FACTORS INFLUENCING COMMUNITY OWNERSHIP OF WATER PROJECTS IN KENYA.A CASE OF KINNA DIVISION ISIOLO COUNTY.

BY

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DECLARATION

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

Signed……Date ……

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L50/83735/2012

This research project report has been submitted for examination with our approval as the University Supervisors.

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DEDICATION

I dedicate this research project report to my brothers Charles and Josphat for their support and encouragement.

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ADF	African Development Fund
ASALs	Arid and Semi Arid Lands
CP	Community Participation
GOI	Government of India
IWSC	International Water and Sanitation Centre
IRC	International Rescue Committee
NGOs	Non Governmental Organizations
VLOM	Village Level Operation and Maintenance

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The purpose of the study was to investigate the factors influencing community ownership of water projects in Kenya with a focus in Kinna division, Isiolo County. The Government of Kenya and Non Governmental Organizations have implemented many projects aimed at addressing the water crisis in Arid and Semi arid areas; however most of these projects have been characterized with low level of Sustainability. In Kenya most water projects have performed dismally and most becoming un-operational and requiring rehabilitation. This is due to low level of community ownership of these water projects. The study was guided by four objectives, namely; to examine the extent to which community participation influences community ownership of water projects, to assess the influence of community training on community ownership of water projects, to determine the influence of technology used in extraction of water on community ownership of water projects and to establish the influence of distance between the user and the water point on community ownership of water projects. The study was guided by community participation theory. The study employed a descriptive survey research design. By employing this study design, quantitative data was collected from 370 respondents who were community members and qualitative data was obtained from members of water management committees and the district water officer who was the Key informant. Simple random sampling technique was used to identify the 370 respondents and through purposive sampling, the study involved 6 members of the water management committee in the 16 water supply projects. Data was collected using well structured questionnaires and through focus group discussion. The data was cleaned, edited and coded. Quantitative analysis was done using statistical packages (SPSS V.21) and qualitative data was analyzed thematically and the findings were then presented. The study found that all the independent variables were significantly influencing community ownership of water projects. Community participation, community training, technology used to extract water and distance between the user and the water point influences community ownership of water projects. From the findings, the study recommends that the Isiolo County Government and stakeholders allocates funding towards the development of water infrastructure especially in construction of new pipeline extensions and constructing of new water points in Kinna division. The use of solar energy as an option to replace the diesel generators or a hybrid system should be explored. The study also recommends that more local technicians are trained on operation and maintenance of generators and hand pumps. The water management committees should be trained on financial management and record keeping by the Ministry of Environment, Water and Natural resources. When water management committee are being formed and registered, participation and membership of women should be encouraged to avoid gender discrepancy. The researcher recommends further studies on factors influencing community ownership of water projects in other regions so as to allow for generalization of factors influencing community ownership of water projects in Kenya. Further studies should be conducted on the influence of social cultural on long term sustainability of water projects. Especially age, gender and education levels of members of water management committees.

CHAPTER ONE:

INTRODUCTION

1.1 Background to the Study

Water is a natural resource that is necessary for sustenance of life, ecological systems and a key resource to social and economic development. Governments, Non-governmental organizations, local and international organizations from all over the world have implemented water projects to promote safe rural water supply and sanitation over the years. However in most project areas there is lack of sustainability of these water infrastructures and water supply systems as most of the communities donôt own the projects (Harvey and Reed, 2007).

Recent figures of operational failure rates from different African countries range from 30 to 60% (Sutton, 2005). In Kenya itôs a common phenomenon to observe non functional water systems just a few years after implementation e.g. lack of adequate protection such as fencing of waterpans, vandalism of solar pumping systems for boreholes, non operational shallow well hand pumps and wind mills. The main issue in water supply in developing countries is gauging the willingness of community members to manage their water sources and infrastructures through contribution of time and resources. Contribution of more time and resources to the protection, operation and maintenance of rural water supply is a key action towards achieving sustainability of water supply infrastructures (Gleitsmann, 2005). According to Harvey and Reed (2007) community involvement strongly influences the sustainability of projects.

Community membersô contribution might take the form of labour, money, material, equipment, participation in decision making, and expression of demand for water, selection of the technology and project site, and selection of management structures within the community (Harvey and Reed, 2007).It is estimated that 41 per cent of the Kenyan population lives without access to safe drinking water, relying on unprotected wells, springs or informal water providers. 69 per cent of the total populations do not have access

to basic sanitation. Kenyaôs population is projected to grow for the next few decades. Given these realities, Kenya will also need to tackle issues related to water crisis (UNICEF/WHO, 2010).

Isiolo County is in the upper eastern region of Kenya and it is categorized under the arid and semi-arid lands (ASALs).The County covers an area of 25,605 square kilometres and it is divided into 6 administrative divisions namely Central, Sericho, Garbatulla, Merti, Oldonyiro and Kinna. The 2009 census report put the population of the district at 143,294 people. Human settlement is around watering points. Garbatulla, Sericho and Kinna divisions form the larger Garbatulla district or sub county. Garbatulla District is 426 kms from Nairobi in Isiolo County, eastern province of Kenya, has hot and dry climate, with erratic rainfall patterns and recurrent drought. The generally arid district covers an area of 10,605km and has an estimated population of about 43,118 persons primarily inhabited by the Borana ethnic community. According to the water resource assessment study by Gicheru (2012) Kinna division has more non-operational water supply systems compared to Sericho and Garbatulla divisions. This study seeks to investigate the factors influencing community ownership of water projects in Kenya with reference to Kinna division. Such a study has never been conducted in the area before.

