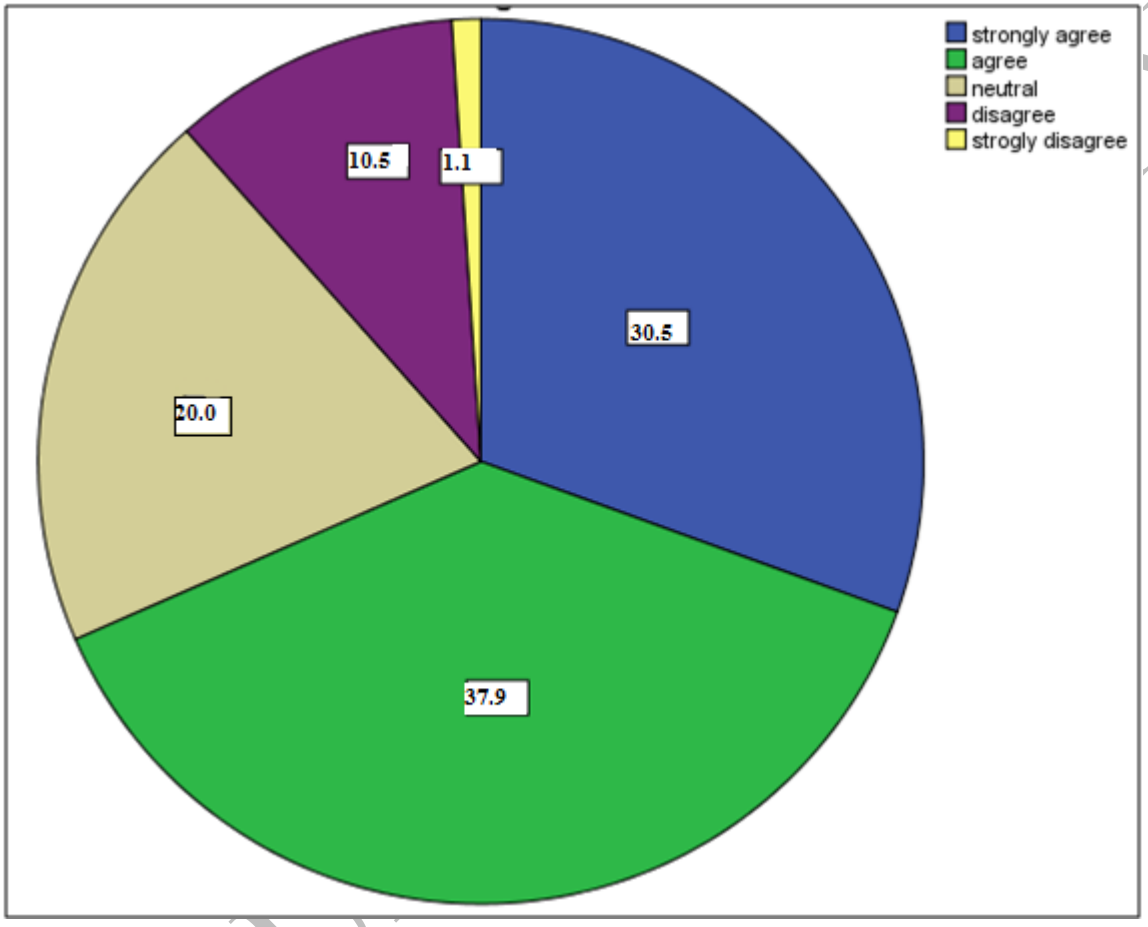


Figure 4:12Water Collection is an Exhausting Daily Routine

Source: author (2016)

The findings in the Figure4.12 show that a total majority(37.89%) of the respondents agreed that collecting water for daily use was an exhaustive activity in the daily routine of Ng'aratuko residents while 30.53% strongly agreed. Cumulatively, 68.42% of the respondents agreed that fetching water is an exhausting daily routine. This shows that the residents in thestudy areathinks collecting water for daily use is an exhausting activity in the daily routine of Ng'aratuko residents. It further shows that fetching water has a negative psychological strain on the individuals involved in fetching it.

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4.6.4 Significance of Monetary Costs for Transporting Water from Source to Home

The study obtained data on whether monitory costs of transporting water from source to home was significant for residents of Ng'aratuko village. The findings were presented in the pie chart in Figure 4:13.

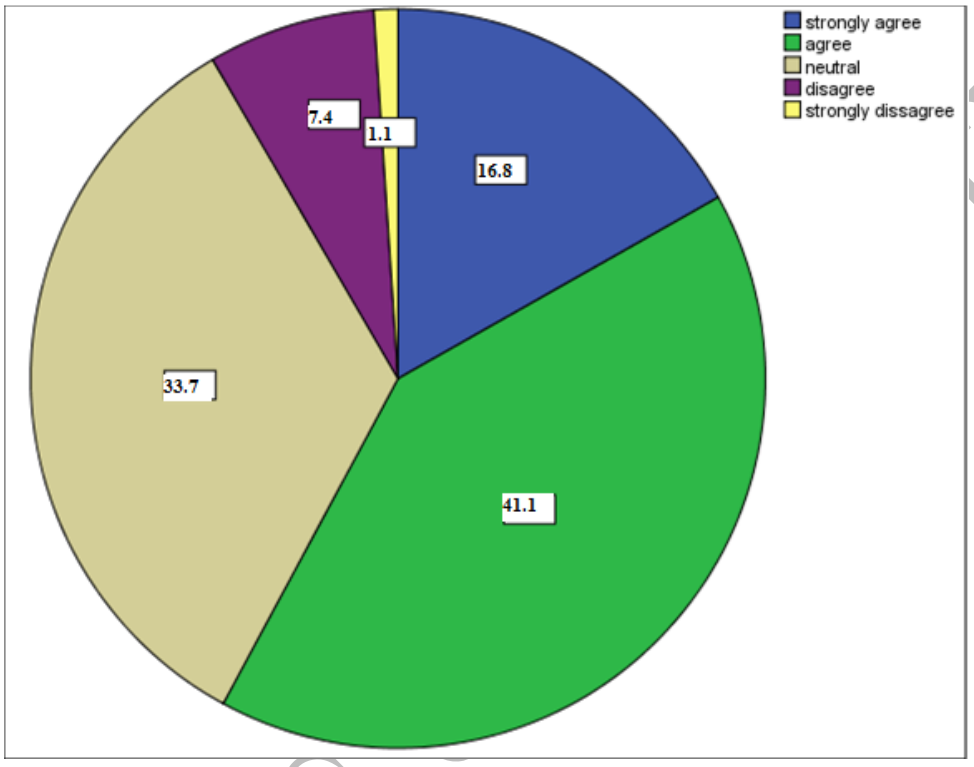


Figure 4:13Significance of Monitory Costs for Transporting Water from Source to Home

Source: author (2016)

The findings in the Figure4.13 show that majority (41.05%) of respondents agreed that monetary costs of transporting water from source to home was significant for residents of Ng'aratuko village while 16.84% strongly agreed; thus cumulatively giving 57.89%. This suggests to residents Ng'aratuko village monetary costs while transporting water is a matter of concern to them. This implies that in transporting water they would consider cheapest alternatives. This would most likely be doing personally. When compared with other sections of this report, this suggests they would bear the risk of injuries when transporting water and the psychological stress of going out to fetch water. This suggests that costs is a key component that should be addressed in any endeavor of increasing access of water to residents of Ng'aratuko village.

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4.7Health Outcomes in Ng'aratuko Village.

The study aimed at measuring the dependent variable which was health outcomes related to access to water in Ng'aratukovillage. The outcomes were presented in the categories below and were presented inform of bar charts.

4.7.1 Residents Often Suffer Water Borne Diseases

This study sought out data on whether the residents of Ng'aratuko village often suffer water borne diseases. The findings are presented in the Figure 4:14.

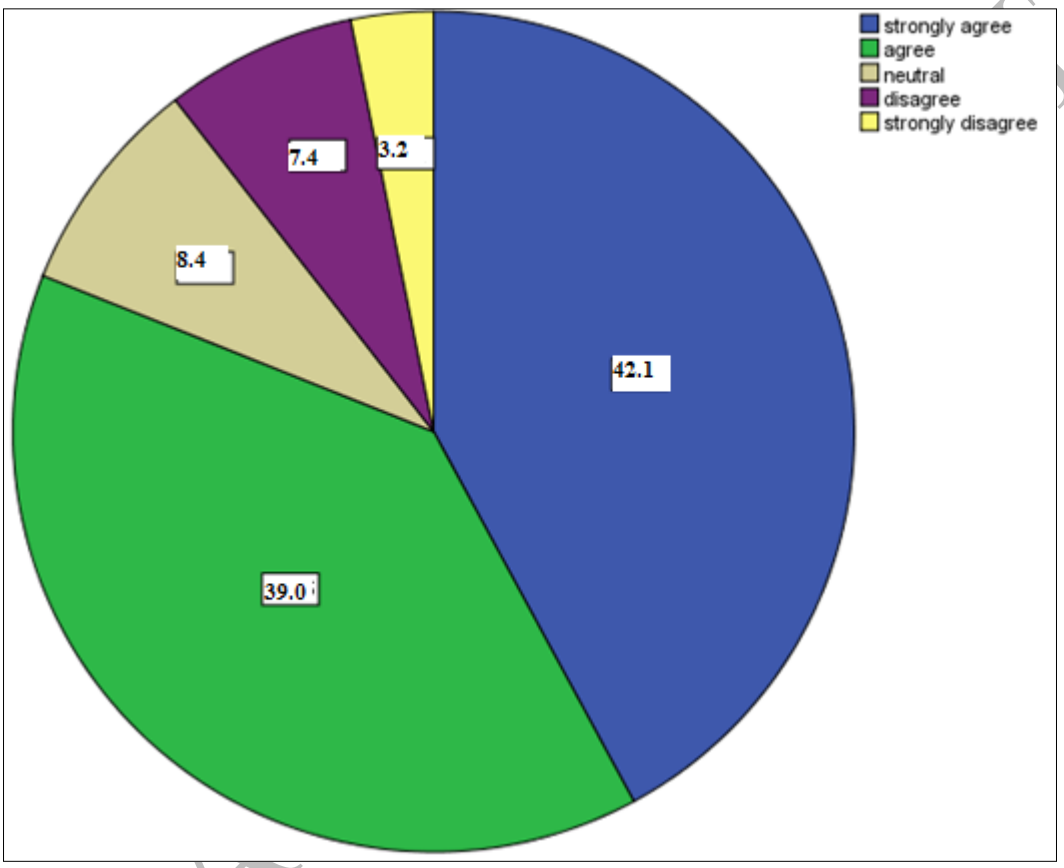


Figure 4:14Residents Often Suffer Water Borne Diseases

Source: author (2016)

The findings inFigure4:14 show that 38.95% agreed that residents often suffer water borne diseases while 42.11% strongly agreed. Cumulatively, this showed that majority (81.06%) agreed that the residents often suffer from water borne diseases. This implies thatconcern from water borne diseasesin the area.

