INFLUENCE OF NON-GOVERMENTAL ORGANIZATION'S SPONSORED COMMUNITY WATER PROJECTS ON POVERTY REDUCTION IN NGONG DIVISION, KAJIADO COUNTY, KENYA

BY

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A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTERS OF ARTS DEGREE IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI.

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DECLARATION

I, Tulito Ole Turere, declare that this research project report is my own original work and that it has not been presented to any other University for a similar or any other degree award.

Signature: …… Date…….

Tulito Ole Turere

L50/70965/2011

This research project report has been submitted for examination with my approval as University Supervisor.

Signature……. Date……

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DEDICATION

This research project report is in memory of my late guardian William Lemayian Karasha, my late mum who carried me to school in her back at a very tender age and to all the beneficiaries of water projects sponsored by non-governmental organizations. The community water committees, projects technical teams and all non-governmental organizations that fund-raise and fund these projects.

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ABBREVIATIONS AND ACRONYMS

AMA: American Marketing Association

AMREF: Africa Medical Research and Education Foundation

CRA: Commission on Revenue Allocation

DAC Development Assistance Committee

DC: District of Columbia

FAO: Food and Agricultural Organization of the United Nations

FGD: Focus Group Discussion

GDP: Gross Domestic Product

ICROSS: International Community for the Relief of Suffering and Starvation

IFRI: International Food Policy Research Institute

IIASA: International Institute for Applied System Analysis

IUCN: International Union for Conservation of Nature

JICA Japan International Development Agency

KNBS: Kenya National Bureau of Statistics

JRF: Joseph Rowntree Foundation

KIHBS: Kenya Integrated Household Budget Survey

LEAP: Learning evaluation and planning

MDG: Millennium Development Goals

NGO: Non-governmental Organizations

OECD Organization for Economic Cooperation and Development

PRSP: Poverty reduction strategy paper

SPSS: Statistical Programme for Social Scientist

UN: United Nations

UNDP: United Nations Development Programme

UNICEF: United Nations International Children Emergency Fund

WCED: World Commission on Environment and Poverty

WHO: World Health Organization

ABSTRACT

The main objective of the study was to determine the contribution of NGO's sponsored water projects on reduction of poverty in pastoral communities living in Ngong division, Kajiado County so as to make appropriate recommendations on how the projects could be designed and operated effectively to achieve their intended objectives. The study used descriptive survey design. The targeted population were individual's community members from the pastoralist communities living in Ngong division. The respondents were asked questions and information captured using questionnaires. KII's and FGD were also carried out using questionnaires. The data collected was both qualitative and quantitative and it was analyzed using descriptive statistics generated from SPSS version 21. Cluster and multi-stage probability sampling techniques were used in selecting various respondents. The sample size used is 100 community members from the beneficiary communities.10 key informants and 10 FGD's of 12 people each. From the findings the study concluded that; on resources mobilization and Its influence on poverty reduction the study concludes that, the communities have owned-up the projects and developed a culture of strong self-dependency an important aspect for any project sustainability. Water availability has created thriving livelihoods by increasing community tolerance to vulnerabilities and providing an opportunity to the communities to build on the quantity and quality of their herd. However, according to the finding of the study there is a challenge in transparent management of financial resources. On clean drinking water and its influence on poverty reduction, the study concluded that there is a high degree of likelihood that communities are consuming contaminated water and the cause of contamination is not known additionally the cost of accessing water, congestion at the water point and distance covered by some households in search of water is still a big challenge for the community. On irrigation water and its influence on poverty reduction, the study concluded that irrigation of food at the water point has played a big role in poverty reduction within the beneficiary communities. It has also instilled in communities' valuable skills like planning and farming skills necessary for personal economic empowerment. On capacity building of communities and its influence on poverty reduction, the study concluded that there is a slow but consistent environmental degradation within the projects areas. There was also no technical skills and knowledge with the locals and this could affect the long term sustainability of the projects. The study recommend that communities need to be trained on monitoring their water quality, a technical analysis of the boreholes water need to be carried out to determine if or not the underground water is chemically or bacteriologically contaminated, Communities need further capacity building on technical skills and knowledge to help them in managing projects especially in areas of fixing simple engineering works and simple hygiene measures like separating water points for livestock and people should be carried out at community water points and also educating people to cover water storage containers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

DAC/OECD in its February 2001 thematic guidelines on poverty reduction, provided guidelines on poverty reduction. The guidelines defined poverty as a situation where there is lack of economic, human, protective, political and socio-cultural capabilities. They said that poverty reduction is a situation which results when an individual or society has five different capabilities. First is economic capabilities; the ability to earn income, consume and have assets because they provide food security, material wellbeing and social status. Secondly; human capabilities these are based on health, education, nutrition, clean water and shelter. These are core elements of wellbeing because they help in improving livelihoods. Thirdly is protective capabilities because they enable people to withstand economic and external shocks therefore they are important in poverty prevention. Fourth and fifthly are political and social cultural capabilities which include human rights because they give people a voice and some influence over public policies and political priorities. The researcher in this study looked into economic and human capabilities specifically the issue of water and how its reducing poverty by improving food security and livelihoods.

On global level, Pirot *et al* (2000) states that the amount of water in the world is limited. They added that water covers about two-thirds of the Earth's surface but most of it is too salty for use and only less than 0.08% of all the Earth's water is available for human consumption. Over the next two decades our use is estimated to increase by about 40%. Gleick (2003) states that global demand for water has tripled since 1950's but the supply of fresh water has been declining. Half a billion people live in water stressed countries and by 2025 the number will grow to three billion due to an increase in population. Water is central in poverty eradication. At the world summit on development in 2002, the late former president of South Africa Nelson Mandela said that one of the many things I learned as president was the centrality of water in the social, political, and economic

affairs of the country, the continent and the world (Source: South Africa department of water affairs and forestry)

Kenya is a dry Country located on the eastern coast of Africa. It has a humid climate and a population of about 40 million people, of which about 17 million (43 percent) do not have access to clean water. For decades, water scarcity has been a major issue in Kenya, caused mainly by years of recurrent droughts, poor management of water supply, contamination of the available water, and a sharp increase in water demand resulting from relatively high population growth. The lack of rainfall affects also the ability to acquire food and has led to eruptions of violence in Kenya. In many areas, the shortage of water in Kenya has been amplified by the government's lack of investment in water, especially in rural areas (World Bank, 2010).

Growth in population, effects of climate change on the environment, and increased economic activities have led to increase demands for fresh water in arid and semi-arid regions of Kenya. Kajiado County, where the study was undertaken, is one of those arid regions. The county has a population of 822,189 people, a water demand of 61,274.33 cubic meters of water per day and a maximum water production capacity of 18,841.30 water scarcity in the Kajiado county is acute (Tana-Athi water services board survey, 2013). Nongovernmental such as AMREF, ICROSS, World Vision International, Childfund International and Living Water International through drilling of boreholes in the regions have been bringing clean and safe drinking water to the people to help in empowerment of these vulnerable and marginalized populations. This research paper therefore looks into and presents the progress and impacts that these communities were able to derive out of these water projects in reducing poverty.

Reducing poverty is not possible without access to water. Water has a lot of benefits that cumulatively reduces poverty. Water helps the poor people in health improvements. That mean, poor people are more productive and have to spend less on health care. Save them the time, in particular women, that can be invested in productive activities and for children in education. Promote direct economic activities such as home gardens,

livestock, tree crops, home-based manufacturing such as pottery and brick making and in services like laundries and hair salons. Small organization formed for expanding and running water supply, sanitation and reuse schemes enhances the social capital and skills and reduced vulnerability to external factors by providing more diversified and productive livelihoods. The research focus on nongovernmental organization community drilled boreholes because out of ten boreholes available for use in the area of study only one was drilled by the government while the rest were done by international development agencies. This one borehole, therefore, does not give a representative sample that can be generalized across the rest of the population.

1.2 Statement of the Problem

Lack of water is a serious problem in Kajiado County because it's hindering the pastoralist's communities living in these regions from realizing their full potential.

Kajiado County, Ngong division, falls under those regions referred as arid and semi-arid lands. These regions have temporal and spatial climatic variations and the availability of resources is uneven. Communities living in these regions depend on livestock as the only source of livelihood.

The shortage of water in the county is acute. Its effects are visible and the repercussions are great. Poverty has caused mass migration as communities relocate to areas with resources like water that sustain their livelihood. It has caused internal wars as communities compete for available resources, increased the rate of crime, caused dietary related diseases like Malnutrition, cholera, dysentery, and tuberculosis and these diseases leads to high infant mortality and annual death rate. These communities from poverty stricken regions migrate to regions inhabited by other communities and where necessities of life are available. These migrations, use as a coping mechanism to disasters by the communities in this areas, has undermined the communities' ability to develop and recuperate from the effects of poverty.

Studies conducted by scholars, researchers and authors such as Mohammed (2011), Hefferman et al (2001) and Peter et al (2007) all assed the livelihoods and poverty conditions of the pastoralist communities and identified the major factors that lead to poverty in pastoral areas specifically Kebribeyah district in Ethiopia for Mohammed (2011). Rono (2011) carried out a research that sought to establish the determinants of the access to water in secondary schools within Kajiado County. Rutten (2005) also carried out a research on shallow wells within the county and he tried to explore sustainable and inexpensive alternatives to boreholes. Despite all this studies, there is a gap interms of the studies already done by the mentioned scholars because they concentrated either on schools or alternatives and inexpensive means of getting water by communities. The gap exist because the studies done were not undertaken on the community this study looked

into and again, unlike this study, they did not look into contribution of NGO's donated boreholes to poverty reductions on beneficiary communities.

1.3 Purpose of the study

The purpose of the study was aimed at assessing the contributions NGO's sponsored water projects have made on poverty reduction on the pastoralists' communities living in Ngong division, Kajiado County.

1.4 Objectives of the Study

The study was guided by the following objectives:

i. To establish how resources mobilization from NGO's sponsored water projects influence poverty reduction among the Maasai pastoralist community in Ngong division, Kajiado County.
ii. To assess how provision of clean drinking water by NGO's to the Maasai pastoral communities in Ngong division of Kajiado County is influencing poverty reduction.
iii. To establish how provision of water for irrigations from NGO's sponsored water project to the Maasai pastoral communities of Ngong division Kajiado County influences poverty reduction.
iv. To determine how capacity building undertaken by NGO's involved in water projects influences poverty reduction among the Maasai pastoral communities in Ngong division, Kajiado County.

1.5 Research Questions

The study sought to answer the following research questions.

1. How does resources mobilization from NGO's sponsored water projects influence poverty reduction in beneficiary communities?
2. How does Provision of clean drinking water by NGO's to communities' influence poverty reduction in beneficiary communities?

3. To what extend does availability of water for irrigation purposes influence poverty reduction in beneficiary communities?
4. How does capacity building undertaken by NGO's involved in water projects, influences poverty reduction in beneficiary communities?

1.6 Significance of the Study

The findings of this study may provide an input for developing intervention strategies to policy makers, researchers, development partners and governments. This study may offer an input to programs in particular those that target poverty reduction at the community level in Kajiado County and elsewhere in Kenya and outside Kenya. Based on the study findings, recommendations were made on how to improve community programmes to make them more beneficial and participatory. Additionally, this study may widen our knowledge on the role participatory development in programmes execution will play in the overall sustainability of community programmes.

1.7 Delimitation of the Study

The study took a period of three months and covered only those boreholes drilled by non-governmental organizations in Maasai pastoralist's communities in Kajiado County, Ngong division Keek-Onyoikie ward. It covered two sub-locations and the sample unit will was a village. The participants were the beneficiaries' households' heads and committees of NGO's sponsored water projects and only those questions included in the survey instrument were asked. The study findings were limited to Keek-Onyoikie Ward of Kajiado County, Ngong division in Kenya due to limited resources of the researcher to target other pastoral communities living within the county.

1.8 Limitations of the Study

The focus of the study posed a lot of challenges given the fact that the time of the study took place during the day and this was not convenient to the participants. The issues discussed were sensitive because it touched on management, resource acquisitions and community cooperation in management of water project and community members could not easily divulge such sensitive information. The study also involved disclosure of group

or community private information and the water committee required community collective approval and this took the research beyond the intended time frame. The scope of the study had various limitations too in that only those NGO's sponsored water projects were studied and the findings used to generalize to the rest. To counter this limitation, the researcher ensured that the sample picked represented the population and the data collection instrument had validity and reliability.

1.9 Assumptions of the Study

The study assumed that participants will answer questions honestly.

1.10 Definitions of Significant Terms

Government laws and policies: are a body of rules to guide human conduct and which are imposed upon and enforced among the members of a given state. These set of rules guides' human conduct, are applied to a community susceptible to change dynamics and must be enforced to ward off anarchy and people follow them for their own good.

Water Resource: Mean sources of water that are useful or more potentially useful. They include surface water and ground water. These water resources provide water for drinking to these communities, agriculture and irrigation and they also provide opportunities for recreation and support tribes to maintain traditional cultural practices and ceremonies.

Clean drinking water: refer to water that is safe to be consumed by humans or used with low risk of immediate or long term harm. Meaning it is free from harmful substances that could endanger human health and whose color, odour, and taste are acceptable to users.

Poverty Reduction: In this research the term poverty alleviation will be used to mean helping the poor people achieve a better quality of life by imposing their lives and laying conditions for future improvements or development.

Community capacity building: Mean supporting individuals and communities so that they can identify and meet the needs of their areas. It involves building on the existing skills, providing them with opportunity to learn through experience and increase their awareness and confidence to participate more fully in the society by learning more ways and acquiring means to do what has to be done.

Irrigation Water: In this research paper the term will be used to mean artificial application of water to the land or soil to help in growing of agricultural crops and re-vegetation of disturbed soils in dry areas and during periods of inadequate rainfall.

1.11 Organization of study

Chapter one provides background information on water situation in various parts of the world, the problem statement, purpose of study, research objectives and the research questions that the study was seeking to answer, significance of the study, limitations and delimitations of study. Chapter two provides literature reviewed on poverty reduction, theoretical framework, conceptual framework and the knowledge gap identified. Chapter three outlines the research methodology that the study employed, the target population, the sample and sampling techniques adapted, data collection techniques, data analysis methods and ethical considerations. Chapter four provides the results of the data analysis, presentation and interpretation according to the four variables of the study. Chapter five provides a summary of the findings, discussion, conclusions of the study, recommendations of the study and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides background information and literature on independent and dependent variables of the study. Theoretical framework, conceptual framework and the knowledge gap.

