THE IMPLICATIONS OF IMPROVED WATER PROVISION ON LIVELIHOODS:
A Case of Mutito Division

BY:

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DECLARATION

This project paper is my original work and has not been submitted for examination in any other university.

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ABSTRACT

This study investigates the implication of improved water provision on livelihoods. It focuses on Mutito Division as a case study. The study moves from the premise that improved water provision will have an effect on the activities that people are able to engage in. The study looked at water not just as a basic need for healthy growth but also as productive asset that can help people improve their living standards. The objectives of the study is to establish the main sources of water for the residents of Mutito Division and to analyse the effects of improved water provision on the livelihoods of the people living in the area.

The data was obtained from both the primary and secondary sources. For the primary data, structured questionnaires for household heads were administered to ninety respondents. The respondents were sampled from three sub-locations namely: Malatani, Kawala and Kitoo sub-locations in Mutito Division. Four key informants were administered unstructured questionnaires and provided detailed information on key issues in the study. The secondary data was obtained from books, articles, journals and reports of similar studies carried out elsewhere. Both descriptive and inferential statistics were computed using SPSS computer programme. The tables and figures generated were explained and backed up with literature.

The findings indicated that the residents of Mutito Division depended on rivers, springs, shallow wells, boreholes and sand dam as their sources of water. Improved water sources were found to have an effect on the livelihood activities that they were able to engage in. Even with little water available, they were able to improve on the activities that they engaged. Improved water provision was helping reduce the occurrence of water borne diseases and with water more parents were able to finance the education of their children.

The study came up with some recommendations. Among them is the need to improve on water provision in Mutito Division to help alleviate poverty. There is need for corroboration in organisations working in water provision. Also need to improve infrastructure and training to enhance livelihood activities in the area.

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CHAPTER ONE

1.0 Introduction

This study set out to investigate the implication of improved water provision on livelihoods. The study report has five chapters. Chapter one introduces the study by giving the background, the statement of the problem and the objectives of the study. Chapter two reviews relevant literature related to the study and gives the theoretical bases on which the study is based. Chapter three discusses the methodology employed in conducting the study giving the study site, sampling procedure and methods of data collection and analysis. Chapter four presents the findings giving both qualitative and quantitative data and its interpretation. Chapter five presents the conclusion of the study and the suggested recommendations.

1.1 Background of the Study

Water is one of the most important resources for the people in rural areas. Access to clean water is central to healthy and productive lives of the people. The problem of lack of access to clean water is more pronounced for poor people in rural areas. For the rural people, water is required for productive and consumptive uses, poverty reduction and sustainable livelihoods. Hence, improving access to water in the rural areas can contribute to greater food security, nutrition, health status, income and resilience in income and consumption pattern (Molden, 2007). Water needs in rural areas are not just for a bucket of water to wash, clean and cook at home after a hard day in the fields. The supply is required to meet the ever changing and sometimes new usages especially non-farm activities to generate income. This is because it is increasingly being recognised that rural non-farm incomes are a key component in the livelihoods of poor people. Safe and secure water is essential not only for poor peoples' survival and health, but it also plays a wider role in poverty reduction and improving livelihoods especially in water scarce rural areas (Moriarty and Butterworth, 2003, Hope and Gowing, 2003, ODI, 2002).

There has been an increased concern on persistent poverty and Millennium Development Goals (MDGs) have been developed as a renewed commitment towards eradication of poverty. The MDGs have identified improving water supply as a core element in poverty reduction in the developing world (Shordf et-al, 2004). Water is essential in all areas of life and hence for each of the goal, at least 30% of it or more is directly dependent on water. This has made the debate on improved water provision central in accomplishing the MDGs (http://www.4ssgap.org/docs/mdgs_2009). The diagnosis of world poverty has been followed up in different forums. In particular, the World Water Development Reports have constantly looked at the link between poverty and water access. According to World Water Development Report of 2004, the problem of poverty is undoubtedly linked to that of water, its availability, proximity, quality and quantity. This determines how the poor people will use the water. It also has the potential to make major contribution towards poverty eradication. Moriarty and Butterworth (2003) noted that key measure of poverty reduction impact of a new or improved water supply scheme is the extent to which the scheme contributes to reduction in peoples' vulnerability to trends and shocks, and increases in their resilience (i.e. when exposed).

At the beginning of the 21st Century over one billion people still lack this vital resource (WWC, 2000, Hope and Gowing, 2003, Black, 2004). It is estimated that 1.1 billion people worldwide do not have access to safe water. Also, an estimated 1.7-2.2 million persons die from water borne diseases each year. Water borne diseases are among the leading causes of morbidity and mortality in the developing world (Centre for Disease Control, 2003). Children in particular suffer poor health as a result of direct injury through hauling heavy water carriers commonly 15-20 litres over long distances and use of insufficient amount of water to maintain adequate standards of hygiene (Carter and HowSam, 1999).

In Kenya, it is estimated that about half of the population lacks access to safe drinking water. This translates to 16 million people with 13 million of the affected people living in the rural areas. Unlike in other countries like Tanzania, Kenya due to its problem of water scarcity has had the Ministry of Water focus more on water development especially for

domestic use. Statistics on water show that in 1972, only 9% of the rural population had supply of 'safe' water schemes. By 1989, the number rose to 20% and by the year 2000, it rose to 42% (Huggins, 2003). By 2002, at least 46% of the rural population had access to water (World Bank, 2006). This was below Kenyan ambitious target of ensuring that by the year 2000, water was available to all, both in the rural and urban areas, at reasonable distances (Mumma, 2005).

Combating poverty and facilitating economic growth recovery is a dominant theme in development policy in Kenya. The Kenyan national water policy has encompassed poverty alleviation as its primary goal. This is because Kenya identifies safe water and adequate sanitation as one of the pillars that can improve the quality of life of its people especially in the poor communities. Poor water supply and inadequate sanitation impede economic and social development and strains government resources when water and sanitation related diseases break out. Access to water for human consumption, agriculture and livestock use is a major problem in rural areas. The situation is severe in ASALs region which occupies almost 80% of the Kenyan land (WWAP, 2006). The water scarcity in this region prevents people from improving their livelihood as most of their time is spent looking for water (Excellent, 2005). This makes water availability and use to be a key issue in the development and sustainable use of the ASALs which have limited water sources that are poorly distributed and have low ground water sources (WWAP, 2006).

For Kenya to improve its economic performance and get to poverty reduction, it needs to invest more on water infrastructure and improve on management of water resources. The key sectors of the Kenyan economy are directly dependent on a reliable and adequate supply of good quality water. These include agriculture, manufacturing, energy, livestock, environment and tourism. Despite this dependence on water for economic and social well being of the people, there has been poor development of infrastructure like dams, pans, boreholes, pipelines, and rainwater harvesting for many years. The water resources and water towers are poorly managed and unprotected and this worsens the country's water situation. This makes water supply for economic activities to be

unreliable. There is inappropriate allocation of water access and the quality of water is compromised through pollution and degradation. This has more implication on the lives of the poor people as their economic activities are impeded. The PRSP report of 2001-2004 showed that the poor people link sustainable management of water resources with poverty. The document stated, "access to water for human consumption, agricultural, and livestock use is a major problem in rural areas. The water supply situation in rural areas has deteriorated over the years to a point where demand cannot be sustained with current systems. Access to piped water has not increased since 1989 and those accessing other water sources have increased from 14 to 29% during the same period" (World Bank, 2004).

1.2 The Study Area

The study has been carried out in Mutito Division in Kitui District. Kitui District lies between 400 m and 1800 m above sea level. The climate is hot and dry, a characteristic of ASALs with unreliable and erratic rainfall. The area experiences bimodal rain whose amount is determined by the topographical features of landscape and hills. Mutito Division being down the hills receives 500-700 mm per year. The minimum temperatures in this area are 18-22° C and a maximum of 30-34° C (Kenya Republic of, 2001).

Mutito Division has three locations and twelve sub locations. The land is characterised by scattered homesteads and irregular patches of cropland inter-spread with areas under trees or bush. Indigenous trees together with occasional baobab, typify the hot, dry conditions that prevail. Dissecting the plains are winding valleys with wide sandy riverbeds and branching tributaries to higher grounds. During rainy seasons, surface water may flow after which it sinks below the level of the sand. People are accustomed to digging holes in the sand and scooping out the water and as the dry season progresses, the water level falls and become deeper hence it is difficult to get water for domestic use and for livestock. Livestock keeping is a major economic activity given the arid climate of the area. Forestry and agro-forestry activities are practiced and it is also an important natural resource base (Kenya Republic of, 2001).

The figure below shows the map of Kitui District administrative boundaries as per the year 2001. The shaded part shows Mutito Division and its three Locations.

Fig1.1 Kitui District Administrative Boundaries (2001)

Source: Kenya Republic of, 2001: District Development Plan

1.3 Statement of the Problem

Water is one of the scarcest natural resources and a key factor in development of Kitui District (Kenya Republic of, 1984). The main source of income in Kitui District is subsistence agriculture. Due to unfavourable climatic conditions, majority of the people

in the area live below poverty line and experience frequent food shortage and water scarcity (Speelman et al, 2006). The district's poverty level is at 65%, the poorest areas being the divisions with erratic rainfall, such as Mutito Division at 71% (Kenya Republic of, 2002). The situation is further aggravated by the underdeveloped water infrastructure to avail water for both financial and non-financial livelihood benefits for the poor (ODI, 2002; ODI, 2003; Speelman, 2006). By 2002, only 6.1%, that is, 6,319 household of the 490, 729 people in the district had access to safe and clean piped water while 600 households (0.6%) had roof catchments (Kenya Republic of, 2002).

Though water is essential for life, health and human dignity, (WWAP, 2006) it remains a major challenge especially in Mutito Division. The people in this area depend on rainfall which is unreliable and very little. The area lacks permanent rivers hence the people depend on seasonal rivers which dry up during the prolonged dry season. The women have to travel long distances to get water in the bigger rivers where it can still be found. The children have occasionally to miss school to assist in water collection for the household. The people of the area struggle to obtain water for domestic use and this leaves them with less time to engage in productive activities for self sustenance and for food security.

Over the past fifty years, various approaches have been tried on how to improve water availability in Kitui District but the impact remains unknown. Most of these interventions have been confounded due to land degradation and lack of sustainable measures to maintain the water projects. The possibilities of improving water provision do exist, such as harvesting rainwater from the roofs, digging shallow wells, boreholes, earth dams, rock catchments, constructing barrages in sandy rivers and improving groundwater recharge through better land use and conservation. With the high levels of poverty, very few individuals in the area are able to construct their own water reservoirs as majority have little money to invest in water harvesting. This makes water a major challenge facing the people in this area. Few people have enough water to irrigate small gardens and grow vegetables for local market. From time to time, famine relief has to be brought in to sustain the population (Sasol and Maji na Ufanisi, 1999).

Due to harsh environmental conditions and absence of industries, majority of young and able bodied men seek work outside and remit money to maintain their families and educate their children. This leaves about 65% of the households to be female headed (Sasol and Maji na Ufanisi, 1999). The farming activities and livestock keeping are also impaired due to lack of water. The people have always to risk planting their crop and hence do not invest much in crop farming. They also have to keep less livestock which they can afford to water. The situation increases the levels of poverty which can be remedied with the supply of right quantities and qualities of water to ensure sustainability. Lack of water for use and the time and energy consumed in its collection have great implications for nutrition, health and productivity of people in a given area.

The distance to water points is a big concern with the recommended convenient distance being 1000 meters in rural areas (Macdonalf, 2003). The challenge is when the safe water source is far, the people are likely to keep fetching water from a surface water source near their homes. It is shown from facts that when the distance to water point is more than two kilometres, the consumption of water goes as low a 3-4 litres a day. This is way below the recommended 20 litres of water per day per person (Carter and Howsam, 1999). This leaves them prone to ill health associated with water access and use as they are not able to have enough water for their consumption. This also has implications on the economic activities that they are able to engage in.

Different organisations including the government have come in to work with the residents of Mutito Division to make this crucial resource available to all at reasonable distances. This is because they realise that water insecurity affects the production, income and consumption pattern of the people (DFID, 2001). Water availability could help offset constraints associated with existing activities and provide options for new activities that are compatible with the preferred livelihood strategies (Moriarty and Butterworth, 2003; Nicol, 2000). Improved water provision has the potential for affecting livelihood but it is not known the extent to which water availability in Mutito Division is affecting the

livelihoods of the people. This study set out to fill a research gap on the extent to which improved water provision affects the livelihoods of the people in Mutito Division.

1.4 Research questions

The study seeks to address one overall research question and two specific questions. The overall question was to assess what implication improved water provision has on the livelihoods of the households in Mutito Division.

Specific questions:

1. What are the main sources of water access for the residents of Mutito Division?
2. How does the improved provision of water affect the livelihoods of the people in the area?

1.5 Objectives

The broad objective of the study was to investigate the implications of improved water provision on the livelihoods of households in Mutito Division.

Specific objectives:

1. To establish the main sources of water for the residents of Mutito Division.
2. To analyse the effects of improved water provision on the livelihoods of the people in the area.

1.6 Study hypothesis

The study hypothesis states that there is no relationship between the source of water and the number of livelihood activities one is able to engage in.

1.7 Rationale of the Study

Water provides directly and indirectly to the livelihoods of the majority of rural poor. Different studies carried out in various parts of the world have shown that access to water is a key determinant of livelihood security by impacting on a broad range of other activities and assets. Moriarty and Butterworth, (2003) noted that water access not only enhances domestic water use but it also enables the rural people to be able to engage in different activities such as subsistence agriculture, livestock production, cottage industry, brick making and service provision within their area. It also improves the health of the people by having adequate quality and quantity of water to use for their household needs. Developing water infrastructure enables people to access water at reasonable distance and hence use the time saved in other productive activities. This in turn helps the people alleviate their living standards and be able to meet their needs. This makes water to be highly considered as one of the most important resources and one whose development can lead to poverty alleviation especially in the poor regions. This study aimed at assessing the effects of water provision on the livelihoods of the people. The information generated can be used to design the most effective method of water provision. It will also show whether water does help people to improve their livelihood strategies and how this inturn impact on their lives especially in meeting their basic needs such as food security, education of their children and their health. The study aimed at contributing to the debate on water as one of the most important resources in the rural areas whose availability could lead to poverty alleviation.

CHAPTER TWO

2.0 Introduction

This section reviews literature on the key issues of definition of livelihoods and six studies on water and its effect on livelihoods. Four of case studies were carried out in Kenya and two are case studies carried out outside Kenya. The final part has the conceptual framework on which the study was based.

2.1 Literature Review

Chambers and Conway (1992:7) define livelihood to comprise, "capabilities, assets (stores, resources, claims and access) and activities required for a means of living. Singh & Lawrence (1997) (quoted in http://www.waterandlivelihood.org) considered 'livelihood' to consist of the assets, activities and entitlements that enable people to make a living. Assets may consist of natural resources, abilities, knowledge, skills, and employment opportunities. Activities consist of things that people do to earn a living, and these will usually be based on available assets. Entitlements refer to those things that people may rely upon because of legal or customary rights.

Livelihood strategies recognise that most people do many things to secure their income, food and other things they desire, and that they have clear strategies to achieve these aims. These strategies include all the activities that people engage in as part of making their living. They include agricultural activities such as crop farming and livestock keeping, selling forest products and wage labour among others (Moriarty and Butterworth, 2003).

Households engage in a number of activities; the most obvious being cultivating field crops and livestock keeping. This is mainly for both self- provisioning, for barter and cash income. They also engage in other additional sources of food, income, support and means of survival such as home gardening, common property resources, casual labour, remittances, seasonal food for work among others (Chambers, 1997).

Considerable evidence indicate that making even small amounts of water available for personal and productive uses to the poor people can transform their lives. Water is an asset in productive processes at household level that is used for watering animals, supplementing small plot irrigation, producing local drinks for sale or other cottage industry products or even reselling for a profit to other households (Save the Sand project, 2003; Nicol, 2000). Water access has positive impacts on the livelihoods of the poor especially in the extensive semi arid areas of the developing world (Hope and Gowing, 2003). The impact goes further than health benefits attributed to it (Moriaty and Butterworth, 2003).

Empirical evidence shows that provision of water does not only improve health, but also help people to engage in other productive activities. A study carried out in Ukambani by Speelman et al (2006) focusing mainly on Machakos and Makueni Districts on productive water uses at household level in rural Kenya showed that water availability had a positive effect on the productive activities that people engaged in. The study used both qualitative and quantitative methodologies and carried out household survey and focus group discussions. They found that on average the household spent two hours to collect water. The distance to the water point ranged from 50m to 7km. They found out that 80.7% of those sampled practiced farming. The households generate income by using water for selected productive uses like crop production (46%), livestock production (49%) and water sales (5%). The rural communities in these regions view water as a productive asset and hence engage in on-farm income related water activities. Livestock and water sale contribution was found not to be significant but livestock contributed to nutrition of the household. Vegetable production generated the highest monthly income making it the main component of cash income of many households. The households using a communal water source were more often limited in the amount of water they use for productive activities and were at 51% compared 92% of those with private access. The difference was explained by the cost of water that made them not engage in productive activities. They compared households participating in the water project (Integrated Natural Resource Management in Ukambani) with those not participating in

the project. They found that the average monthly income of those not participating was lower than for those participating. The farmers felt they could benefit more if market for their product was improved. They also found out that salaried employment was very important for the households.