The data showed that Access to Clean Water has implications of Health Outcomes among the residents of Ng'aratuko. This corroborates data on the health status that show that the most prevalent diseases in the larger Baringo county are Malaria, upper respiratory tract

infection (URTI) and Pneumonia, the causes of infant deaths are due to respiratory diseases, pneumonia, malaria, worms and diarrhoea (Baringo County Government, 2016). According to UNICEF, common water and sanitation related diseases include diarrhea, guinea worm disease, HIV/AIDS, intestinal worms, malaria and typhoid (UNICEF, 2015) among others. In retrospect, presence of malaria, worms and diarrhea shows that access to clean water has an implication on health outcomes in Ng'aratuko village that is located in Baringocounty. Furthermore, a report by Relief Web (2014)showed that in 2014, therewas an acute water shortage in the county. A number of water pans either dried or contained very little poor quality water. Such areas wereNatan, Naudo, Katikit, Nginyang, Chesirimion, Tangulbei and Kinyach that are near Ng'aratuko village.

4.7.2 Loss of significant time due to water borne diseases

The study sought out data on whether Ng'aratuko village lost significant amount of time suffering from water borne diseases. The findings are presented in the pie chart in Figure 4:15.

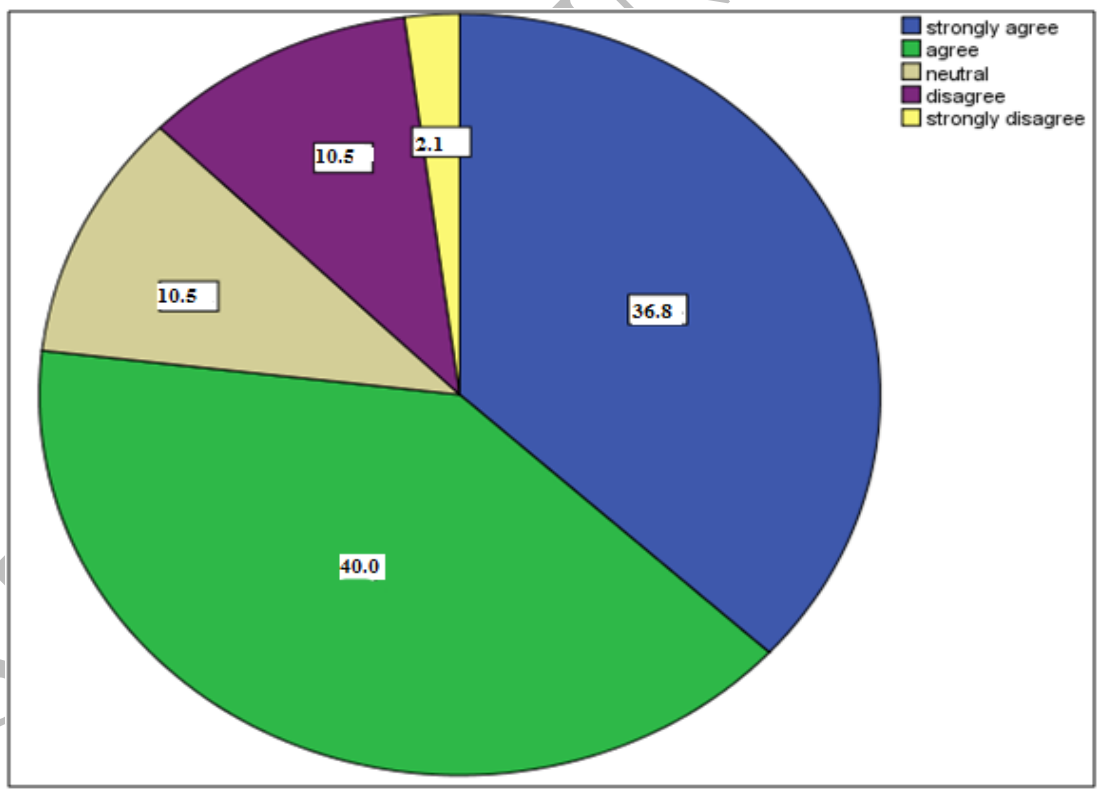


Figure4:15Loss of significant time due to water borne diseases

Source: author (2016)

The findings in Figure 4:15 show that majority (40%) agreed that there was loss of significant time due to water borne diseases while 36.84% agreed, cumulatively showing that 76.84% of the respondents agreed that Ng'aratukovillage had lost significant amount of time suffering from water borne diseases. This shows that there was much time lost by Ng'aratuko village on water borne diseases.

4.8 Statistical Analysis

The study did statistical operations on the data using Pearson Moment correlation. The Pearson product-moment correlation coefficient (Pearson's correlation, for short) is a measure of the strength and direction of association that exists between two variables measured on at least an interval scale.

4.8.1 Pearson Correlation Between Availability of Clean Water and Health Outcomes

The study obtained Pearson Correlation (r) value under 2 tailed test health outcome of Ng'aratuko village and health outcome.

The source data between availability of water is shown in an overlaid scatter diagram shown with best lines of fit. The relationship was established between the data from different indicators of availability of clean water and whether Ng'aratuko village residents often suffer water borne diseases.

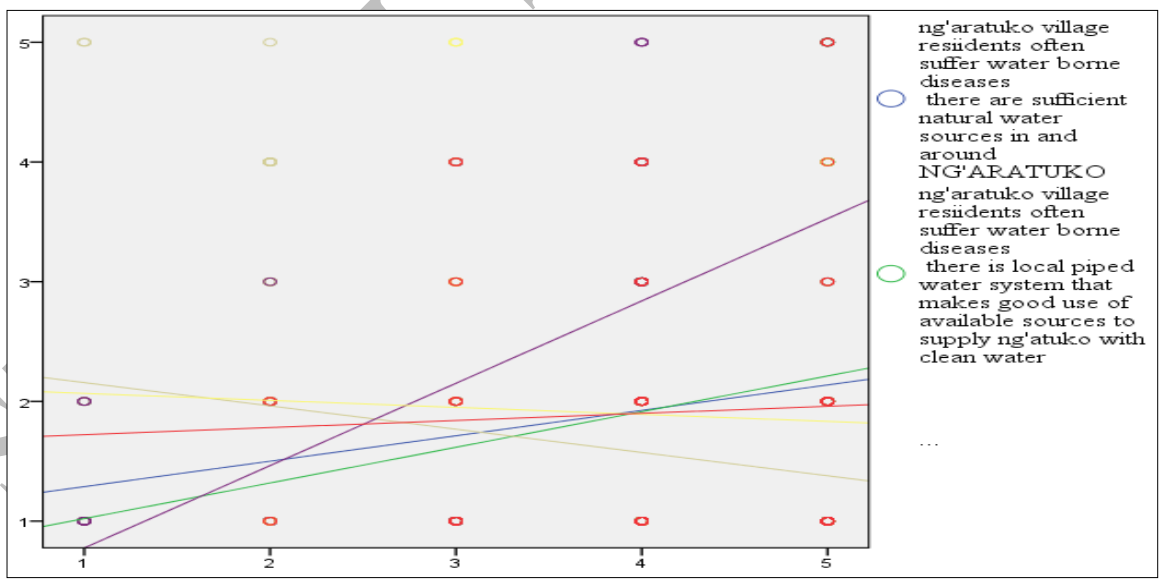


Figure 4:16An overlaid Scatter Diagram of Between Availability of Clean Water and Health Outcomes in Ng'aratuko Village

Source: Author (2016)

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The person correlation (r) was established and findings presented the in the Table 4.13.

Table 4:13Pearson Correlation Between Availability of Clean Water and Health Outcome

Variable	Statistics	Health outcome of Ng'aratuko village residents	Availability of clean water sources
Health outcome of Ng'aratuko village residents	Pearson Correlation (r) value	1	.200
	Sig. (2-tailed)		.053
	N	95	95
Availability of clean water sources	Pearson Correlation	.200	1
	Sig. (2-tailed)	.053	
	N	95	95

Source: author (2016)

Table 4.13 shows that the Pearson correlation (r) between availability of clean water and health outcome of residents in Ng'aratuko had anr value 0.2. This shows there is a positive correlation between the two variables with a weakstrength.