2.2 Resource Mobilization and poverty Reduction

Kajiado County in which the research is to be undertaken, according to Kenya National Bureau of Statistics, has a population of 687,312 people (KNBS, 2009). However, based on an independent survey carried out by Tana-athi water services board in the year 2013, the population had increased to 822,189 people. The population increase is attributed to immigrants coming in as a result of expansion of Nairobi. The county has a water demand of 61,274.33 cubic meters of water per day. This is the highest water demand compared to other arid neighboring counties like Kitui, Makueni and Machakos that has a higher human population than Kajiado County (Tana-Athi water services board survey, 2013).

The Tana-Athi water board report 2013 explained that Kitui has 1,130,986 people with a water demand of 41,829.25 cubic meters of water per day. Makueni has 987,833 people with a water demand of 35,892.91 cubic meters of water while Machakos has 1,226,890 people with a water demand of 60,608.38 cubic meters of water. With such a high water demand of 61,274.33 cubic meters of water per day, Kajiado County can only produce 18,841.30 cubic meters of safe water per day. This therefore means the county has a deficit of 42,433.03 meters cubic of water per day (Tana-Athi water services board survey, 2013).

The county has a population growth rate of 4.6% per annum. This is the highest growth rate in the region with the neighboring counties with similar environmental conditions like Kitui, Makueni and Machakos having a population growth rate of 2.8% per annum.

41.4% (340,386 people) of the 822,189 human populations in Kajiado County live in urban areas while 58.6% (481,803) reside in rural areas. 413,696 of the county total population do not have access to safe water. The county has an urban water demand of 50 liters of water per person per day while rural water demand is 25 liters of water per person per day (Tana–Athi water services board survey, 2013).

KIHBS district poverty data 2005/2006 shows that poverty prevalence in Kajiado district is 11.6%. Other similar pastoralist districts such as Turkana has a poverty prevalence of 94.3%, Marsabit 91.7%, Samburu 73%, Narok 29% and Isiolo 72%. The neighboring counties like Kiambu and Nairobi have a poverty prevalence rate of 23% and 22% respectively. On a report entitled Kenya richest and poorest counties, the Daily Nation on its December 17th, 2011 newspaper explained that all arid and semi-arid counties, which are also the largest geographically in the country and most marginalized, are at the bottom end of the poverty in the Country. The data of these poorest counties depicts a sorry state of development ongoing from poor infrastructure, health to education. Kajiado district statistics indicating that 11.6% are poor has come under a lot of professional criticism questioning on accuracy of the instruments used and inclusiveness of the sampled used to arrive at the conclusions.

CRA vice chairperson Fatuma Abdul-Kadir commenting on the fortunes of Kajiado district stated that Kajiado riches are concentrated on areas in close proximity to Nairobi such as Ngong, Ongata Rongai, Isinya, and Kajiado town. The interior rural populations are as poor as any other marginalized districts of the country. The success of the projects rests on community involvement and mobilization of local financial, natural and human resources. Resource mobilization is the process by which a group secures collective control over the resources needed for collective action. The major issues, therefore, are the resources controlled by the group prior to mobilization efforts, the processes by which the group pools resources and directs these towards social change, and the extent to which outsiders increase the pool of resources.

2.3 Clean drinking water and poverty reduction

Former American president Benjamin Franklin said that when the well is dry, we know the worth of water. On a world conference in Geneva in 2012 WHO states that access to safe water and sanitation is a constant and urgent problem in developing countries. Nearly 800 million people live without safe water, while a staggering 2.5 billion people have no access to adequate bathroom facilities. Lack of water, toilets and hygiene education costs sub-Saharan African countries more in lost GDP than the entire continent gets in development aid. Clean water and sanitation both directly and indirectly impact the economic climate in communities, and are essential to breaking the cycle of poverty. Access to water also saves time for the rural communities. In many developing countries, families have no local access to water. Women in these families spend up to five hours walking an average of three and a half miles every day to simply collect water. These women are unable to pursue employment, economic opportunities or vocational and literacy training because their time is devoted to survival.

Making clean water easily accessible frees hours of time that can be directed toward earning income or caring for children. Instead of walking miles for water, women are able to focus on growing produce, making products such as baskets or bread that they can sell, or taking on paid work. The water that these women work so hard to collect is dirty and contaminated with disease. This water, combined with poor sanitation, is the second leading cause of death for children under the age of five and contributes to up to 50% of malnutrition. Around 700,000 children each year die from diseases associated with unsafe water, sanitation and hygiene. Families must spend the little money they have on medical treatment for preventable illnesses including diarrhea, scabies, intestinal worms and pneumonia. The cost of medicine and doctor visits weighs heavily on their economic woes. As diseases associated with unsafe drinking water and sanitation decrease, families spend less money on doctor visits, treatments, and medicine, and see an increase in income. Productivity is also boosted as malnutrition falls. (WHO 2012).

In its 2006 human development report UNDP reiterated the Impact lack of water has on education. They stated that Children often miss school days because they must help their mothers to collect water, or because they are sick with water-related illnesses, some of which can also cause delays to cognitive development. Girls who are menstruating will often drop out due to lack of adequate and private sanitation facilities. The cycle of poverty is perpetuated as the next generation fails to attain an education and an opportunity to work. Access to clean water and toilets directly impacts the educational success of school-age children. Attendance rates and academic achievement rise as children's health improves and they have more time to devote to their studies. The economic benefits of clean water and sanitation transform lives in the world's poorest communities. As the focus shifts from survival to opportunity, people gain time and money to pursue economic and educational goals while enjoying an improvement in health and wellbeing (UNDP 2006).

Increases in water use and degradation of water quality are putting extreme pressures on water resources. FAO, (2001a) said that more than one billion people, one- sixth of the world population, lack access to safe drinking water. Inadequate sanitation, poor health facilities, unsafe water sources contribute insignificantly to malnutrition by increasing the burden of illness for both children and adults Households dependent on well surface water for drinking are more likely to have increase prevalence of underweight children because the water is more likely to be contaminated. Improvement in health, sanitation, water and other basic services contribute 20 percent of the reduction in child malnutrition from 1970-1995 (Smith & Haddad, 2000). Of the nearly 12 million children under age five who died in 1995, about 70 percent were affected by one or more of just five conditions: malaria, measles, acute respiratory infections, under nutrition, and diarrhea. And the death rate from disease among undernourished children is much higher than among those better nourished (FAO 2001a). Contaminated water supplies cause more than 90% of water-related deaths. Some 2.5 million people die from unsafe water every year.

The quality of water remains one of the most pressing issues in the world. Much of the population in the big basins of developing countries is exposed to contaminated water and serious waterborne diseases such as cholera and schistosomiasis (or bilharzias) are endemic. Population takes water from streams, lakes, ponds, or springs. Water from wells is equally contaminated, as most of them are shallow. Similarly, piped water is also unsafe in many parts of the developing countries, because water is pumped from lakes, ponds, streams, or rivers and delivered in residences completely untreated. Coverage of the population with access to adequate sanitation remains low due to low-income, informal settlements, which are often considered illegal and therefore have no rights to sanitation services. As a result, morbidity due to preventable water and sanitation related disease remains high (Sitali, 1997; Howard *et al,* 1994).

Rapid urbanization, poor and inadequate sanitation in the cities of the developing countries, and over-crowding and congestion have led to the development of slums, which in turn have further worsened the sanitation and health problems in the city. The provision of water and sanitation facilities has consequently fallen behind population growth and community expansion. For the majority of the inhabitants in urban centers, open defecation is a common practice. People use all kinds of means, including the wrapping of human excreta in polythene bags, commonly referred to as precious package for disposal, sometimes over rooftops. People also defecate along beaches or watercourses, gutters, etc., because of the absence of usable toilets in the home or even conveniently located near the home (Allan, 1997).

Recognizing the vital role of healthy ecosystems in the water cycle and protecting them should form the basis of any water management decision (IUCN 2000). Groundwater contamination with arsenic and fluoride and increasing pollution of surface water with waste from urban areas are major water-quality problems. The growing worldwide scarcity of good-quality fresh water makes it essential to bridge the gap between the different sectors involved in water-resource management (Van der Hoek, *et al.,* 1999; Blumenthal *et al.,* 2000). Most of the water resources set for livestock and human

drinking lacks water quality standards. Particularly in pastoral areas where accessibility is poor the water quality standards are unknown.

Kenya's clean water crisis is also caused by water contamination. Many Kenyans use wells to obtain domestic water and also use pit latrines that are often close in distance to the wells. This causes contamination of the wells because the microorganisms travel from the pit latrines to the wells. The wells should be placed in elevated areas (at least 2 meters above the water table) and at least 15 meters from pit latrines, which however is not the case in most overcrowded urban slums. An excellent case study undertaken by Kimani-Murage and Ngindu (2007) provides an explanation for the severe contamination of drinking water in Kenya. The study argues that the severe contamination is largely due to the close distance between pit latrines and wells.

This study focuses on residents of a Kenyan slum because the majority of urban residents in sub-Saharan Africa live due to rapid urbanization in slums. The following quote summarizes what was collected from the study: This cross-sectional study involved 192 respondents from Langas slum, Kenya. Forty water samples were collected from the water sources used by the respondents for laboratory analysis of coliforms. Of these 40 samples, 31 were from shallow wells, four from deep wells, and five from taps. Multiple-tube fermentation technique was used to enumerate coliform bacteria in water. The results from the study show that most people in urban slums (91 percent) used wells as their main source of water and the rest used tap water. The majority of people in urban slums said they used pit latrines for disposal while 30 percent of children said that they emit in open fields.

The problem is that many wells are very close to the pit latrines. Out of 175 wells, about 39 percent of the wells were less than 15 meters from the latrines, about 59 percent were located within 15 and 30 meters and only about 3 percent were located 30 meters or more to pit latrines. All the samples taken from shallow wells were positive for total coliforms, which is fecal contamination. Three out of four samples taken from the deep wells were contaminated and none of the tap water samples were contaminated. Other possible

sources of water contamination in the area were also examined by the study. People of the area said that contamination can be a result of children dipping dirty objects into water sources (34 percent), drawing water from the source with dirty containers (27 percent), domestic animals excreting around water sources (19 percent) and people washing their clothes at the water source (5 percent). In any case, this study shows that the drinking water in Langas urban slum is contaminated and unsafe to drink, yet, the slum dwellers continue to drink it as they have no other alternatives.

2.4 Irrigation water and poverty reduction

At the world summit on development in 2002, the late former president of South Africa Nelson Mandela said that one of the many things I learned as president was the centrality of water in the social, political, and economic affairs of the country, the continent and the world. At the world economic forum held in Dubai in 2008, the global agenda council on water security stated that there are strong water connections to energy, climate and food security whether negative or positive. Policy decisions made on energy, climate and food have a determinate impact on water and the reverse is also true. Water is a key driver of agricultural production and its scarcity can cut production and adversely impact food security. FAO, (2004) stated that 852 million people worldwide cannot obtain enough food to live healthy and provide lives.

Water shortage has great impact on the available water to provide food, safe environments, health, and livelihoods to a growing world population, in harmony with nature. Irrigation water is a vital resource for many productive and livelihood activities. As a production input in agriculture, irrigation water is an important socioeconomic ‘‘good’’, with a positive role in poverty reduction. Access to reliable irrigation water can enable farmers to adopt new technologies and intensify cultivation, leading to increased productivity, overall higher production, and greater returns from farming. This, in turn, opens up new employment opportunities, both on-farm and off-farm, and can improve incomes, livelihoods, and the quality of life in rural areas. Overall, irrigation water, like

land, can have an important income-generating function in agriculture specifically, and in rural settings in general.

Irrigation has helped boost agricultural yields and outputs in semi-arid and even arid environments and stabilized food production and prices (Hanjra *et al*, 2009 a, 2009b; Resegrant & cline 2003). Water for agriculture is critical for future global food security. However, continued increase in demand for water by non-agricultural uses like urban and industrial uses and greater concern for environmental quality have put irrigation water demand under great scrutiny and threatened food security. Water plays an important role in people's livelihood and lack of it to produce food causes food insecurity. A condition that exist when people do not have physical and economic access to sufficient, safe, nutritious, and culturally acceptable food to meet their dietary needs and lead an active and healthy life (FAO 1996). Food insecurity is divided into pro-chronic and acute food insecurity. Chronic food insecurity occurs when people are unable to access sufficient, safe and nutritious food for over a long period such that it becomes their normal condition. Acute food insecurity exists when the lack of access to adequate food is more short term caused by shocks like drought or war. Haddad, Webb and Slack (1997) and Smith and Haddad (2000), noted that the underlying terminate of malnutrition are extremely important because they show that individuals who are malnourished have been failed by many different sectors such as agriculture, health, education, social welfare, finance, and employment.

To address hunger effectively requires understanding the many causes of malnutrition at the household, community, and regional levels. It also requires a multi sectoral approach to develop solutions and designs and implement policies specifically targeted at vulnerable populations. Hunger has many impacts. It is reflected in high rates of disease and mortality, limited neurological development and low productivity among current and future generations. It is also a major constraint to country's ability to develop economically, socially and politically. Women and children living in developing countries are most vulnerable to the broad and devastating effects of hunger. Hunger,

poverty and disease are interlinked with each contributing to the presence and persistence of the other two (WHO 1997). World leaders, recognizing the enormity of the problem committed themselves to the goal of reducing hunger by half by 2015. Achieving this goal is possible but it requires an integrated, multi-sectoral approach and an unprecedented commitment of political action and resources from both developing and developed countries.

The system sustains life but also imposes the threats of drought and flood. Human activities such as industry, agriculture, irrigation, and rural and urban settlements are therefore naturally dependent sub-systems. These sub-systems have a heavy impact on the system, often with negative consequences on, the quantity and quality of available water, climate change, environment and biodiversity (Pirot *et al*., 2000). The amount of water in the world is limited, and water covers about two-thirds of the Earth's surface, but most of it is too salty for use. Only 2.5% of the world's water is not salty, and two-thirds of that is locked up in the icecaps and glaciers. About 20% is in remote areas, and much of it arrives at the wrong time and place, as monsoons and floods. Less than 0.08% of all the Earth's water is available for humans and over the next two decades our use is estimated to increase by about 40%. About 70% of the water we have is used for agriculture. By 2020, additional 17% more water is needed than is available now if we are to feed the world (Pirot *et al*., 2000).