Speelman et al (2006) study informed the study carried out in Mutito Division to assess how the improved water provision impact on the livelihoods of the people. It also helped to relate several aspects such as time, distance, cost, water source ownership and use of the water to livelihood activities. It applied similar research methodologies to collect and analyse the data. The study being carried out in Mutito will go further by focusing on other non farm livelihood activities such as micro enterprises carried out in the area. It will also look at how that is reflected in the lives of the residents in terms of improving their well being in food security, health and education of their children.

A study carried out by two NGOs (Sasol and Maji na Ufanisi 1999) carrying out water interventions in Kitui District found out that water availability had an impact on the community well being, agriculture and on the environment. They started their project with provision of water in schools through shallow wells and rain water storage. Later they moved on to develop sand dams which they found would help maintain steady water level for long and hence improve the availability of water in the community. To collect the report of their interventions, they relied on people's evaluation of the project and collected their comments to gather the findings. The women reported that they did not have to queue for water or travel long distances in search of water. They saved time and energy which they diverted to other activities such as terracing their land. The girls were not withdrawn from school to go and assist the parents to fetch water. Other women noted the impact of the project on health as the risks of pollution were reduced. It was also noted that tree nurseries were established near the sand dams and seedlings were available for transplanting. The time saved was used in terracing their land and this lead to conservation of rainfall which improved the production of their main food crops. The people were also engaged in production of vegetables near the sand dams and this provided income and improved their nutrition.

The study by Sasol and Maji na Ufanisi presents the situation on the ground in Kitui and how water can help improve the situation and enable the people to live better lives. The study used qualitative methods and relied on comments of the beneficiaries. The study could have some bias as it was done by the same NGOs implementing the project. They also lacked a criterion of selecting their respondents and didn't have specific instrument to collect the findings. Their findings were useful to this study as they helped in analysing the benefits of improved water provision to the beneficiaries. It will also help assess activities being done with the provision of water and how the time saved is being used by the households. The study carried out in Mutito Division differs in that it was done by an independent person for academic purposes. Both qualitative and quantitative data were obtained using questionnaires administered to household heads from a sample randomly selected and from key informants.

A study carried out by BG Associates on Kenya Sweden Rural Water Supply (2002), meant to provide in-depth analytical results of SIDA activities in water provision covering July 1995 to June 2000; showed that water projects do help improve water access and greatly reduce incidences of water related illnesses. They used both qualitative and quantitative methodologies. The data was gathered using desk study, discussion with key informants and rapid impact assessment through household surveys and focus group discussions. The study covered the entire programme funded by SIDA in both the highlands and in the semi arid areas.

One of the case studies done by BG Associates covered Tharaka Division in Eastern Province which is a semi arid area where SIDA had started Tharaka Water and Sanitation Project. They found that water projects improved water provision in the area. The project provided piped water supply, borehole and roof catchments. They interviewed 67 household heads and found out that most people obtained water from the piped water system and the river followed by community borehole with surface pump while very few people owned a private well. They found that the average distance covered to get to the water source was 2300m and average time covered to get to the water source was 118.4

min. Most people felt that the water was of good quality. Majority felt satisfied with the water project and felt it helped in reduction of water borne diseases. Very few people felt that water project helped them engage in income generating activities. In assessing the diseases most prevalent in the area, they found the following water related diseases to be the most prevalent in the area: Malaria, Amoeba/dysentery and typhoid.

From the focus group discussions, BG associates (2002) gathered that the people of Tharaka Division were well prepared to take up the project. The groups also noted the benefits accrued from the project among them being reduction of distance to water point, availability of clean and safe water for drinking, water borne diseases especially amoeba had gone down, women saved fuel to boil the water and had more time to engage in economic activities. The children were able to attend the night preps and cleanliness in homes had improved.

Another case study by BG associates (2002) of a SIDA project was done in Kimbulyu location, Kibwezi Division in Eastern Province on 'Umani water supply and sanitation project'. The findings showed that there was improved water provision with 93% of the residents being served by piped water supply. The distance to the water point was reduced to 88m and average time taken was 31.8minites. Majority felt that the water was of good quality and this led to reduction in water born diseases and they saw the need to pay for the water. They noted that women were able to participate equally with men in development activities as a result of gender empowerment within the project areas.

These case studies covered broad areas from the way the project was conceived, community participation and household benefits from the water project. The project had the resources from both SIDA and the Kenyan government and hence had a large coverage area and impacted on more people. This was significant in this study as it used similar methodologies to collect and analyse the data only that the study was more quantitative while this study applied both the qualitative and quantitative methods. The studies by BG Associates also measured variables such as distance, time, and reduction of water borne diseases, income distribution and availability of time to engage in other

productive activities. This study also examines similar variables. The difference is that the study carried out in Mutito Division focused more on the livelihoods activities that resulted from water provision and how this had impacted on the people.

Studies have also been carried out in other parts of Africa and in Asia on water access as water remains a major problem in many countries. Water is seen to be one of the interventions that can help break the intergenerational poverty experienced especially among the poor living in marginalised areas. This study will review a few cases on the contribution of water to livelihoods in other parts of the world.

A study carried out by Hope and Gowing (2003) in South Africa, Limpopo province focusing on Luvuvhu catchment found that improved water provision had positive impact on the livelihoods of the households. They found that improved water provision is positively associated with wealth and the distance to the water point falls with wealth. They focused on the role that water plays in harvesting natural resources to capture the inputs that water makes on livelihood. Six areas significant to the livelihoods of the people were identified: water collection, livestock, non-edible forest product, edible forest product, dry land agricultural fields and kitchen gardens. The data indicated that women under 30 years of age were the main collectors of water. On average two people per household collected water taking 124 minutes per day. The kitchen gardens were found to be important as a rural livelihood strategy mainly in expenditure-saving. Water collection was found not to be economically viable for any group in terms of financial inputs and opportunity cost on labour. This study was useful in assessing the implication of water to livelihoods in Mutito Division especially in examining the significant livelihoods activities in the area, if the distance to the water point is dependent on wealth and assessing who are involved in water collection.

A study carried out in Amhara region of Ethiopia by DFID, (2001) revealed that access to and use of water is influenced by access to a wide range of household assets e.g. access to labour and animals for collecting the water; money to purchase water; social capital for securing customary rights to non-communal sources, or small irrigation schemes;

knowledge of alternative sources as well as by physical access barriers to the water itself. The household assets are related to the water resource characteristic in terms of reliability, quality, and yield, source as well as terrain of the land, the distance to the water point and the time spent for queuing. This study showed that households with limited assets, and with limited physical access to reliable water sources and resources, are the most water insecure. This study was useful in that it linked water access and use to other factors such as assets, water resource characteristic and distance to the water point. The study showed that poor household were more water insecure. The study also focused on households as the unit of analysis and this study also focused on households. This will be useful in this study in assessing how water access and use relate to other factors such as food security, and how this influences livelihood asset especially for the poor.

A study carried out in India by James et al. (2002) showed that in Gujarat, India, improved water supply brought significant improvements on income. It helped save the time which was combined with promotion of handicraft-based rural enterprises. The handicraft enterprises didn't significantly depend upon making productive use of domestic water but better supply enhanced productivity through time savings. The project illustrated not really the utility benefit of water but the important message is that just providing the utility was on its own less effective than doing so in conjunction with a programme that supported the women in making use of the time saved. This study aimed at establishing whether water provision was enough or there is need to create other activities to be done during the time used to collect the water. This study was useful in this study as it enabled the study to examine how the people of Mutito Division were using the time saved in a productive manner and what activities they engaged in during that time.

2.2 Conceptual Framework

2.2.1 The conceptual link between water resources access and livelihoods.

The role that water plays in livelihoods activities in the rural areas is manifold: health, agriculture, domestic use, livestock, ceremonial etc. With land, it can be argued that water is the most critical input into a sustainable livelihood in Africa (Moriarty and Butterworth, 2003, Save the Sand project, 2003). Rural non-farm incomes are increasingly being recognised as being a key component in the livelihoods of the poor people. The actual impacts on poverty might be achieved by promoting productive uses of water but this will clearly depend on how other constraints faced by poor people are addressed and by targeting of water supply improvements. Some of these constraints include: availability of labour, skills, infrastructure, equipment, lack of knowledge of markets for products and services, transport and quality control standards. Water supply projects can and should broaden peoples' focus to address some of these other Constraints (Hope and Gowing, 2003).

Water provision plays a wider role in poverty reduction and improving livelihoods. Improved domestic water supplies and improved institutions surrounding them bring multiple benefits to the people. These include: reduced sickness, saving time for other productive uses, income generation, and enhanced food security, strengthening of local organisations and building cooperation between people. In rural areas, water resources are seen as productive asset for the poor and an economic good, which, can be combined with other assets to generate financial and non-financial livelihood benefits (Nicol, 2000).

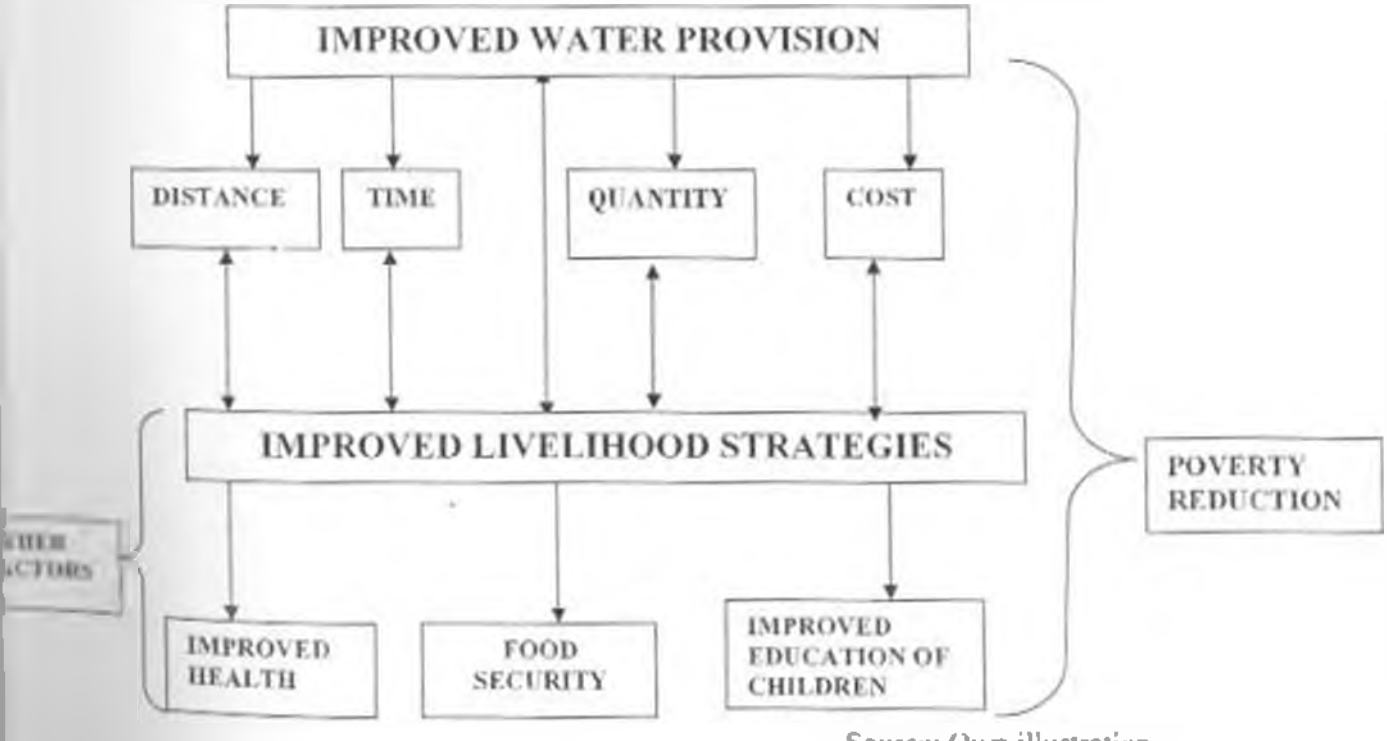
Livelihood perspective has helped to draw out the relationship between water and food security which is a concern especially in semi arid areas. It helps to look at how water is combined with other assets to generate income e.g. watering livestock, small-scale irrigation which can help improve food security and generate income for other activities. However, there is greater integration of water supply activities with other aspects of sustainable livelihoods, such as education provision, livestock production and small-scale household cultivation and income-generation interventions (http://www.livelihood.org).

Adequate supply of water improves the prospects of new livelihood activities which act as a key step out of poverty. It allows people to diversify their livelihood activities and allows the children to benefit from education opportunities and eventually make a transition from agriculture to more profitable activities.

2.2.2 Analytical Framework

The framework shows how improved water provision affects the livelihoods of the people. The framework shows how improved water provision impacts on the distance, the time, the cost and quantity of water accessed by a household. This in turn has implication on the livelihood activities that a household can engage in. The framework will help examine the following variables: time taken to collect water; the quantities of water consumed; the distance covered to get to the water point; cost of water; other factors improving the livelihood; agricultural activities practiced in the area, micro enterprises; the episodes of water related illnesses; ability to be food secure and ability to educate the children.

Figure 2.1 Analytical framework on how water impacts on livelihoods



Source: Own illustration

Water access is central to household daily activity and survival. Improved water provision refers to the various sources of water provided in the area. This was assessed in terms of its effects on the distance covered, the time taken to collect it, quantity and the cost of water. The area will have an improved provision of water if it will be reflected in this factors. This factors determine how water is going to be used in the household. If the distance covered to get to the water point is too far, then the household is likely to engage most of the household labour in water collection. Distance goes hand in hand with time so that most of the the time will be spent to collect the water if the distance is far and more time will be saved if the distance is near. The quantity of water available for the household to use from a given water source will have an effect on what activities that they can engage in with the water. The cost of water is also very relevant to a household. If the water is made available at a cost, the consumption per household will be determined by their income level. The quality is also important because if the water provided is of good quality and at a reasonable distance, the household will consume good quality water and hence avoid frequent illnesses that impede their productivity.

The distance, time, cost quantity of water available from the improved water provision if favourable will lead to improved livelihood strategies for the people living in the area. If the water is available to the household at a reasonable distance, the household is likely to collect the right quantity for domestic use and for other activities. The cost of water has implication on how much water the household can access in the household and how they use it in productive activities. For any livelihood activity that they engage in, it must be percieved to be economically viable and be able to cover the cost of water. These factors are interrelated and will influence peoples' engagement in livelihood activities. Improved livelihood strategies include activities such as: farming activities like kitchen gardens, growing vegetables for sale among others; livestock keeping; micro enterprices such as small scale businesses, beer brewing, brickmaking, hotel among others. Other factors such as being involved in wage labour, receiving remitances, food security and their perception of their class also helps people improve their livelihood strategies and their quality of life. Improved livelihood strategies increase the income of the household through the sale of their products, it improves their food security, consumption pattern,

health and ability to educate their children. This leads to reduction of poverty as the people will be able to improve their living condition.

Once the household has improved its livelihood strategies by performing better the activities that they were previously engaging in before there was an improved water provision, they will be able to move out of poverty by being able to meet their basic needs. This will be reflected in their ability to acquire daily meal for the household and to afford a balanced diet for better health. Improved livelihoods will also be reflected in the health of the household. This will be assessed in terms of the household ability to afford medical treatment and occurrence of water related illnesses. It will also be reflected in the household ability to afford to educate their children beyond the primary level. he research will analyse these factors and find out how improved livelihood activities impact on the people.

CHAPTER THREE

3.0 METHODOLOGY

This chapter describes the study area, sampling process, data collection techniques and how the data was analysed. It also describes the challenges faced during the field work.

3.1 The site description

Mutito Division is under Kitui District and covers an area of 614.45km^2. The climate in this region is arid and semi arid with erratic and unreliable rainfall whose reliability is rated at 40% (Kenya Republic of, 2001). Due to limited rainfall and lack of permanent rivers, the surface water sources are scarce and dry up during the dry season. There are few dams and springs some of which also dry up during the prolonged dry season. Underground water supplements these other sources though there are few borcholes. The area is said to be endowed with minerals that are yet to be fully exploited. The government is supporting the attempts to search for coal in the area. Mutito Division has three locations namely: Mutito, Nzombe and Kaliku and twelve sub locations. The area experiences frequent droughts making food and water the major challenges that the people encounter. The division lacks basic infrastructure such as electricity and feeder roads to the interior parts hindering development of other basic infrastructures such as hospitals and learning institutions.

3.2 Sampling size and procedure

The sample size was drawn from the entire division. The study sampled one sub location from each location. The Sub-locations were randomly sampled by writing the names of the Sub-locations in each location on pieces of paper. The pieces of paper were then folded and placed in three containers, one for each location. One paper was randomly picked from each container. The study sampled Malatani Sub-location in Nzombe Location, Kawala Sub-location in Kaliku Location and Kitoo Sub-location in Mutito Location.