1.2 Statement of the Problem

The well-being of an individual is directly related to water. Inadequate access to clean water consumes time, increase prevalence rates of waterborne diseases and increase costs of accessing healthcare. This finally impacts the economy of an area. A household is considered to have access to improved water supply if it has sufficient quality and quantity of water for family use at affordable price, available to household members without being subject to extreme physical effort especially to women and children.

In Kenya, most water projects implemented in the rural areas to address the problem of water accessibility are observed to be non-operational. However if the trend of lack of community ownership continues, rural water facilities will be completely nonfunctional

and this will render all the positive efforts by the government and the non-governmental organizations towards achieving accessibility to clean water useless, wasteful and of no impact.

According to Baumann (2009), 55% of all the rural water supply projects in Tanzania, Uganda and Kenya are non-operational.

Various factors have attributed to this failure; the lack of demand of the project by the beneficiary community, high recurrent costs, neglect of the water facilities especially on operation and maintenance, use of inappropriate technology, siting of water points far from the community and lack of proper training. Boru (2012) did a study on determinants of community ownership of water projects in Kenya with reference to Central division, Isiolo County. He found that community involvement, type of technology, distance, governance structures and training influences the level of community ownership of water projects. Ochelle (2012) did an assessment on factors influencing sustainability of community water projects in Kenya; a case of water projects in Mulala division, Makueni County.

Ngetich(2009) looked into factors influencing sustainability of community water projects in Keekonyokie Central Location of Kajiado district while Ibrahim(2011) did an assessment into factors influencing the implementation of sustainable community based projects in Kenya; a case of Raya project in Garissa County. None of the studies conducted has focused in Kinna division, Garbatulla district in Isiolo County. Therefore this study intends to fill the knowledge gap on factors influencing community ownership of water projects in Kenya with reference to Kinna division in Isiolo County.

1.3 Purpose of the Study

The purpose of this study was to investigate the factors influencing community ownership of water projects in Kenya with reference to Kinna division in Isiolo County.

1.4 Objectives of the Study

The study was guided by the following objectives:

i. To examine the extent to which community participation influences community ownership of water projects.

ii. To assess the influence of community training on community ownership of water projects.

iii. To determine the influence of technology used in extraction of water on community ownership of water projects.

iv. To establish the influence of distance between the user and the water point on community ownership of water projects.

1.5 Research Questions

This research study sought to answer the following questions;

i. To what extent does community participation influence community ownership of water projects?

ii. To what extent does community training influence community ownership of water projects?

iii. What is the influence of technology used in extraction of water on community ownership of water projects?

iv. To what extent does the distance between the user and the water point influence community ownership of water projects?

1.6 Significance of the study

It is hoped that the findings of this study will be useful to stakeholders in the water sectors such as the County government ,NGOs, donors, community members and other interested stakeholders in coming up with sustainable interventions to improve domestic water access in Kinna division. The information gathered in this study is also expected to be useful to planners in formulating policies aimed at developing infrastructures particularly under

rural development initiative that will be expected to enhance the quality of life for the Kinna community. Finally, the study is also expected to add to the existing body of knowledge by proposing possible areas of future research.

1.7 Delimitations of the Study

The study on factors influencing community ownership of water projects was restricted to Kinna division of Garbatulla district, Isiolo County The respondents targeted in this study were mainly households, water management committees and the District Water Officer as a key informant. Kinna division was chosen for study due to the fact that most water systems are non operational or requiring rehabilitation e.g. the Duse water project and Kulamawe water supply.

1.8 Limitations of the Study

Harsh weather conditions, time needed to cover this wide division and financial constraints were among the challenges encountered in this study.

1.9 Assumptions of the Study

In conducting this study, the researcher assumed that the respondents taking part in this study were willing to answer all the questions with all honesty and to the best of their ability and knowledge.

1.10 Definition of Significant Terms

Breakdown – refers to all failures that causes a system not to operate as expected

Community management structure – itôs a locally formed structure with the sole responsibility of operating and maintaining water facilities and addressing water issues in the community e.g. water management committee

Community ownership – active involvement of community members or representatives in management of water points and willingness to allocate time and resources in ensuring

long term functionality of water systems with majority of the community members enjoying the benefits from these systems.

Community participation - means that men, women, boys and girls perceive they actively participate in all aspects of water infrastructure development, with particular focus on provision of free labour locally available materials, decision making, project planning, implementation, monitoring and evaluation.

Community training ï learning process that involves awareness creation, sharing of ideas for purposes of behaviour and attitude change.

Maintenance - Routine repairs to ensure proper functionality

Reliable water supply - it is a source that provides water all year round, during the dry and wet season.

Technology used in extraction – refers to all equipments and machinery constructed by the use of scientific knowledge for the purposes of pumping water from a source e.g. solar system, Diesel generators and hand pumps.

Water supply system – refers to all physical infrastructure constructed for the purpose of extraction, storage, supply, distribution and treatment of water for human and livestock use.

1.11 Organization of the study

This study is organized into five chapters. Chapter One deals with the background of the study, the statement of the problem and the objectives that guided the study of factors influencing community ownership of water projects in Kenya with reference to Kinna division, Isiolo County. Chapter Two deals with the literature review and it revealed findings and recommendations from other researchers and experts. Chapter Three examined the study methodology which was applied and methods of data analysis and ethical issues. Chapter Four deals with data analysis, presentation and interpretation. Finally Chapter Five indicates the summary of findings, discussions, conclusions and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature related to the factors influencing community ownership of water projects in different parts of the world cascading down to Kinna division in Isiolo County. It includes findings of related studies undertaken by other researchers. Finally it presents a conceptual framework on which the study is based.