Gleick (2003) states that global demand for water has tripled since 1950's but the supply of fresh water has been declining. Half a billion people live in water stressed countries and by 2025 the number will grow to three billion due to an increase in population. Irrigated agriculture is the dominant use of water because it accounts for 80% of global water use (Molden *et al,* 2007). Population growth will increase the demand for irrigation water to meet food production requirements and household and industrial demand. Global population is projected to increase to about 8 billion people by 2050. Those will likely increase the demand for food which requires water to produce in turn (de fraiture et al, 2007). Tillman et al, (2002) states the limited accessibility of fresh water resources in

rivers, lakes and shallow ground water aquifers has been caused by over-exploitation and water quality degradation. Irrigation is the largest losses out of water scarcity (Falkenmark & Molden, 2008; Molden, 2007) and the challenges are heightened by huge cost of developing new water systems or sources (Hanjra & Gichuki, 2008), land degradation in irrigated areas (Khan & Hanjra, 2008), ground water depletion (Shah et al, 2008), water pollution (Tillman *et al,* 2002), and ecosystem degradation (Dudgeon, 2000). These factors may cause global water resources limits.

De fraiture *et al,* (2007) states that the global water security predicted by IWMI that will be reached by 2025 were reached in 2000. Serageldin (2001) contends that water supply and demand in the world is startling with 450 million people in 29 countries facing severe water shortages. It, will therefore require additional 20% more water than it is available now to feed the additional 3 billion people by 2025 (Seckler *et al*, 1999 a). UNDP (2007) projected water scarcity to become a more important determinant of food scarcity than land scarcity. Scarcity and declining water quality in many areas of the world will pose challenge to people such as increased competition for water within and between sectors, transferring water out of agriculture (Molden, 2007) and leaving less water for food. It's also clearly to increase inequity in access to water creating water "haves" and "have not's" perpetuating poverty (Husain & Hanjra 2003) and widening the inequalities in access to water for food.

Climate change poses significant threats to global food security due to changes in water supply and demand (Alcamo *et al,* 2007; Doll and Sebert, 2002; Spash, 2008 a), impacts on crop productivity (Droogers and Acrts, 2005, impacts on food supply (Arnell *et al,* 2004; Rosenzweig & Parry, 1994), and high costs of adaptation to climate change (Kandlikar & Risbey, 2000). Climate change affects agriculture and food security by altering the spatial and temporal distribution of rainfall and the availability of water, land, capital, biodiversity and terrestrial resources. It may heighten uncertainties throughout the food chain, from farm to fork and yield to trade dynamics, and ultimately impact on the global economy, food security and the ability to feed nine billion people by 2050.

Modeling by IIASA (Fischer *et al*, 2007) shows that future social economic development and climate change may impact on regional and global irrigation requirements and thus on agricultural water withdrawals. Its assumed or predicted that net irrigation will increase by 45% by 2080 but still despite the efficiency that will come with that, gross water withdrawal may increase by 20%.

The impact of climate change on water and global food production are small but geographically very unevenly distributed with losses felt mostly in arid and sub- humid tropics in Africa (Parry *et al*; 2001) especially in poor countries with low capacity for adaptations (Kurukulasuriya *et al*; 2006). Parry *et al*, 2001 and Tubiello and Fischer, 2007 states some conclusions that emerged from climate change analysis on agriculture and food availability shows that food shortages will occur due to decrease in net global agricultural production and disrupted access to water and energy. Over the past decade Kenya has experienced a severe drought. Global warming is one critical factor that has prolonged the drought and as a result, millions of Kenyans are unable to grow their crops and keep their livestock alive. Because most Kenyans rely directly or indirectly on agriculture, when severe droughts occur, many Kenyans are left to starve unless food aid prevents a famine. In the last decade alone, there have been four major food crises, all due to drought. Global warming has had a great impact in Africa. In Kenya between 1997-2005, the country faced four food crises that have been associated with global warming.

In January 1997 the Kenyan government declared a state of national disaster after a severe drought threatened the livelihood of two million people. In December 2000, four million people were in need of food aid after Kenya was hit by its worst drought in 37 years. In 2004, the long rains between March and June failed and the subsequent crop failure left more than 2.3 million people in need of assistance. In 2005, president Kibaki declared yet another “national catastrophe” in reference to the famine that affected 2.5 million in northern Kenya. The worst drought in the last 60 years hit the country in 2001.

This drought affected over four million people because of a severely reduced harvest, damaged livestock, and weak sanitary conditions (Kandji, 2006 p 18).

Forest degradation is another reason for water scarcity and prolonged droughts. The largest forest in Kenya, Mau, distributes water to six lakes plus eight wildlife reserves, and some 10 million people depend on its rivers for a living. However, loggers and farmers have destroyed a quarter of Mau's 400,000 hectares. The problem with deforestation is that it almost always leads to increased runoff, which has negative implications in both the rainy as well as the subsequent dry season. Satellite images of Mau forest points to the fact that deforestation has increased from 1986 to 2003 because of increase in the number of settlers and clearers into the Mau forest, which has had a huge impact on the loss of forest cover. According to Morgan (2009), since 2001, when 60,000 hectares of Mau forests were given to settlers, it has been hard to control the amount of forest degradation.

Almost 20,000 hectares were handed out to farmers by the government for political reasons and about 2,000 hectares were illegally purchased with the help of local officials. Mau forest has suffered degradation and it's difficult for Kenya to rebuild the forest to overcome the water shortage in the rivers around it. Kenya's relatively high population growth has had another negative impact on having access to safe water. According to the World Bank (2010), the population in Kenya in 1990 was about 23 million and in 2008 the population increased to about 40 million people. With an increase in population, water is less accessible. In Kenya there are more people that live in rural areas than urban, however, the percent of total population that live in rural areas went down from about 82 percent (in 1990) to about 78 percent (in 2008). Due to this migration from rural to urban areas, there has been increased pressure on the rural water supply.

2.5 Community capacity building and poverty reduction

For many years there has been an increased need for funding, management and development of water resources in Kenya because of the increasing population as well as the country's increasing use of water for agriculture. However, the actions taken have not been effective because organizations in charge of managing water resources have failed in multiple ways: According to the Government of Kenya's National Water Development Report of 2006, Kenya's water resources have been mismanaged through unsustainable water and land use policies, incompetent management committees, laws and institutions, weak water allocation practices, growing pollution, and increasing degradation of rivers, lakes, wetlands, aquifers and their catchments.

Capacity building is a development work that strengthens the ability of community organizations and groups to build their structures, systems, people and skills so they are better able to define and achieve their objectives and engage in consultation and planning, manage community projects and take part in partnerships and community enterprises. It includes aspects of training, organizational and personal development and resource building, organized and planned in a self-conscious manner, reflecting the principles of empowerment and equality (Skinner, 1997) Skinner again described Community Capacity Building as activities, resources and support that strengthen the skills, abilities and confidence of people and community groups to take effective action and leading roles in the development of communities (Skinner, 2006). Capacity building focused on working directly with people in their communities so that they can become more confident and effective in addressing community issues and build on their strengths to enable them and others to take part in an effective, fair and inclusive way. LEAP (2002) stated that There are five areas of community learning and development work that support community capacity building: Working with communities to assess their needs and plan for change, supporting the development of skills and confidence of activists and organizations, promoting broad based participation in community affairs, assisting communities to exercise power and influence and assisting communities to provide or manage services

2.6 Theoretical framework

This literature review looks into economics theories of poverty, their views on the causes and consequences of poverty, as explained by both classical and neoclassical and radical theorists like Marxist.

So as to understand poverty, its economic causes and potential solutions, there is a need to define and understand what poverty is. Different schools of thoughts adopt different definitions of poverty. JRF (2013) defines poverty as the situation where a person's material resources are not sufficient to meet minimum needs including social participation. The father of modern economics, Adam Smith, defined poverty as the inability to purchase necessities required by nature or custom (Smith, 1776). Peter Townsend defines poverty as the lack of the resources necessary to permit participation in the activities, customs and diets commonly approved by society (Townsend, 1979). The World Bank (2004) also defined poverty as a pronounced deprivation in well-being, comprising many dimensions including low incomes, inability to acquire the basic goods and services necessary for survival with dignity, low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of political voice, and insufficient capacity and opportunity to better one's life. European Commission stated that people are said to be living in poverty if their income and resources are so inadequate as to preclude them from having a standard of living considered acceptable in the society in which they live (European Commission, 2004).

Classical theory states that poverty is caused by the consequences of poor individual choices and the underlying genetic abilities that affect productivity negatively. They said that wrong choices made by individual people leads them to poverty or welfare trap. They see welfare programmes as a cause and a reinforcement of poverty by creating in people welfare dependence. They view state intervention as an adverse source of economic inefficiency by generating incentives that are misaligned between poor individuals and society as a whole. The theory proposes that the government is only justified to intervene whenever poor people need supportive activities or threats to correct

for perverse economic incentives though they also acknowledge that some individuals like the young, sick and the old cannot participate and will need alternative support. They recommend that policy prescriptions should focus on efforts to raise the productivity of deprived individuals in order for them to join the labour force as soon as possible. Classical theory gave rise to other two different approaches raising different factors as the main cause of poverty; behavioral decision-based theory and the "sub-culture of poverty".

Esping-Andersen (1990) describing behavioral/decision based theory said that classical view on poverty corresponds to the market-espousing laissez-faire principle that attributes responsibility of the outcome of individual well-being to their own economic decisions. Hence, in this view, people should be held accountable for their experience of poverty because it's linked to individual deficiencies. Rank et al, (2003) points out that these individuals' characteristics can range from lack of an industrious work ethic or virtuous morality to low level of education or competitive market skills. This, therefore, means that there is no role for the state to intervene given that the individuals' traits that because poverty is either given or determined by market forces. Townsend (1979) stated that poverty is not as a result of the failure of market forces but out of their short comings in their efforts and capabilities, the poor self-select themselves into deprivation therefore the only reason left to support the poor is out of morality through charity and voluntary efforts.

The theory reiterates that social and political environments surrounding individuals has very little or no role for the low productivity and non-involvement in markets. It is as a result of a conscious choice with individual themselves playing a big and active part in influencing its outcome. It adds that although other options are available, the poor still make choices that limit their access to economic resources raising their risks of ending up in poverty (Blank 2010). Asen (2002) said that any individual can succeed by skills and hard work and that motivation and persistence are all that are required to achieve success. Asen implied that individuals who do not succeed are responsible for their failure. This

theory opposes the use of subsidies as a measure of reducing poverty but support the use of long term development aid which develops capabilities and supplies opportunities in terms of jobs creations, education and health care. Kasarda and Ting, (1996), among others suggested that to prevent dependence or a welfare trap where people will lack reasons to work hard, people should be trained to move from welfare dependence to work. They advised authorities to fever development policies over mere poverty reduction policies (Blank, 2010). Maskovsky (2001) proposed the "working consensus" by pushing the poor into work as a primary goal and eliminate all other forms of assistance. Neoclassical, Keynesians and Marxist economist have criticized this theory on ground that individual decisions may be affected by market failure and unemployment can also be involuntary due to inadequate aggregate demand or class based oppression.

The theory of the sub culture of poverty suggest that poverty is created by a set of believes, values and skills that are individually held but socially generated then transmitted over generations. The theory link poverty to culture rather than individual capabilities and motivation. Culture is socially generated and perpetuated reflecting interaction of individuals and community. Individuals therefore, should not be blamed or held responsible because they are victims of their dysfunctional sub culture or culture. The culture of poverty is a subculture of poor people in ghettos, poor regions, or social contexts. These people develop a shared set of beliefs, values and norms for behaviors that are separate from but embedded in the culture of the main society. Once it comes to existence, it perpetuates itself making the people who practice it absorb its basic attitudes making them psychologically unready to take full advantage of changing conditions or improving opportunities that may develop in their lifetime (scientific American, October 1966 quoted in Ryan, 1976). Blank (2010) claims that poverty be-gets poverty. Children learn deviant behaviors of their progenitors who act as role models hence there is an intergenerational transmission of attitudes relating to poverty. Lewis (1965) stated that poverty is a way of life, remarkably stable and persistent, passed down from generation to generations along family lines. He said that this subculture is underpinned by a number of social and psychological characteristics such as lack of ability to defer gratification,

crowded quarters and frequent resort to violence. The subculture is also linked to an inability to accumulate private and social assets.

Neoclassical economists are of the opinion that poverty is caused by unequal initial endowment of factors like talent, skills, and capital which determines productivity of an individual. Incomplete information, market failures such as externalities, moral hazard and adverse selection are also major aggravators of poverty (Davis, 2007). This theory implies that solutions to poverty are not in regulating market mechanisms but in character reforms and training of individuals (Townsend, 1979). In the views of neoclassical, poverty has five central causes; monetary approach, assets and financials/income risks, incentives/market failures and access to credit market, human capital theory, ethnic minorities and immigration and health demographics.

In the monetary approach neoclassical said that income of individuals depends on their marginal productivity. They see poverty as a shortfall below some minimum level of resources given by a specific poverty line. Bhalla (2002) states that in reducing poverty, income should be a primary consideration because it will enable the poor people get purchasing power, reducing resources inequality by providing access to resources which are unavailable to the poor and enable the poor to purchase goods. Laderchi *et al* (2003) criticized the approach on whether a short fall of resources is all that can be defined as poverty.

Assets and financial/income risk approach explains poverty and social exclusion through the incidence of asset scarcity. They stated that households that owns adequate level of assets are not or less affected by fluctuations in their incomes. The risk of becoming poor when they are hit by a negative income shock is very low compared to asset-poor households which cannot withstand income risks easily. Ulimwengu (2008) claims that lack of income diversification due to having too few assets affects the probability of becoming poor and the length of that poverty especially when the job is not secure and the family internal situation is prone to instability. He added that the ability to accumulate both private assets and social assets like health and education matters a lot in reducing the

rate of poverty and its persistence. He advocated for accumulation of economically-valuable assets in cash and human capital.

Johnson and Mason (2012) stated that the poor are characterized by their inability to save. He therefore proposed that they need to be facilitated to access low cost credit markets to protect them against income shocks and help them start a self-reinforcing assets accumulation process that can eventually lead to a sufficient level of wealth to counter-act the effects of income fluctuations. Sachs (2005) refuted the claims and said that it is low level or lack of capital but not income that is perpetuating high level of poverty in developing countries. The poor lacks the capital needed to get a foot on the ladder of development. They lack human capital like health, skills, and education; business capital like machinery and buildings; infrastructure capital like transport, power and sanitation; natural capital like viable land; institutional capital like rule of law and security and knowledge capital like technical know-how needed to raise productivity.