The sample size was arrived at by getting the entire population statistics which had been projected to be 29,101 by year 2008 (Kenya Republic of, 2001). The total population was then divided by the estimated average size of each household which was 8 to get an estimate of 3638 households. Since the area had 12 sub locations, the estimated household were divided with the average number of households in each sub-location and came up with 303 households in each sub-location. The study worked with 10% of the household in each sub-location adding up to a sample size of 90 from the three sampled sub-locations. The study intended to pick every 10^{th} homestead but this was only possible in Mulatani sub-location as it had feeder roads to get to the homes and the homes were not so sparsely distributed. For the Kitoo and Kawala sub-locations this was difficult for the researcher due to poor transport network and it was not easy to find the household heads in their houses. Due the drought that the area was experiencing, most of the households were getting relief food and were engaged in food for work programme. The researcher then moved to the areas where they were working and sampled two household heads from each village within the sub-location. To ensure that the study didn't end up with people from the same social economic class, the study picked 23 households from the food for work and sampled 7 other households from among those who were not in food for work program. The study also purposively sampled four key informants based on their knowledge of water issues in the area.

3.3 Data Sources and collection techniques

The data was collected from both primary and secondary sources. The primary data included structured questionnaires administered to household heads, key informants interviews and observation. The secondary data was from books, journal articles and other publications in the internet. This provided useful information to ground the study and understand the problem better and provided useful case studies of similar studies carried out in other areas.

The data examined various variables among them the household source of water, whether water access was a problem, the cost of water, the distance and time spent in water collection, the quantity of water spent, the livelihood activities in the area, water borne diseases in the area and the household ability to meet the basic needs like food and education of their children. The primary data was collected using structured questionnaires administered to household heads and unstructured questionnaires for four key informant interviews. The household questionnaires were written in English but administered in Kiswahili and Kikamba to enable the respondents understand the information that was being sought. The key informants included the Division Water Officer, Division Public Health Officer, and Water Technician from AMREF in charge water projects in the Division and a businessman who has been living in the area for over 5 years. They provided useful information to the study on the sources of water in the division and the livelihood strategies of the people living in the area. This information was used to argument the information from other sources.

The following table was useful in relating a research objective with the method used to collect data. It also showed the various variables that were to be examined to answer each of the research objectives.

Table 3.1: Data Collection Techniques

Research Objectives:	Method of Data Collection	Data needs
1. To establish the main sources of water for the residents of Mutito Division.	1. Interviewing household heads randomly selected using structured questionnaires. 2. Observation. 3. Key informant interviews.	1. Household source of water. 2. Distance to water point. 3. Who collects the water. 4. Time taken to get water. 5. Quantity of water collected. 6. The cost of water
2. To analyse the effects of improved water provision on the livelihoods of the people in the area.	1. Household interviews with the experiment and control group 2. Interviews with key informants 3. Observation	1. Activities that people are engaged in. 2. Quantity of water used in the activity. 3. Contribution of each activity to household 4. Food security. 5. Ability to consume daily meal. 6. Occurrence of water related illness. 7. Ability to afford medical treatment. 8. Ability to educate children. 9. Economic status of the household.

Source: Own Illustration

3.4 Data Analysis

The field data was gathered using questionnaires which were first cleaned and the quantitative data was coded. The data was then entered into the SPSS and run to generate both descriptive and inferential statistics. Descriptive narration has been used to analyse data from key informants, observation of the researcher and issues from the household heads. Descriptive statistics summarised frequencies, percentages, cross tabulation and chi squire test from the primary data gathered from household heads.

The first objective on establishing the main sources of water for the residents of Mutito Division has been analysed using descriptive narration of the sources of water that were found in the area and how the water gets to the household. Frequency distribution tables

and percentiles were used to represent the number of people using the various sources of water, the cost and the means of obtaining the water.

The second question on how improved water provision affects the livelihoods of people in the area has been analysed using descriptive statistics such as, frequency tables, cross tabulation, bar graphs and pie charts to represent the activities practiced in the area and household ability to meet the basic needs in relation to water access. The chi-squire test was used to test the hypothesis of the study.

3.5 Definition and Operationalisation of variables of key terms

Livelihoods: This refers to a system of economic activities that people engage in which allow them to maintain and improve their quality of life. These activities include both on-farm and non-farm activities which generate income and also provide food security.

Improved Water Provision: This refers to an access to an adequate amount of water from an improved source such as protected spring or well, borehole, rain water collection, public stand pipe or a household connection (WHO/UNICEF, 2000, Shordt, 2004).

Household: This refers to a home comprising of parent(s) and children who live together and engage in some activities to earn their living. The activities can be done either in their farm or they may be activities done outside their farm.

Water source: This refers to a place where water is obtained. The water can be either from: rain water, sand dams, boreholes, rock catchment, spring or fountain, shallow well, water kiosk, tankers or from the river. It provides a point where people can be able to meet their water needs.

3.6 Challenges Faced During Field Work.

There were a number of challenges experienced while carrying out this study. The area of study had not received rainfall for the last two years. This led to low underground water recharge and the area experienced severe drought. This affected the number of livelihood activities that the people were able to engage in.

The other challenge was the transport as most of the interior places had no roads. The researcher had to use a motorbike and walk to reach to the home. In household where the heads were not at home, the researcher had to meet them at their area of work mainly in the food for work programme.

The other challenge was language barrier as the researcher was not very conversant with the local language which is Kikamba. The researcher had to use Kiswahili to interview those that understood it understood it while a research assistant from the area helped to interview those who only understood the local language.

CHAPTER FOUR

4. 0. Findings and Discussions

4.1 Introduction

This chapter presents and discusses the findings of the study in line with meeting the study objectives. The issues will include sources of water in the area and how it gets to the household, the livelihood activities of the people in the area and the ability of the household to meet their needs. The results are presented in frequency tables, cross tabulations, pie chats, bar graphs and chi square test which are discussed and related to other literature done on similar issues by other scholars.

4.1.1 Background Information of the Respondents

The study focused on household heads who often happen to be men but ended up with more women than men. The sample had 62% of the respondents being women and 37.8% were men. This could be explained by the fact that due to drought, most men moved out to look for employment outside to support their families Sasol and Maji na Ufanisi; (1999) had stated that 65% of households were female headed in a research carried out in Kitui due to lack of industries and job opportunities for many to support their families. Njonjo (1997) also posits that due to the traditional African attitudes towards work, men consider it degrading for them to engage in communal work and opt to move out to look for salaried employment outside.

Most of those interviewed were married showing that marriage was a value in the community. Seventy six point seven percent (76.7%) of those interviewed were married, of those interviewed were married, 12.2% single and 10% were widowed while 1.1% of those interviewed were separated/ divorced. This shows that most of those married maintained their marriages (see the table 4.1).

Table 4.1 Percentage distribution of people by their gender and marital status.

Gender	Frequency	Percent
Male	34	37.8
Female	56	62.2
Total	90	100.0
Status		
Single	11	12.2
Married	69	76.7
Divorced/Separated	1	1.1
Widowed	9	10.0
Total	90	100.0

SOURCE: Research data, 2009

Most of those interviewed were in their middle ages from 26 to 40, having a cumulative percentage of 63.3%. This shows that the community had young and active generation who were bringing up their families and have the capability of engaging in different livelihood activities to sustain their families. The table 4.2 below shows the percentage distribution of their age groups.

Table 4.2 Frequency distribution showing Age-groups of respondents.

Age	Frequency	Percent	Cumulative Percent
21-25	4	4.4	4.4
26-30	20	22.2	26.7
31-35	18	20.0	46.7
36-40	19	21.1	67.8
41-45	7	7.8	75.6
46-50	9	10.0	85.6
51-55	3	3.3	88.9
56-60	6	6.7	95.6
Above 60	4	4.4	100.0
Total	90	100.0	

SOURCE: Research data, 2009

4.1.2 Education and Occupation of Respondents

Table 4.3 below shows the percentage distribution according to the level of education. Majority of the respondents had formal education even though to a lower level. More than half (58.8%) of the respondents enrolled for primary education. Only 24.5% had completed secondary school and a few (8.9%) proceeded to college. The situation can be explained by high levels of poverty in the area making it not possible for them to afford high levels of education. Twenty four point four percent (24.4%) were not able to complete primary school. There were few secondary schools most of which had been set up after 1990's majority of which were boarding schools. The division also lacked institutions for higher learning. However, it had some polytechnics focusing mainly on tailoring and dressmaking for girls who do not make it to secondary schools. This was a recent development and thus applied only to a few respondents.

Table 4.3: A Frequency distribution table showing the level of education

Level of education	Frequency	Percent
None	9	10.0
Primary Incomplete	22	24.4
Primary Complete	31	34.4
Secondary Incomplete	6	6.7
Secondary Complete	14	15.6
College	8	8.9
Total	90	100.0

SOURCE: Research data, 2009

Table 4.4 below shows the occupation of the respondents and their spouses. Fifty percent (50%) were farmers while 33% of their spouses were also practicing farming. This shows that farming was the main activity in the area. The findings agrees with what Speelman et al (2006) found out in a study in Ukambani that most of the residents (80.7%) practiced farming. Housework followed with 17.8% of those interviewed and 21.1% of the spouses being involved in housework. This can be explained by the fact that accessing water was a problem and most women had to spend most of their time collecting water for the household. Also the households had an average of 7 members and this increased the

household work especially feeding the family. Sixteen point seven percent (16.7%) of those interviewed and 8.9% of their spouses were in small scale business. Very few were teachers or in formal employment making 7.8% of those interviewed and 11.2% of their spouses. This was due to levels of education of the people in the area and the fact that there were few institutions to absorb the people into the formal employment in the area.

Table 4.4: A frequency table showing the occupation of the respondents and their spouses.

Occupation	Frequency	Percent
Farmer	45	50.0
House work	16	17.8
Business	15	16.7
Teacher	5	5.6
Formal employment	2	2.2
Casual Workers	4	4.4
Other	3	3.3
Total	90	100.0
Occupation of Spouses		
Farmer	33	36.7
Housework	19	21.1
Business	8	8.9
Teacher	5	5.6
Casual worker	3	3.3
Formal employment	5	5.6
Other	1	1.1
n/a	16	17.8
Total	90	100.0

SOURCE: Research data, 2009

4.2 Sources of Water in Mutito Division.

This section presents findings related to the first objective of establishing the main sources of water for the residents of Mutito Division. The discussion covers the various sources of water, distance and time to get to the water source, the individual fetching the water and the mode of carrying the water to the household.

4.2.1 Sources of Water

The sources of water are important for determining how water will finally be used in the household. This formed the bases of the first objective of the study as it sought to establish the various sources of water for the people of Mutito Division. The sources were looked at in terms of where the household collected the water and the issues surrounding its delivery to the household. The study also used key informants who provided in-depth information on where the water actually came from to get the distribution points like the Water Kiosk and the pipes.

The study established that there were attempts by different organizations and government to improve water provision in the area. They focused on digging deep wells at the point where two rivers join and pumping the water to big tanks for redistribution into the water kiosks and piping to the households and institutions. There were protected shallow wells mainly at the river banks dug by one organization for organized groups in the community who own the shallow wells. There were also a few boreholes sunk in the area and the water was pumped into a tank for redistribution. There were rain water tanks mainly in schools to collect water for the schools. Also found in the area were also springs on the Mutito hills where the water was collected in the dams and then piped to institutions for the people around the specified radius. There was an earth dam to collect water in Kaliku Location where the waters were saline making the area not suitable to drill the ground water. However, these improvements had not reached to all the people and where there were water kiosks; some could not afford to buy the water. Some areas were still solely depending on seasonal rivers. The people had to dig unprotected wells from where they could scoop the water which was unsafe for consumption. One also risked falling in the well in the process of fetching the water. This agrees with Akong'a (1985) where he noted that during the dry seasons of Kitui, there were very few sources of water and people have to scratch riverbeds to get trickles of water.

Table 4.5 below shows where households collected their water, the frequency and percentage number of household using the different sources of water in the area. Most households had more than one source of water to meet their water needs. This could be

attributed to reliability of the source and the cost implication of the source in relation to its use.

Table 4.5: A frequency distribution table showing the various sources of water for households.

Source of water	Frequency	Percent
River	26	28.9
Shallow well	4	4.4
River and shallow well	28	31.1
Water kiosk	4	4.4
River and water kiosk	15	16.7
Borehole	3	3.3
Piped water, river	3	3.3
River, shallow well, water kiosk	7	7.8
Total	**90**	**100.0**

SOURCE: Research data, 2009

Table 4.5 above shows that the highest percentage (31.1%) depended on the river and shallow wells as their source of water supply. This can be explained by the fact that most shallow wells were dug just next to a river and hence people used both sources. They used the water from the shallow well mainly for domestic use and from the river for watering their livestock. This was followed closely by the river at 28.9% showing that some areas had not yet experienced any improvement in water provision. River and water kiosk had 16.5% of the sampled households. Water from kiosks was not free and so they preferred using it for domestic purposes and that from the river for other activities like watering livestock. Water kiosks were placed approximately three kilometres from each other though this improvement had not reached some parts of the division. In areas where the river was nearer than the water kiosk, the respondents preferred the rivers despite it being unsafe. Macdonalf (2003) had noted that when the clean water source is far, the people will opt to collect surface water than walk to a far distance. This was the case in Mutito Division as found in this study.

Improved water provision varied within the different Locations in the Division. This can be explained by the fact that some of the areas especially Kaliku Location, the water was highly saline hindering development of underground water. Poor development of

infrastructure especially roads also made it difficult to access the area. Mutito Location lacked water kiosks as the area had for a long time depended on springs catchments from the hills for water provision. However, this covered mainly institutions like schools and Divisional Head Quarters and those living within these surroundings. Unfortunately, human encroachment to the hills and prolonged dry season had left most of the springs dry making people depend on seasonal rivers.

The table 4.6 below shows a cross tabulation of the sources of water for each sampled sub-location.

Table 4.6: Cross tabulation of sub locations and source of water.

Sub-location	Source of water								Total
	River	Shallow well	River and shallow well	Water kiosk	River and water kiosk	Borehole	Piped water, river	River, shallow well, water kiosk	
Malatani	2	2	11	5	2	3	0	3	30
Kawala	10	0	5	1	13	0	0	1	30
Kitoo	14	2	8	0	0	0	3	3	30
Total	26	4	28	4	15	3	3	7	90

SOURCE: Research data, 2009

The table 4.6 above shows Kitoo and Kawala as areas with the highest number of people depending on the river for their water. Malatani had the highest number of people depending on the river and shallow wells. This could be explained by the fact that one of the NGOs (AMREF) working on water provision in the division had its base in the Sub-location and the rivers in the location were big with clean water making it possible for them to develop shallow wells for many established groups in the area. Kawala Sub-location had the highest number of people depending on the river and water kiosks. This was because most of the rivers in that area were saline and water kiosks provided clean water. Most of the rivers in this area were small and seasonal making people wait for many hours for it to recharge. However, they still used the river to feed their livestock which helped cut down on the cost of watering livestock. Very few people (3) sourced for water from the borehole. This can be explained by the fact that there were few boreholes sunk in the area and the water from the borehole was not well distributed to the tanks for redistribution. Much still needed to be done to pipe the water to different areas. There

was also fear in organizations to sink boreholes in the area as some of them turned out to be saline and others lacked water. The government with assistance from JICA had sunk 3 boreholes in the area and only one had clean water, though not been properly distributed.

The springs were identified among the sources of water but they did not seem to have much influence on the interviewed household as the water was piped mainly to the institutions and the household around them. According to Divisional Water Officer there were three springs in Mutito hills; Ngulini springs which covered a radius of 5 km, Muthua springs covering a radius of 2 km and Nzaa springs which covered Mutito Boys and Mutito Girls secondary schools and the Catholic Mission in the area. Hence, very few people in Mutito Location were able to access piped water from the springs. Water tanks for rain harvesting were meant mainly for schools but lack of rains had left them dry and schools had to source for water elsewhere.