Model Summary for Availability of Water

The researcher obtained a model summary to show the relationship between availability of water and health outcome of Ng'aratuko Village. The results are presented in the Table 4:14

Table 4:14 Model Summary of Availability of Water against Health Outcome

Model 1	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
	.565[a]	.319	.273	.889	.319	6.875	6	88	.000

a. Predictors: (Constant), Availability of water

b. Dependent Variable: Health Outcome

Table 4.14 provides the R and R2 value. The R value is 0.565, which represents the simple correlation. It indicates a slightly strong correlation. The R2 value indicates how

much of the dependent variable, "Health Outcome", can be explained by the independent variable, "Availability of water". In this case, 27.3% can be explained, which is significant.

4.8.2 Pearson Correlation between Water Quality and Health Outcome

The study obtainedPearson Correlation (r) value under 2 tailed test between water quality and the health outcome of the residents in Ng'aratuko village. The source data is resented in a over laid scatter diagram in Figure 4:17 showing data obtained under the variable water quality and the fit line at total in the Figure below.

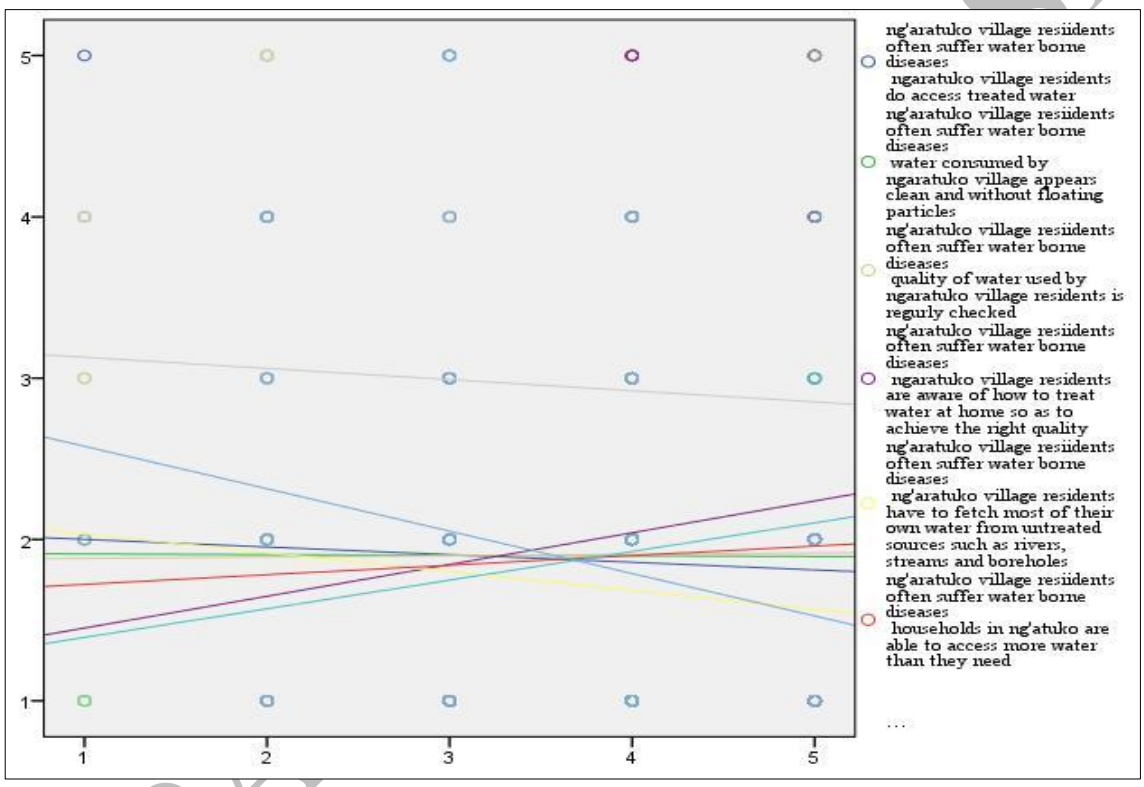


Figure 4:17A Overlaid Scatter Diagram Between Water Quality and Health Outcome for Ng'aratuko Village

Source: Author (2016)

The results for Pearson Correlation between Water Quality and Health Outcome were presented in the Table 4.15.

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Table 4:15Pearson Correlation between Water Quality and Health Outcome

Variable	Statistics	Health outcome of Ng'aratuko village residents	Water Quality in Ng'aratuko Village
Health outcome of Ng'aratuko village residents	Pearson Correlation (r value)	1	.201
	Sig. (2-tailed)		.052
	N	95	94
Water Quality in Ng'aratuko Village	Pearson Correlation	.201	1
	Sig. (2-tailed)	.052	
	N	94	94

Source: author (2016)

Table 4.15 shows that the Pearson correlation between water quality and health outcome of residents in Ng'aratuko had an r value 0.201. This shows there is a positive correlation between the two variables with a weak strength. The data was further analyzed to show the relative influence of independent variable on the dependent variable. The results were presented in model summary below.

Model Summary of quality of Water

The researcher obtained a model summary to show the relationship between quality of water and health outcome of Ng'aratuko Village. The results are presented in the table 4:16

Table 4:16Model Summary of quality of Water

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	.396[a]	.157	.067	1.012	.157	1.741	9	84	.092

a. Predictors: (Constant), Water Quality
b. Dependent Variable: Health Outcome

Source: author (2016)

Table 4.16 provides the R and R2 value. The R value is 0.396, which represents the simple correlation. It indicates a slightly weak correlation. The R2 value indicates how

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much of the dependent variable, "Health Outcome", can be explained by the independent variable, "quality of water". In this case, 6.7% can be explained, which is low.

4.8.3 Pearson Correlation between Affordability of Water and Health Outcome

The study calculated the Pearson Correlation (r) value under 2 tailed test betweenaffordability of water and the health outcome of the residents in Ng'aratuko village. The source data is presented in a scatter diagram in Figure 4:18.

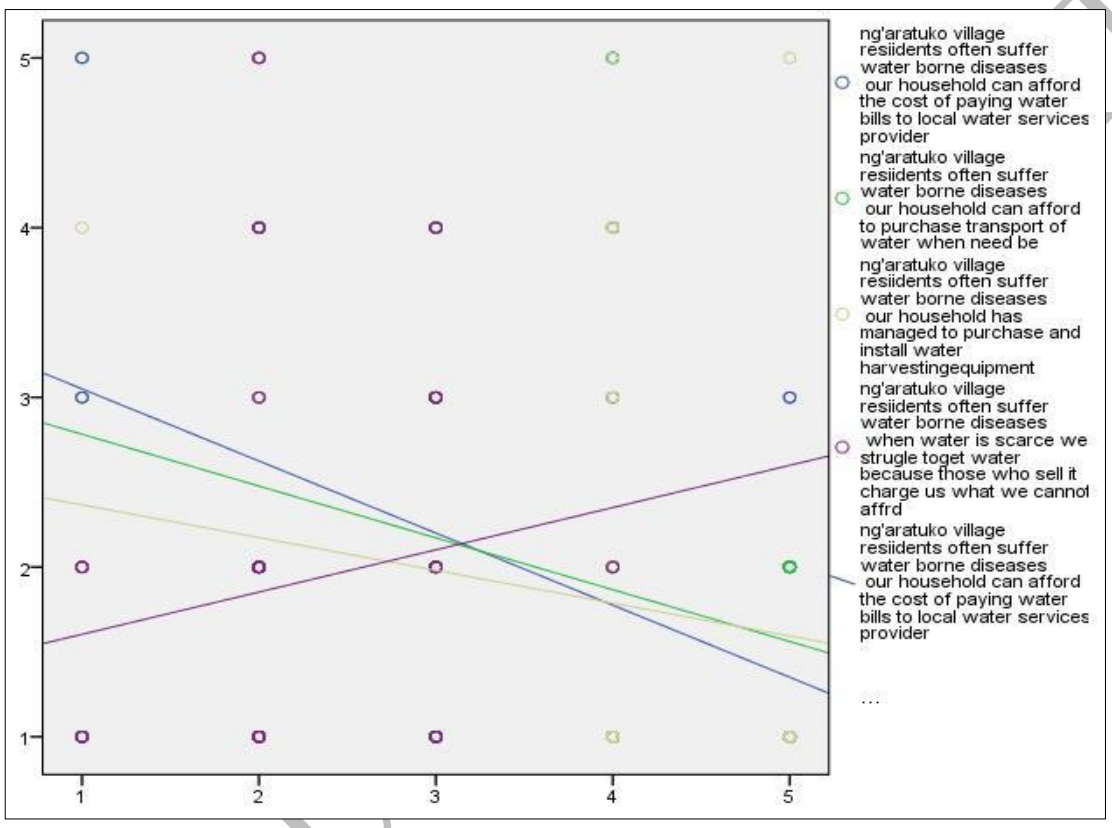


Figure 4:18A Overlaid Scatter Diagram Between Affordability of Waterand Health Outcome for Ng'aratuko Village

Source: Author (2016)

The results for Pearson Correlation between Affordability of Water and Health Outcome were presented in Table 4.17.

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Table 4:17Pearson Correlation between Affordability of Water and Health Outcome

Variable	Statistics	Health outcome of Ng'aratuko village residents	Affordability of water
Health outcome of Ng'aratuko village residents	Pearson Correlation (r value)	1	-0.257
	Sig. (2-tailed)		.012
	N	95	95
Affordability of water	Pearson Correlation	-0.257	1
	Sig. (2-tailed)	.012	
	N	95	95

Source: author (2016)

Table 4.17 shows that the Pearson correlation between water quality and health outcome of residents in Ng'aratuko had an r value -0.257. This shows there is a weak negative correlation between the two variables. The results were analysed further to show the single variable relationship and results presented in the table below.