In the concept of incentives, market failures and access to credit, Banerjee and Duflo (2012) said that the poor always seems to make decisions contrary to their own interest because; first, they have very few resources so they trade of their health for other desirable ends. Secondly, they lack information and thirdly they are faced by behavioral constraints such as procrastination, self-control and present consumption bias. They said that poor people are lazy and indulgent. The theory affirms that there are market failures inform of information asymmetries and other constraints causing inadequate savings. Banerjee and Duflo proposed a radical thinking in the sense of change from focusing on deep institutional reforms proposed by Sachs (2005) to practical on the field direct assistance in terms of small scale transfers to behavioral-change inducing policies and subventions. Rosenzweig (2012) criticized this concept stating that it's a thinking small approach because the gain achieved from tackling individual-level problems are small in absolute compared to relative terms. He proposed employment to be provided to the poor and setting up full-fledged programmes to combat poverty at an aggregate level. Pemberton et al (2013) said that poverty is caused by a mismatch of skills in the labor

market. To avoid poverty, the quantity and the type of skills matters. This means having the wrong skills increases poverty which is common with the poor because they cannot afford quality education and training. This aggravates poverty later in life because demand for unskilled labor keeps on declining.

Human capital theory was put forward by Becker in 1964. The theory focuses on the role played by individual choices in relation to education, training and mobility in poverty reduction. Lydall (1968) argued that it is the variation in individual intelligence, environment and education that account for most variations in distribution of personal earnings. Machin (2009) notes that poor households under invest in education. The theory proposes that spending on the education of the poor should be increased to improve their level of ability to achieve. Scott *et al* (2000) advocated for adult education saying that it has an important role to play for those whose skills are in low demand or have not benefitted from normal schooling. The failure to invest in one's own skills risk perpetuating low pay therefore causing poverty (Pemberton *et al,* 2013).

On ethnic minorities Farkas (1996) and Tackey *et al* (2011) observed that around two fifth of people from ethnic minorities in the United Kingdom live in low income households which is twice the rate of white British people. They concluded that poverty among ethnic minorities is largely caused by discrimination and cultural aspects especially their attitude toward education. Health and demographics are a major component of an individual stock of human capital and can therefore easily influence an individual likelihood of the incidence of poverty. The theory says that just like the way poor skills causes poverty, poor level of health implies a lower likelihood of finding work or not being able to work at all and hence a higher probability of ending up poor (Reinstadler & Ray, 2010). Buddel Meyer & Cai (2009) points out that individuals in precarious health conditions may not be able to gather abilities required for higher paying jobs therefore they settle for low wage opportunities. Income poverty causes poor health due to malnutrition and les s access to medical services.

Keynesians or the liberal theories suggest that both market distortions and under development in its multiple facets causes poverty. Sachs (2005) states that in a liberal approach the under development is characterized by poor levels of human capital (Health, skills and education), business capital (machinery and buildings), infrastructure (transport, power and sanitation), natural capital (Viable land), public institutional capital (rule of law and security) and knowledge capital (technical knowhow needed to raise productivity). Keynes, like neoclassical theory, embrace the significance of education in poverty reduction but not education on individual decision but rather on the promotion of human capital accumulation through aggregate investment in public education. Keynes says that government interventions against poverty are needed to tackle involuntary unemployment and promote human capital accumulation through investing in public education. Dickens and Ellwood (2001) said that despite economic growth, if the poor are left off the "growth wagon", poverty rates can and will grow and persist. The liberals hold the view that unemployment is a primary source of poverty because labor income lifts individuals out of poverty (Aassve *et al,* 2005). Sen (1983, 1999) says that employment gives someone ability to transform assets into entitlement.

Marxist or radical theories relate that poverty is caused by social and political factors based on class division and that the market is inherently dysfunctional (Blank, 2010). The view holds that capitalist societies keep the cost of labor very low than its value through the threats of unemployment. They propose a minimum wage because low wages lead to perpetual poverty by preventing individuals from saving (Pemberton *et al,* 2013). Unionizations also protect and preserve the basic standard of living for workers and other low wage earners (Kyzyma, 2013). Through its dual market theory, Marxist said that the labor market is stratified into primary and secondary sectors. The secondary sectors are distinguished by unstable employment, depressed pay levels and very poor prospects for promotions. According to Rank *et al* (2003), these issues reflects a situation where the experience of poverty is the consequence of vulnerabilities inherent in the system rather than in their personal traits and characteristics. This radical view put forward the idea that it's only those poor people affected by deprivation who can find a solution for it. There is

no need for external advice/ expertise on the matter (Morazes and Pintak, 2007). Ayittey (2005) argues that, for poverty to be properly addressed, it should be the lowest classes in the society that gains control of production of production and governance. They insist that in the investigation of poverty, the focus should be shifted to ensure fulfillment of social rights and social justice.

Social exclusion, social capital and electic theories of poverty consider a wide spectrum of aspects and ideas arising from several disciples such as sociology and economics. Durlauf and Fafchamps (2005) defined social capital as a network based processes that can generate beneficial economic outcomes through norms and trust. Jefferson (2012) added that this processes can generate positive or negative externalities. For example, individuals with access to social groups interactions that promote negative behavior and negative outcomes will more likely be poor. Putnam (2000) warns that, although low levels of social capital can cause poverty, the opposite may not necessarily hold true. That is, poor communities may not necessarily be endowed with low levels of social capital. In fact, poor people may belong to social groups characterized by high levels of social capital; however, they might lack the basic/essential resources to take advantage/make use of that social capital. Effectively, this means that high enough levels of social capital may be a necessary but not sufficient condition to combat poverty if it is not accompanied by minimal improvements in the material and socioeconomic attributes present in poor communities. Social capital can have a dark side in which dense social networks are used to realize goals that do not contribute to a public good, but, rather, to a public bad.

2.7 Conceptual framework

A conceptual framework is used in research to outline possible courses of action or to present a preferred approach to an idea or thought. A Conceptual framework can act like a map that gives coherence to empirical inquiry. In this study, provision of NGO's sponsored water projects was used as a potential factor influencing peoples and communities level of poverty and their resilience to economic shocks. Communities and

individual living in those communities need to know which water projects exist in their communities, they need to know what roles they can play in their implementation and management and what they can do to ensure sustainability.

An independent variable is the variable that is manipulated or treated in order to see what effect this has on the outcomes or behavior of respondents. In this study, NGO's water projects are the independent variable. Other independent variables in the study include Resource mobilization, provision of water, provision of water for irrigation, and community capacity building. A dependent variable is the variable in which the changes arise as a result of the level or amount of manipulation of the independent variable (s). In this study, alleviation of poverty is the dependent variable. A moderating variable is the variable which may influence the effect of the independent variable on the dependent variable. In this study, Government Policies is the moderating variable.

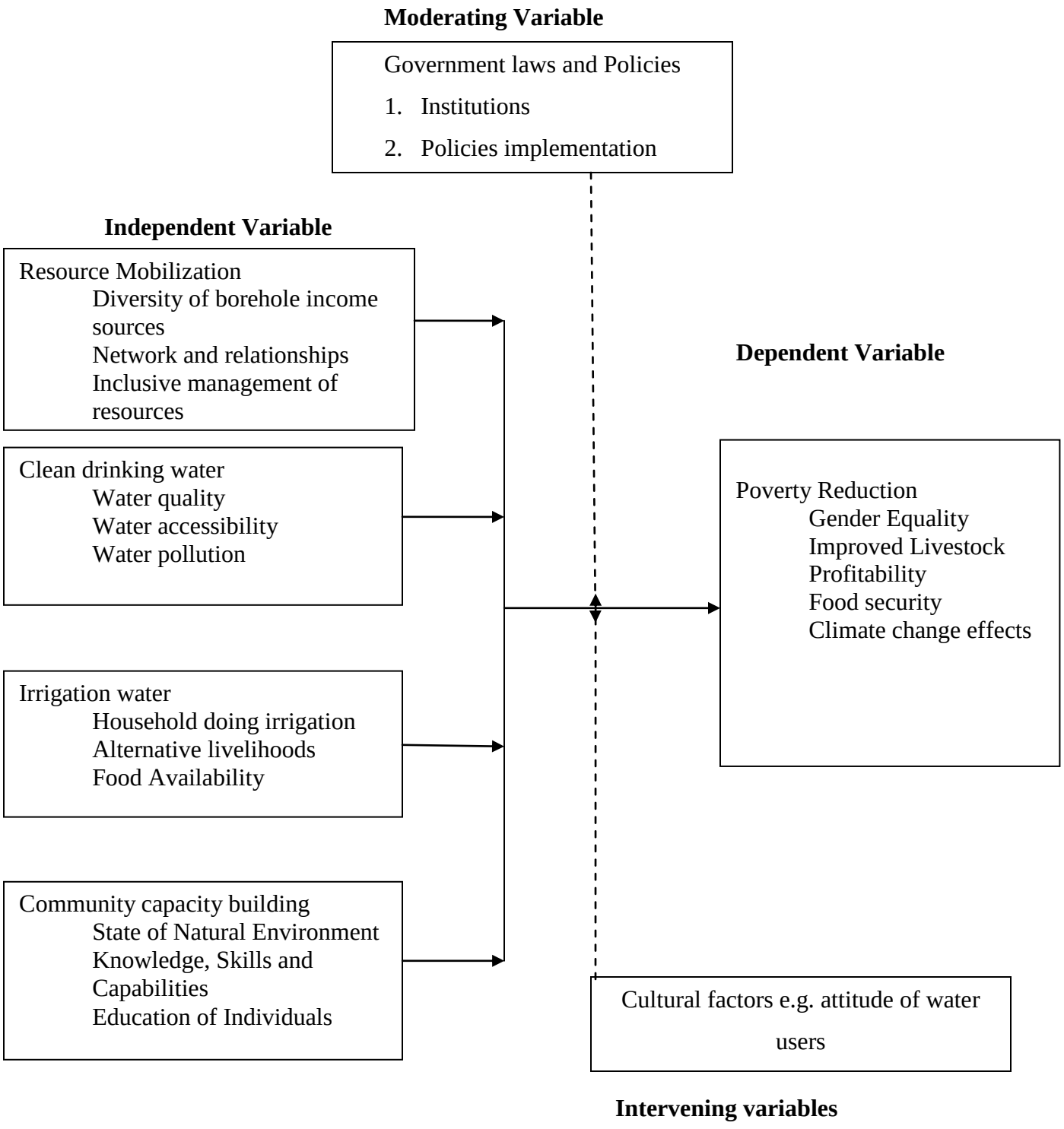

Figure 2.1: Conceptual Framework

From the above conceptual framework figure, it was realized that water resource mobilization, provision of clean drinking water, provision of water for irrigation, and capacity building of communities (independent variables) can positively or negatively influence poverty reduction (dependent variables). Water quality, scarcity, pollution, decline and demand have a negative influence, on poverty reduction but water use, availability, communities' skills and capabilities, training of expertise, good decision making of water users and management of water supply has a positive influence on poverty reduction.

Government policies on water (moderating variable) has a contingent effect on the relationship between water resource, clean drinking water, irrigation water and capacity building of communities (independent variable) and poverty reduction (dependent variable). Cultural factors; taboos and gender water access (intervening variable) though difficult to measure, has an influence on the relationship between water resource, clean drinking water, irrigation water and capacity building of communities (independent variable) and poverty reduction (dependent variable).

2.8 Gaps in Literature Review

Most research undertaken and reported on access and availability of water to rural communities has focused on the relationship between water and disease, water and health, and role of water in agriculture or effect on lack of water to food security. Researchers have not clearly explained in which way the access to clean water for livestock and people is eliminating poverty. There is need to carry out an assessment how availability of water projects and access to safe drinking water to people and livestock is helping in eliminating poverty in the rural communities of Kajiado district. This research that will use both primary and secondary methods to collect data, once completed, may help in adding knowledge base on related water projects and their challenges in communities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter discusses the method of data analysis, the Research Design and Methodology used to conduct the research. It explains how the researcher selected the population and target group, the type of research design, the suitable sampling design, the method of data collection, data analysis and the techniques that were used to ensure validity and reliability of the instruments used.

3.2 Research Design

A research design is the "blue print" that enables the investigator to come up with solutions to the problems and guides the researcher in the various stages of the research (Nachmias, 1996). Clotty (1998) described that they are four key features to consider in research design. One is the epistemology that informs the research and the philosophical stance underlying the methodology in question (e.g. positivism, constructivism, pragmatism, advocacy/ participatory), the methodology itself, and the techniques and procedures used in research design to collect data. Burns and Grone (2003:19) defined research design as ''a blue print'' for conducting a study with maximum control over factors that may interfere with validity of the findings. Paratoo (1997: 142) described a research design as ''a plan that describe how, when and where data are to be collected and analyzed''. Polits et al (2001: 167) defined a research design as ''the researcher's overall for answering the research questions or testing the research hypothesis. In this research, the researcher used descriptive research design.

3.3 Target population

The target population of the study was the individual households water consumers for the household survey and water committee members in the specific target area which is Ngong division. Keek Onyoikie central location and Esonorua Location which are the specific areas of the study within Ngong Division have ten (10) water management committees spread across 10 communal water projects with 7 members each. Each of the

water management committee is made up of three executive leaders: chairman, treasurer, and secretary. According to Kenya National Population Census (2009) the research area has a population of 15,636 household consumers spread across the two locations. The target population units of the research study were therefore 15,636 households' consumers and 70 water management committee members.

3.4 Sampling procedure and Sampling Size

According to Mugenda and Mugenda (1999) where there is time and resources, a researcher may make a bigger sample to increase the level of confidence. The researcher adopted Yamane (1967) formula to calculate the sample size of household consumers' respondents and purposive sampling technique in order to select one committee member as key informant from each of the 10 water projects and 5 community leaders who joined the 7 water committee members to form an FGD group of 12 people per project. Stratified proportional sampling was used to obtain a sample of household consumers from the two locations who were then selected through simple random sampling technique as shown in Table 3.1 and 3.2 above.

The sample size of households' consumers at 10% level of significance was obtained as presented below.

$n = N \div (1+N (e)^2)$

Whereby n is the sample size

N is the target population (no of household consumers) =15,636

e is the level of significance = 0.10

$$n = 15,636 / (1+ 15,636 (0.10)^2)$$

$$15,636/157.36$$

$$= 99.4$$

This sample size is similar to the sample size proposed by Yamane, (1967) of 99 for a population of 15,000 and 20,000 with precision levels of + 10%. Therefore, a sample of

100 households was selected for the study since the population was slightly greater than 15,000 but less than 20,000 and 99.4 is very close to 100.

Table 3.1 Proportionate sampling of household consumers in Ngong Division.