4.2.2 PROBLEMS OF WATER ACCESS

Most of the respondents (83.3%) felt that accessing water in the area was a problem while only 16.7% felt that it was no longer a problem. Table 4.7 below shows the number of people and what they perceived to be the problem with accessing water from their sources. The main problem noted was the source drying up. This could be attributed to the fact that the area only had seasonal rivers and prolonged drought had left the sources with no water recharge. Distance to the water point was also a problem with most people having to walk over 2 km to get to the water point and still spend more time queuing for the water. This was way above the recommended distance of 1 km to the water points in the rural areas. Others sited salinity of the water as a major problem. Few respondents felt that buying water was a problem unless those who had to travel far and still buy the water. This contradicted the results by BG Associates (2002) on Tharaka Division where 60% of their sampled population felt that they should not pay for the water. These showed that due to severity of water problem, the residents of Mutito were willing to pay for the water if only they could access it. The respondents understood why the cost had to be introduced and bearing it did not matter as long as they got the water

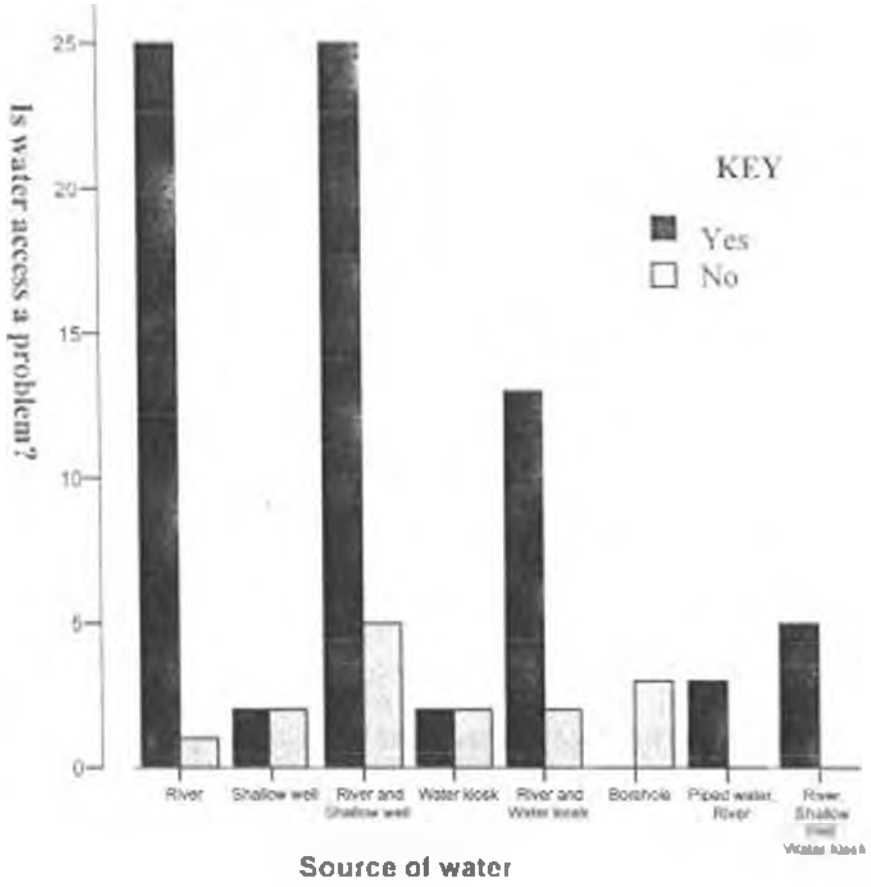
Table 4.7: A Cross tabulation whether water access is a problem and what makes it a problem.

Is water access a problem	What makes it a problem									Total
	it dries up	it is salty	it dries up and salty	its far	its far and salty	far, dries	dirty, dries	salty far	n/a	
Yes	29	1	4	13	13	10	1	4	0	75
No	0	0	0	0	0	0	0	0	15	15
Total	29	1	4	13	13	10	1	4	15	90

SOURCE: Research data, 2009

Figure 4.1 below represents the different sources of water and the frequency of respondents' response as to whether water access was a problem or not. Those who obtained their water from the river felt that water access was really a problem as the rivers were seasonal and scooping water on the sand was difficult. Those using piped water and the river also said that water access was a problem despite it being so near to them. This was because the source of the tapped water especially from the springs was drying up and hence they were going for many days without water. The shallow wells were still found to be a problem because despite ensuring that people could access protected water, it did not reduce the distance covered. Some of the respondents collecting water from the water kiosks felt that water access was still a problem as some had to walk long distances to get to the water kiosk and needed money to buy the water which was a challenge for many to get. Those that obtained water from a borehole felt that water access was not a problem. This is because the boreholes were not dying up and always had water. This could be an indication that boreholes could be more reliable as sources of water.

Figure 4.1: Bar graph showing the problems of water access



SOURCE: Research data, 2009

Queuing for the water was seen to be one of the major problems of water access for many people in the area. This was mainly because water was available in little quantities and in some areas they had to wait for the water to recharge. Other water points had many people waiting to obtain the water from one source. This mainly affected the areas where there was little improvement in water provision. The table 4.8 below shows the sampled Sub-locations and the time that was spent queuing for water. The table shows that the residents Mulatani sub-location spent the least time queuing for water. This was because there were more people more with protected shallow wells and water kiosks which were distributed 2 km apart. This agrees with what Sasol and Maji na Ufanisi (1999) after implementing their water project found that women who were the main people used in household water collection did not have to spend long hours queuing to obtain water.

However, those in Kitoo and Kawala sub-locations spent long hours queuing for the water. This was mainly because they depended on rivers which dried up and hence the residents had to dig dipper and wait for the water to recharge for them to scoop the water. The water kiosks were also few and serving a wider area making people take more time queuing for this essential commodity.

Table 4.8: Cross-tabulation of sub locations and time spent queuing for the water

Sub-location	How long do you take queuing for the water									Total
	less than 30min	30-40min	40-50min	50-60min	60-80min	80-100min	100-120min	more than 120 min	n/a	
Malatani	6	9	1	7	0	0	1	1	5	30
Kawala	1	1	2	6	3	2	4	8	3	30
Kitoo	1	8	0	3	5	2	5	6	0	30
Total	8	18	3	16	8	4	10	15	8	90

SOURCE: Research data, 2009

4.2.3 Cost of Water

Table 4.9 below presents the frequencies and number of respondents buying water from different sources.

Table 4.9: Cross-tabulation table of sub-location and where they bought the water from

Sub-location	Where do you buy water					Total
	Water kiosk	Water vendors	Piped water	Borehole	n/a	
Malatani	9	4	0	3	14	30
Kawala	17	5	0	0	8	30
Kitoo	1	6	3	4	16	30
Total	27	15	3	7	38	90

SOURCE: Research data, 2009

Most of the residents who depended on the water projects paid for the water. However, those that depended on community shallow wells did not pay. At times, some had to get water from the kiosks as the rivers dried up. Some respondents lacked funds to buy the water. Thirty four point four percent (34.4%) of the respondents bought water, 22.2% bought the water sometimes while 43.3% did not buy the water and obtained it for free.

Table 4.9 above shows that most of those who bought water bought it from the water kiosk most of who (17) were from Kawala sub-location. This was because most of their rivers were saline and dried up early and hence the people choose to buy water when they could afford. The water kiosks in Kawala were a recent development by the government after the Water Act developed by the Water Board and handled down to the community. This development enabled the residents obtain clean water for domestic use and also avoid travelling long distances in search of water when their sources dried up. In Malatani Sub-location the water kiosk were established mainly by an NGO (AMREF) and this facilitated the development in Nzombe shopping centre as the people were able to obtain clean water at reasonable prices compared to when they depended on water vendors who charged very high fee for the commodity. It also helped them improve on the sanitation of the town especially in butcheries and hotels and enhanced further construction of businesses and rental houses. The project is run by the community and has 9 water kiosks distributed around the surrounding area. They also piped the water to people who met the installation cost and fixed meters for them. Most of the piped water from this project went to institutions and businesses and a few households who didn't fall within the sampled group in this study. The water vendors were more in Kitoo as the improved water provision in the area was mainly the piped water from the springs which were drying up and had to recourse back to the rivers especially the time of this study. The people in employment who did not have much time to go to collect the water had to depend on vendors' households' supply

The cost of water for most respondents who bought the water ranged between Ksh. 50 to Ksh. 250 per week. This was found to be affordable to many people who found it better than having to struggle so much to get the water. The table 4.10 below represent the frequency distribution table of the amount of money spent weekly by households on water.

Table 4.10: Frequency distribution table of the percentages of respondents and amount of money spent weekly on water.

Amount	Frequency	Percent
Less than ksh 50	6	6.7
Ksh 51-150	23	25.6
Ksh 151-250	15	16.7
Ksh251-350	4	4.4
Ksh 351-450	2	2.2
Ksh 451-550	1	1.1
n/a	39	43.3
Total	90	100.0

SOURCE: Research data, 2009

4.2.4 Ownership of a Private Water Source

Most respondents of Mutito did not own private water source as shown in table 4.11 below. Only 15.6% owned a private water source as compared to 84.4% who did not own a private water source. Still out of those who owned a private water source, 8.9% owned unprotected shallow wells, which were dug at the rivers but they had exclusive rights to use them but once it rained, this wells were filled up with sand. Only 1.1% owned a rain water reservoir because they were not considered to be viable as the rains were less frequent. Most water tanks in the area were constructed in schools. Majority of the respondents depended on community sources of water.

Table 4.11: Frequency distribution table of the percentage number of respondents owning private water source.

Source	Frequency	Percent
Protected shallow well	5	5.6
Unprotected shallow well	8	8.9
Rainwater reservoir	1	1.1
n/a	76	84.4
Total	90	100.0

SOURCE: Research data, 2009

4.2.5 Distance to the Water Point

The distance to the water point varied with the source. The river was the most common source of water for most of the residents though few of them happened to live near the source. Only 7 respondents walked the recommended distance of 1 km to get to the river. The rest walked more than one kilometre showing that more developments were needed to enable the residents obtain water at reasonable distances. The table 4.12 below shows the number of respondents and the distance they cover to get to the water point. More than half of those interviewed covered more than 2.5 km indicating that the rivers were few and hence far from most residents in the area. Kawala sub-location was the worst hit and most of the respondents had to walk long distances. This can be explained by the fact that little has been done in the area to improve on water provision and the people rely on water kiosks to obtain water for domestic use but still go to the river to obtain water for their animals to cut on the cost. This was similar to what Speelman et al (2006) found in their study in Makueni and Machakos Districts whereby they found that their respondents walked between 50 m to 7 km to get to the water point.

Table 4.12: A Cross- tabulation of sub locations and the distance covered to get to the river.

Sub-location	Distance to the river								
	less than 200m	200m-1km	1-1.5km	1.5-2km	2-2.5km	2.5-3km	3-4km	4-5km	Above 5km
Malatani	0	5	4	4	1	2	3	3	2
Kawala	1	0	1	3	2	11	2	3	7
Kaloo	0	1	5	7	3	1	4	5	3
Total	1	6	10	14	6	14	9	11	12

SOURCE: Research data, 2009

Table 4.13 on the Sub-locations and the distance to the shallow well and to the water kiosk showed that only 18 and 11 respondents respectively covered the recommended distance to get to the water source. The shallow wells were dug at the river banks hence people covered the same distance to obtain water from them. It was only in Malatani Sub-location where they had managed to place water kiosks 2 km apart and hence only two respondents walked for long distance to get to the water kiosk when their sources dried

up. Kitoo Sub-location remained with few water kiosk and few shallow wells. This could be attributed to the fact that it falls within the divisional headquarters and most of the water improvement initiated in the area mainly from the springs is piped to institutions in the area. This could be contributing to human encroachment of the hills so as to obtain water and start livelihood activities to meet their needs.

Table 4.13: A cross tabulation of sub location and distance to the shallow well

Sub-location	Distance to the shallow well								
	200m-1km	1km-1.5km	1.5-2km	2km-2.5km	2.5km-3km	3km-4km	4km-5km	Above 5km	n/a
Maisiani	6	7	3	1	1	1	1	0	11
Kawala	0	1	2	3	4	0	0	1	18
Kitoo	1	4	2	1	0	0	2	1	19
Total	8	12	7	5	5	1	3	2	49

	Distance to the water kiosk									
	less than 200m	200m-1km	1-1.5km	1.5-2km	2-2.5km	2.5-3km	3-4km	4-5km	Above 5km	n/a
Maisiani	3	2	1	1	0	0	0	0	2	21
Kawala	0	2	3	2	1	2	2	3	2	13
Kitoo	0	0	0	0	0	1	0	0	0	29
Total	3	4	4	3	1	3	2	3	4	83

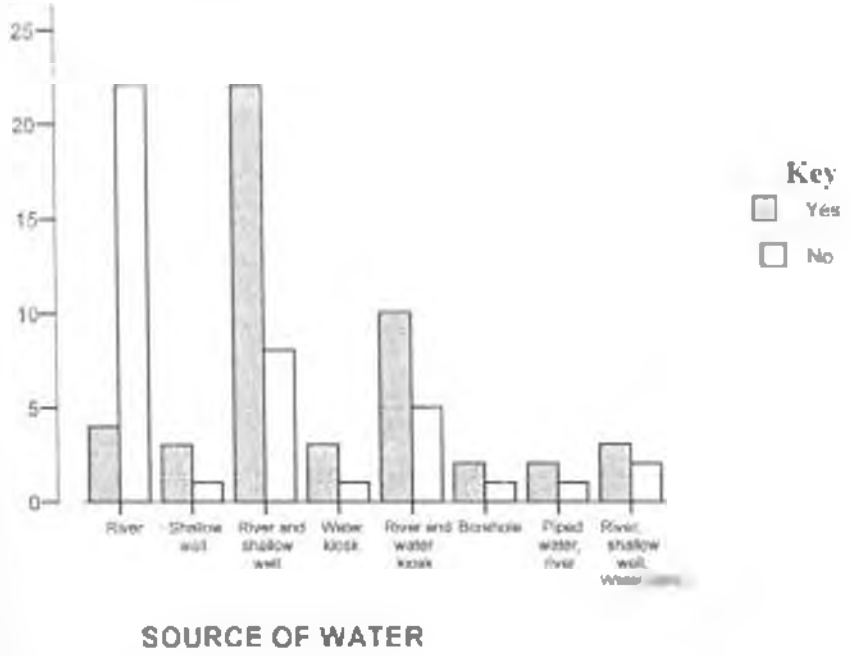
SOURCE: Research data, 2009

4.2.6 Time Saved from Water Collection

Some areas had experienced improvement in water provision and this helped save the time that they previously spent looking for the water. Though the river was a predominant source of water, most people felt there was still an improvement in water provision. Those that still depended on the river said that the organizations which had come in the area had made them aware that by digging deeper in the river; they could get the water and avoid walking for long distances to the bigger rivers where water could still be found. Previously they acknowledged that they lacked this awareness and once they couldn't get the water near the surface, they had to travel long distances in search of water. Fifty four point four percent (54.4%) of the respondents felt that they saved the time that they previously used looking for water while 45.6% felt that they were still struggling to get water and hence did not save the time that they spent in water collection.

Figure 4.2 below shows the source of water and the respondents view as to whether they saved the time that they previously used to collect water. Despite the fact that most of the shallow wells are sunk just next to the river, they were seen to save time because it enabled the people to always get water without having to wait for it to recharge as was the case with the rivers. Water kiosks also enabled the people to save the time that they previously used looking for the water. The same was true with the borehole and piped water. However, even with the improved water provision, some people felt that the water provided did not help them to save on time. This is because most people combined the sources and still went to the river either cut down on cost or because the sources were unreliable as they dried up.

Figure 4.2: Bar graph showing the source of water and the whether there was time saved that was previously used to collect the water.



SOURCE: Research data, 2009

In cases where there was an alternative source of water other than the river most respondents said that they used the time saved to engage in other activities. These activities included working on their farm 21.1%, domestic chores 33.3%, grazing their animals 5.6%, resting 8.9%, doing casual work 13.3% and doing business 11.1%. This

shows that the time saved was used for different activities but domestic chores took the highest percentage 33.3%. This agrees with what James et al (1992) found out in a study carried out in India that there is need to provide an alternative activity to be done after an improvement in water access to ensure that the time saved is used in productively

4.2.6 Water Collection.

Table 4.14 below shows that water was collected by women mainly the mother and the girls. This was because the women in the African tradition had the responsibility of undertaking all the household chores and issues of water collection were part of the chores. Hope and Gowing (2003) came up with similar findings in South Africa where they found that young women were involved in collecting water. Black (2004) also described the task of collecting water to invariably fall on women who have to walk long distances to collect it. The study showed that men and boys were involved only in few cases and also few were able to afford a hired worker to assist in water collection. In the few cases where father were involved was mainly in cases where both the mother and the father are in formal employment and have learnt to share responsibilities. This would mean that with education, there was change in the perception of responsibilities as both men and women did engaged in similar household chores.

Table 4.14: A frequency distribution table show who collect water for the household and the percentage of each

Who collect water	Frequency	Percent
Mother	40	44.4
father mother	2	2.2
Girls	8	8.9
hired worker	9	10.0
mother and girls	19	21.1
girls and boys	3	3.3
Mother children	7	7.8
mother father hired worker	2	2.2
Total	90	100.0

SOURCE: Research data. 2009

The study also found out that in most cases, (66.7%) only one member of the household was involved in collecting water. This was contrary to a study carried out in South Africa by Hope and Gowing (2003) where they found that at least two members of a household were involved in water collection. This was because most people used donkeys which could carry up to 80 litres of water. Few households had two or more household members going to collect water. This was especially so for those who had to carry the water on their back to get to their homes. The other methods of ferrying water such as using a wheelbarrow or using a cart were not as popular to many. This could be because they require a higher cost of obtaining them and the fact that they also required more energy for pushing it hence it is hard to use them over long distances. Table 4.15 below shows the number of people who collect water per day and the means they use to collect the water.

Table 4.15: A cross tabulation of members of household who collect water in a day and the means used to carry the water.