Model of Affordability of water

The researcher obtained a model summary to show the relationship between affordability of water and health outcome of Ng'aratuko Village. The results are presented in the table 4:18

Table 4:18Model of Affordability of water

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	.452[a]	.205	.169	.950	.205	5.784	4	90	.000

a. Predictors: (Constant), Affordability of water

b. Dependent Variable: Ng'aratuko village residents often suffer water borne diseases

Source: author (2016)

Table 4.18 provides the R and R2 value. The R value is 0.205, which represents the simple correlation. It indicates a slightly weak correlation. The R2 value indicates how much of the dependent variable, "Health Outcome", can be explained by the independent variable, "affordability of water". In this case, 16.9% can be explained, which is low.

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4.8.4 Pearson Correlation between Distance to Clean Water Source and Health Outcome of Residents

The study calculated the Pearson Correlation (r) value under 2 tailed test betweendistance to clean water source and the health outcome of the residents in Ng'aratuko village. The source data was presented in a overlaid scatter diagram in figure 4:19.

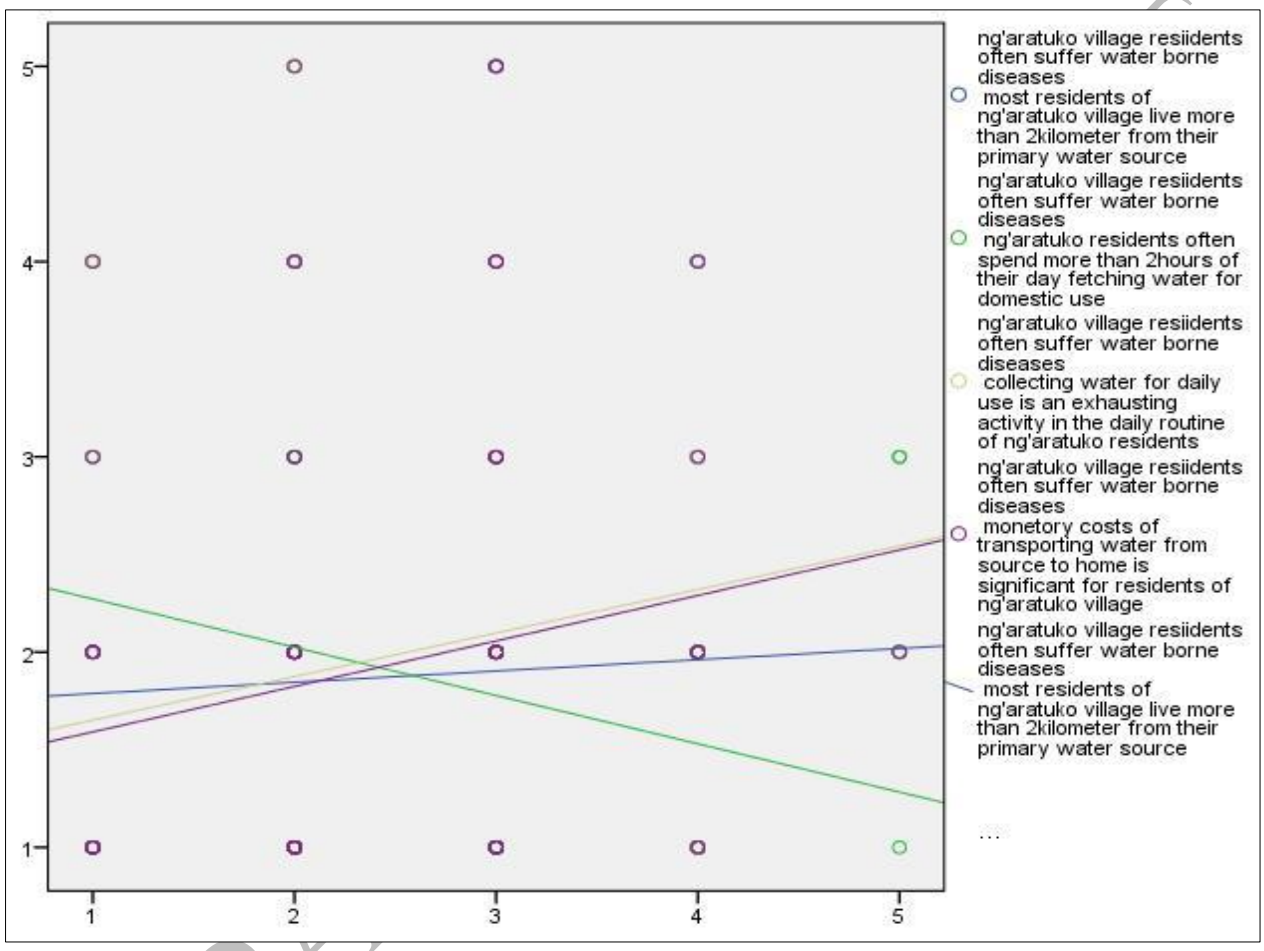


Figure 4:19A Overlaid Scatter Diagram Between Distance to Clean Water Sourceand Health Outcome for Ng'aratuko Village

Source: Author (2016)

The results for Pearson Correlation between Distance to Clean Water Source and Health Outcome of Residents were presented in the Table 4.17.

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Table 4:19Pearson Correlation between Distance to Clean Water Source and Health Outcome

Variable	Statistics	Health outcome of Ng'aratuko village residents	Distance to the nearest clean water source
Health outcome of Ng'aratuko village residents	Pearson Correlation (r value)	1	.198
	Sig. (2-tailed)		.055
	N	95	95
Distance to the nearest clean water source	Pearson Correlation	.198	1
	Sig. (2-tailed)	.055	
	N	95	95

Source: author (2016)

Table 4.17 shows that the Pearson correlation between Distance to Clean Water Source and health outcome of residents in Ng'aratuko had an r value 0.198. This shows there is a positive correlation between the two variables with a weak strength. The data was further analysed to give a model of single variable on the dependent variable. The results were presented in the table below.

Model Summary of Distance to Clean Water Source

The researcher obtained a model summary to show the relationship between distance to clean water and health outcome of Ng'aratuko Village. The results are presented in the table 4:20

Table 4:20Model Summary of Distance to Clean Water Source

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	.332[a]	.110	.071	1.005	.110	2.792	4	90	.031

a. Predictors: (Constant), Distance to Clean water

b. Dependent Variable: ng'aratuko village resiidents often suffer water borne diseases

Source: author (2016)

Table 4.20 provides the R and R2 value. The R value is 0.332, which represents the simple correlation. It indicates a significant correlation. The R2 value indicates how much of the dependent variable, "Health Outcome", can be explained by the independent

variable, "distance to clean water source". In this case, 11.1 % can be explained, which is significant.

In summary regression analysis has shown that Availability of water can explain 27.3% of health outcome; quality of water" can explain 6.7%; affordability of water can explain 16.9% while distance to clean water source can explain 11.1 % of health outcome, all based on simple correlation. This suggests that availability of water has highest influence followed by affordability, then distance to clean water source and finally quality of water.

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CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will summarize the findings of the study, draw conclusions based on the objectives of the study and make recommendations.

5.2 Summary of Findings

The study made the following findings regarding the objectives under investigation.

5.2.1 Respondents' Background information

The study gathered some information regarding the background of the respondents and made the following findings. Majority (54.7%) of the respondents are males while 45.3% of the respondents are females. In addition majority (35.8%) of the respondents was between 36 years and 45 years while 30.5% of the respondents are in the age bracket of (46-55) meaning shows that most respondents are in the mid life. Furthermore, majority (47.4%) have lived in the village for more than 5 years while 42.1% of the respondents have lived for a period between 2-5 years meaning that most of the respondents have lived in the village for more than 2years.

5.2.2 Availability of Clean Water in Ng'aratuko Village

This study showed that a high of 73.7% of respondents disagreed that there are sufficient water sources in the village meaning that a majority of the residents did not have access to treated water. This implies that the available natural water sources in Ng'aratuko village are not sufficient. This study further showed that a total of 75.8% of the respondents disagreed that there were local piped water system in Ng'aratuko village meaning the village lacks piped water system. The study further showed that majority (54.7%) of the respondents disagreed that the water collection points of Ng'aratuko residents were safe and clean. This suggests that to most of residents the collection points for water in Ng'aratuko village are not clean. The study also showed that while majority (48.4%) of the respondents neither disagreed nor agreed that water collection points were protected. 32.6% of the respondents who were significant disagreed that water collection points were protected. This implies that to a considerable extent water collection points in Ng'aratuko Village are not protected. The study further revealed that findings shows that 59% of the respondents disagreed that water supply points in Ng'aratuko village would

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supply water throughout the year. This implies that the water sources were not permanent and thus at times getting water for the residents was a challenge for some time in the year. Furthermore, the study showed that 79% disagreed that they were able to access more water than they needed. This shows that households in Ng'aratuko village do not access excess water than they need. This implies that water available is sufficient to meet the daily needs of the residents but to a moderate extent. This implies that there is a threat to meeting future water needs since the population is growing.