2.2 Community ownership of water projects

Social interaction is part of human life. It produces organization which structures the interaction. It begins with the interaction of the unborn child with his environment, the mother. It continues through the years of dependency during which the child is taught the shared values and practices of his elders and peers and unknowingly makes commitments in place. This continues as he becomes an adult. Thus it makes sense to consider community by looking at the relationship that exists between interaction and commitment to a given group and place. Human beings are interdependent of one another. Out of being interdependent and various activities involved, it creates interaction which in turn results to sentiments of the individual to a given interdependent group. Therefore the strength of a group to unite and direct its membersô action will depend on the degree of interdependence and sentiment generated between members and the group as a whole (Minar and Greer, 2007).

According to Majory (2009), Communities can be defined by the characteristics of its peopleôs geographic boundaries, history shared interests, values and power relations. There exists vital interactions and networking within the community. The elements of a community includes; common symbol systems, common values, a sense of membership, common needs and commitment to meet them and a shared history. A community is a multidimensional system which is variable, shaped and re-shaped continuously by changing actions and relationships.

Harvey and Reed (2007) define community in terms of area coverage that can be adequately served by a particular water facility. This definition applies to studies related to rural water supply.

The term ñsense of ownershipò is frequently deemed as a significant characteristic of community development work. A sense of ownership is described as a concept through which to assess whose voice and opinion is heard, who influences a decision, who is affected by project implementation process and outcome. Applying the concept of ownership makes it easier in determining how the interests and actions of individuals or organizations contribute to community development work. If individuals are engaged authentically and intimately, the level of dedication to the process and outcome will be enhanced. This will lead to greater chances of support in implementation and realization of community development goals (Lachapelle, 2008).

Community management has become the main model in management of rural water supplies over the past two decades. Despite its popularity among donors and implementing agencies, low levels of sustainability are common in most water supply systems in Pakistan, Peru, Bolivia and India. Community participation is a prerequisite for sustainability while community management is not. For community management systems to be sustainable, they require post construction support from an overseeing institution to provide technical assistance, training, monitoring, motivation and encouragement (Harvey and Reed, 2007).

According to Fielmua (2011), in a study conducted in Ghana, community ownership does not mean that the community will not receive support from external sources. Support may be received from the government or other agencies in the form of subsidies and technical support, but the community itself should own the system, make decisions on when to seek support, and exercises control over access to the system. Community ownership and management empowers communities through genuine partnership to advocate for water services. Communities are able to actively participate in the whole process of acquisition and operation of the facilities. This implies that communities have to elect water

management committees that will be responsible for the management of water facilities. The communities are responsible for all operation and maintenance cost of the facilities. This implies that the sustainability of the facilities rest on the community. A water facility bank account is required where funds raised for new investment, operation and maintenance are kept.

In Nigeria, rural water projects have suffered as a result of poor co-ordination, poor maintenance culture, and lack of community ownership, poor technical and institutional structure and over bearing bureaucratic control by various supervising ministries. Due to lack of community participation this has led to poor operation and maintenance of water projects. This is because of use of inappropriate technology, incorrect location of supply systems, water being sold expensively and lack of social acceptability because of presence of minerals which affects water taste for a few water sources. The demand for community water supply projects are localized demands, hence managerial decisions about levels of service, location of water facilities and cost sharing should be made locally.

Community roles are not limited to finance and maintenance. Communities must be involved from the start, in decisions about which system they want, what price to pay for water and where to locate systems. Such involvement enhances community ownership of water projects. Key features of community ownership and management includes; the community having legal ownership and control of services, selecting the site of water points, selecting the level of services it requires, can afford and can sustain with human and financial means, the community has to set up a committee that is accountable for management of water projects, accept complete responsibility for operation and maintenance of water systems, including collection of funds and purchasing goods and services required in maintaining the systems. The community should appoint its own caretakers to receive training and tools and be responsible for corrective maintenance and repairs. The community should be ready to clean, fence and maintain the areas around the water projects (Nwankwoala, 2011).

In Tanzania surveys have found that only 46% of existing rural water points are functional, and a quarter of the newly installed systems fail after only two years of operation. This problem of lack of sustainability is associated with lack of finance especially for operation and maintenance, lack of technical personnel at the project level, lack of spare parts and lack of community participation and ownership. Community participation during project selection, design and installation can help achieve an increased sense of ownership on the part of the community. Communities that feel they own a hand pump installed at a shallow well are more likely to look after it. Institutional arrangement or local community structures for managing the water projects are also important. Community participation and ownership have a valuable role to play in achieving sustainability, but can create other challenges. In particular how realistic is participatory decision making where community members have very little understanding on various management and technological options and their implications on the long run? This raises the question of wether it is appropriate to try and bridge such a vast and costly knowledge gap for the sake of ownership (Nkongo, 2009).

Boru (2012) conducted a study on determinants of community ownership of water projects in Kenya, a case of central division, Isiolo County. The study revealed that community involvement in site selection for water facilities, provision of labour, locally available materials, cash contribution, and selection of the management type influences community ownership of water projects. The study also concluded that there is a significant and inverse relationship between distance from the water source and ownership of water projects. The far the water points from the community the higher the likelihood that the facility will not be used or taken care of. The established that technology used, ease of operation and maintenance, cost, availability of spare parts influences community ownership of water projects. Boru recommends further studies to be done in other parts of Isiolo County on factors influencing community ownership of water projects.

Ngetich (2009) did an assessment of factors influencing sustainability, the case of community water projects in Keekonyokie central location, Kajiado district, Kenya. He recommends community training for empowerment and sensitization to environmental

concerns and further studies should be conducted on the influence of distance on sustainability of water projects. Revena (2009) conducted an assessment of factors influencing sustainability of foreign aid projects, a survey of Imenti North district, Kenya and recommends for further studies variables that influence sustainability, such as conflicts among local leaders should be studied.