Members of a household collecting water	Means of ferrying water						Total
	Carry on my back	Use a donkey	Use a wheel barrow	Use a donkey, carry on my back	Use a cart	n/a	
One	12	42	2	3	0	1	60
Two	6	5	2	2	1	0	16
Three	3	3	0	2	0	0	8
n/a	0	4	1	1	0	0	6
Total	21	54	5	8	1	1	90

SOURCE: Research data, 2009

4.3 Other Sources of Livelihood

The study found that the residents of Mutito Division had various sources of livelihoods. Some are directly related to water while others are indirectly linked to water. This study looked at different activities that were carried out in the area and how water access influenced them. It also focused on how they met their basic needs such as food and education of the children. The study also looked at how they looked at how they perceived their income level in relation to where they collected water. This helped to show the impact that water availability on people's quality of life.

4.3.1 Employment

Employment influenced people's livelihoods as shown in table 4.16 below. Sixty three point three percent (63.3%) were involved in some employment while 36.7% were not. Fifteen point six percent (15.6%) were in formal employment, 24.4% in self employment and 23.3% in casual labour. All those who engaged in formal employment felt that most of their livelihood came from their employment. This can be explained by the fact that the area was a hardship area the residents depended more on buying most of their needs. About half of those in self employment felt that most of their income was coming from their activities. This can explained by the fact that business and self employment was not always consistent in the market hence sometimes they are able to have a smooth flow but get affected by the prevailing conditions such as drought. Most of those on casual work were getting little of their income was coming from their employment. This was because casual work was not constant and due to low demand especially during the dry spell and also very little was paid for the work done. Most of the casual labour was related to agricultural activities. This meant that if there was more water, they would be more work and thus more casual labour needed.

Table 4.16: A Cross tabulation of type of employment engaged in and the proportion of livelihood coming from employment.

Proportion of livelihood from employment	Are you engaged in employment	If yes which one				
		formal employment	casual labour	self employment	n/a	Total
most of it	yes	14	6	10		30
	Total	14	6	10		30
Little of it	yes		11	10		21
	Total		11	10		21
very little of it	yes		5	1		6
	Total		5	1		6
n/a	no				33	33
	Total				33	33

SOURCE: Research data, 2009

4.3.2 Remittances

Another source of livelihood for some of the residents was the remittances from the children, relatives or friends. This was an external support mechanism to help the families to meet their needs. Only 22.2% of the respondents received remittances while 77.8% did not receive any remittances. This shows that most of the respondents depended on their effort to sustain their families. The parents considered the remittances that they received from their children to be significant. The relatives also gave a significant contribution and they had the highest number of those who were giving remittances. This shows that the community had good values of having those who are well of support their relatives who experience challenges in meeting their needs. Table 4.17 below represents the marital status of different households and how they received remittances and from whom. These who were in married status were noted be the only group that received remittances from their children. This can be attributed to their earlier ability to educate the children so that they can get a job and be able to support them. The children were also in a better position to understand the situation for their parents and their siblings. Only one single person received remittances from the relatives and this could mean that being single was not well accepted state in the community. The widows and the married couples received support from their relatives most of which was focused on educating the children. The married people are the main ones who reported to be receiving little assistance from friends showing they had strong social networks than any other category.

Table 4.17: A Cross tabulation of marital status and whether they receive remittances and from whom.

Source of remittance	Marital status	Do you receive remittances		Total
		yes	no	
Children	Married	7		7
	Total	7		7
Relatives	Single	1		1
	Married	4		4
	Widowed	4		4
	Total	9		9
Friends	Married	4		4
	Total	4		4
n/a	Single		10	10
	Married		54	54
	Divorced/Separated		1	1
	Widowed		5	5
	Total		70	70

SOURCE: Research data, 2009

4.3.3 Food aid

Another source of livelihood in the area was food aid. Crop failure due to lack of rain had occasioned drought which had hit many residents and their livestock were also affected. Though this affected the whole area, not everyone was receiving food aid as the programme considered those who had more challenges in the society. Table 4.18 below shows the marital status, whether they received food aid and the proportion of livelihood which comes from food aid. Since most people in the area were married, the table shows they had the highest number of people receiving food aid. This was especially so with families which had large family size. Apart from one widow in the sample, all the other widows were receiving food aid. This could be a sign that the community supported the widows and did not want them to suffer. A significant number of the single people in the sampled population received food aid showing that most single people like the widows were struggling to meet their needs. Thirty six (36) respondents felt that food aid was only able to provide just a little of what they needed while 6 respondents felt that most of their livelihood came from food aid. Thirty four (34) respondents felt that food aid contributed very little of their livelihood. This shows that the food aid given was meant to supplement and enhance what the people have and hence it was not enough to feed the large family size. Each family received 42 kg of grain every month but they had to get to

ood for work programme to avoid having it for free. Availability of water would provide solution to the problem of food insecurity.

Table 4.18: A Cross tabulation of marital status and whether they receive food Aid and the proportion of their livelihood from food Aid.

Proportion of livelihood from food aid	Marital Status	Do you receive food aid		Total
		yes	no	
most of it	Married	5		5
	Widowed	1		1
	Total	6		6
little of it	Single	5		5
	Married	25		25
	Widowed	6		6
	Total	36		36
very little of it	Single	3		3
	Married	5		5
	Divorced/Separated	1		1
	Widowed	1		1
	Total	10		10
no	Single		3	3
	Married		34	34
	Widowed		1	1
	Total		38	38

SOURCE: Research data, 2009

4.5 HOUSEHOLD INCOME LEVEL

The study also sought people's view on how they rated their income. This was to establish whether they considered themselves to be poor, middle class or wealthy as shown in table 4.19 below.

Table 4.19: A Cross tabulation of source of water and how they rate their income

Source of water	How do you rate your Income			Total
	Wealthy	Middle	Poor	
River	0	9	17	26
Shallow well	1	3	0	4
River and shallow well	1	19	10	30
Water kiosk	0	4	0	4
River and water kiosk	1	4	10	15
Borehole	0	3	0	3
Piped water, river	0	3	0	3
River, shallow well water kiosk	0	5	0	5
Total	3	50	37	90

SOURCE: Research data, 2009

Those who purely depended on the rivers had the majority (17) being poor. This was because they had to spend most of their time in search of water and thinking and working for survival with fewer activities to engage in to raise their income. This agrees with what Brooks, (2002) noted that, 'water scarcity menaces our well-being, jeopardizes our livelihood, and sometimes endangering our lives'. Those depending on shallow wells alone felt that they were in the middle and wealthy classes, 3 and 1 respectively. This was because most of the shallow wells were privately owned and hence those who had some resources could be able to dig a private well. The 4 respondents depending purely on water kiosk were in the middle class as this were people who could afford to purchase the water for their use. Most of those depending on the river and the shallow wells had most (19) in the middle class as they were able to engage in more livelihood activities to alleviate them from poverty. Those depending on the boreholes and piped water and a combination of shallow well, river and water kiosks were in the middle class as they were able to pay for the water. Very few respondents (3) rated themselves to be wealthy. This were mainly those had formal employment and felt they were above the average members of the community. The source of water did not seem to influence their status.

4.3.4 Food consumption in Mutito division.

The ability of a household to meet its food requirements indicates its well being as food is the most basic need which cannot be done away with. However, being a semi- arid

region, the food is usually bought, donated, harvested after good rains or grown under irrigation. With water provision, it is expected that many people would be able to grow their own food but the water provided in Mutito Division was little for irrigation to take place. This would make the area to be less reliant on food aid. Most of it was intended to provide households with water for domestic use and to help people grow vegetables. Despite the hiccup, some of the respondents in areas where there was improved water provision felt that water had helped ease the problem of food insecurity. Table 4.20 below shows the number of respondents and whether they felt that water availability had helped them improve their food situation.

Table 4.20 A Cross tabulation of how water has eased the problem of food security.

Has water provision eased the problem of food insecurity	If yes how						Total
	have a kitchen garden	grow vegetables	easy to get vegetables	time to work for cash	time to work get vegetables	n/a	
Yes	2	11	8	13	3	0	37
No	0	0	0	0	0	40	40
slightly	0	0	2	1	1	9	13
Total	2	11	10	14	4	49	90

SOURCE: Research data, 2009

Thirty seven (37) respondents felt that water had helped them improve their food situation while 13 respondents felt that that was slight improvement in water provision. Forty respondents (40) felt that the water had not helped them improve on their food security. This was because they were still struggling for the water and what was available was used for domestic purposes. Thirteen (13) felt that water availability had helped them ease the problem of food insecurity by being able to growing vegetables or having a kitchen garden. This helped them to supplement their diet or for sale to gain income to buy other foodstuff. Others (14) felt that water availability enabled them to have more time to work to get money to buy food. This was because they were able to save the time that they used to spend looking for water. Fourteen (14) of them felt that water had made it easier for them to obtain vegetables. This was because they were able to buy them from their neighbours who were able to grow them and at an affordable price.

Obtaining a daily meal was a challenge to many households in the area. Seventy percent (70%) of those interviewed consented that at times they spent a day without receiving a meal while only 30% said that they had never missed their meals. This shows that food availability was still a challenge in the area. Table 4.21 below shows whether household at times went without meals and what their daily meal was mainly composed of.

Table 4.21: A cross tabulation of what daily meal is mainly composed of and if a family has gone without meal and if yes how often.

Composition of the daily meal	Has your family gone without food	If yes how often				Total
		never	just once or twice	several times	many times	
maize	Yes			10	4	14
	No			0	1	1
	Total			10	5	15
maize, beans	Yes	0	2	18	8	28
	No	6	0	1	0	7
	Total	6	2	19	8	36
maize, beans, vegetables	Yes	0	8	7	2	17
	No	11	0	0	0	11
	Total	11	7	7	2	27
maize, beans, vegetable, meat	No	8				8
	Total	8				8
maize peas vegetable	Yes				1	1
	Total				1	1
maize vegetables	Yes			2	1	3
	Total			2	1	3

SOURCE: Research data, 2009

From table 4.21 above, less than half of total the respondents (37) were not able to consume a balanced meal. For most people, the main source of proteins was plant proteins. Despite the fact that livestock keeping was their major preoccupation, few households were able to consume animal proteins. This was because the livestock kept were meant for sale and the money obtained was used to meet other family needs. Only 40 households were able to regularly consume vegetables. This was because in many areas they were not able to grow the vegetables and had to source for them outside. This

was especially so in Kaliku Location and parts of Mutito Location, the vegetables were sold at a very high prize as they were sourced from other places. Thirty five (35) respondents had maize and beans as their main food. This was the staple food of the community and hence it was easily accessible in the market. Most of the households who were able to afford a balanced meal hardly went a day without meals. This means they were had stable income to afford to buy balanced meal for their families. The households who were not able to afford a balanced diet also faced the challenge of having an assured meal everyday. This explains why they couldn't go for a balanced meal as they had to struggle to have a meal a day to keep them going.

4.8 Education of Children in Mutito Division

The ability to educate the children was also an indicator of whether there was an improvement in the area with an improved provision of water. The focus was drawn to the ability to take the children to secondary schools as the government offered free primary education and the cost for primary schools was relatively low. Table 4.22 below shows whether the children were taken for secondary school and who paid for them

Table 4.22: Frequency distribution table of whether the children are taken to secondary school and who pays for their school fees.

Do you take your children to secondary school	Frequency	Percent
Yes	39	43.3
No	27	30.0
N/A	24	26.7
Total	90	100.0
Who pays for their school fees		
Self	27	30.0
Relatives	1	1.1
Self, sponsor	4	4.4
Self, relatives	7	7.8
N/A	51	56.7
Total	90	100.0

SOURCE: Research data, 2009

Though the area was a hardship area, the parents were putting effort to educate their children. Forty three point three percent (43.3%) of the respondents were able to take their children to secondary schools while 30% were not able to take their children beyond primary schools. Twenty six point seven percent (26.7%) had their children still in primary schools and hence their ability to educate them through to secondary school and colleges could not be stated. Most of those (30%) who were able to take their children to secondary schools financed their education Seven point eight percent (7.8%) of them supported their children and were assisted by their relatives, 4.4% were supported by a sponsor and 1.1% was supported by the relatives. This shows that despite all odds, there were efforts towards education of children especially by their parents. Also despite the area being a hardship area, very little assistance was given to parents in terms of sponsorship to educate their children.

Table 4.23 below shows where the parents who take their children to secondary school got the resources from. Those who were in formal employment were able to take their children to secondary school from their employment. Others still in formal employment were boosted by the sale of livestock. Sale of livestock was contributing greatly to the education of the children. This was mainly combined with other livelihood activities such as casual labour, sale of farm produce among others. This shows that livestock were important assets in facilitating the education of the children. Casual labour made significant contribution to education of the children. Those in causal labour were able to combine their casual labour gains with other resources to manage to pay the school fees. Farm produce especially when they had good rains was contributing capital to educate their children. Frequent crop failure due to lack of rains however made it difficult for many to rely on the farm produce. This shows that with water availability would contribute greatly to education of children as people will be able to grow crops, there would be more opportunities for causal labour and small scale business based on farming would improve.

Table 4.23: A Cross tabulation of whether parents take their children for secondary schools and colleges and who pays for their school fees and if they pay how they acquire it

HOW DO YOU ACQUIRE THEIR SCHOOL FEES	DO YOU TAKE YOUR CHILDREN TO SECONDARY OR TO COLLEGE	IF YES, WHO PAYS FOR THEIR SCHOOL FEES					Total
		self	Relatives	self, sponsor	self relatives	n/a	
Formal employment	yes	8					8
	Total	8					8
Formal employment, sale of livestock	yes	3					3
	Total	3					3
Casual labour, sale of livestock	yes	6		3	1		10
	Total	6		3	1		10
Casual labour, sale of livestock, sale of land, farm produce	yes	2			1		3
	Total	2			1		3
Sale livestock, farm produce, remittances,	yes	1			3		4
	Total	1			3		4
Small scale business, casual labour	yes	1			1		2
	Total	1			1		2
Small scale business, sale livestock, farm produce	yes	4		1			5
	Total	4		1			5
n/a	yes		1			0	1
	no		0			27	27
	n/a		0			24	24
	Total		1			51	52
Harambee, sale of farm produce, sale of livestock	yes	2					2
	Total	2					2
Sale of farm produce	yes				1		1
	Total				1		1

SOURCE: Research data, 2009

4.10 Other Challenges Experienced in the Area.

Besides the problem of water, there were other challenges that the people of Mutito were experiencing. The main problem mentioned by most people was the problem of hunger (89.9%). Most people experienced hunger due to erratic climatic patterns and this hindered them from engaging in many livelihood activities. Most of the income which could have been invested or saved for other needs was used to purchase food. There were

various suggestions from the respondents on how they felt the problem of hunger can be solved as shown in table 4.24 below. The highest number (41) felt that the problem of hunger could be solved through provision of food aid by government and other non governmental institutions. This was especially the case in Kawala and Kitoo Sub-location where water access was still a challenge. In times of drought, they mainly depended on food aid and hence felt an increment in food aid would help solve the problem of hunger. The residents of Malatani sub-location on the other hand had most the respondents who felt that provision of water could help them solve the problem of water. This could be because they had experienced more efforts toward improvement in water provision and were able to practically see that they can solve the problem of hunger if they can get more water from what they were doing with the little water made available to them.

Table 4.24: A cross tabulation of Sub locations and whether hunger is a challenge and how it can be addressed.

Ways of addressing hunger	Sub-location	Is hunger a Challenge		Total
		Yes	no	
Need food aid	Malatani	5		5
	Kawala	21		21
	Kitoo	15		15
	Total	41		41
Need water	Malatani	20		20
	Kawala	6		6
	Kitoo	7		7
	Total	33		33
Need training to improve farming	Malatani	1		1
	Kawala	2		2
	Kitoo	3		3
	Total	6		6
N/A	Malatani		4	4
	Kawala		1	1
	Kitoo		5	5
	Total		10	10

SOURCE: Research data, 2009

Other problems encountered in the area included poor transport network reported by 41.1% of the respondents. The area had all weather roads and lacked by passes to get to the interior. This hindered their further development hindering even the marketing their produce and leaving them to be exploited by middlemen. Thirty percent 30% felt that

diseases were another challenge in the area. The area lacked enough medical facilities and had only one public health centre which was far. They felt that the government needs to set up more health centres and have a general hospital so that they can avoid taking their patient to far places like to Kitui or Mutomo for admission. This was leading to many deaths for those not able to take their patients to those places for further treatment. Obtaining school fees for their children was mentioned to be a challenge facing 26.7% of the sampled population. This is because most of them depended on farming and livestock which were unreliable. They felt that if they could get sponsorship of their children, most of them could be able to study with ease and later improve their standards of living. This shows that the people were still experiencing other challenges that equally needed to be addressed though some would be solved as the water is provided like being able to take their children to school, creation of employment, food security, ability to afford medical treatment and even others such as roads will be addressed as water projects help build strong social capital necessary for local development. Hope and Gowing (2003) also stressed that to effectively fight poverty, other challenges facing the rural areas need to be addressed and water provision can aide in solving those other problem.

4.4 Effects of Improved Water Provision on Livelihoods

This section sought to fulfil the second objective of establishing the effect that water had on the livelihoods of the people in Mutito Division. The study sought to establish the livelihood activities that people engage in and how water provision had enabled the people improve on their livelihood activities.