5.2.3 Water Quality in Ng'aratuko Village

This study revealed that a total of 38.95% disagreed that the village residents did have access to treated water. The study further showed that a total of 71.58% agreed that water consumed by Ng'aratuko village appears clean ad without floating objects. This study further showed that 66.32% of respondents disagreed that water quality is regularly checked. This suggests that the quality of water used by Ng'aratuko residents is not monitored for quality. The study further revealed that 49.48% of the residents were not aware of how they could treat water at home meaning there is need for educating Ng'aratuko residents on how to treat water at home. The study further showed that 72.63% agreed residents consumed untreated water. This implies that Ng'aratuko village residents were exposed to health hazard due to water from untreated sources. The study also showed that72.34% agreed that water sources in Ng'aratuko are regularly polluted with either dirt from runoffs, sewerage and other pollutants. This shows that the water sources in this village were regularly polluted and thus pose a health hazard to the residents. The study further revealed that 74.74% of the respondent either strongly disagreed or disagreed that Ng'aratuko village residents had access to modern sanitation facilities. This shows that Ng'aratuko village residents did not have access to modern sanitation facilities. The study also showed that majority (51.58%) of the respondents agreed that Ng'aratuko residents have a significant capacity to store clean water for later use. This shows that the residents in the area have a capacity to store clean water significantly for later use. The study further showed that 59.75% of the respondents disagreed that harvested water was treated before consumption by Ng'aratuko village.

5.2.4 Affordability of Water in Ng'aratuko Village

This study showed that majority 67.4% of the respondents disagreed that their households could afford the cost of paying water bills to local water services provider. Furthermore,

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69.5% of respondents disagreed that households can afford the cost of water transport should it be needed. This shows that the households of Ng'aratuko village cannot afford the cost of water transport. In addition the study showed that 53.7% of the respondents disagreed that households are able to purchase and install water harvesting equipment. This implies that households cannot afford to purchase the equipment and thus water harvesting is low in the area. The study also showed that 66.3% of the respondents agreed that cost of getting water when its scarce is a struggle. This therefore shows that the residents of Ng'aratuko village do struggle to get water when it was scarce.

5.2.5 Distance to Clean Water in Ng'aratuko Village

This study revealed that most (44.21%) of the respondents do not live more than 2 kilometers from their primary source of water. This indicates during the normal season, time spent by household to access water is relatively low. The study also showed that majority (64.21%) of the respondents agreed that Ng'aratuko residents often spend more than 2 hours of their day fetching water for domestic use. The study further showed that majority 76.84% of the respondents agreed that collecting water for daily use was an exhaustive activity in the daily routine of Ng'aratuko residents. In addition, the study showed that 57.89% of respondents agreed that monetary costs of transporting water from source to home was significant for residents of Ng'aratuko village.

5.3 Conclusions

Based on the findings, the study makes the following conclusions.

On availability of clean water in Ng'aratuko Village, the study revealed that the available natural clean water sources in Ng'aratuko village are not sufficient. It also revealed that Ng'aratuko village lacks piped water system to supply the villagers with clean water while water collecting points of Ng'aratuko residents are not reliably safe and clean. In addition the water collection points in Ng'aratuko Village are not protected from health hazards while the water supply in Ng'aratuko village is not reliable and especially during dry seasons. In addition, study revealed that water available is sufficient to meet the daily needs of the residents but to a limited extent.

On quality of water found in Ng'aratuko village the study revealed that majority of the residents do not have access to treated water even though water consumed by Ng'aratuko village appeared clean and without floating objects. In addition the study revealed that quality of water used by Ng'aratuko residents is not monitored for quality while the residents are not aware of how they could treat water at home as a measure of

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controlling diseases. The study also revealed that Ng'aratuko village residents were exposed to health hazard due to water from untreated sources. The study further revealed that water sources in this village were regularly polluted. Furthermore, Ng'aratuko village residents do not have access to modern sanitation facilities thought they have a capacity to store clean water significantly for later use. The study further revealed Ng'aratuko village residents do not treat harvested water before consumption.

On affordability of water, the study revealed that households in Ng'aratukovillage might not afford the cost of paying water bills to local water services providers. In addition the residents income is too low for them to afford water transportation costs. The study further revealed that households cannot afford to purchase and install water harvesting equipment and thus water harvesting in the area is not optimum and that they do struggle to get water when it was scarce such as during the dry season.

On the distance to the nearest clean water source, the study revealed that during the wet season, while primary water source is not close to most homes in the study area. The study further revealed that residents of Ng'aratuko village spend more than 2 hours of their day fetching water for domestic use on average. In addition, whileNg'aratuko Village residents think collecting water for daily use is an exhausting activity the monetary costs while transporting water is a matter of concern to residents of Ng'aratuko village

On accessibility to clean water the study showed that while the available natural water sources in Ng'aratuko village are not sufficient, the available water is not monitored for quality. All the variables have shown limited access to clean water that is either of low quality, not affordable when it is scarce or is located at distance that affects the health of residentsOn the health outcomes of residents in Ng'aratuko, the study concluded that poor health as a result of water borne diseases is a severe concern for the residents. Common that are associated to water include diarrhea, guinea worm disease, HIV/AIDS, intestinal warms , malaria and typhoid. These diseases affect both adults but pose higher danger to children in the area and in the larger Baringo County. The study further showed that that availability of water has highest influence followed by affordability, then distance to clean water source and finally quality of water on the health outcome of residents in Ng'aratuko Village.

5.4 Recommendations

The study recommends the following

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On availability of clean water the study recommends that the Development agents including the county and national Government should build a piped water distribution system in Ng'ratuko village in order to improve health for the residents. In addition, the water resource authorities and health officers should make water collection points safe so as to improve the health of residents in Ng'aratuko Village. The authorities should also sensitize Ng'aratuko residents on how to take care of their water collection points while natural resource planners should incorporate sustainability concerns to ensure available sources are maintained for future generations.

On Water quality in Ng'aratuko village, the study recommends that Development planners should install water treatment facilities to ensure that the health of residents is taken care of.Authorities, the policy makers and water service providers shouldalso put up mechanisms for monitoring water quality in order to minimize the risk of pollution and subsequent effect of health of residents, either through direct consumption or through the food chain. The study further recommends that the authorities should train Ng'aratukoresidents skills and techniques of treating water at home. Furthermore, authorities should develop strategies that would control sources of contamination is the study area as a preventivemeasure against health hazards. Development agencies should also put in place long term plans sanitation interventionand facilitiesin Ng'aratuko that would make the village less prone to preventable health hazards.Authorities should also support acquisition and installation of water storage among residents to ensure that water storage facilities are clean while residents of Ng'aratuko should be sensitized on treating harvested water so as to reduce the threat of infection to residents.

On affordability of water in Ng'aratuko village, the study recommends that Development agents should look for external financing for water projects in Ng'aratuko since the village residents may not be able to finance installation of a water supply system in the area. Furthermore, Ng'aratuko village should be supported during the dry season to access water. This could be done through the Government sending a water bowser to facilitate residents' access to clean water.On distance to clean water source, the study suggests that Development agents and authorities should support the residents in acquisition of water infrastructure and equipment so as to mitigate the hazards of injury as a result of long distances covered.As a stop-gap measure, the authorities should consider offering free water to residents during the dry season.

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5.5 Recommends for Further Research

The study recommends the following

A replica of the same study in other areas

The effect of water pollution on the health of animals and plants in Ng'aratuko village and other areas in Baringo County

The Influence of Social Political practices on health outcome of residents in Ng'aratuko village and other areas in Baringo County

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QUESTIONNAIRE

This questionnaire is aimed at collecting data to facilitate the study titled "a research onAccess to Clean Water and Health Outcomes: A Case of Ng'aratuko Village, Baringo County, Kenya". The questionnaire forms an integral part of the study and the respondents are kindly requested to respond to the questions and/or statements herein. Utmost integrity and ethics will be observed by ensuring that the data collected will exclusively be for academic purposes and will as such be treated with strict confidentiality.

Section A: Respondents' Profile

1. What is you gender:

   Male [ ] Female [ ]

2. What is your age group?

   Less than 25 years old [ ] 25-35 years old [ ] 36-45 years old [ ]

   46-55 years old [ ] 56 years and above [ ]

3. For how long have lived in this village?

   [< 1 year]

   [2-5 years]

   [>5 years]

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Section B:Availability of Clean water in Ng'aratuko Village

On a 5 point-scale, kindly consider the statements that follow regarding availability of clean water inNg'aratuko village, Baringo County and tick the box which indicates how much you agree or disagree with them

1: Strongly Disagree,2: Disagree, 3: neutral 4: Agree, 5: Strongly Agree

Statements	**1**	**2**	**3**	**4**	**5**
There are sufficient natural water sources in and around Ng'aratuko					
There is local piped water systemthat makes good use of available sources to supply Ng'aratuko with clean water					
Water Collection points for Ng'aratuko residents are safe and clean					
Water Collection points in Ng'aratuko Village are well protected					
Water supply points for residents of Ng'aratuko have sufficient water throughout the year					
Households in Ng'aratukoare able to access more water than they need					

SECTION C: Water Quality in Ng'aratuko Village

Kindly consider the statements that follow regarding water quality inNg'aratuko village, Baringocounty and tick the box which indicates how much you agree or disagree with them.

KEY: 1= Strongly Agree, 2= Agree, 3= Not Sure, 4= Disagree, 5= Strongly Disagree

Statements	**1**	**2**	**3**	**4**	**5**
Ng'aratuko village residents do access to treated water					
Water consumed by Ng'aratuko village residents appears clean and without floating particles					
Quality of water used by Ng'aratuko village residents is regularly checked					

ST. PAUL'S UNIVERSITY

Ng'aratukovillage residents are aware of how to treat water at homeso as to achieve the right quality					
Ng'aratuko village residents have to fetch most for their own water from untreated sources such as rivers, streams and boreholes					
Water source in and around Ng'aratuko are regularly polluted with either dirt from runoffs, sewage and other pollutants					
Ng'aratuko village residents have access to modern sanitation facilities					
Ng'aratuko residents have capacity to store significant amounts of clean water for later use					
Harvested Water is treated before consumption by Ng'aratuko Village					

Section D: Affordability of water in Ng'aratuko Village

Kindly consider the statements that follow regarding Affordability of water inNg'aratuko village, Baringo County and tick the box which indicates how much you agree or disagree with them.