Ochelle (2012) did a study on factors influencing sustainability of community water projects in Kenya, a case of water projects in Mulala division, Makueni County. The study concluded that community participation during conception, design, implementation, operation and maintenance of water projects influences sustainability of communal water projects. Community participation ensures that projects designed borrow from opinions of end users. This factor influences community ownership of water projects. This will enhance their willingness to effectively manage these projects after construction. The study also concluded that availability of funds, and technology used influences sustainability of communal water projects. Ochelle recommends training of water management committee members on operation and maintenance to enhance sustainability. Implementers of water projects should ensure that water management committees are formed and members adequately trained.

2.3. Community participation

According to Van (2008) water projects have greater impact when women are involved. In a study conducted on community water and sanitation projects in 15 countries found that projects with full participation of women are more sustainable and effective than those that do not. This supports earlier studies by World Bank which found that womenôs participation was strongly associated with water and sanitation project effectiveness. The women are involved in roles such as; decision making, educating children on sanitation and hygiene, capacity building, mobilizing political will and other priorities such as linkages between water, sanitation and hygiene. It is important to determine what the consumers of water and sanitation want , what they can and will contribute, how they participate in decision making on the technology used, location of facilities and operation

and maintenance. According to Mushtaq (2004) Community participation is a process by which people from all sects of community (rich, poor, Men, women, uneducated, educated, and so on) can influence or Control those decisions, which affect their lives. This involves participation of project beneficiaries, women and men in decision making, design, construction and operation and maintenance of community projects.

Community participation is vital in all projects implemented in a community. Communities should be involved in all stages of the project, from the planning through to the building and managing, of systems, by doing this, long term solutions can be found that are suited to their own needs and locally available resources. Rather than being imposed by outsiders, e.g. development agencies, donors and governments projects should solve the communitiesô own problems which in most cases are different from other communities. Community participation is very crucial especially during the initial stages of a project. With clear understanding of the how and why of their projects or systems, communities will be committed to their projects and feel a sense of ownership for them. Ultimately community participation is all about creating an enabling environment for communities to help themselves. By utilizing their own skills and resources communities are able to take their first steps out of poverty and move towards sustainable development. And once these basic services are in place and communities develop the skills and resources for changing their environment they continue to further their development (Keen, 2007).

If community water and sanitation projects are to succeed, technical, social, economic and environmental aspects must be well coordinated. A very important contribution to these aspects is the participation of the community involved in the project. Without the interest and support of the target beneficiaries using the system, no project will succeed; however well designed and planned. The success of a project depends on people understanding; accepting and using systems they have selected for themselves.

Community participation (CP) contributes to all important enabling environments that community requires in order to function. Eventually, the responsibilities of the community should be present at every stage of the project implementation. In this way the community

assumes responsibility, authority and control over its own development. Despite the rather complex nature of community participation in the management of water resources, it is possible to identify the preconditions that create the enabling environment in which community management can occur. Important preconditions for CP include: There must be community demand for improved system. The information required to make informed decisions must be available to the community. Technologies and levels of service must commensurate with the communityôs needs and capacity to finance, manage, and maintain them. The community must understand its options and be willing to take responsibility for their system. The community must be willing to invest in capital and recurrent costs. The community must be empowered to make decisions to control the system. Effective external support must be available from governments, donors, and the private sector e.g. training, technical advice, credit, and construction (McCommon, 2009).

Attention should be given to the community involvement in all the stages of projects implementation (Gicheru, 2012). Projects will fail if the community participation approach in project management is not adopted .Dissemination of information, community memberôs involvement in all stages of water project implementation and use of local knowledge in implementation of water projects are very crucial, as this would make the projects more sustainable in the long run (Mwakila, 2008).

To enhance community participation, according to the International Rescue Committee (2012), regional learning centres should be established and information on good practices and innovations should be documented. The community should be capacity built on the link between increased community participation in water management and increased functionality of water facilities and ultimately improved sustainability of the water facilities to ensure water services that last. Regional learning should be strengthened and used to promote community participation in the management of the water facilities. Steps and processes should be initiated to institutionalize regional learning as a strategy for identifying good practices, innovations and information sharing (Baur and Woodhouse

2009). This is also as a way of creating awareness on advocacy issues to influence policy change at the national level.

According to Mclvor (2008), various water programmes implemented in the Zambezi Valley, Zimbabwe failed due to the fact that the local communities did not regard the water facilities e.g. dams and boreholes "as their own." They considered them to be someone else's responsibility. This is because of an inadequate process of consultation with local people prior to the construction of such facilities; this left the community with an impression that they had no role to play in their management. This lack of local ownership transformed such facilities into a classic example of an open access resource (Harvey and Reed, 2007).There were no community sanctions against the destruction of the surrounding watersheds, no limits on the number of livestock around water-points, no maintenance of the site by the local community or protection of supportive infrastructure, such as fences and pipes, from being stolen. Communities were also alienated by the technology utilized, which was not considered to be of village level operation and maintenance VLOM, in many of these programmes (Mwakila 2008). The hand pumps installed required trained personnel who received allowances from the local government. These people were generally regarded as employees of the state, rather than community representatives. When their allowances were eliminated because of government cutbacks, local communities had little interest in contributing money to retain them. Nor did they have the skills and expertise to maintain pumps themselves, largely because no one had thought of training them (Baur and Woodhouse, 2009). Another factor that was not considered was the prior identification of the actual pump users. Even when consultation had taken place about the maintenance, siting and function of wells and dams etc. it had been assumed that adults were the ones most responsible for water collection and management. Children were often the ones primarily responsible for issues to do with water in their families.