4.4.1 Water and livelihoods

Water is essential for the people to engage in different livelihood activities. Water provides a means through which poverty can be eradicated and a way through which basic human rights can be guaranteed. Water availability for household use, farming and other activities helps people improve their living standard and gives the poor people a chance to increase their income. It helps them save the time and use it in productive activities like farming and commerce (Waswa et al, 2007). This formed the basis of

investigation of this section. The study looked at water availability and the activities that people are engaged in and how they are eventually able to meet their basic human rights.

The study established that the people of Mutito Division engaged in different livelihood activities. All the households interviewed were engaged in domestic work. Fifty two point two percent (52.2%) kept cows, 68% kept goats, 26.7% were engaged in kitchen garden, 10% were engaged in fruit farming, 24.4% were engaged in casual work, 45.6% were engaged in charcoal burning, 17.8% in brick making, 11.1% in operating a hotel, 13.3% in selling a kiosk, 17.8% in vegetable growing and 95.6% were engaged in food crops growing when they received the rains. Speelman et al (2006) in a study carried out in Ukambani came up with similar findings where 80.7% of those interviewed in Makueni and Machakos District practiced farming. This shows that farming and livestock keeping are the predominant activities in Ukambani region. Charcoal burning followed closely especially in Malatani Sub-location as the transport network was well developed connecting the division to other parts hence they had market for their charcoal. This has negative effects to the environment especially by reducing the forest cover for rain attraction and leaving the land bare thereby encouraging soil erosion. Though the residents were aware of this danger, they kept to the practice due to economic hardships experienced in the area. This agrees with Chambers (1997) view that households engage in different livelihood activities to meet their needs.

Water was one of the main resources that facilitated performance of these activities. Improvements in water provision had enabled 58.9% of the respondents engage or improve on their livelihood activities, but 41.1% felt it had not helped them. Those that didn't feel water had helped them were mainly in the areas where they still relied on the rivers and water kiosks where they had to pay for the water and this limited their ability to put it into productive use. Twenty seven point eight percent (27.8%) of those interviewed had improved on cattle keeping, 50% on goat keeping, 14.4% on kitchen garden and vegetable farming, 11.5% in hotel, 11.1% in brick making, 5.6% in beer brewing, 8.9% in kiosks and 6.7% had time to engage in casual work.

This shows that most people were able to improve on goat keeping than in any other livelihood activity. This can be explained by the fact that goats do not require much for their upkeep in terms of feeding them and they also consume little amount of water as shown in table 4.25 below. Cattle keeping followed but it was not as embraced by many as the goats. This could be due to the cost of a cow and the fact that it consumes more water and hence, when it is not free, the cost of maintaining a cow goes higher. Most of those who kept the cows watered them from the source. These study findings were different from another study finding conducted by Bukure et al (1991) in Eastern Kajiado District where they found that the people who lived far away from the water source kept more cattle than those living near the water source. This was because there more feed available for them as they walked to the water source. This was not the case in Mutito Division as the community in this region was an agricultural and did not devote much time grazing the animals unlike the Maasai who are pastoralists. Contrary to the findings in Eastern Kajiado, in Mutito Division, those who lived near the water source kept more animals.

Table 4.25 below shows the amount of water taken by goats and cows in each household. Most of household that kept goats spent 20 litres and 40 litres of water per day which was a little amount that was easy to obtain. The goats do not consume more than 80 litres while the cows spent a minimum of 40 litres. Most of the cows in 18 household were watered at the river because they consume more water and it was tedious to fetch water for them This was similar to what De Bruijn and Rhebergen, (2006) found in a study carried out in Kitui that water use rate of livestock was 60 litres per household per day. They also found that most livestock were watered at the river.

Table 4.25: Frequency distribution table showing the amount of water spent watering goats and cows.

Amount of water consumed by goats	Frequency	Percent
10 l	4	4.4
20 l	26	28.9
40 l	24	26.7
80 l	9	10.0
Take to the river	8	8.9
n/a	19	21.1
Total	90	100.0
Amount of water consumed by cows		
40 l	4	4.4
60 l	8	8.9
80 l	4	4.4
100 l	4	4.4
120 l	4	4.4
140 l	8	8.9
Take to the river	18	20.0
n/a	40	44.4
Total	90	100.0

SOURCE: Research data, 2009

Other livelihood activities such as farming of vegetables, fruits and the kitchen garden were often done near the water source so that watered their crops by sprinkling mainly by those people who lived near a water source. This confirms the finding of Save the Sand project in South Africa (2003) where they found that given the water, 70% of the people engaged in fruit farming and 50% in backyard farming. Few households engaged in other livelihood activities such as brick making, hotel business and butchery.

4.4.2 Water use at household level

Most of the water collected from the source and taken to the household was used for domestic chores. Most of the families used 80 litres of water per day. Compared to another study carried out Shallow et al (2005) in lower Nyando, the water consumption in Mutito Division was quite low as the amount of water collected was per household per day in Lower Nyando during the dry season was 100 litres. The level of water consumption in most of the sampled households in Mutito was not to proportional to the

family size. This was due to the time spent collecting the water, distance, cost and available quantity of water at the source that they had to spend to get the water home. The table 4.26 below shows the household size and the amount of water that they consume per day. Most households are not able to consume the recommended amount which is 20 litres per person per day.

Table 4.26 Cross tabulation of the total number of family members and the amount of water spent in domestic work.

Total number of family members	Amount of water spent in domestic Chores							Total
	40 l	60 l	80 l	100 l	120 l	160 l	200 l	
3	2	2	2	1	0	0	0	7
4	3	0	4	0	1	0	0	8
5	3	0	3	1	0	0	0	7
6	3	2	7	2	2	0	0	16
7	1	2	6	1	0	1	1	12
8	3	1	8	0	0	0	0	12
9	2	1	2	1	2	1	0	9
10	0	1	5	1	0	0	0	7
11	0	0	1	1	1	0	0	3
12	0	1	3	0	2	0	0	6
13	0	0	0	0	1	0	0	1
14	0	0	0	0	1	0	0	1
15	0	0	1	0	0	0	0	1
Total	17	10	42	8	10	2	1	90

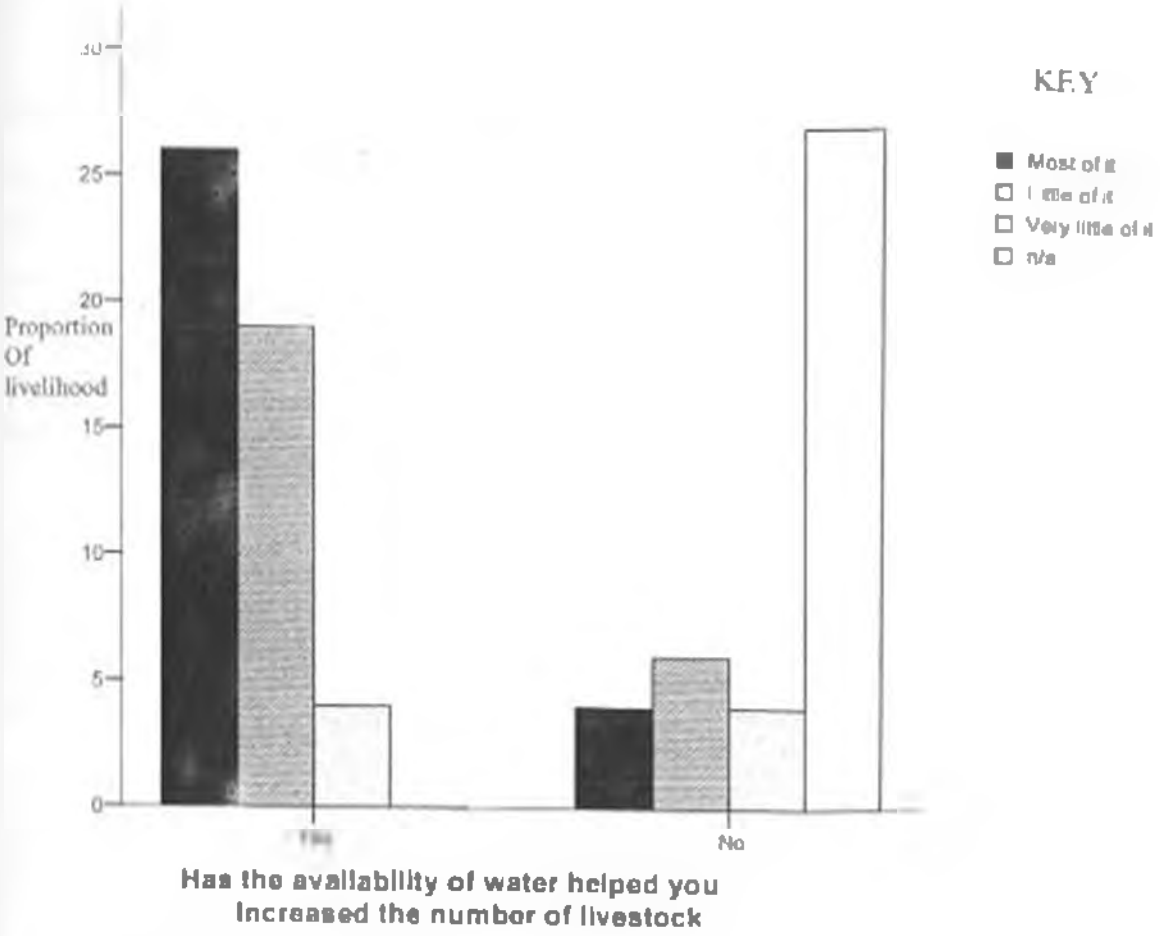
SOURCE: Research data, 2009

4.4.3 Livestock Keeping

Most people felt that water availability helped them to increase the number of livestock that they kept. Livestock keeping is a predominant activity in many semi arid areas as so is in Mutito Division. This is because the area still had common land as the land was yet to be allocated to individuals and hence the people were able to graze the animals on the bush land and also livestock required less water compared to farming. The animal can also be taken to the water point to take in the water even if the water point is at far distance. Hence even those that had lacked improved water provision still kept livestock and it contributed to their income though they were fewer than those who had improved water provision as shown in the figure 4.3 below. Those that felt that water provision

helped them improve on livestock keeping obtained most of their livelihood from the sale of livestock. Livestock sale had the highest contribution to the household income. This was similar to the finding by Speelman et al (2006) in Ukambani where they found that 49% of the people got their income from livestock.

Figure 4.3: Bar graph showing the number of people who have increased the number of livestock and the proportion of livelihood coming from livestock keeping.



SOURCE: Research data, 2009

4.3.4 Crop farming

The study also found out most of the residents (95%) was engaging in food crop farming. These depended on rainfall and hence they were only able to plant and harvest if they received enough rainfall. Table 4.27 below presents the types of crops grown, the purpose for which they are grown and the proportion of livelihood that came from crop farming. Most of the respondents (52.2%) grew food crops for home consumption while 44.4% grew food crops for consumption and for sale. Maize was the staple food and was grown by all the respondents. Green grams and traditional crops like sorghum and millet were also adopted by many. This was because they were was suitable for the area and they had a ready market. However, lack of alternative source of water hindered the people from exploiting this potential. If water provision was improved especially also to harvest the rain water on the sand dams and on the rocks, the residents would have regular supply of these crops and ease their problem of food insecurity.

Table 4.27: Cross tabulation of the crops grown in the area, the proportion of livelihood and the purpose for which they are grown.

Proportion of livelihood from crop farming	Purpose of the crops grown	Food Crops grown					
		maize, beans, peas	maize, peas, green grams, traditional crops	maize, peas, pumpkins	maize, green grams, pumpkins	n/a	Total
most of it	for consumption		5	5	1		11
	for consumption and sale		2	1	8		11
	Total		7	6	9		22
little of it	for consumption	2	8	13	5		28
	for consumption and sale	2	7	3	13		25
	Total	4	15	16	18		53
very little of it	for consumption	1	1	5	1		8
	for consumption and sale	0	0	2	2		4
	Total	1	1	7	3		12
n/a	n/a					3	3
	Total					3	3

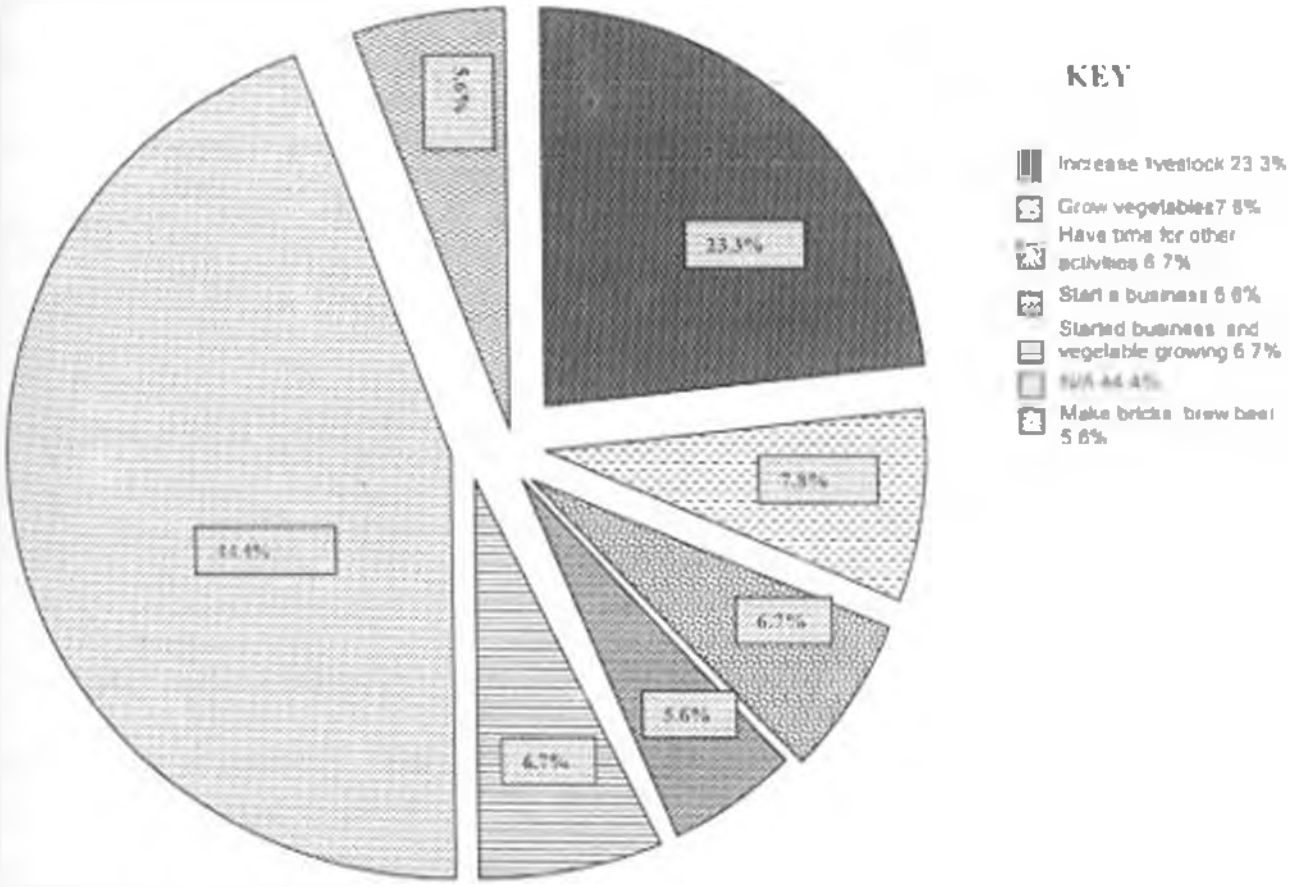
Source: Research data 2009

4.4.5 Increase In Income

The study also sought to know if improved water provision helped people increase their income. Fifty three point three percent felt that water availability had helped them increase their income while 46.7% felt that it had not helped them improve on their income. This was because in some areas, little had been done for the people to get water and most of the efforts towards water provision focused on providing water for domestic use. The figure 4.4 below presents the different activities that the respondents who felt that they had helped them improve on their income. Twenty three point three percent (23.3%) of those interviewed had increased the number of livestock that they kept, 7.8% had started growing vegetables, 6.7% said that water helped them to have time for other activities, 5.6% were able to start a business, 6.7% were able to start business and to grow vegetables at the same time, 5.6% were able to engage in making bricks and brewing beer while 44.4% felt that they had not been able in increase income as they were still struggling to get water. The percentages show that besides livestock keeping, very few people were able to improve on other livelihood activities. This was because the other activities required more water and capital in some cases but few were able to acquire it.

However, despite the fact that the water that was made available was little in quantity, more than half of the respondents were able to increase their income. This shows that with more efforts towards water provision, more people can be able to get this essential commodity and can be an effective tool toward poverty reduction. This support the statement made in World Water Development Report (WWAP, 2003) states that "giving the poor better access to better managed water can make a big contribution to poverty eradication". Those who had an improved source of water especially those who depended on the river and the shallow wells were able to grow vegetables and have water for making bricks. Also with search for water for domestic being eased by the water kiosks, more people were able to have time to engage in other productive activities and raise their income.

Figure 4.4: Pie chart showing the activities done which have increased the income and the percentage number of respondents in each activity.