KEY: 1= Strongly Agree, 2= Agree, 3= Not Sure, 4= Disagree, 5= Strongly Disagree

Statements	**1**	**2**	**3**	**4**	**5**
Our household can afford the cost of paying water bills to local water services provider					
Our household can afford the cost of water transport when need be					
Our household has managed to purchase and install water harvesting equipment					
When water is scarce we struggle to get water because those who sell it charge us what we cannot afford.					

Section E: Distance to clean Water in Ng'aratuko Village

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Kindly consider the statements that follow regarding distance to clean Water inNg'aratuko village, Baringocounty and tick the box which indicates how much you agree or disagree with them.

KEY: 1= Strongly Agree, 2= Agree, 3= Not Sure, 4= Disagree, 5= Strongly Disagree

Statements	**1**	**2**	**3**	**4**	**5**
Most residents of Ng'aratuko village live more than2 kilometer from their primary water source					
Ng'aratuko residents often spend more than 2 hours of their day fetching water for domestic use					
Collecting water for daily use isan exhausting activity in the daily routine of Ng'aratuko residents					
Monetary costs of transporting water from source to home is significant for residents of Ng'aratuko Village					

Section F: Health Outcomes in Ng'aratuko Village

Kindly consider the statements that follow regarding Health Outcomes related to access, quality and distance of water used byNg'aratuko village residents, Baringocounty and tick the box which indicates how much you agree or disagree with them.

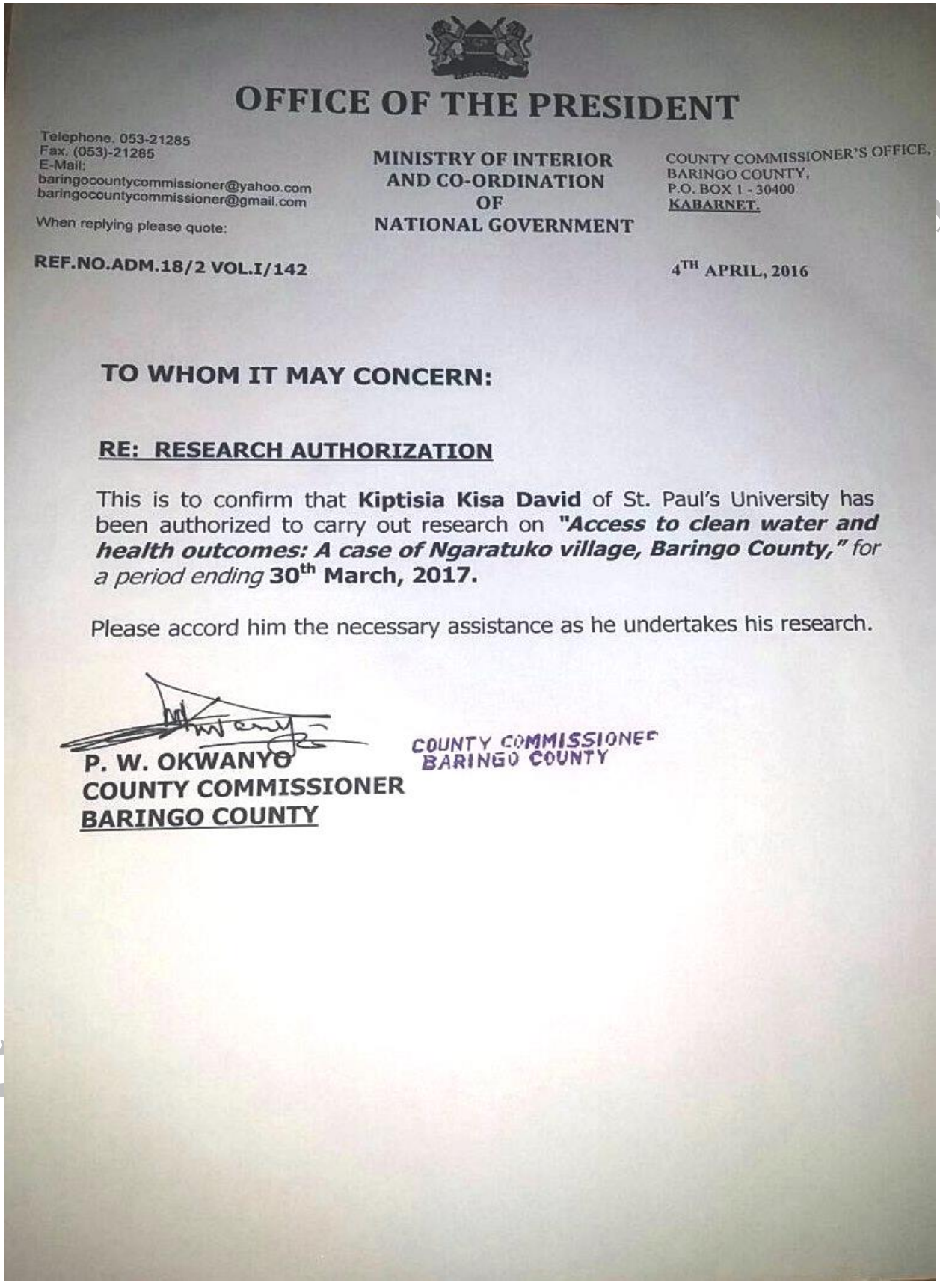
KEY: 1= Strongly Agree, 2= Agree, 3= Not Sure, 4= Disagree, 5= Strongly Disagree

Statements	**1**	**2**	**3**	**4**	**5**
Ng'aratuko village residents often suffer water borne disease					
Ng'aratuko village lose significant amount of time suffering from water borne diseases					

Thank you for your time and cooperation.

ST. PAUL'S UNIVERSITY

APPENDIX 1: AUTHORIZATION FROM COUNTY COMMISSIONER: BARINGO COUNTY



OFFICE OF THE PRESIDENT

Telephone, 053-21285
Fax. (053)-21285
E-Mail:
baringocountycommissioner@yahoo.com
baringocountycommissioner@gmail.com

When replying please quote:

REF.NO.ADM.18/2 VOL.I/142

MINISTRY OF INTERIOR
AND CO-ORDINATION
OF
NATIONAL GOVERNMENT

COUNTY COMMISSIONER'S OFFICE,
BARINGO COUNTY,
P.O. BOX 1 - 30400
KABARNET.

4TH APRIL, 2016

TO WHOM IT MAY CONCERN:

RE: RESEARCH AUTHORIZATION

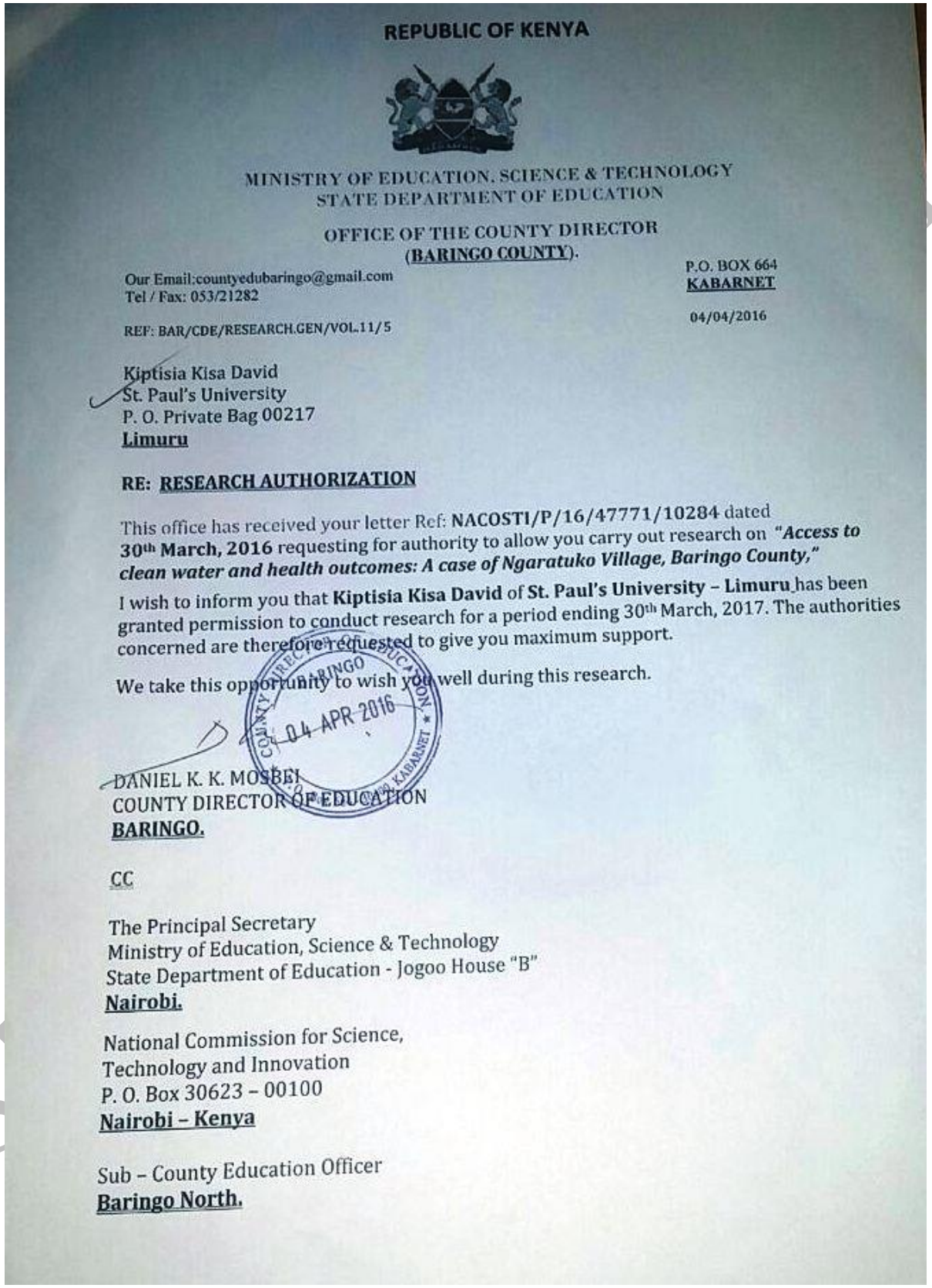
This is to confirm that **Kiptisia Kisa David** of St. Paul's University has been authorized to carry out research on ***"Access to clean water and health outcomes: A case of Ngaratuko village, Baringo County,"*** *for a period ending* **30th March, 2017.**

Please accord him the necessary assistance as he undertakes his research.