Nevertheless, many of the hand pumps were too heavy to be individually used by children, requiring four or five of them to use it at any one time (Mwakila 2008). Nor were they consulted about the siting of wells, even though they were the ones most compromised by long distances of water-points from home or school. According to Baur and woodhouse

(2009) the principal objective is to return a significant measure of responsibility of decision making about management of water to local people themselves. It is an initiative that seeks to challenge the idea that it is always "experts" who know best about solutions to problems (Mwakila 2008).

According to Harvey and Reed (2007), the process of involving people extends to decisions about installation of water points, where these should be sited, what technology should be chosen, what management arrangements should be introduced, as well as contribution to costs.

According to Mwakila (2008), a decision has to be made if communities are genuinely to own their water resources, some contribution in terms of cost would have to be made so as to reinforce a feeling of ownership. Water charges are small, yet they enable spare parts to be purchased and fences to be installed to protect water-points from livestock damage (Baur and Woodhouse 2009).

Communities should be trained to maintain pumps. Previously the local government authority was responsible for repairing pumps that had broken down, even though the repairs were often minor. Yet in some case repairs by this authority would take many months, since they had little transport to service the entire region. Training of members of the community including women and children, in stripping a pump, replacing washers, reinserting pipes etc. will lead to a significant reduction in the number of water-points not functioning (Gicheru 2012). In terms of technological change, a decision has to be made by several agencies to introduce manageable pumps for children (Mwakila 2008). Pumps which require less effort to utilize and only one child to operate. These should be been piloted in several parts of the region, and through community consultations (Mclvor, 2008).

In a study conducted to assess the influence of community participation on the performance of Kiserian dam project in Kenya, it revealed very low levels of community participation in identification, planning, implementation and monitoring of the dam project. This has influenced the overall performance of the project (Mukunga 2012).

2.4 Training

According to Toole (2002), capacity building sessions to develop community awareness of water supply problems will increase local participation in developing and demanding a project that will satisfy the needs of the community. Technical training in construction, operation and maintenance will teach selected individualsô practical skills and may create an understanding and the sense of responsibility for water facilities in the beneficiary community and this enhances community ownership of water projects.

Campos (2008) in an intervention model carried out in Peru for water supply, considered community training as an important component in which the project used various methods of training including audio-visuals. Campos emphasizes that training on issues such as operation and maintenance empower the communities to look after their water supply systems thus enhancing sustainability.

In Ghana, capacity building of key actors in rural water delivery and management usually precedes the provision of the facilities. Capacities of the district assembly staff are strengthened through training and equipment supply e.g. computers, office supplies and motor bikes. All these are geared towards enhancing the district assembliesô role in improving community ownership of water projects in rural areas (Fielmua 2011).

Targeting women for training is critical to the ownership and sustainability of water projects, especially in technical and managerial roles to ensure they actively participate in decision making process this influences community ownership of projects (Harvey and Reed, 2007).

2.5. Technology used in extraction of water.

In a study conducted in rural India it revealed that approximately a third of Indiaôs hand pumps in rural water projects are either nonfunctional or in need of repairs. The largely publicly funded hand pump programme has been a remarkable success. Through the programme access to safe water increased from less than 10 per cent to 31 per cent. This

achievement was a result of Non-Governmental Organizations, NGOs using technologies and pumps that require village level operation and maintenance (VLOM). The Government of India (GOI) created demand so that private companies stepped in to produce the hand pumps and spare parts. The GOI also trained engineers and mechanics to use and repair these new technologies at the community level so as to enhance ownership of community water projects (Mackenzie and Isha, 2005).

In rural Ghana the factors responsible for the non-functioning of boreholes range from extreme low yields, inability to raise funds to acquire spare parts, to lack of access to spare parts. To sustain access to potable water, access to spare parts needs to be improved. Obsolete hand pumps should be replaced with modern ones to ensure easy access to spare parts in case of breakdowns. Community ownership of projects is influenced by the ease of operation and availability of spare parts for the technology incorporated in the water systems (Fielmua 2011).

According to Gleitsmann (2005) in a study conducted in Koro region of Mali, West Africa, sustainability of various types of water supply infrastructure is dependent upon the degree to which the technology used corresponds to the needs of the local community and the communityôs ability to maintain and repair it over time. Considering the non-functional state of most manual hand pumps in Koro, it is apparent that efforts need to be made to ameliorate the situation. Learning from previous development projects, the latest approaches are addressing the problems of limited availability of spare parts, absence of trained technicians at the local level and the limited role of women in the pump management scheme. These factors influence ownership of water projects by the beneficiary community (Mwakila, 2008).

2.6. Distance between the user and the water point

According to Harvey and Reed (2007), the distance from a household to the nearest water point is an indicator to the access to water. This indicator requires actual measurements to

be done during a survey. This is time consuming especially in emergency assessment surveys. Another way to measure this indicator is to map the camp, including the water access points. Through this, one can tell if households are located to far from a water access point. In most cases water points are not evenly distributed and therefore households have to cover varying distances in search of water. This influences the level of involvement and ownership. Distance to water points influences the time taken and quantities drawn since there are no water distribution systems in most arid and semi-arid lands, ASALs (Gicheru2012). According to Baur and Woodhouse (2009), if the distances are beyond a kilometre distribution networks should be considered.

In a study conducted in Ethiopia funded by African Development Fund (2005), indicated that women in rural areas travel long distance to collect water, accounting for two to six hours per day. As the amount of time spent on water collection increases, womenós involvement in other economically beneficial activities significantly decreases. Therefore water facilities should be as accessible as possible to all segments of the population to better satisfy water requirements of members of the community.

In a study conducted by Boru (2012) in central division of Isiolo County in Kenya, it revealed that there is a significant but inverse relationship between distance from the water source and ownership of community water projects. As distance to the water point increases the community members do not participate in the affairs of the water projects.