SOURCE: Research data, 2009

4.4.6 Involvement In Small Scale Business

The study found that 35.6% of the respondents were involved in small scale business while 64.4% were not involved in small scale business. Table 4.28 below shows the frequency and the percentages number of people engages in different businesses. This business included selling vegetables at 11.1%, hotel 8.9 %, butchery 2.2%, beer brewing 2.2%, making bricks 7.8%, kiosk 2.2%, and a combination of selling vegetable, bricks and local brew had 1.1%. The rest 64.4% who were the majority were not involved in business. This showed that very few people were able to engage in business. This could be attributed to many reasons among them lack of capital, lack of skills and lack of commodity for sale. Water was also contributing to less involvement in activities which

required much water such as brick making which was very viable activity in the area. This confirmed what Excellent, an organization working in Kenya, in 2005 found that the Kenya's semi-arid areas experience water scarcity which makes them not able to improve their livelihoods as most of their time is spent looking for water (Excellent, 2005).

Table 4.28: Frequency table showing the business engaged in and the percentages.

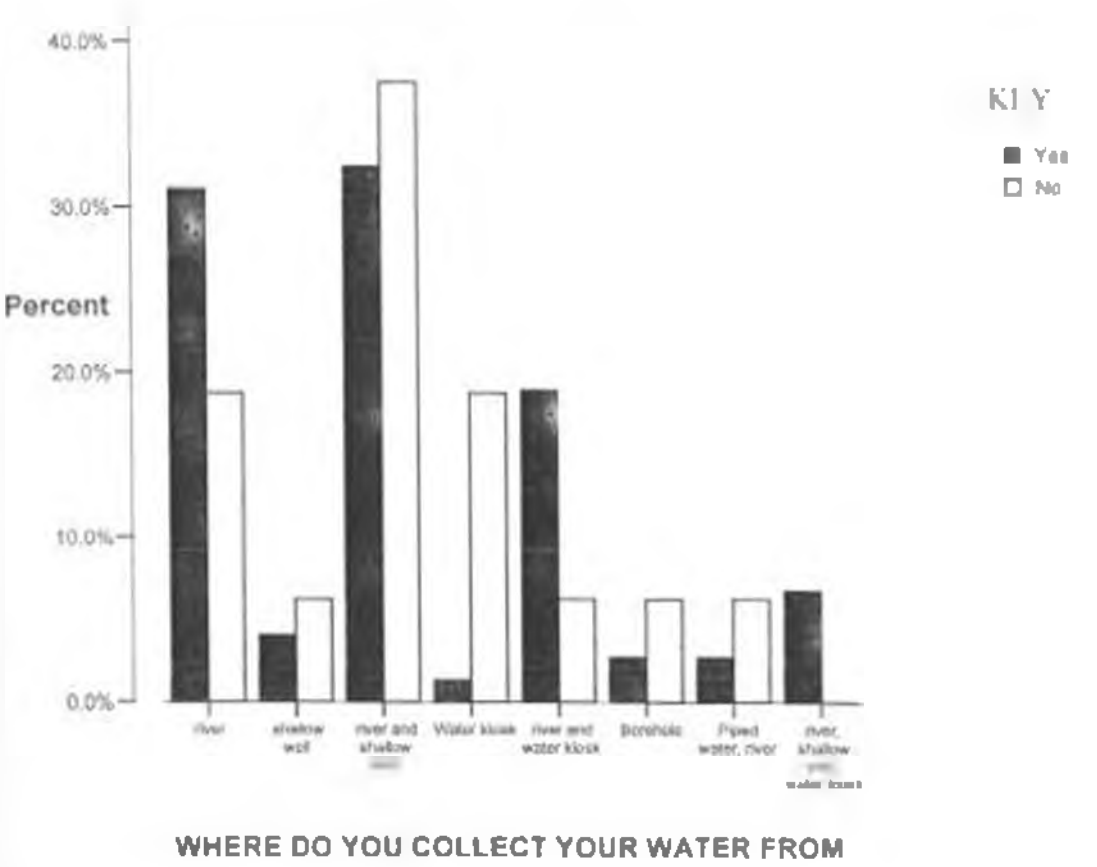
Business engaged in	Frequency	Percent
Selling vegetables	10	11.1
Hotel	8	8.9
Butchery	2	2.2
Beer brewing	2	2.2
Making bricks	7	7.8
Kiosk	2	2.2
Vegetable sale, bricks, local brew	1	1.1
n/a	58	64.4
Total	90	100.0

SOURCE: Research data, 2009

4.4.7 Water Borne Diseases

The study also sought to investigate whether improved water provision had helped reduce the occurrence of water borne diseases. Eighty two point two percent (82.2%) of those interviewed suffered from water borne diseases while 17.8% of those interviewed did not suffer from water borne diseases. The figure 4.5 below shows the source of water and the occurrence of water borne diseases.

Figure 4.5: Bar graph shows the source of water and the occurrence of water borne diseases.



SOURCE: Research data, 2009

Figure 4.5 above shows that those who obtained water from the river had the highest infection of water borne diseases. This shows that the rivers were not a safe source of water. It also shows that the water was consumed without boiling or treating it. Akong'a (1985) posits that scarcity of water in Kitui increases the health risks as people rarely boil or filters the water once they obtain it. This makes the majority of diseases experienced in Kitui to be water borne diseases. Very few of those who depended on water kiosks, piped water, borehole and also shallow well suffered from water borne diseases. This concurs what BG Associates (2002) found in Tharaka Division that improved water provision greatly reduced the occurrence of water borne diseases. This shows that water from the

water kiosk was treated and helped people avoid water borne diseases. Whenever the respondents combined the alternative source with the river, there was high water borne disease infection as water from the river was highly unsafe for their consumption.

Table 4.29 below shows the diseases that were most prevalent in the area. A combination of Malaria, typhoid and amoeba affected most households at 32.2%. Typhoid was the most common disease in the area followed by amoeba. These diseases were directly linked to taking contaminated water and can be remedied with provision of clean water and treating the water before drinking. In spite of awareness campaigns given in the area on the need to treat the water before consumption, most respondents were still getting these diseases. This shows laxity on their part to treat and seek for clean water. Diarrhoea features as the least common water borne disease in the area. This can be explained by the fact that the waters in the area are not exposed to the surface for it to be contaminated.

Table 4.29: Frequency distribution table of the water borne diseases common in the area.

Water borne disease	Frequency	Percent
Malaria	11	12.2
Typhoid	7	7.8
Malaria, typhoid	12	13.3
Typhoid, amoeba	3	3.3
Amoeba	6	6.7
Malaria, typhoid, amoeba	29	32.2
Typhoid, diarrhoea	2	2.2
Typhoid, amoeba, diarrhoea	2	2.2
N/a	16	17.8
Malaria, amoeba	2	2.2
Total	90	100.0

Source: Research data, 2009

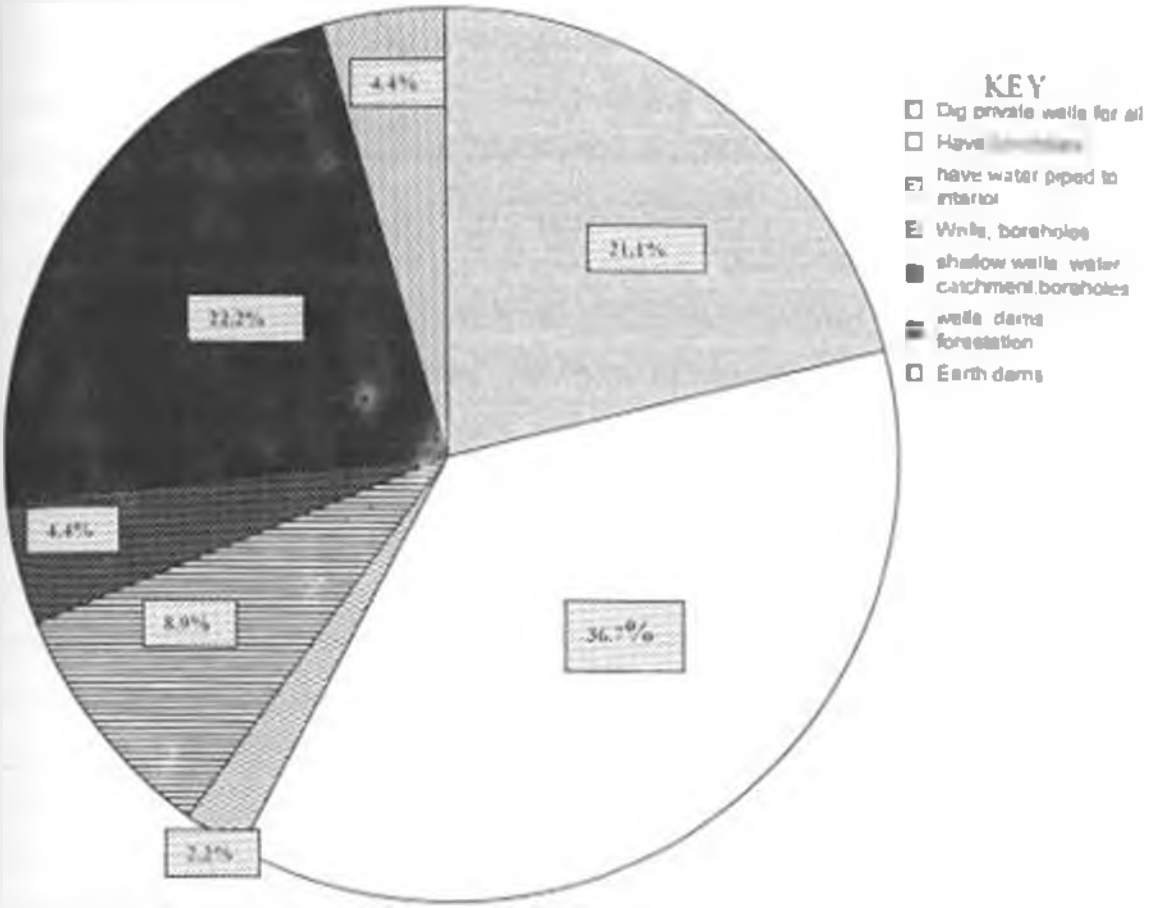
4.4.8 Ways of Improving Water Provision in Mutito Division

Though there were attempts to improve water provision in Mutito Division, most people (88.3%) still felt that water access was still a challenge. The study therefore sought to get the respondents view on how they feel the problem of water can be addressed. Figure 4.6 below represents the percentage number of people and their views on how best the

problem of water can be solved. Most of the respondents (3.7%) felt that boreholes would be the best solution to water problem. Though they were very few households who were accessing water from boreholes, the few that were accessing water from the boreholes felt that boreholes were solving for them the problem of water access. This was because the boreholes do not dry as other sources do especially when there was a prolonged dry spell. Other 22.2% felt that there was need for wells, dams and forestation. Carim, (1987) had noted that the major handicap in Kitui District is its climate which can be overcome by provision of water, proper cultivation and tillage methods and reduction in deforestation. Charcoal burning was a predominant activity in the area and this was posing a threat to the forested area in case it continues the water access problem would get worse.

Others 21.1% felt that if everyone had a private shallow well, they could be able to get enough water for their use and to use in other productive activities. This agrees with what Speelman et al (2006) found in Ukambani where they found that those who were using private source were able to engage in more productive activities compared to those who were using a private water source. Though sad dams could help retain water for longer, few people felt that this could be a solution. This was because most of them had not seen them and hence lacked knowledge of how they operate. The least number of respondents (2.2%) felt that piped water was a solution to water problem. Unlike in urban areas where everyone desires to have piped water, this was not the case due to the cost attributed to it and the fact that from their experience the piped water was not regular

Figure 4.6: A pie chart showing the different ways of improving water provision.



SOURCE: Research data, 2009

4.4.9 Linking Water Access with Livelihood Activities

The above discussion shows that the area had a number of livelihood activities. These include livestock keeping, formal and casual labour others are in crop farming, vegetable farming, small scale business, charcoal burning, beer brewing, hotel, making bricks and remittances. However livestock keeping was the most reliable activity that was able to contribute to most of the respondents' livelihood. Though the area was suitable for growing different crops, the contribution it made to the livelihood was limited as they could only harvest when they received enough rains. Other activities such as vegetable farming and brick making are very dependent on water and this were only practiced in areas where they had water being available for these activities.

Table 4.30 below shows the source of water and the number of activities that respondents were engaged in. This shows that people with an improved water source like river and shallow wells were able to engage in many activities. Some were having up to seven livelihood activities. This shows that water available opens opportunity for diversified livelihood activities. Others were still depending on the river but were able to engage in many activities. This could be attributed to their proximity to the river and other factors such as availability of finances to start these activities. However the river had most of the respondents having two livelihood activities. Those who depended only on water kiosk could only engage in few livelihood activities and none went above three activities. However those that combined the river and water kiosk were able to engage in more activities with the highest taking five activities. This was because they were assured of water for domestic use and the water from the river and the time that they previously spent in search of water was used in these activities. Those depending on borehole for their water supply had two and four activities. This shows that there a potential in the borehole providing reliable water to enable people undertake more activities. Those depending on the piped water and river had between two and five activities. This also shows an improvement in the ability to engage in different activities. Those that combined the river, shallow well and water kiosk were able to have between one and four livelihood activities. It would be expected that they could have more activities due to different sources but it could be that the sources were used to supplement each other due to scarcity of water. This analysis shows that improved water provision was actually helping the people engage in more activities than when they have to rely on unimproved sources of water.

Table 4.30: A Cross tabulation of source of water and the number of livelihood activities.

Source of water	Number of livelihood activities								Total
Activities	0	1	2	3	4	6	8	7	
River	1	4	15	2	1	3	0	0	26
Shallow well	1	0	0	2	0	1	0	0	4
River and shallow well	0	5	6	10	4	2	1	2	30
Water kiosk	1	2	0	1	0	0	0	0	4
River and water kiosk	0	1	4	7	2	1	0	0	15
Borehole	0	0	1	0	2	0	0	0	3
Piped water river	0	0	1	0	1	1	0	0	3
River shallow well water kiosk	0	1	1	2	1	0	0	0	5
Total	3	13	28	24	11	8	1	2	90

SOURCE: Research data, 2009

4.4.10 Hypothesis Testing

The hypothesis stated that there was no relationship between the source of water and the number of livelihood activities one is able to engage in. Table 4.31 below shows a chi-square test the source of water and the number of livelihood activities.

Table 4.31: Chi-Square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	59.694(a)	49	.141
Likelihood Ratio	56.720	49	.209
Linear-by-Linear Association	1.423	1	.233
N of Valid Cases	90		

a 80 cells (93.8%) have expected count less than 5. The minimum expected count is .03

SOURCE: Research data, 2009

The Pearson chi square test value was 59.694 and the significance level for the two tailed test was 0.141. This test indicates that there was a very weak relationship between the source of water and the number of livelihood activities one was able to engage in. This means that there was no relationship between the source of water and the number of livelihood activities hence the hypothesis was true. This could be explained by a many

factors. Among them were the other activities that generated income for the people such as employment, remittances, food aid and one's creativity and ambition to improve their living conditions. The other challenges that the people experienced in the area such as hunger, lack of capital, poor infrastructures such as school, roads and hospitals among others. This could hinder them from taking up many activities as most of their energy get spent mitigating these effects especially hunger. Akong'a (1985) argues that psychologically, prolonged starvation leads to depression, apathy and loss of initiative. This could hinder them from engaging in many of these activities even when they have an improved source of water.

CHAPTER FIVE

5. RESEARCH CONCLUSIONS AND RECOMMENDATIONS

5.1 Research Conclusion

From the research findings, several conclusions were arrived at which were in line with the study objectives and the research respondents.

5.1.1 Respondents Characteristics

From the research findings, the ninety respondents were both men and women of different age groups. The women however were the majority though the study focused on household head who normally are men. This was the case because many men in the area move out to go and look for employment opportunities outside the area to support their family. Most of those interviewed were in their middle age showing that the area has an active generation who can engage in many activities if they have the necessary resources. The respondents had an average of seven members showing that the people in the area were not planning their family. Very few respondents were in formal employment. Most them were farmers or engaged in housework.

5.1.2 Sources of Water

The first objective was to establish the main sources of water. The study showed that the main sources of water for the residents of Mutito division were rivers, shallow wells, water kiosks, boreholes, springs and sand dam. The rivers were the major source of water which was distributed to the water kiosks. Most people in the area still relied on the seasonal rivers to meet their water needs. This shows that there was need for more intervention to enable more people access water safe and reliable water. The water kiosks enabled people to access clean water for domestic use. The water kiosks were placed 2-3 km apart and the water was obtained at a fee. The piped water had not reached many

households due to the cost of piping the water where it was possible the water was scarce to pump in each household.

The distance to the water point varies but most people walked for more than a kilometre to obtain water. This shows that more needs to be done for the area to be said it has an improved water provision. The study also showed that the donkey were the preferred mode ferrying water. This was because a donkey could carry about 80 litres of water and save on time and energy. This also involved only one person per household. The distance impacted on the quantity of water they would obtain for household use. Most of the water obtained was used for domestic chores and most households' consumption was below the recommended amount of 20 litres per person day per.