P. W. OKWANYO
COUNTY COMMISSIONER
BARINGO COUNTY

COUNTY COMMISSIONER
BARINGO COUNTY

APPENDIX 2: AUTHORIZATION FROM THE BARINGO COUNTY DIRECTOR OF EDUCATION:



REPUBLIC OF KENYA

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

OFFICE OF THE COUNTY DIRECTOR
(BARINGO COUNTY).

Our Email:countyedubaringo@gmail.com
Tel / Fax: 053/21282

P.O. BOX 664
KABARNET

REF: BAR/CDE/RESEARCH.GEN/VOL.11/5

04/04/2016

Kiptisia Kisa David
St. Paul's University
P. O. Private Bag 00217
Limuru

RE: RESEARCH AUTHORIZATION

This office has received your letter Ref: **NACOSTI/P/16/47771/10284** dated **30th March, 2016** requesting for authority to allow you carry out research on ***"Access to clean water and health outcomes: A case of Ngaratuko Village, Baringo County,"***

I wish to inform you that **Kiptisia Kisa David** of **St. Paul's University – Limuru** has been granted permission to conduct research for a period ending 30th March, 2017. The authorities concerned are therefore requested to give you maximum support.

We take this opportunity to wish you well during this research.

COUNTY DIRECTOR OF EDUCATION BARINGO
04 APR 2016
P.O. BOX 664 KABARNET

DANIEL K. K. MOSBEI
COUNTY DIRECTOR OF EDUCATION
BARINGO.

CC

The Principal Secretary
Ministry of Education, Science & Technology
State Department of Education - Jogoo House "B"
Nairobi.

National Commission for Science,
Technology and Innovation
P. O. Box 30623 – 00100
Nairobi – Kenya

Sub – County Education Officer
Baringo North.

APPENDIX 3: AUTHORIZATION LETTER FROM NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/16/47771/10284**

Date: **30th March, 2016**

Kiptisia Kisa David
St. Paul's University
P.O. Private Bag-00217
LIMURU.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Access to clean water and health outcomes: A case of Ngaratuko Village, Baringo County,"*** I am pleased to inform you that you have been authorized to undertake research in **Baringo County** for a period ending **30th March, 2017.**

You are advised to report to **the County Commissioner and the County Director of Education, Baringo County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

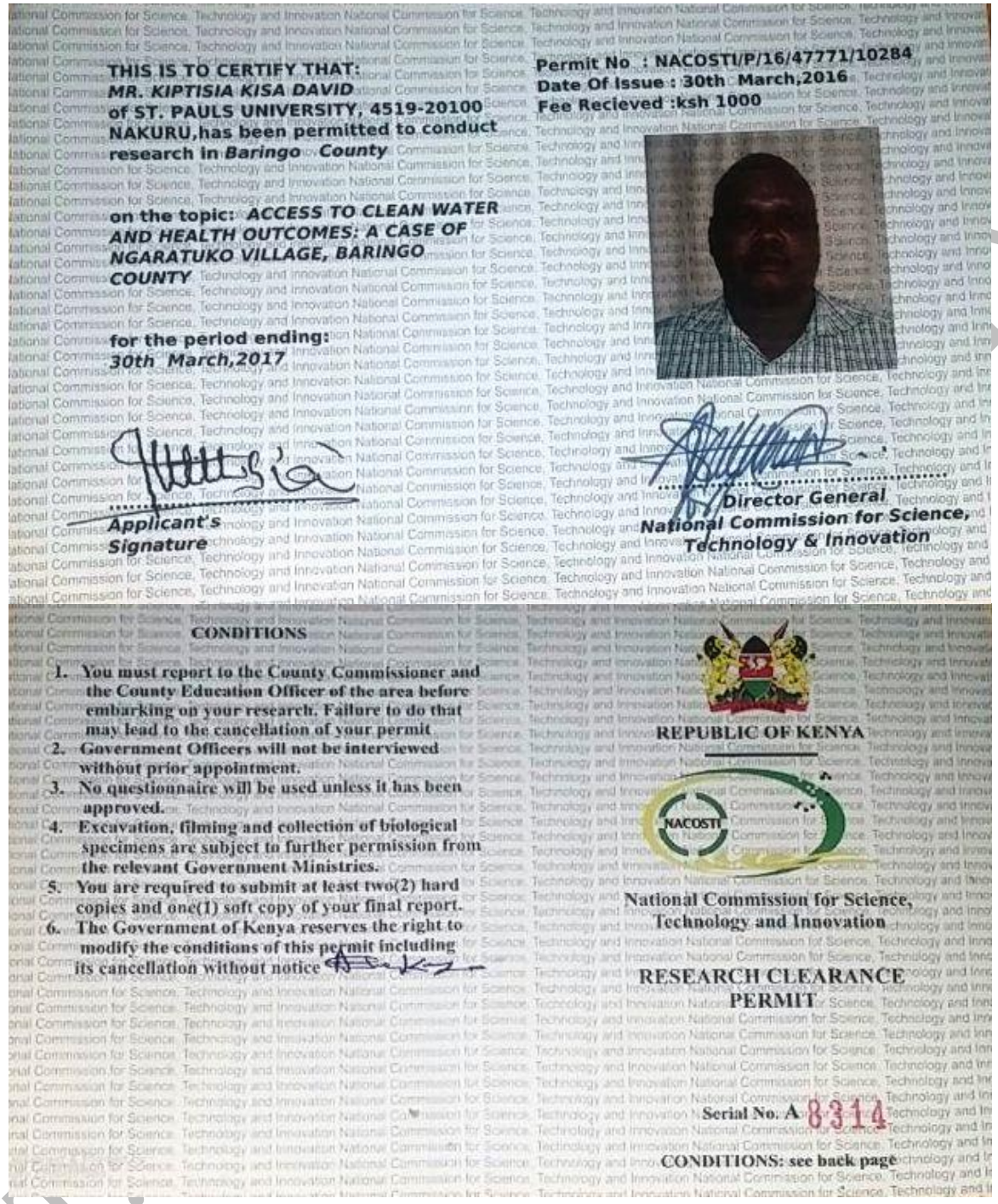
DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Baringo County.

The County Director of Education
Baringo County.

APPENDIX 4: RESEARCH PERMIT



THIS IS TO CERTIFY THAT:
MR. KIPTISIA KISA DAVID
of ST. PAULS UNIVERSITY, 4519-20100
NAKURU,has been permitted to conduct
research in *Baringo County*
on the topic: *ACCESS TO CLEAN WATER AND HEALTH OUTCOMES: A CASE OF NGARATUKO VILLAGE, BARINGO COUNTY*
for the period ending:
30th March,2017

Permit No : NACOSTI/P/16/47771/10284
Date Of Issue : 30th March,2016
Fee Recieved :ksh 1000

Applicant's Signature

Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 8314

CONDITIONS: see back page

APPENDIX 5: LETTER TO THE REPONDENTS

Letter to the Respondents

I AM a Student at St. Paul's University Nakuru Campus undertaking a Masters Degree in Development Studies. Part of my course requirements is that Students must undertake a research project before graduation.

I am therefore undertaking a research studies on **Access to clean water and health outcomes; a case study of Ng'aratuko village, Baringo County.** You have been randomly selected to participate in the study and I am requesting you to kindly assist completing the questionnaire attached.