2.7 Community participation theory

The most important process in any development project is the encouragement of the active participation of the local community. Without community participation it is not possible to determine what are the problems, constraints, and local desires for a give community.

According to Harvey and Reed (2007) participation of project beneficiariesô ifs of great essence in that it enhances the sense of ownership among members. This is important in ensuring that water projects are operated and maintained after the implementation phase.

Cohen and Uphoffôs model regarding peopleôs participation is chosen for this study.

Community participation theory assumes that the higher the community participation in a decision, the less the likelihood of interferences of external organizations on that decision. In this theory focus is given on the participation of beneficiaries and not that of personnel from the implementing agencies in development projects. Community participation is attained through collaborative or joint involvement of project beneficiaries and the implementing agencies. (Khwaja 2004)

2.8 Conceptual framework

Figure 1 presents the conceptual framework on which this study is based

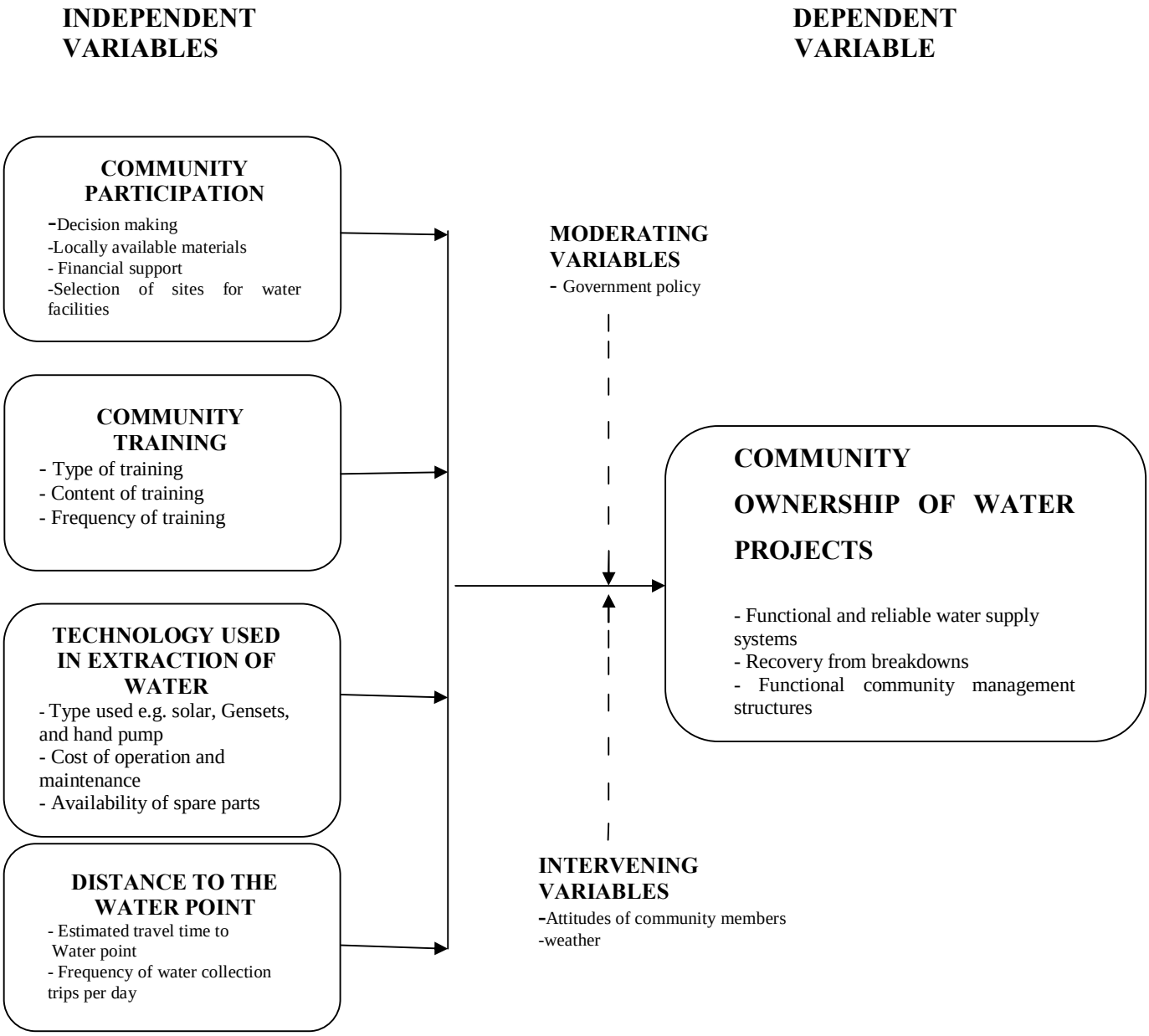

Figure 1: conceptual Framework

The conceptual framework above is a diagrammatic representation of the relationship between the variables. Community participation, training, technology used in extraction of

water and distance between the user and the water point are the independent variables for this study. They influence the dependent variable which is; community ownership of water projects. This relationship is affected by the Government policy which is a moderating variable and will not measured in this study. The intervening variables which can affect the relationship between the dependent and independent variable are; weather conditions and the attitudes of community members.