The time spent in collecting water varied with distance covered and whether one had to queue to get the water. Improved water provision helped them save the time that they previously spent looking for water. However, most of the saved time was used in domestic chores. This shows that there was the need to introduce people to other activities that can enable them use the saved time in a more productive way. Very few households owned private water source. This could be attributed to the physical attributes of the area and economic well being of the people.

5.1.3 Other Sources of Livelihood

Employment was contributing greatly to household income with formal employment being the most reliable form of employment. Self employment was also embraced by people and made significant contribution to the household. Casual labour was also common though its returns were little to cater for the household needs.

Few people were relying on remittances be it from their children, relatives or friends. The children from households where they had both parents were seen have the ability to help their families. This ability can be attributed to the parents' earlier ability to educate their children and hence they are able to give back to them.

Food aid was also a common source of survival for most people especially those who were in extreme poverty. The beneficiaries were engaged in food for work programme. Though the quantity given was not enough for most families for the whole month due to large family size, it did contribute to their survival. Most widows and single women were in the food for work programme showing the society had a way of taking care of the needy people among them.

In regard to how they rated their income, the study found that most household considered they were middle income earners. Most of those struggling to get water especially in the areas where they had to walk long distances to get water from the river were the once who easily identified themselves with poverty. This shows that water had the capacity to uplift a community and draw them out of poverty.

Availability of food was found to be a challenge to most people due to drought frequently experienced in the area. Consuming a balanced diet was also a challenge to most households who were able to mainly afford maize and beans. Those that were able to grow vegetables were able often consume vegetables and those who lived in the surrounding areas could obtain vegetables in the market at a reasonable price. Many people attested that water had helped improve the food security in the area either by being able to grow vegetables or being able to obtain them freely in the market. Consumption of animal protein was not common as many preferred to keep livestock for sale.

The study found that most parents were gathering their resources together to take their children to secondary schools. Only those in formal employment were able to pay for the school fees from their salaries with fewer struggles. The others had to combine a number of outputs to raise the school fees mainly from the sale of livestock. If they had water to enable them engage in more activities, they would easily raise the school fees for their children to attend secondary schools and colleges.

Hunger was found to be a major problem facing the area due to unreliable rainfall. Other problems included poor transport due to lack of feeder roads, few medical facilities, lack of school fees, lack of capital, lack of electricity among others. Water was noted as key resource in solving the problem of hunger while other felt that they needed more food aid. A lot needed to be done in the area to especially to provide the basic infrastructures in the area such as roads, schools, hospitals, water, and electricity in the area.

5.1.4 Water and Livelihoods

The second objective was to analyse the effects of improved water provision on the livelihoods of the people in the area. The study found that the main livelihood activities in the area included: livestock keeping, kitchen garden and vegetable growing along the water sources, charcoal burning, brick making, beer brewing, and growing food crops during rainy seasons, fruit farming and small scale businesses such as hotel and kiosks for household goods. Most of this activities required water for their accomplishment.

Livestock keeping was embraced by most people in the area and it contributed significantly to the household. Most preferred to keep goats as opposed to cattle as they consumed less water, required less labour and have high chances of surviving drought.

Kitchen garden and growing vegetables for sale was also embraced by those who had access to water mainly those who lived near a river or near a shallow well. This also contributed to the household food security and improved their income.

Charcoal burning was also embraced by a significant number of people. Though charcoal burning had negative effects on the environment which the people are well aware, they still engage in it due to poverty due to lack of alternative sources of income.

Brick making was also found to be viable in the area but few people were engaged in it. This was because brick making required a lot of water which was only accessible to a

few. Beer brewing was also embraced by few people as it was considered an illegal activity. The brew had many consumers but many brewers opted to do it secretly.

Being an agricultural community, Food crops growing was embraced by most people only that it depended on the rains. The main food crops grown included: maize, beans, cow peas and pigeon peas, green grams, pumpkins, sorghum and millet. Few people were able to engage in fruit farming though the climate is favourable for the fruits.

Most people who had improved water provision were able to improve on their income. This had more impact on increasing the number of livestock that they kept. Others were able to engage in small scale businesses mainly selling vegetables. Others had more time to go for casual labour and this also increased their earning.

The water borne diseases were still prevalent in the area. The diseases were more prevalent in areas where the people depended on the rivers. The areas with water kiosk had clean water had less likelihood of getting the water borne diseases. Improved water provision showed that it had the potential to reduce the water borne diseases. The most common water borne diseases in the area were typhoid, malaria and amoeba.

The study showed that the boreholes would be the most reliable source of water to ease the problem of water access. Other sources such as private shallow wells, dams and sand dams could also ease the problem of water.

The study also found that household were able to undertake different livelihood activities but a few were not in any activity to bring them income. The ability to engage in different activities was found not to be related to the source of water. Many factors could be contribute to these such as the ability to raise the required capital, access to water, household's ambitions and if they have a stable source of income.

5.2 Recommendations.

The study found that water provision was indeed an effective tool for enhancing livelihood of the people and eventually alleviating poverty. With regard to the sources of water, the study found that there were more potential sources of water which had not been fully exploited. The boreholes were more consistent in providing water as they hardly dry up. But there was need for more water kiosks to be set up in the area to make water accessible to all at a reasonable distance. There was need to pump water from boreholes to big tanks and then pipe it to the household and distribute it to the water kiosks. Shallow wells for individuals as well as for groups needed to be increased along the rivers to make clean water accessible to more people. The springs also needed to be protected so that they do not dry up. Hence the government need to enforce strong measures to protect the springs from human encroachment. There also need to develop sand dams especially in areas where the rivers are saline to save the rain water. To ensure that the residents were able to get this commodity and avoid duplication of activities, there was the need for organisations and government to work together in water provision so that they can combine their efforts and do a complete and thorough work in that area.

With regards to livelihood activities, there was the need for more training to be given to the residents to enhance the activities that they had. There was the need to train them more on drought resistant crops. They also needed above all to provide water for the people and train them especially on how to practice some farming activities that utilize less quantities of water.

Other constraints such as poor markets, ways of food preservation, infrastructure needed to be put in place. The needed infrastructure would include electricity which would especially bring down the cost of pumping water and development of other institutions. roads also needed to be developed to have an easy access to the area.

There was need to educate the residents on the ways of treating water for consumption to reduce the occurrence of water borne diseases. The organizations providing water should also look for ways of having the water treated before redistribution

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APPENDIX 1

QUESTIONAIRE 1

My name is Sophia W. Ngigi, a postgraduate student at the Institute for Development Studies, University of Nairobi. I am carrying out a study on '*The implications of Improved water provision on livelihoods A case study of Mutito Division*'. This study focuses on how improved water provision helps the people improve their livelihood strategies. My interest is to learn from the residents of Mutito Division what effect the water has had on their lives and improve their living conditions. I would highly appreciate your patience and time spent on answering the following questions. The information you will give will be treated with confidence.

Please answer the questions as honestly and openly as possible. There are no "right" or "wrong" answers. Thank you in advance for your cooperation.

HOUSEHOLD QUESTIONAIRE

DATE..... QUESTIONAIRES NO.....

STUDY LOCATION.....

DEMOGRAPHIC INFORMATION

NAME:

Gender	**Age**	**Marital status**	**Level of education**	**Household members**	**Occupation**	**Spouse occupation**
Male	Under 21	Single	None	**Total**	No work	No work
female	21-25	Married	Primary incomplete	Male	Farmer	Farmer
	26-30	Divorced/ separated	Primary Complete	female	Harder	Harder
	31-35	Widowed	Secondary complete		House work	House work
	36-40		Secondary incomplete		Business/Trade	Business/Trader
	41-44		Poly technique		Teacher	Teacher
	45-50		College		Civil Servant	Civil Servant
	51-55		University		NGO worker	NGO worker
	55-60				Other	Other

WATER PROVISION

9.	Where do you collect your water from?	1. River 2. Shallow well 3. Rain water Reservoir 4. Water kiosk. 5. Piped water 6. Rock Catchments 7. Borehole 8. Tanker-truck 9. Other Specify	
10.	Do you feel accessing water in this area is a problem?	1. Yes. 2. No.	
11.	If it is a problem, what in your view makes it a problem?		
12.	Do you own a private water source?	1. Yes. 2. No.	
13.	If yes, what is your private source of water?	1. Shallow well 2. Rock Catchments 3. Sand dam 4 Rain water harvesting 5. water kiosk 6. Other (specify)	
14.	Do you buy the water?	1. Yes 2. No	
15.	If yes in the question above, where do you buy your water from?	1. Council 2. Water tank 3. Borehole 4. Water vendors 5. Tanker-truck 6. Other (specify)	
16.	If Yes how much do you spend weekly on water.	7. Less than Ksh. 50 8. About Ksh. 100 9. About Ksh. 200 10. About Ksh. 300 11. About Ksh. 400 12. About Ksh. 500 13. More specify	
17.	If you at times obtain water from the river, what distance do you cover to get to the river?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km 4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km	

		9. Above 5km	
18.	If you obtain water from a shallow well, what distance do you cover?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km 4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km 9. Above 5km	
19.	If you obtain water from an earth dam, what distance do you cover?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km 4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km 9. Above 5km	
20.	If you obtain piped water, what distance do you cover?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km 4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km 9. Above 5km	
21.	If you obtain water from a borehole, what distance do you cover?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km 4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km 9. Above 5km	
22.	If you obtain water from rainwater reservoir, what distance do you cover?	1. Less than 200m 2. 200m-1km 3. 1km-1.5km	

		4. 1.5km-2km 5. 2km-2.5km 6. 2.5km-3km 7. 3km-4km 8. 4km-5km 9. Above 5km	
23.	Who fetches the water for you?	1. Mother 2. Father 3. Girls 4. Boys 5. Hired worker 6. Other specify	
24.	What do use to ferry the water home?	1. Carry on my back. 2. Use a donkey. 3. Use a wheel barrow. 4. Use a bicycle. 5. other (specify)	
25.	How many members of your household go to collect the water in a day?	6. One 7. Two 8. Three 9. More than three(specify)	
26.	How often do you obtain the water?	1. Daily 2. After two Days 3. After 3-4 days 4. Weekly 5. Other Specify	
27.	Do you queue to obtain the water?	1. Yes. 2. No.	
28.	If yes above how long do you take to collect the water?	1. Less than 30min 2. 30-40min 3. 40-50min 4. 50-60min 5. 60-80min 6. 80-100min 7. 100-120min 8. More than 120min (specify)	
29.	How long do you take to get to your water source? (indicate time taken from each of your source)	1. Less than 30min 2. 30-40min 3. 40-50min 4. 50-60min 5. 60-80min 6. 80-100min 7. 100-120min 8. More than 120min	

		(specify)	
30.	Do you save the time that you previously used to spend looking for water?	1. Yes. 2. No.	
31.	If Yes in the question above, what do you do the time you used to spend fetching the water?	1. Work in my farm. 2. Rest. 3. Domestic chores. 4. Casual labour. 5. Graze animals. 6. Started a business 7. Other specify	
	EFFECTS OF WATER ON LIVELIHOODS		
32.	How do you use the water that you obtain within the household?	1. Domestic use. 2. For livestock. 3. For vegetable growing. 4. To make bricks for sale. 5. In hotel. 6. To brew beer. 7. other (specify)	
33.	What Activities does your family engage in?	1. Domestic chores 2. Collecting water 3. Keeping cows 4 Keeping goats 5. Kitchen Garden 6. Fruit farming 7. crop farming 8. Beer brewing 9. Water sale 10. Operating a kiosk 11. Operating a hotel 12. Formal employment 13. Other specify	
34.	Do the activities that you engage in require water?	1. Yes. 2. No.	
35.	If Yes what is your source of water for these activities	1. River 2. Rain water 3. Own a shallow well 4. Community shallow well 5. Borehole 6. Sand dam 7. Spring 8. Rock catchments	

		9. Other (specify)	
36.	Has the availability of water helped you engage or improve on the activities that you do?	1. Yes 2. No	
37.	If yes in the above question, which activities are you engaged with improved water provision?	1. Keeping cows 2. Keeping goats 3. Kitchen Garden 4. Fruit farming 5. crop farming 6. Vegetable farming 7. Beer brewing 8. Water sale 9. Operating a kiosk 10. Operating a hotel 11. Formal employment 12. Other specify	
38.	How much water do you spend in these activities in litres? (Specify)	1. Domestic chores 2. Watering cows 3. Watering goats 4. Kitchen Garden 5. Fruit farming- 6. Vegetable growing 7. Small scale business (specify) 8. Other specify	
39.	Has the availability of water helped you increase the number of livestock that you keep?	1. Yes 2. No	
40.	What proportion of your livelihood comes from livestock keeping?	1. most of it 2. little of it 3. very little of it 4. other	
41.	Do you grow food crops?	1. Yes 2. No	
42.	If yes which crops do you grow?	1. Maize 2. peas (Nzuu) 3. Vegetables 4. Tomatoes 5. Onions 6. Fruits 7. Other (Specify)	
43.	Do you grow these crops for sale or for home consumption?	1. For consumption 2. For sale 3. For sale and consumption	

44.	What proportion of your livelihood comes from crop farming?	1. most of it 2. little of it 3. very little of it 4. other	
45.	Has the water available helped you improve on your income?	1. Yes 2. No 3. No Answer	
46.	How has it helped you to improve your income?		
47.	Has the availability of water helped you engage in small scale business?	1. Yes 2. No	
48.	If yes which business are you engaged in?		
49.	What proportion of your livelihood comes from small scale business?	1. most of it 2. little of it 3. very little of it 4. other	
50.	Are you engaged in any employment	1. Yes 2. No	
51.	If Yes which one?	1. Formal employment 2. Casual labour 3. Other (Specify)	
52.	What proportion of your livelihood comes from employment?	4. most of it 5. little of it 6. very little of it 7. other	
53.	Do you receive any remittances?	1. Yes 2. No	
54.	From whom do you get your remittances?	1. children 2. relatives 3. friends 4. others (Specify)	
55.	What proportion of your livelihood comes from remittances?	5. most of it 6. little of it 7. very little of it 8. other	
56.	Do you receive food aid?	1. Yes 2. No	
57.	About what proportion of your livelihood comes from food aid?	3. most of it 4. little of it 5. very little of it 6. other	
58.	How is the distribution of your income? (From the most to the least)	1. 2. 3.	

		4. 5.	
59.	Does your family suffer from water borne diseases	1. Yes 2. No	
60.	If yes, which are the most common diseases	1. Malaria 2. Typhoid 3. Amoeba/dysentery 4. Diarrhoea/ Cholera 5. Fever 6. Head ache 7. Other specify	
61.	Is your family able to pay for the medicines after the improvement in water provision?	1. Yes 2. No	
62.	Have you gone without enough food?	1. Yes 2. No	
63.	If yes how often?	1. Never. 2. Just once or twice. 3. Several times. 4. Many times. 5. Always. 6. Don't know	
64.	What is your meal mainly composed of?	1. Maize 2. Vegetables 3. Eggs 4. Meat 5. Beans 6. peas	
65.	Have water provision helped ease the problem of food insecurity?	1. Yes 2. No. 3. Slightly.	
66.	If yes how?		
67.	How do you rate your income?	1. Wealthy 2. Middle 3. Poor	
68.	Do you take your children to secondary school or to college?	1. Yes 2. No.	
69.	If yes, who pays for their school fees?	1. Self. 2. Sponsor. 3. Relative 4. Other (specify)	

70.	If you pay for their school fees, how do you acquire it?	1. Formal employment. 2. Casual labour 3. Retirement benefits. 4. Sale of livestock 5. Sale of land. 6. Remittances. 7. Sale of agriculture produces. 8. Small scale business 9. Other (specify)	
71.	Can you suggest ways of improving water provision?		
72.	What other challenges do you face in this area?		
73.	How can the above challenges be addressed?		

APPENDIX 2

QUESTIONAIRE 2

IN-DEPTH QUESTIONAIRES FOR KEY INFORMANTS

SECTION ONE: General Information

Name of the interviewer.....
Research site .....
Date of the interview .....

1. Name of the respondent .....
2. Occupation .....
3. Age (years) .....
4. Sex .....
5. Number of years lived in the area .....

SECTION TWO: Water access and livelihoods.

1. What are the main sources of water for people living in this area?
2. How is the availability of that water?
3. Are there any improvements in water provision, name them?
4. Is the water obtained free or there is a fee charged?
5. Is there a limit to the amount of water one can obtain?
6. What activities are the people of this area engaged in?
7. Are they able to raise their income from these activities?
8. How has water availability helped in these activities?
9. How has this helped on the food security?
10. Which water borne diseases are common in this area?
11. Has the improvement in water situation helped address these diseases?
12. Are the people able to support their children education
13. How can the water situation be improved?
14. What other challenges do face in this area?
15. Suggest the way forward?

APPENDIX 3

KEY INFORMANTS

1. Mr. Simba Mutunga Mathias ---------- Public Health Officer Mutito Division

2. Mr. Nicolas Muungami----------Divisional Water Officer

3. Mr. Simon Kithuku ---------- Water technician Extention Officer (AMREF)

4. Joseph Mboya---------- Businessman Nzombe Shopping Center