The table below shows the number of households' consumers and sample size selected for the study in Keek Onyoikie and Esonorua location of Ngong division.

Location	No. of Households Consumers	Sample Size
Keek Onyoikie Central	10,402	67
Esonorua	5,234	33
Total	15,636	100

Table 3.2 Sampling frame of stakeholders

The table below shows the composition of the total sample size of stakeholders

Target group	Population size	Total sample size
Water Committee members and community leaders	120	120
Key informants	10	10
Household Members	15,636	100
Total	15,766	230

3.5 Methods of Data Collection

Data collection is an integral part of research design as it is from the collected data that the researcher can do an analysis, draw conclusions and make recommendations. In this study, data was collected through a multi-dimensional approach. The researcher did not limit himself to a single approach in collecting data but used a number of approaches.
The study collected data through the following methods

3.5.1 Focus Group Discussion

Focus group is a way of collecting data by gathering a group of 12-15 people together with a similar background and experiences to discuss a specific topic of interest. Kreger, (1998) says that FGD is an efficient method of collecting data because participants will agree or disagree with each other providing an insight on how the group thinks about the issue at hand. It also provides a range of opinions, and ideas, inconsistencies and variations that exists in a particular community in terms of beliefs, experiences and practices regarding the topic in question. Additionally, FGD explores the meaning of survey findings that cannot be explained statistically; provide a range of views /opinions on the topic of interest and to collect a wide variety of local terminology. FGD can reveal a wealth of detailed information and deep insights, a focus group when well executed can create an accepting environment that puts participants at ease allowing them to thoughtfully answer questions in their own words and add meaning to their answers. Focus group discussion guides were developed and used by the researcher. A total of 10 focus group discussions were conducted for the 10 water projects each containing 12 people and data captured in questionnaires that contained two types of questions: closed and open ended. Closed ended questions asked had two options for the respondent to choose from: true or false.

3.5.2 Household Questionnaires

Martin, (2006), states that questionnaires help to illicit reports of facts, attitudes and other subjective states. (Elizabeth martins, 2006, Research report series, survey methodology 2006). Data was collected from households through structured questionnaires. The questionnaires contained both open and closed questions. (Oppenheim, 1992), contends that questionnaire is a more objective research tool that can produce generalizable results because it involves a large sample. The questionnaires were administered to the respondents by the researcher with the help of two researches assistant. Gay, (1981) says that a questionnaire is a typical method through which descriptive data can be collected; the data to be collected is descriptive. The Household questionnaire deployed by the researcher contained two type of questions: closed and open ended. For each closed

ended question, two to five options were provided where the respondent can choose from. The questionnaire captured data based on four parameters: clean drinking water, resource mobilization, capacity building and irrigation.

3.5.3 Key Informant Interviews

Key informant interview was carried out with the beneficiary's communities to give in-depth information to validate or fail to validate communities' households or FGD information. Kendal, (2008), states that interviews often gathers more in-depth insights on participants' attitudes, thoughts and actions. Interviews provide a context where by a participant or participants can ask for clarification, elaborate on ideas, and explain perspectives in their own words, Richman, Keisher, Weisband and Drawgon, 1999; Yin,2009). Key informant interviews questionnaires were administered to 10 leaders from each of the 10 water project. Key informant interview questionnaire administered to the respondents contained closed ended questions only. KII respondents were asked to respond as to whether the statements were true or false.

3.6 Validity and Reliability of instruments

A fundamental concern in qualitative research revolves around the degree of confidence a researcher can place in what the researcher has seen or heard. In other words, how can researchers be sure that they are not being misled?

3.6.1 Validity

Validity is the degree to which a test or measuring instrument actually measures what it purposes to measure (Anastasi & Urbina, 1997). Ary; Jacobs and Razuvieh (2002) conceptualize validity as the extent to which theory and evidence support the proposed interpretation of test scores entailed by proposed uses of test. Kaplan and Saccuzo (2005) viewed validity as evidence for inferences made about a test score while McBurney & White (2007) viewed validity as an indication of accuracy in terms of the extent to which a research conclusion corresponds with reliability. This therefore suggest that validity is based on the extent to which meaningful and appropriate conclusions or decisions are

made on the basis of scores acquired out of the instrument used in the research (Anastasi & Urbina, 2007).

Face validity is a desirable feature to test the degree of accuracy and revenue of the research instruments the researcher carried out face validity to ensure the items in the measuring instruments are relevant reasonable, unambiguous and clear. Content validity was also carried out by the researcher evaluating contents and rewarding words. Content validity ensured that the elements of the main issue to be covered in a researcher are both a fair representation of the wider issue under investigation and that the elements chosen for the research sample are addressed in-depth and breadth (Cohen, Manion & Morisson, 2008). Mugenda and Mugenda (2003) said that the right procedure in assessing the content validity of a measure is to use an expert in that particular field. The researcher in this study in an effort to establish the validity of the research instruments, sought the opinion of the researcher's supervisor and other University of Nairobi lecturers who are experts in research and data collection.

3.6.2 Reliability

A research is reliable if it can demonstrate that if it can be repeated on a similar group of respondents in a similar context then similar results will be obtained. Bowling, (2009) said that reliability is the dependability, consistency, reprocibility or replicability of results overtime, over instruments and groups of respondents. Brock-Utme (1996) argued that reliability in research is the fit between what researchers' record as data and what actually occurs in the natural settings that is being researched. Winter (2000), Stenbacka (2001) and Holafshani (2003) suggested that in research reliability can be replaced with other terms such as credibility, neutrality, conformability, dependability, consistency, applicability, trustworthiness and transferability. Reliability of the research instruments was assessed using split half technique where the researcher administered questionnaires to two different groups of respondents. The data was entered into the computer software for SPSS. The data was analyzed by the researcher using Spearman Brown prediction formula and a correlation coefficient of 0.82 was obtained. This high correlation indicates

that the instruments had internal reliability and consistency. According to Mugenda and Mugenda (2003) an instrument that yields a reliability coefficient of above 0.8 is reasonably consistent and therefore acceptable for data collection and analysis.

3.6.3 Pilot study

Orodho, (2004) said that a pilot testing is a smaller version of a large study that is conducted in order to prepare for the study and also provide a basis for the design. Pilot testing of 10 household and water committee members was conducted by the researcher in Singiraine a nearby community with almost similar condition to the targeted community. This 10 households and water committee members represent 4% of the total sample of 230. According to Mugenda and Mugenda (2003), a pilot size of between 1% and 10% is acceptable.

3.7 Data collection procedure

Before data collection, the researcher sought permission from the local administration of both locations in which the research was undertaken. Before also an individual was questioned the researcher explained the purpose of the study and for each respondent to give his free, prior and informed consent. The researcher recruited two research assistants to assist in data collection. The research assistants were trained on the research objectives and guided on techniques of administering the questionnaires and the interview guides. Households respondent, FGD and KII each had its own separate questionnaire. All interviews were conducted face to face.

3.8 Methods of Data Analysis

Lecompte and Schensul (1999), defined analysis as the process the researcher uses to reduce data to a story and interpretation. Data analysis is the process of reducing a large amount of collected data to make sense out of it. During data analysis three things happens; data is organized, is reduced through summarization and categorization and patterns, and themes in the data are indentified and linked. Patton (1987) and Merriam (1998) states that they are several approaches to data analysis; ethnographic analysis, narrative analysis, phenomenological analysis and constant comparative method.

Ethnographic analysis identifies categories related to a cultures economy, demographics, human life, particularly, family, education, and health care issues and environment. It described narrative analysis as it's used in several field of study, for example, sociological models relate narrative to the social context. Psychological approaches focus on memorization in storytelling, with particular emphasize on understanding, recall and summarization in storytelling. Anthropological models emphasize how stories vary across cultures, looking at customs, beliefs, values and social context of narratives. Literacy models focus on grammar, syntax and plot of narratives; ideological perspectives, like feminist theory, critical theory, and post modernism, may be used to analyze and interpret narratives

Phenomenological analysis includes an epodal approach, which involves laying out one's assumptions about the phenomenon under study, bracketing, imaginative variation (looking at the phenomenon in various ways), and first and second order knowledge.
Constant comparative methods assign codes that reflect the conceptual relationships (Merriam, 1998). Bernard (2000) also suggested several approached to data analysis including hermeneutics or interpretive analysis narrative and performance narrative, discourse analysis, grounded theory analysis, content analysis and cross cultural analysis.
In hermeneutics or interpretive analysis, the researcher continually interprets the words of those texts to understand their meaning and directives.

Narratives and performance analysis is to discover repeated similarities in people's stories. Discourse analysis is looking closely how people interact with each other. He described grounded theory as the acts of techniques for identifying categories and concepts that emerge from tests and link the concept into narrative and formal theories. Context analysis approach data analysis by use of codes. Creating a matrix or table of units then conducting statistical analysis of the matrix. Anderson and Poole, (2001) says that the researcher must be able to interpret the data reliably, once data has been collected. In this study, the data collected by the researcher was analyzed using descriptive statistics such as percentages and tables. Both qualitative and quantitative data

were analyzed and interpreted using descriptive statistics in order to address the research objectives. Data was keyed in Statistical Programme for Social Scientist (SPSS) version 20 and results were presented in tables using percentages and frequencies to facilitate comparisons.

3.8.1 Measurement and analysis of variables

The measurement of variables in this research was undertaken as shown in Table 1 below

Table 3.3: Operationalization of variables

Variable	Indicator	Measurement Scale	Data Collection Method	Tool of analysis	Decision making
Independent Variables					
1. Resource Mobilization	1. No. of households contributing financial resources for continuity of the water project. 2. No. of households and key informants reporting having developed financially beneficial relationship, networks and partnerships with other communities and external donors. 3. % of households reporting being included in decision making on the use of borehole resources. .	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages
2. Clean drinking water	1. % of households reporting that the borehole water smells and tastes good. 2. No. of households with access to clean water less than a kilometer from their houses. 3. No. of households reporting having had one of its members suffering from a water born disease in the last one year.	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages

3. Irrigation water	1. No. of households doing irrigation at the borehole site 2. No. of households reporting that the local pastoral communities owns the irrigated foods. 3. % of household reporting having access to the irrigated food.	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages
4. Capacity building of communities	1. No. of households reporting that the Ecosystem/environment around the borehole has not been degraded. 2. % of households reporting that the community has sufficient skills and knowledge among themselves to handle breakdown emergencies. 3. No. of households reporting that their members of school going age are going to school.	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages
Dependent Variable					
Reduction of poverty	1. Gender Equality 2. Improved livestock profitability 3. Food security 4. Climate change effects	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages

Moderating Variable					
Government policies	Existing Government policies on development and management of water projects.	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages
Intervening variable					
Cultural factors	1. Taboos 2. Attitude of water users 3. Community beliefs	Ordinal Nominal	Questionnaire FGD Key informant	SPSS Thematic	Tables Percentages

3.9 Ethical Considerations

Research involved interaction with people or general community members who acted as respondent in the research. The researcher in this study ensured to the extend humanly possible that no harm occurred to the respondents whether psychological, financial or social harm. Therefore, the researcher adopted a deontological approach by ensuring that any practice that may have caused harm to the individual was avoided. AMA (2009) states that, a researcher should "do no harm". Kinner, Ferrell and Dubinsky (1988) proposed deontological philosophies as mean to arrive on an ethical decision and emphasize moral obligations for proper conduct. They emphasized that a researcher should not harm participants in anyway no matter what the potential benefit may be. Kantian ethics suggest that "persons should be treated as ends and never purely as means" (Beauchamp & Bowie, 2004). The researcher ensured that participant or respondents answered questions under voluntary participation with full inform consent. Their confidentiality and anonymity was guaranteed with no any potential harm, results were communicated back. Other specific ethical issues were also observed.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter deals with the analysis of data collected from the field, presentation and interpretation of the data. Analysis of data was done using statistical package for social sciences (SPSS) version 21; presentation was done using tables while interpretations are generated from analysis of the data presented.

4.2 Questionnaire Return Rate

The study targeted 100 household respondents, 10 FGD of 120 people and 10 KII. The sample is very close to the sample size proposed by Yamane, (1967) of 99 for a population of 15,000 to 20,000 with precision levels of + 10%. In Actuals, the researcher distributed 100 questionnaires to the individual respondents, 10 key informants' interviews and 10 focus group discussion. All groups responded and returned their questionnaires contributing to the response rates of 100% in every category. This response rates were sufficient and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This excellent response rate was due to the efforts of the researcher visiting in person and requesting respondents to fill questionnaires. Table 4.1 below shows the questionnaire return rate.

Table 4.1: Questionnaire Return Rate

Respondents	Targeted	Returned	Percent
Households	100	100	100%
KII	10	10	100%
FGD	10	10	100%

As shown in table 4.1 above, the return rate of the questionnaires administered to each category of respondents was returned 100%.

4.3 Demographic characteristic of respondents

The demographic characteristics of respondents on age, religion, livelihoods, education, years of residency and occupation are presented in tables 4.2 to 4.7 below.

4.3.1 Distribution of respondent in terms of age bracket

The researcher sought to find out the age of the respondent. Table 4.2 shows the distribution of respondents in terms of age bracket.

Table 4.2 respondents age brackets

Ages	Frequency	Percent
25-35	45	45%
36-45	34	34%
46-55	15	15%
56 and above	6	6%
Total	100	100

As shown in table 4.2, Out of the hundred respondents 45% were in age bracket between 25 and 35 years. 34% were between 36 to 45 years while 46 to 55 years were 15% of the respondents. The remainder 6% of the respondent were between 56 years and above.

4.3.2 Distribution of respondents according to Religion

Respondent were asked whether they are Christians, Muslims or specify any other religion. Results are shown in table 4.3 below.

Table 4.3 respondents' religion

Religion	Frequency	Percent
Christians	100	100
Muslims	0	0
Others (specify)	0	0
Total	100	100

As shown by the findings in table 4.3, 100% of respondents are Christians.

4.3.3 Distribution of respondents according to livelihood

Table 4.4 Respondents livelihoods

Mean of livelihood	Frequency	Percent
Pastoralism	99	99
Agro-Pastoralism	1	1
Others (specify)	0	0
Total	100	100

Pastoralism was rated by the respondents as the main source of livelihood. As shown in table 4.4, 99% of respondents are pastoralist except one respondent who said he is an agro-pastoralist accounting to 1% of total respondents.

4.3.4 Distribution of respondents according to levels of education

The researcher sought to find out the level of education of the respondents. Table 4.5 below shows distribution of respondents in terms of their education level.