2.9 Relationships among the variables and the research gap

From the literature review it is clear that unsustainability of many rural water supply schemes is due to lack of community ownership. Community ownership of water projects is negatively influenced by the use of inappropriate technologies, unavailability of spare parts, lack of local maintenance and operational capacity, lack of local community education and participation, ineffective community demand, lack of co-ordination of sector agencies and water facilities being sited from the beneficiary households. From the conceptual framework, community participation, community training, technology used in extraction of water and distance between the user and the water point are the independent variables for this study. They influence the dependent variable which is; community ownership. If community water projects are to succeed, technical, social, economic and environmental aspects must be well coordinated. Without the interest and support of the target beneficiaries using the system, no project will succeed. This study will adopt the community participation theory which is considered appropriate for this study because community participation in decision making, implementation, operation and maintenance of development projects influences community ownership which in turn enhances sustainability of development projects. From the literature reviewed such a study has never been conducted in Kinna division of Isiolo County. This study will contribute towards the bridging of the knowledge gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a description of the research methodology that was used by the researcher to conduct the study. This includes the research design, target populations, sample size and sampling procedures/techniques, data collection instruments and data analysis techniques and ethical considerations.

3.2 Research Design

Research design is a method that provides a framework through which the researcher gathers and presents data. This study employed a descriptive survey research design. Descriptive survey design focuses attention on the formulation of objectives, design of data collection instruments, collection of data, processing and analyzing data and reporting findings (Mugenda and Mugenda, 1999). A descriptive survey involves administering questionnaires to individuals by mail, telephone or in person. This research design method was used because the method has the potential to provide a lot of information from quite a large sample of individuals. By employing this study design, quantitative data was collected from a cross section of community members and qualitative data was obtained from members of water management committees and the district water officer who was the Key informant.

3.3 Target Population

This study was conducted in Kinna division in Isiolo County. Water projects in this division serve a population of 9,920 people. Itôs from this population that a representative sample was drawn and administered questionnaires. Water committee members from the

16 water supply systems were involved in the focus group discussions because they were in a position to provide vital information on community ownership of water projects.

Table 3.1: Target population

Type of water structure	Total	Population Percentage
Boreholes	6	6280	63.3
Shallow wells	5	2740	27.6
Water pans	5	900	9.1
TOTALS	**16**	**9920**	**100**

3.4 Sample size and sampling Technique

The section discussed sample size and sampling procedure

3.4.1 Sample size

The choice of a sample size is vital so as to avoid wastage by not being too large and to give confidence to the results of the study by not being too small (Kothari, 1990.)The sample size is determined by using Fishers formula:

$$n = \frac{pqZ^2}{d^2}$$

Where:

n = the desired sample size (if the target population is greater than 10000).

Z = the standard normal deviation at the required confidence interval

p = Proportion in the target population with characteristics being used

q = 1 ï p

d = the level of statistical significance set

If the p is not known in advance 50% should be used.

P=0.5

Q=1-p=0.5

Z=1.96 at 95% confidence interval

$N=1.96^2 x0.5x0.5/0.05^2=384$

The water projects in Kinna division are serving a population of 9,920

The target beneficiaries are less than 10,000, hence a final sample size (Nf) using the following formula from Mugenda and Mugenda (1999)

Nf = n/1+n/N

Where N=Total Population

Therefore sample size = 384 / 1+ 384/9920 = 370 respondents

Table 3.2: Sampling frame

Type of water structure	Population	Sample size
Boreholes	**6280**	**234**
Shallow well	**2740**	**102**
Water pans	**900**	**34**
TOTALS	**9920**	**370**

3.4.2 Sampling Technique

A sample size of 370 respondents was required for this study. Simple random sampling technique was used to identify the respondents and purposive sampling was used in selecting 6 key members from each water management committee in the 16 water supply projects.

3.5 Research instruments

Research instruments are the tools used to collect data. A questionnaire was the main tool used for collecting data and other information relevant to the study. A structured questionnaire was administered to the 370 respondents. The questionnaire had five sections consisting of questions on demographic characteristics, community participation, community training, technology used in extraction of water and the distance between the user and the water point. An interview guide was used to collect data from 6 members from each water management committee through focus group discussions. A separate interview guide was used to collect data from the Garbatulla district water officer who was the key informant in this study.

3.5.1 Validity of the instrument

Validity defines the accuracy, truthfulness and the meaningfulness of the inferences that are based on the data obtained from the use of a given scale for each variable of the study. Content validity allows the test to measure intended domain of the indicators or content of a particular concept. Reason behind pre-testing is to assess the clarity of the instrument items so that those found to be inadequate in measuring the variables are discarded or modified to improve the quality of the research instrument. To access the content validity of the instrument, the questionnaires were given to three research specialist in the department of extra mural studies of Nairobi University, Their comments were used to improve the quality of the instruments.

3.5.2 Reliability of the instrument

Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. Reliability answers the question ñAre scores stable over time when the instrument is administered a second time?ò (Creswell, 2003) .To ensure that the instrument is reliable for the study; the researcher used Cronbachôs Alpha formula. A pilot group a 15 respondents were targeted. A coefficient of 0.68 was obtained. A coefficient of 0.6 ï 0.7 indicates acceptable reliability (Mugenda 2008).

3.6 Data collection Procedures

A permit for data collection was first obtained, and this was preceded with a letter introducing the researcher. The two documents were presented to the local provincial administration within the area of study. Three research assistants were recruited and capacity built on all the aspects of the research and data collection techniques so as to understand research objectives, master the research tools, ethical consideration in research and to plan approaches to data collection. The data collection took 8 days after which the data was processed.

3.7 Data analysis Techniques

The research employed qualitative and quantitative techniques of analysis. The data analysis technique involved the use of both descriptive and inferential statistics which included frequency tables and cross tabulation. The returned questionnaires were checked for errors before coding and analysis. Data processing and analysis included preparation of data, editing, coding, classification and analysis. The researcher analyzed the quantitative data using descriptive statistics using the Statistical Package for Social Scientists (SPSS V.21) software and presented through percentages, means, standard deviations and frequencies. SPSS was used because it was fast, flexible and provided more accurate analysis resulting in dependable conclusions. The use of structured questionnaires enabled the researcher to work with quantitative data using size, frequency distribution, and

association of variables in the study population and answers to questions that could be counted and expressed numerically. Qualitative data was coded thematically and then analyzed.