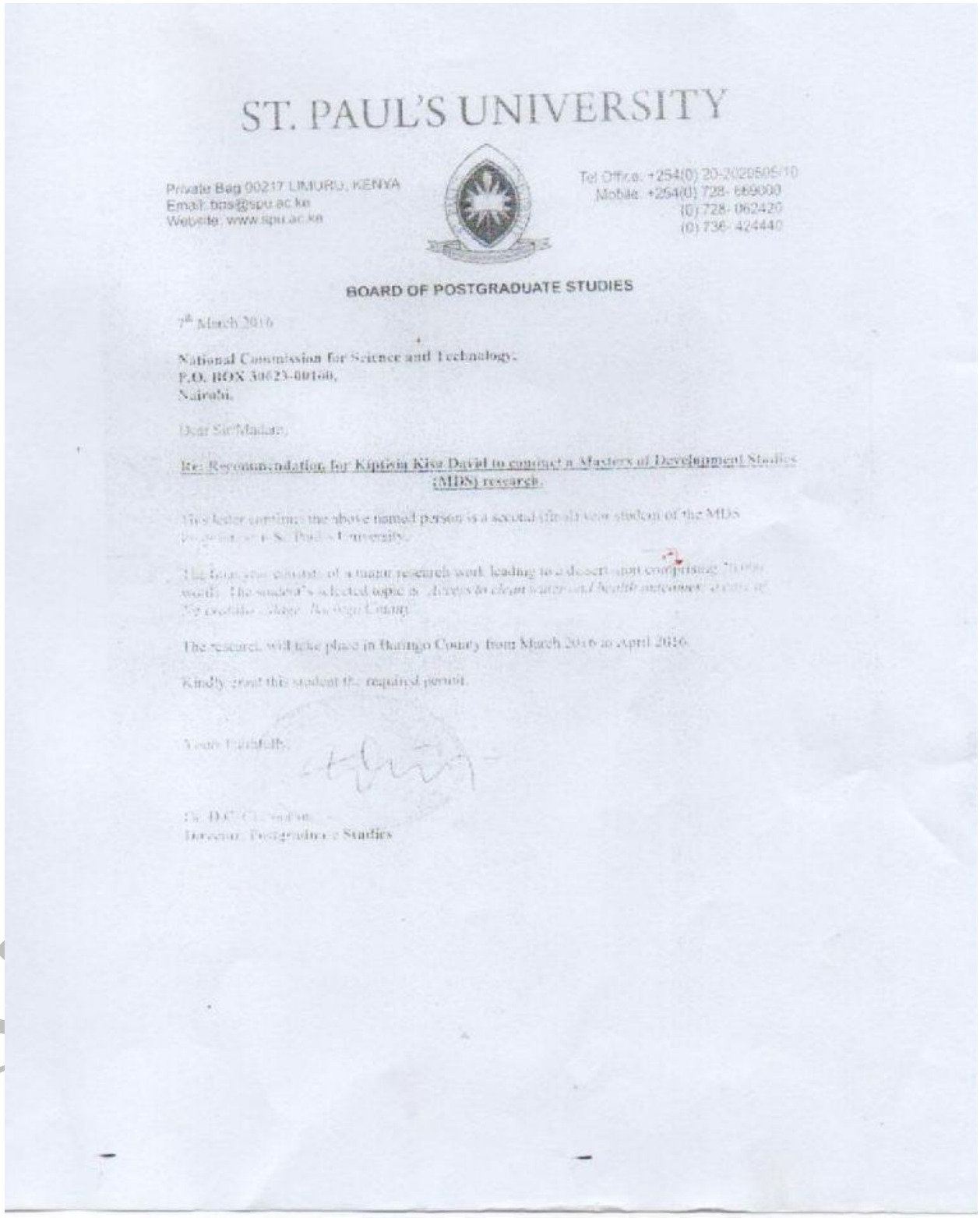
Please note that the information being sort is for academic purposes only and will be treated with utmost confidentiality.

Your assistance will be highly appreciated.

Thank you.

Kiptisia Kisa David

APPENDIX 6: RECOMMENDATION FROM ST. PAUL'S UNIVERSITY TO CONDUCT A MASTERS OF DEVELOPMENT STUDIES (MDS) RESEARCH



ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
Email: bps@spu.ac.ke
Website: www.spu.ac.ke

Tel Office: +254(0) 20-3020505/10
Mobile: +254(0) 728- 669000
(0) 728- 062420
(0) 736- 424440

BOARD OF POSTGRADUATE STUDIES

7th March 2016

National Commission for Science and Technology,
P.O. BOX 30623-00100,
Nairobi.

Dear Sir/Madam,

Re: Recommendation for Kiptoon Kisa David to conduct a Masters of Development Studies (MDS) research.

This letter confirms the above named person is a second year student of the MDS programme at St. Paul's University.

The programme consists of a taught research work leading to a dissertation comprising [illegible] months. The student's selected topic is "[illegible]" [illegible]

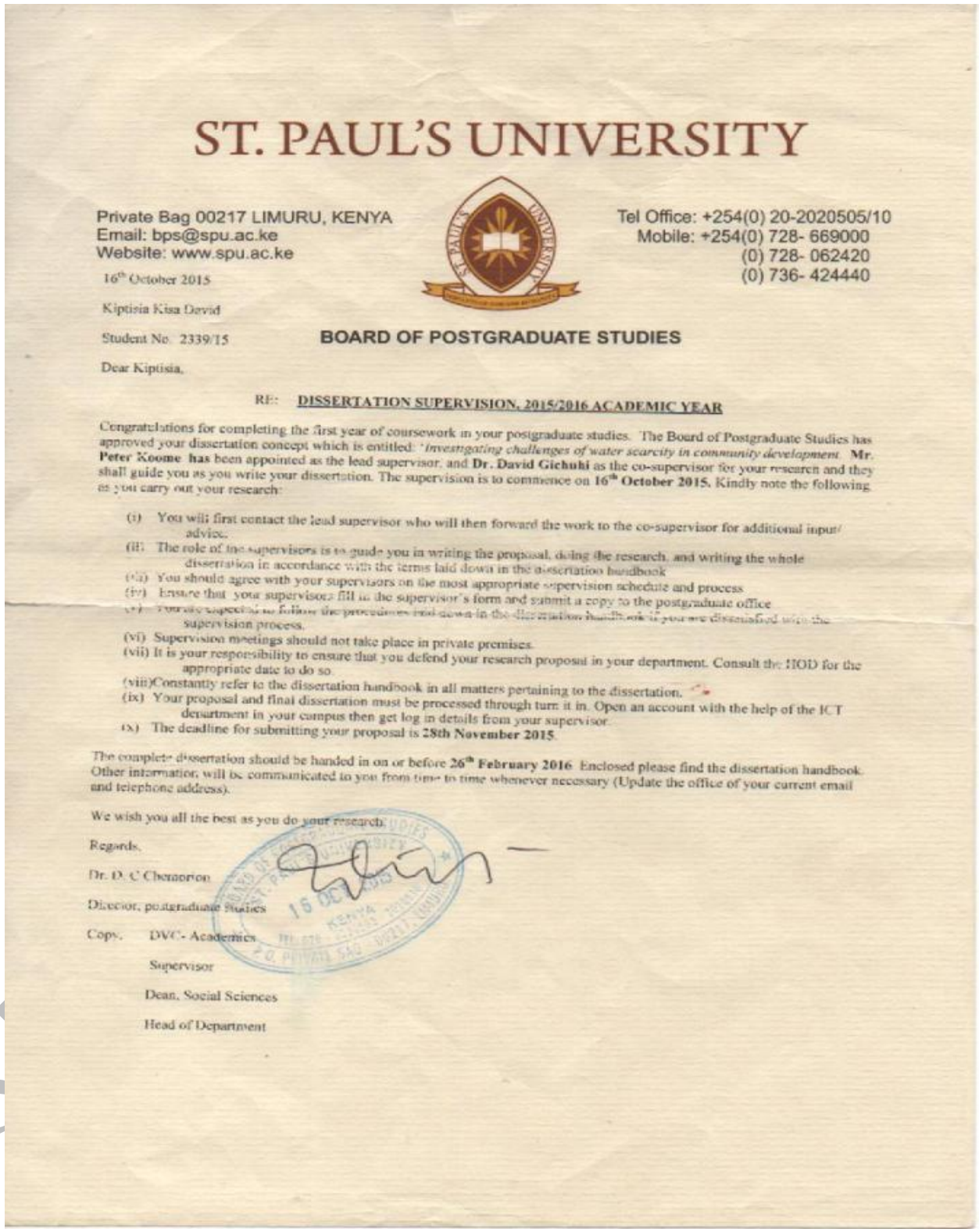
The research will take place in Baringo County from March 2016 to April 2016.

Kindly grant this student the required permit.

Yours faithfully,

Dr. D.C. [illegible]
Director, Postgraduate Studies

APPENDIX 7: APPROVAL OF DISSERTATION CONCEPT



ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
Email: bps@spu.ac.ke
Website: www.spu.ac.ke

Tel Office: +254(0) 20-2020505/10
Mobile: +254(0) 728- 669000
(0) 728- 062420
(0) 736- 424440

16th October 2015

Kiptisia Kisa David

Student No. 2339/15

BOARD OF POSTGRADUATE STUDIES

Dear Kiptisia,

RE: **DISSERTATION SUPERVISION, 2015/2016 ACADEMIC YEAR**

Congratulations for completing the first year of coursework in your postgraduate studies. The Board of Postgraduate Studies has approved your dissertation concept which is entitled: *"Investigating challenges of water scarcity in community development.* **Mr. Peter Koome has** been appointed as the lead supervisor, and **Dr. David Gichuhi** as the co-supervisor for your research and they shall guide you as you write your dissertation. The supervision is to commence on **16th October 2015.** Kindly note the following as you carry out your research:

(i) You will first contact the lead supervisor who will then forward the work to the co-supervisor for additional input/ advice.
(ii) The role of the supervisors is to guide you in writing the proposal, doing the research, and writing the whole dissertation in accordance with the terms laid down in the dissertation handbook
(iii) You should agree with your supervisors on the most appropriate supervision schedule and process
(iv) Ensure that your supervisors fill in the supervisor's form and submit a copy to the postgraduate office
(v) You are expected to follow the procedures laid down in the dissertation handbook if you are dissatisfied with the supervision process.
(vi) Supervision meetings should not take place in private premises.
(vii) It is your responsibility to ensure that you defend your research proposal in your department. Consult the HOD for the appropriate date to do so.
(viii) Constantly refer to the dissertation handbook in all matters pertaining to the dissertation.
(ix) Your proposal and final dissertation must be processed through turn it in. Open an account with the help of the ICT department in your campus then get log in details from your supervisor.
(x) The deadline for submitting your proposal is **28th November 2015**.

The complete dissertation should be handed in on or before **26th February 2016**. Enclosed please find the dissertation handbook. Other information will be communicated to you from time to time whenever necessary (Update the office of your current email and telephone address).

We wish you all the best as you do your research.

Regards,

Dr. D. C Chemorion

Director, postgraduate studies

Copy: DVC - Academics
Supervisor
Dean, Social Sciences
Head of Department