Table 4.5: Respondent level of Education

Education level	Frequency	Percent
None	74	74
Primary	11	11
Secondary	5	5
Higher education	10	10
Total	100	100

According to the findings in table 4.5 above, a majority 74% of respondents do not have any formal education. 5% have gone up to secondary level, 11% to primary level and 10% have higher education; that's college and University.

4.3.5 Distribution of respondents in terms of years lived in the community

Table 4.6: respondent years of residency

Ages	frequency	Percent
0-10yrs	58	58
11-20yrs	36	36
21-30yrs	6	6
Total	100	100

Out of 100 respondents, 58% have lived in Ngong division for between 0-10 years. 36% of respondents have lived between 11-20 years and 6% between 21-30 years.

4.3.6 Distribution of respondent in terms of their economic occupation

The researcher sought to find out economic occupation of the respondents.

Table 4.7respondent economic occupation.

Occupation	Frequency	Percent
Not employed	85	85
Self employed	11	11
Employed	4	4
Total	100	100

On economic occupation, as shown in table 4.7, 85% of the respondents are not employed, 11% are self-employed while 4% are employed. On further inquiry by the researcher on the nature of self-employment, those who said are self-employed engage in small businesses like kiosk selling and livestock retailing.

4.4 Resources Mobilization and Its influence on poverty reduction

The first specific objective of the research seeks to establish how resources mobilization from NGO's sponsored water projects influence poverty reduction among the Maasai pastoralist community in Ngong division, Kajiado County.

4.4.1 Financial resources contribution

The study sought to find out whether the households respondents in the survey had ever participated in financial resources contribution for the continuity of the water projects.

Table 4.8 financial resources contributions

	Frequency	Percent
Agree	63	63
Strongly agree	36	36
Undecided	1	1
Disagree	0	0
Strongly disagree	0	0
Total	100	100

From the study findings in Table 4.8, the majority (63%) of the households' respondents agreed to have contributed financial resources for continuity of the water projects. 36 households representing 36% of total respondents strongly agreed while 1% was undecided. There were no respondents who disagreed or strongly disagreed having contributed financial resources. This could be an indicator on the level of interest the communities have in advancing the existence of this water projects probably due to immediate tangible and non-tangible benefits they drive out of them.

4.4.1.1 Qualitative findings on Financial contribution

From the focus group discussion and key informant interviews conducted, 10 FGD groups which translates to 100% of respondents said that beneficiaries of the projects participate in financial resources contribution for the continuity of the water projects. 10 (100%) key informant interviews also confirmed that the beneficiaries contribute financial resources as a form of financial and project sustainability. ".....the money we contribute are meant to guard this borehole from prolonged break downs because we

depend on cattle for a livelihood and without water there are no cattle…."- FGD respondents in Lerujat borehole. "…. when we were growing up we had no this permanent sources of water, we used to trek far searching for free natural sources of water and cattle were poor breeds that could withstand challenges of that time. their mortality rate was very high and fetched very little at the Market. Now there is paid water. Cattle breed are of very good quality and they fetch good market prices. One cow can pay a child secondary school fees for a year……."- Sonchikai Maruna KII informant.

4.4.2 Involvement in decision making

The study inquired from the households whether they are involved in making decision on the use of funds they contributed or donated to the water projects.

Table 4.9 Involvement in financial decision making

	Frequency	Percent
Agree	40	40
Strongly agree	4	4
Undecided	10	10
Disagree	46	46
Strongly disagree	0	0
Total	100	100

From the findings in Table 4.9, the majority of the households (46%) disagreed being involved in financial decision making. 40% agreed that they are involved, 4 strongly agreed while 10% of the households were undecided. No household strongly disagreed with the inquiry.

In the opinion of FGD groups, only 5 (50%) agreed that the communities are involved in financial decision making. 6 (60%) out of 10 of KII respondents said that the community are involved in financial decision making.

4.4.3 Resources acquisition

In order to establish from respondents, the effectiveness of water availability to poverty reduction the researcher asked whether availability of water has increased livestock numbers.

Table 4.10 Resources Acquisition.

	Frequency	Percent
Agree	76	76
Strongly agree	20	20
Undecided	1	1
Disagree	3	3
Strongly disagree	0	0
Total	100	100

According to the findings in table 4.10 above, a majority 76% of respondent agreed that availability of water has increase livestock numbers. 20% strongly agreed. 3% disagreed that availability of water has not increased livestock numbers while 1% of the respondent were undecided. There was no respondent who strongly disagreed.

The study further inquired from the FGD groups and KII respondents on whether availability of water has reduced poverty. 100% of respondents from both groups said that presence of water has reduced poverty significantly.

4.4.4 Livestock Market Value

The study sought to find out whether availability of water has increased livestock profitability at the market and improve their resiliency to drought.

Table 4.11 Livestock Market Value

	Frequency	Percent
Agree	73	73
Strongly agree	27	27
Undecided	0	0
Disagree	0	0
Strongly disagree	0	0
Total	100	100

From the finding in table 4.11 above, 73% of respondent agreed that there is an increase market value of livestock and their resiliency to drought as a result of water availability. 27% strongly agreed. No respondents disagreed, strongly disagreed or was undecided on the question.

4.4.5 External fundraising

The study sought to establish whether water management committees have been able to bring up new partnerships that provides additional external resources to the water projects

Table 4.12 External fundraising

	Frequency	Percent
Agree	39	39
Strongly agree	22	22
Undecided	0	0
Disagree	39	39
Strongly disagree	0	0
Total	100	100

From the study findings in Table 4.12 above 39% of households interviewed said that the water projects committees have been able to bring up new partnerships that have provided additional external resources to the water project. 22% strongly believed and 39% disagreed on acquisition of new partnerships by the water projects committees. There were no households that were either undecided or strongly disagreed.

From the data collected 6 FGD groups which translate to 60% of all FGD respondents said water management committees have been able to bring up new partnerships that provides additional external resources to the water projects. In addition, only 2 (20%) out of 10 key informants accepted that there are new partnerships that have brought on board more resources for the projects. 80% of KII respondents did not agree.

4.4.6 Resources Management

The study further inquired from the respondents their suggestion on the water committees' accountability and transparency on the use of water resources.

Table 4.13 Accountability and transparency on water resources use

	Frequency	Percent
Agree	32	32
Strongly agree	18	18
Undecided	2	2
Disagree	47	47
Strongly disagree	1	1
Total	100	100

From the study findings in Table 4.13, 32% of respondents interviewed agreed that there is transparency and accountability in management and use of water projects resources. 18% strongly agreed. 47% of respondents disagreed, 1% strongly disagreed and 2 respondents were undecided.

50% of FGD respondents said that the water committees are accountable and transparent on the use of water project resources. 100% that's 10 out of 10 KII respondents said there is no accountability and transparency in the way in which the water projects committees are managing project resources.

4.4.7 Social Networks

The study sought to establish whether the community and water management committees developed financially beneficial relationship, networks and partnerships with other communities and external donors.

Table 4.14 Social Networks

Respondents were asked on whether water projects have helped them as a community to developed beneficial relationships and social networks with other communities and donors.

	Frequency	Percent
Agree	37	37
Strongly agree	22	22
Undecided	2	2
Disagree	39	39
Strongly disagree	0	0
Total	100	100

From the study findings in table 4.14, Majority of the respondents (39%) disagreed that presence of water projects has helped them developed financially beneficial relationship, social networks and helpful partnerships with other communities and external donors. 37% agreed that water project build their social networks. 22% strongly agreed and 2% of respondents were undecided.

100 % of Both the FGD and KII respondents accepted that presence of water projects has helped them as a community to developed beneficial relationships and social networks with other communities and donors.

4.5 Clean Drinking water and its influence on poverty reduction

The second objective of the study was to assess how provision of clean drinking water by NGO's to the Maasai pastoral communities in Ngong division of Kajiado County is influencing poverty reduction.

4.5.1 Respondents access to clean water in sufficient quantities

Respondents were asked questions on whether they have access to clean, sufficient quantities of water at the boreholes**.**

Table 4.15 Access to clean water

	Frequency	Percent
Agree	65	65
Strongly agree	17	17
Undecided	0	0
Disagree	18	18
Strongly disagree	0	0
Total	100	100

According to the respondents, as shown on table 4.15 above, 65% of them agree that they have access to clean water and 17% strongly agreed. 18% of the people interviewed disagreed. There were no respondents who strongly disagreed or were undecided.

4.5.2 Approximate distance between the respondent home and nearest borehole

The researcher sought to know from the respondents the approximate distance they travel between their homes and the nearest borehole for water.

Table 4.16 Distance to boreholes

Distance	Frequency	Percent
0-5 Km	44	44
6-10 Km	36	36
11 – 15 Km	17	17
16 – 20 Km	3	3
Total	100	100

From the findings in Table 4.16, most of the household respondents (44%) travel less than five kilometers to access water. 36% covers a distance of six to ten kilometers. 17% travel between eleven to 15 kilometers and 3% travel for 16-20 Km.

4.5.3 Time taken to water points

The researcher inquired from the respondents the amount of time they take to walk from their homes to the nearest borehole.

Table 4.17 Time taken to water points

Hours	Frequency	Percent
0-1	50	50
2- 3	34	34
4 - 5	13	13
6 - 7	3	3
Total	100	100

From the findings in Table 4.17 above, the majority of respondents (50%) take less to one hour to get to the nearest water point on foot. 34% take between two to three hours. 13% take between four to five hours and 3% take between six to seven hours.

4.5.4 Challenges of accessing water

The researcher inquired from the respondents the kind of challenges that they face while accessing water from the boreholes.

Table 4.18 Challenges faced while accessing water

Challenge	frequency	Total Respondents	Percent
Cost of accessing water	81	100	81
Congestion of livestock and people	72	100	72
Machineries breakdown	3	100	3
Tiredness	3	100	3

Respondents revealed that there are four major challenges as shown by Table 4.18 above. 81 out of 100 respondents said the biggest challenge was the cost of accessing water. 72 respondents said it was human and livestock congestion at the water points and another 3% said the challenge was machineries breakdown and tiredness respectfully.

4.5.5 Taste and smell of water

The researcher sought to find out from the respondents their opinion on the smell and taste of the water they use from the boreholes.

Table 4.19 Taste and smell of water

	Frequency	Percent
Agree	80	80
Strongly agree	10	10
Undecided	0	0
Disagree	10	10
Strongly disagree	0	0
Total	100	100

From the findings in Table 4.19 most of the respondents (80%) agree that the smell and taste of their boreholes water was okay. 10% strongly agreed and another 10% disagreed. There were no respondents who either strongly disagreed or were undecided.

From the findings of FGD and KII respondents each group accepted 100% that the color, smell and taste of the water they get from the borehole was alright.

4.5.6 Water Coloration

The researcher further sought to determine the satisfaction of the respondents on the color of their boreholes water. The researcher wanted to know from the respondents whether the water is clear and transparent to the eye.

Table 4.20 Water coloration

	Frequency	Percent
Agree	84	84
Strongly agree	16	16
Undecided	0	0
Disagree	0	0
Strongly disagree	0	0
Total	100	100

From the findings in table 4.20 above, out of 100 respondents, 84 of them which account for 84% of the total respondents agreed that water from the boreholes is clear and they can see through it. The remaining 16% strongly agreed on the same. There were no respondents that disagreed, strongly disagreed or were undecided on the inquiry.

4.5.7 Water Contamination

The study inquired from the respondents whether stored water for use at the borehole area is exposed to contamination by dust and livestock droppings.

Table 4.21 Water contamination

	Frequency	Percent
Agree	53	53
Strongly agree	0	0
Undecided	0	0
Disagree	31	31
Strongly disagree	16	16
Total	100	100

From the findings in Table 4.21, the majority of the respondents (53%) said that water stored in the borehole for human and livestock consumption is exposed to contamination. 31% of the respondents disagreed that water is not exposed to contamination while 16% strongly disagreed. There were no respondents who either strongly agreed or were undecided.

4.5.8 Water treatment

The research sought to find out from the respondents whether they treat the borehole water at home before drinking

Table 4.22 Water treatment

	Frequency	Percent
Agree	13	13
Strongly agree	0	0
Undecided	3	3
Disagree	78	78
Strongly disagree	6	6
Total	100	100

As shown by table 4.22 above, 13% of respondents agreed that they treat the borehole water at home for drinking. A majority 78% disagreed that they do not treat borehole

water for drinking. 6% of the respondents strongly disagreed while 3 percent were undecided whether they treat it or not. There were no respondents who strongly agreed treating borehole water for drinking.

4.5.9 Water borne diseases

The research sought to find out from the respondents whether there was any user of the borehole water who was diagnosed with a water borne disease.

Table 4.23 Water Borne diseases

	Frequency	Percent
Agree	52	13
Strongly agree	3	0
Undecided	0	3
Disagree	43	78
Strongly disagree	2	6
Total	100	100

The study, as shown in table 4.23, revealed that a majority 52% of respondents agreed to have suffered from a water borne disease. 3% of the total respondents strongly agreed. 43% of respondents using the boreholes water disagreed having been attacked by a water borne disease supported by a 2% of total respondents that strongly disagreed. There were no undecided respondents.

4.5.10 Type of water borne disease

The research sought to further find out the type of water borne disease that the respondents or a member of his household suffered from in the last one year.

Table 4.24 type of water borne disease.

	Frequency	Percent
Cholera	12	12
Typhoid	59	59
None	27	27
Dysentery	2	2
Total	100	100

The study revealed prevalence of three water borne diseases as shown on table 4.24. Majority of respondents (59%) said that they have been attacked by typhoid.12% were affected by Cholera and 2% by dysentery. 27% of respondents were not attacked by any water related ailment.

4.6 Irrigation water and its influence on poverty reduction

The third objective was to establish how provision of water for irrigations from NGO's sponsored water project to the Maasai pastoral communities of Ngong division Kajiado County influences poverty reduction.

4.6.1 food irrigation

The study sought to find out from respondents whether There are irrigations of food going on around the borehole project area.

Table 4.25 food irrigation

	Frequency	Percent
Agree	55	55
Disagree	45	45
Total	100	100

From table 4.25, 55% of respondents agreed that there is irrigation of food going on at the boreholes projects area. 45% disagreed that there is no irrigation going on at the borehole sites.

4.6.2 respondents involve in irrigation

Respondents were asked whether as an individual he/she is carrying out irrigation to produce food.

Table 4.26 respondents involved in irrigation.

	Frequency	Percent
Agree	21	21
Disagree	79	79
Total	100	100

As shown in table 4.26 above, a majority (79%) of the respondents disagreed and said that they do not carry out irrigation. 21% of total respondents said that they are carrying out irrigation at the borehole sites.

4.6.2.1 Qualitative findings on irrigation involvement.

From the FGD and KII finding, the respondents (100%) in both groups said that availability of borehole water has increased farming and boosted food security. "……. before we got this borehole, we use to get food from Kiserian. Now we are getting varieties of good in large quantities and at a cheaper price here at home. The money I was spending for transport are now part of my budget for food…." – FGD respondents from Lerujat borehole. "…. this water has helped me as an individual. I do a lot of tomatoes, maize and onions farming. I make substantial amount of income from the local people and other markets……." – Kiko Sentero KII respondent.

4.6.3 Access to irrigated food.

The researcher sought to establish the number of respondents that have access to irrigated food at the boreholes sites.

Table 4.27 Access to irrigated food.

	Frequency	Percent
Agree	44	44
Disagree	56	56
Total	100	100

From the findings in table 4.27, 44 respondents out of 100 which translate to 44% agreed that they have access to irrigated foods at the boreholes sites. 56% of the respondents disagreed and said they do not access irrigated foods.

4.6.4 Food Ownership

The researcher further inquired so as to understand from the respondents whether the local pastoral communities are the owners of the irrigated foods.

Table 4.28 Food Ownership

	Frequency	Percent
Agree	39	39
Disagree	61	61
Total	100	100

Finding from the inquiry, as shown in table 4.28 above, revealed that only 39% of local's pastoralist community members owns those irrigated foods. 61% of respondents said that the irrigated food is not owned by the locals.

4.7 Capacity building of communities and its influence on poverty reduction

The fourth objective of the research was to determine how capacity building undertaken by NGO's involved in water projects influences poverty reduction among the Maasai pastoral communities in Ngong division, Kajiado County.

4.7.1 Environmental degradation

The study inquired from the respondents their opinion on the state of natural environment within the project areas.

Table 4.29 Environmental degradation

	Frequency	Percent
Agree	43	43
Disagree	57	57
Total	100	100

From the findings in Table 4.29, the majority of the respondents (57%) said the natural environment at the project areas has greatly degraded. The other 43% said degradation has not taken place.

4.7.2 Skills and Knowledge

The researcher sought to find out from the respondents whether there are sufficient skills and knowledge among the community members to repair community boreholes

Table 4.30 Skills and Knowledge

	Frequency	Percent
Agree	32	32%
Disagree	68	68%
Total	100	100%

As shown in Table 4.30, a majority 68% of respondents said that there are no sufficient skills and knowledge among the community members to repair community boreholes. 32% of respondents said the community has the required skills and knowledge to repair its boreholes.

4.7.3 Formal education

The researcher further sought to find out the number of members in respondents' households, how many are of school going age and how many of the school going age are actually attending school.

Table 4.31 Formal education

	Frequency
No. of members in respondents households	614
School going age	393
Actuals attending school	325

From the finding in table 4.31 shown above, the respondents households had 619 members of which 393 (64%) are of school going age. Out of the school going age of 393, 325 (82.7%) are actually attending school.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter presents a summary of the research findings, discussions, conclusions, recommendations of the study and suggestions for further research. The purpose of this study was to assess the contribution NGO's sponsored water projects have made on poverty reduction on the pastoralist communities living in Ngong division, Kajiado County.

5.2 Summary of findings

The findings of this study are summarized below and presented according to the four variables of the study namely: resources mobilization, clean drinking water, irrigation water, and capacity building of communities.

Table 5.1 summary of findings of the study

Objective	Findings
Demographic Characteristics	99% of respondents interviewed are pastoralist except one agro-pastoralist accounting to 1% of total respondents. 74% of respondents do not have any formal education. 5% have gone up to secondary level, 11% to primary level and 10% have higher education; that's college and University. 85% of the respondents are not employed, 11% are self-employed while 4% are employed. On further inquiry by the researcher on the nature of self-employment, those who said are self-employed engage in small businesses like kiosk selling and livestock retailing.
Influence of resources mobilization on poverty	63% of the households' respondents agreed to have contributed financial resources for continuity of the water projects. 36

reduction among the Maasai pastoralist community	households representing 36% of total respondents strongly agreed while 1% was undecided. Majority of FGD and KII respondent described resources mobilization as a driver of the projects. ".....the money we contribute are meant to guard this borehole from prolonged break downs because we depend on cattle for a livelihood and without water there are no cattle…."- FGD respondents in Lerujat borehole. "…. when we were growing up we had no this permanent sources of water, we used to trek far searching for free natural sources of water and cattle were poor breeds that could withstand challenges of that time. their mortality rate was very high and fetched very little at the Market. Now there is paid water. Cattle breed are of very good quality and they fetch good market prices. One cow can pay a child secondary school fees for a year……."- Sonchikai Maruna KII informant.
Influence of clean drinking water on poverty reduction among the Maasai pastoral communities.	Most of the household respondents (44%) travel less than five kilometers to access water. 36% covers a distance of six to ten kilometers. 17% travel between eleven to 15 kilometers and 3% travel for 16-20 Km. Majority of respondents (50%) take less to one hour to get to the nearest water point on foot. 34% take between two to three hours. 13% take between four to five hours and 3% take between six to seven hours. This means availability of clean drinking water has reduced both distance and time consumed by community members looking for water. This extra time available can be channel to other economically productive chores.
Influence of water for irrigations on poverty reduction among the Maasai pastoral	79% of the respondents disagreed and said that they do not carry out irrigation. 21% of total respondents said that they are carrying out irrigation at the borehole sites. From the FGD and KII

communities.	findings, the respondents (100%) in both groups said that availability of borehole water has increased farming and boosted food security. "……. before we got this borehole, we use to get food from Kiserian. Now we are getting varieties of good in large quantities and at a cheaper price here at home. The money I was spending for transport are now part of my budget for food…." – FGD respondents from Lerujat borehole. "…. this water has helped me as an individual. I do a lot of tomatoes, maize and onions farming. I make substantial amount of income from the locals and other markets……." – Kiko Sentero KII informant.
Influence of capacity building on poverty reduction among the Maasai pastoral community.	The respondent's households had 619 members of which 393 (64%) are of school going age. Out of the school going age of 393, 325 (82.7%) are actually attending school. Availability of water has provided a humble time to pastoralist communities to start developing their human capital skills.

5.3 Discussion of the findings

This section discusses study findings under the five objectives namely; resource mobilizations, provision of clean drinking water, irrigation water and capacity building among the pastoral communities.

5.3.1. Resources Mobilization and Its influence on poverty reduction

This study confirms that principles that govern water projects sustainability and its effectiveness to reduce poverty prevalence in rural pastoralist communities are similar to those of other communities. as stated by Mumma (2005). He stated that communities in Kenya have a strong culture of self-help which has been harnessed for many development activities especially in rural areas. From the findings of the research, it was evident that these beneficiary communities get resources from other multiple sources to develop their projects. They do not rely entirely on financial aid from external sources to finance their

projects. The water committee, according to the study, has been able to mobilize resources inform of funds and technical support from within themselves inform of personal contributions and other development partners like non-governmental organizations, other incoming communities that comes in due to internal migrations and the government of Kenya through constituency development funds. These shows that the beneficiary communities have taken the leading role to drive their own self-development. The motivating factors, according to observation made by the researcher in the field, could be the need for self-dependence, aridity, unpredictable environment or involvement of the communities in management affairs of the project. Carter et al (1999) said that sustainability and effectiveness of projects in poverty reduction is determined by the level of community motivation because motivated communities own up projects.

Richard (1999) emphasizes the need to involve all stakeholders in management of projects to ensure high quality and sustainable development projects. From this study, Community level of involvement in resources management was good. 44% of households' respondents, 50% of FGD and 60% at the KII interviews said that community are involved in making decisions pertaining to water projects. A large percentage of the community feel that they are being involved in decision making. Involving the beneficiaries in decision making in resources management could be an indicator of good governance and therefore the community are getting both social and economic benefits out of the project. Having been consulted and involved in project design stages and in formulation of solutions to their challenges, there is ownership of the project which is very vital for sustainability of community projects and in poverty reduction. Being fully aware that they live in arid zones with a highly unpredictable environment, this high level of involvement that project committees involve the local community in decision making of the projects and the rate at which the local beneficiaries commit themselves in projects management could also have been motivated by the nature and extent of challenges and loss they will face and incur collectively without reliable sources of water.

Hutton et al (2007) said that water is the most important natural resource, indispensable for life and at the same time the backbone of growth and prosperity for mankind. This is in line with the findings of this study where 100% of FGD and KII and 96% of the households' respondents said The presence of the water projects has enhanced livelihoods by increasing the quantity of livestock. And in a community where 99% of them are sustained by livestock economically, presence of water mean thriving livelihoods and a corresponding rate of poverty reduction. According to the respondents' reliable water supply has buffed them against calamities by increasing the quantity of livestock in the community. There is reduce livestock mortalities due to a drop in diseases that livestock pick while venturing into foreign environment in search of water and also reduced trekking distances therefore livestock can conserve energy which is crucial for survival in times of limited fodder. Water has increased livestock tolerance to vulnerabilities and in response there is a corresponding increase in their numbers. More numbers mean more income for the local people.

From this study also, 100% of the respondents said The boreholes have provided beneficial livelihoods outcomes to the communities. There is an increase in the quality of livestock resulting to an increase in their market price value. This direct economic benefit of water is reversing poverty among the members of the community by increasing incomes of individual's households.

Narayan (1993) said that projects thrive on information disclosure and transparency in budgets, financing, contracting, procurement, anonymous grievance procedures and community monitoring of contracts and implementation. This information is important to be discussed publicly in villages and displayed. Village committees should also be established to oversee the project and are required to report back regularly to the community and as a result community members are in a better position to influence local level planning and decision making pertaining to local projects. According to Bolt and Fonseca (2001) financial management and transparency are among the most problematic aspects of community management of water projects. From the findings of this study, 50% of both households and FGD respondents said that there is accountability and

transparency in management of water financial resources but 100% of KII respondents said that there is no accountability or transparency in the way borehole resources are being managed. Accountability and transparency are virtues so critical in building trust and alleviating poverty. Though the respondents are not satisfied with the level of this virtues as per the outcome of the research, the little believe that their resources are being managed well, could be the reason why the community are contributing finances in large numbers and hence contributing to financial sustainability of the projects

DFID (2000) says that an effective poverty reduction and sustainable project is one that emphasizes both the economic and social processes of development. From the finding of this study, 59% of household's respondents and 100% of both FGD and KII said that through the help of this borehole projects they have been able to develop with other communities mutually supportive networks to reduce social risks and provided extra financial income. One of the achievement is livestock movement. Either side are able to shift livestock base on availability of water and pasture and therefore reduce loss of stock during extreme weathers. Incoming communities also provide funds for operations or completing borehole projects they also at times provide technical support in borehole operations. The project has therefore reduced poverty by helping in technical, economic and social development of the beneficiary communities.

5.3.2 Clean Drinking water and its influence on poverty reduction

This study confirms universal challenges of water within pastoral communities as stated by Shivoga and Coppock (2003). Smith et al (2000) state that lack of water is the most important problem within the pastoralist communities. According to the United Nations a person should use a minimum of 50 liters of water a day both in Washing, drinking, cleaning and cooking. Vanloon (2005) observed that 80% of diseases in developing countries are caused by contaminated water. The findings of this study are closely similar to the findings of a participatory rural appraisal carried out on the Rendile community in 2001 which revealed that lack of safe clean water for consumption was a problem (Desta and Godana, 2001). In that study community members reported commonly suffering

from water borne diseases, cause by poor quality water, such as cholera, typhoid and dysentery but reasons behind the poor water quality are unknown.

From the study findings, 90% of the respondents said that the water has no any foul smell or taste and 100% said it has no coloration, 53% said that the water is contaminated but surprisingly only 13% of the respondents boils the water before drinking. 55% of the respondents agreed to have suffered from a water borne disease of which, of the total respondents, 12% said Cholera, 59% said typhoid and 2% dysentery. Although in some boreholes communities complained of water being saline, based on first hand observation at the water points water storage facilities like tanks at the water source were well covered but in agreement with the respondents, still, chances of people consuming contaminated water are so high. Community members and livestock share the same water collection point. Livestock, therefore, can contaminate water using their hooves, fecal matter, and fur. Wind can also blow dust into poorly covered or uncovered water containers.

Shivoga (2002) said that presence of Salmonella bacteria in water meant for human consumption can lead to a variety of debilitating ailments including typhoid fever, arthritic-like joint disease and severe diarrhea. This means that either the water quality from this wells is poor for human consumption or community members are using dirty containers to carry water. There was no complains on effect of the water to livestock health. According to the researcher observation, the community has given a lot of attention on water project sustainability but less on the quality of the water itself even though none of them had technical ability to monitor bacteriological quality of the water. One of the most important ways clean drinking water reduces poverty is by lowering the cost of health which the projects are not effectively achieving.

The 7^{th} millennium development goal of the united nations is to reduce by half the proportion of people without sustainable access to safe drinking water by 2015.On its World development indicators report the World Bank stated that Kenya as a country has made some progress in the percentage of its people having access to clean water. Access

rates have increased by 16% having increased from 41% of the population in 1990 to 57% of the population in 2006 World Bank (2010). From the study findings, 82% of respondents' households said that they are accessing clean water in sufficient quantities. 81 households out of the 100 respondents said that the main challenge they face while accessing water at the boreholes is the high monetary cost. 72 households said congestion of livestock and people at the water points while 3 households each said machinery breakdowns and tiredness respectively.

Of all the household interviewed 44% travel less than five kilometers to access water. 36% covers a distance of six to ten kilometers. 17% travel between eleven to 15 kilometers and 3% travel for 16-20 Km. 50% of respondents take less to one hour to get to the nearest water point on foot. 34% take between two to three hours. 13% take between four to five hours and 3% take between six to seven hours. Access to clean water, reduced time and distance has resulted to increased economic productivity of these communities' members. Women respondents in particular said that reduced distance and time searching for water has given them an extra time to engage in necklace beading. On average, one necklace takes an hour to make and has a market price of Ksh 300. On an average of seven hours one person can make Ksh 2,100 a substantial amount of income per day for one household. While at the field, the researcher witnessed women groups who have invested in livestock and tent hiring business as a result of income generated from the extra time.

5.3.3 Irrigation water and its influence on poverty reduction

IFAD (2001) states that the fight against poverty requires action in many fronts. The significant reduction of poverty in India has been attributed to availability of irrigation (Ray, Rao and Subbarao 1988). From the study findings 55% of the respondents said that irrigation of food is taking place at the community boreholes but only 44% of the total respondents have access to that irrigated food. Although 39% of total respondents said that food produced from irrigated lands belongs to the local community members, only 21% of the respondents are involved in irrigations. On further probing the researcher was

informed by the respondents that some of the households imports the services from members of other communities who understands farming well.

Availability of water for irrigation has made food both available, accessible and cheap for the pastoral communities. For example, a crate of tomatoes cost Ksh 2000 at the market and a farmer at the rural area produces, on average, 160 crates of tomatoes per acre in a span of three months. This translates to accumulative income of Ksh 320,000 in a duration of 90 days. From a micro economics perspective, at the farm, a one and a half kilogram of tomatoes costs Ksh 50. At the nearest market, traders sell a similar quantity at Ksh 250. These means community members are getting tomatoes at Ksh 200 less than the rest of the consumers. At the farm, a cob of maize cost Ksh 10 but the same cob cost Ksh 25 at the nearest market. One kilogram of water melon at the farm cost Ksh 14 per kilo but the same quantity of water melon is Ksh 40 at the nearest market. This shows that at the local level community irrigation has made it easier for the local pastoral communities to earn income both in savings and direct sales food stuffs and also access food before it gets into the hands of profit driven business people.

Availability of irrigation water at the boreholes a part from saving the community money, it has taught them valuable life skills such as farming skills, planning skills, methods of irrigations, crop rotations and pest control. These skills are so vital in earning income by increasing economic productivity of land through irrigation which results to poverty reduction

5.3.4 Capacity building of communities and its influence on poverty reduction

Tackling environmental degradation is a pre-requisite for effective and lasting poverty reduction There is a strong correlation between sound natural resource management and poverty reduction (Cambodia interim poverty reduction paper, 2000). In its 2002 global environmental outlook, United Nations Environmental Programme said that the level of awareness and action has not been commensurate with the state of the global environment today; it continues to deteriorate.

From the study findings 57% of the respondents said that the natural environments at the projects sites has greatly degraded. The researcher observed that vegetation has disappeared and left behind stunted shrubs. Livestock, through their hooves have created pathways which have been eroded by water and wind to become big gulley's and furrows.

68% of respondents said that there are no sufficient skills and knowledge among the community members to repair community boreholes. Lack of skills and knowledge in the nature of the projects can be a constraint to expansion of the projects. Skills and knowledge both at technical and managerial levels are crucial. In the long term cost reduction, it helps in fundraising because external donors will have increased confidence on the project due to its human resource capability and fosters project ownership and sustainability. The respondent's households had 619 members of which 393 (64%) are of school going age. Out of the school going age of 393, 325 (82.7%) are actually attending school. The level of school attendance for formal education is satisfactory taking into account that previous generations did not go to school.

5.4 Conclusion of the study

This study aimed at assessing the contributions NGO's sponsored water projects have made to reduce the burden of poverty on the pastoralists' communities living in Ngong division, Kajiado County. The following conclusions were made from the research of the study.

On resources mobilization and Its influence on poverty reduction the study concludes that, the communities have owned-up the projects and developed a culture of strong self-dependency an important aspect for any project sustainability. Water availability has created thriving livelihoods by increasing community tolerance to vulnerabilities and providing an opportunity to the communities to build on the quantity and quality of their herd. However, according to the finding of the study there is a challenge in transparent management of financial resources.

On clean drinking water and its influence on poverty reduction, the study concluded that there is a high degree of likelihood that communities are consuming contaminated water and the cause of contamination is not known additionally the cost of accessing water, congestion at the water point and distance covered by some households in search of water is still a big challenge for the community.

On irrigation water and its influence on poverty reduction, the study concluded that irrigation of food at the water point has played a big role in poverty reduction within the beneficiary communities. It has also instilled in communities' valuable skills like planning and farming skills necessary for personal economic empowerment.

On capacity building of communities and its influence on poverty reduction, the study concluded that there is a slow but consistent environmental degradation within the projects areas. There was also no technical skills and knowledge with the locals and this could affect the long term sustainability of the projects.

Therefore, at confidence level of 90% and confidence interval of 10%, this study concludes that irrigation water was ranked first to have the highest influence on poverty reduction among pastoral communities. The second one is resource mobilization, followed by clean drinking water and then capacity building of communities.

5.5 Recommendation of the study

1. The study recommend that communities need to be trained on monitoring their water quality

2. The study recommends that a technical analysis of the boreholes water need to be carried out to determine if or not the underground water is chemically or bacteriologically contaminated.

3. The study recommend that Communities need further capacity building on technical skills and knowledge to help them in managing projects especially in areas of fixing simple engineering works.

4. The study recommends that simple hygiene measures like separating water points for livestock and people should be carried out at community water points and also educating people to cover water storage containers.

5.6 Suggested area for further research

The following area is suggested for further study

1. A technical analysis research is required on water quality

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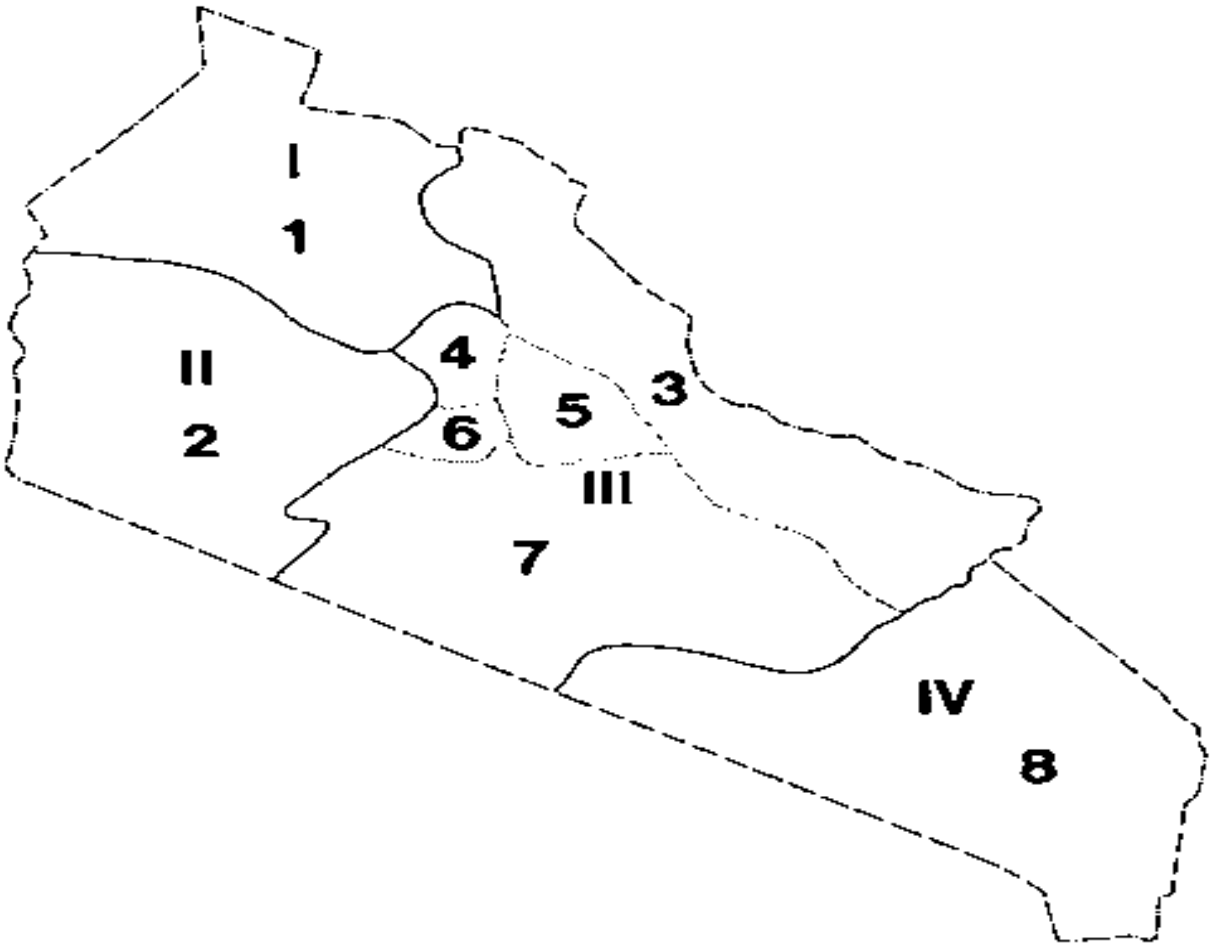
APPENDICES

Appendix 1: *Map of Kajiado District showing administrative Divisions and Maasai Sections.*



Source: Google map retrieved July 2010

Appendix 1: LETTER OF TRANSMITTAL

Tulito Ole Turere
P.O. Box 619-00206
Kiserian,

No…….

Dear Sir/Madam,

I am a student at the University of Nairobi and I am carrying out a research study as a requirement for the award of Master of Arts Degree in Project planning and Management. I am conducting a survey with the sole purpose of gathering information on "**influence of Non-governmental organizations sponsored community water projects on poverty reduction in Kajiado County, Ngong Division, Kenya"**

You have been selected to assist in providing the required information as your views and ideas are considered important to this study.

I am therefore kindly requesting you to fill this questionnaire. The information and data required is needed solely for academic purposes and will be treated with a very high degree of confidentiality.

Your cooperation will be highly appreciated

Thank you.

Yours faithfully

Tulito Ole Turere
Student Reg. L50/70965/2011

Appendix 2: HOUSEHOLDS QUESTIONNAIRE

Date:

Age: (tick one)	25 - 35		36 - 45		46-55		56 and above	

Religion: (tick one)	Christian		Muslim		Others (specify)	
Source of livelihood	Pastoralist		Agro-pastoralist		Others (specify)	

Level of education: (tick one)	
• None	
• Primary education	
• Secondary education	
• Higher education	

Economic Occupation: (tick one)	
• Not employed	
• Self employed	
• Employed	

1 Clean Drinking Water

Pick the most appropriate response from your viewpoint for each of the statements indicated below

Where 5 – Strongly Agree, 4 – Agree, 3 - Undecided, 2 – Disagree and 1 – Strongly Disagree

	5	4	3	2	1
The water from the borehole is clear. I can see through					
The water I use from the borehole taste and smell good					
Stored water for use at the borehole area is exposed to contamination by dust and livestock droppings					
Though I use borehole water I have been diagnosed with water borne disease.					
I have access to a toilet at home					
People have access to toilets at the public water points					
I treat the borehole water for drinking at home					
When I go to the borehole, I get clean water in sufficient quantities.					

1. Name a water borne disease a member of your household has been diagnosed suffering from in the last one year

2. What is the approximated distance between your home and the nearest borehole?

3. How long do you take to walk there?

4. What major challenges do you face when accessing water from the borehole?

2. Resource Mobilization House Hold

Please evaluate each of the following statement by putting a mark on the appropriate box.

Where 5 – Strongly Agree, 4 – Agree, 3 - Undecided, 2 – Disagree and 1 – Strongly Disagree

	5	4	3	2	1
Access to water has increased livestock numbers					
Availability of water has increased livestock profitability and increased their resilience to drought					
We contribute financial resources for borehole operations					
I make decisions on the use of contributed or Donated funds.					
The water projects have helped us as a community to develop beneficial relationships and networks with other communities and donors.					
The water management committee has been able to bring up new partnerships that provides additional resources					
There is a lot of accountability and transparency on use of water project resources.					

3 Capacity Building

Please agree or disagree with the following statements

	Agree	Disagree
Water project are highly protected from Vandalism		
The ecosystem/environment around the borehole has not degraded		
There are sufficient skills and knowledge among the community to repair community boreholes		
I make decisions on the use of contributed or Donated funds.		

The water projects have helped us as a community to develop beneficial relationships and networks with other communities and donors.		
The water management committee has been able to bring up new partnerships that provides additional resources		
There is a lot of accountability and transparency on use of water project resources.		
The water committee has been able to bring community people together, assemble resources and coordinate their use		

How Many members are in this household?

How many are of school going age?

How many of the household members are of school going age and are attending school?

4 Irrigation

Please agree or disagree with the following questions

	Agree	Disagree
There are irrigations of food going on around the boreholes		
I carry out irrigation to produce food.		
I have access to irrigated food at the borehole area		
The local pastoral community people are the owners of the irrigated foods.		

Appendix 3: FOCUS GROUP DISCUSSION QUESTIONS

Pleas answer the following questions truthfully

Statement	True	False
The water from the borehole is of high quality. It's clear in color, taste and smell good		
Availability of water in the community has reduced poverty		
Community members are consulted in making decision on borehole operation		
Community contribute financial resources to help in operation		
The water projects have helped us as a community to develop beneficial relationships and networks with other communities and donors.		
The water management committee has been able to bring up new partnerships that provides additional resources		
There is a lot of accountability and transparency on use of water project resources.		
Water project are highly protected from Vandalism		
The ecosystem/environment around the borehole has not degraded		
There are sufficient skills and knowledge among the community to repair community boreholes		
Community makes decisions on the use of contributed or Donated funds.		
The water committee has been able to bring community people together, assemble resources and coordinate their use		
Availability of water has increased farming and boosted food security		

What partnerships do you have at the moment that brings in additional resources?

What resources mobilization strategies do you use to raise predictable revenue for water project?

Appendix 4: KEY INFORMANT QUESTIONNAIRE

Please responds to each of the following question on whether it's true or false

Statement	True	False
The water from the borehole is of high quality. It's clear in color, taste and smell good		
Availability of water in the community has reduced poverty		
Community members are consulted in making decision on borehole operation		
Community contribute financial resources to help in operation		
The water projects have helped us as a community to develop beneficial relationships and networks with other communities and donors.		
The water management committee has been able to bring up new partnerships that provides additional resources		
There is a lot of accountability and transparency on use of water project resources.		
Water project are highly protected from Vandalism		
The ecosystem/environment around the borehole has not degraded		
There are sufficient skills and knowledge among the community to repair community boreholes		
Community makes decisions on the use of contributed or Donated funds.		
The water committee has been able to bring community people together, assemble resources and coordinate their use		
Availability of water has increased farming and boosted food security		

Appendix 5: SAMPLE SIZE DETERMINATION

Sample Size for ±3%, ±5%, ±7%, and ±10% Precision Levels where Confidence Level is 95% and P=.5.

Size of Population	Sample Size (n) for Precision (e) of:			
	±3%	±5%	±7%	±10%
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100
a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.				