3.8 Ethical considerations

Throughout this study, the ethical issues were up held to ensure the dignity of the participants is maintained. Major Ethical issues of concern in this study included voluntary participation, informed consent, invasion of privacy and confidentiality. The objectives of the study were well explained to the respondents with an assurance that the data provided was to be used for academic purposes only and will be treated with confidentiality.

3.9 Operational Definition of Variables

Research Objectives	Type Of Variable	Variable	Measuring of Indicator	Data Collection Methods	Measurement Scale	Types Of Analysis
To examine the extent to which community participation influences community ownership of water projects in Kinna division, Isiolo County.	Independent	Community Participation	-Involvement in decision making -Provision of locally available materials -Community Financial contribution to projects -Selection of sites for water facilities	Questionnaire, Focus group discussion	Ordinal Nominal	Descriptive

To assess the influence of community training on community ownership of water projects in Kinna division, Isiolo County.	Independent	Training	- Type of training - Content of training - Frequency of training	Questionnaires Focus group discussion	Ordinal Nominal	Descriptive
To determine the influence of technology used in extraction of water on community ownership of water projects in Kinna division, Isiolo County.	Independent	Technology	-Type of pumping system used e.g. solar, Gensets, and hand pump - Cost of operation and maintenance - Availability of spares parts	Questionnaires Focus group discussion	Ordinal Nominal	Descriptive
To establish the influence of distance between the user and the water point on community ownership of water projects in	Independent	Distance	- Estimated travel time to water point - Frequency of water collection,	Questionnaire, Focus group discussion	Ordinal Nominal	Descriptive

Kinna division, Isiolo County.			trips per day			
Community ownership of water projects	Dependent	Community ownership	- Functional water supply systems - Recovery from breakdowns in water supply systems - Functional community management structures	Questionnaire, Focus group discussion	Ordinal Nominal	Descriptive Correlational

3.10 Summary

The study adopted a descriptive survey research design. A sample size of 370 respondents was sufficient for this study. A questionnaire was the main tool used for collecting data and Focus group discussions were conducted where by the water management committee members were engaged. To access the content validity of the instrument, the questionnaires were given to three research

specialist for expert opinion. The research employed qualitative and quantitative techniques of data analysis. Major Ethical issues of concern in this study included voluntary participation, informed consent, invasion of privacy and confidentiality.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter focused on data analysis, interpretation and presentation of findings. The purpose of the study was to investigate the factors influencing community ownership of water projects in Kenya with reference to Kinna division in Isiolo County. The study sought to establish how community participation, training, technology used to extract water and the distance between the user and the water point influence community ownership of water projects in Kinna division in Isiolo County. The researcher made use of tables, percentages and regression analysis to present data.

4.2 Response Rate

This research study had a sample size of 370 respondents who were community members served by the 16 water projects in Kinna division. Out of this sample size, 317 questionnaires were filled and returned to the researcher which represents a sample size of 85.68% response rate. The 24 sampled respondents, did not return their questionnaires and 29 questionnaires were found to be irrelevant during data cleaning.

4.3 Demographic characteristics of the respondents

The demographic characteristics of the respondents were as shown in the Tables 4.1 to 4.4.

Table 4.1: Respondent composition by gender

Factor	Frequency	Percentage
Male	156	49.2%
Female	161	50.8%
Total	**317**	**100%**

Table 4.1shows the gender composition of the respondents 156(49.2%) were male and 161(50.8%) were female. It can therefore be concluded that the majority of the respondents were female.

Table 4.2: Respondent composition by age

Factor	Frequency	Percentage
18-30 Years	92	29.0%
31-40 Years	116	36.6%
41-55 Years	82	25.9%
Above 55 Years	27	8.5%
Total	**317**	**100%**

Table 4.2 shows the respondent composition by age, out of 317 respondents, 92 (29.0%) with age between 18-30 years, 116(36.6%) between 31-40 years, 82 (25.9%) between 41-55 years and 27(8.5%) with over 55 years. This indicates that the youth form the majority group in Kinna division.

Table4.3: Respondent composition by level of education.

Factor	Frequency	Percentage
None	77	24.3%
Primary	109	34.4%
Secondary	104	32.8%
Post-Secondary	27	8.5%
Total	**317**	**100%**

Table 4.3 shows respondents composition by level of education, 77 (24.3%) had no education background, 109(34.4%) had primary education, 104 (32.8%) had secondary education and 27(8.5%) had post-secondary education. This indicates that the literacy levels are still low in Kinna division.

Table4.4: Respondent composition by period of stay.

Factor	Frequency	Percentage
0-3 months	2	6.0%
1-2years	12	3.8%
3- 5years	70	22.1%
More than 5 years	233	73.5%
Total	**317**	**100%**

Table 4.4 shows the period of stay of respondents in Kinna division, 2 (6.0%) had stayed for less than a year, 12(3.8%) between 1-2years, 70(22.1%) between 3-5 years and 233(73.5%) for over 5 years. This indicates that the findings of the study are based on opinions collected from the real inhabitants of Kinna division.

4.4 Community participation

The study sought to find the opinions of the respondents in regard to decision making during the selection of construction sites for water facilities, roles played by community members in project implementation and the presence of water management committee. These were the findings;

Table 4.5: Decision on selection of construction sites

Factor	Frequency	Percentage
Water management committee	45	14.2%
The project implementer	54	17.0%
Village Elders	193	60.9%
Others	25	7.9%
Total	**317**	**100%**

Table 4.5 shows findings of who made the decision on selection of construction sites for water projects, 45 (14.2%) agreed decision was made by water management committees, 54(17%) by the project implementers, 193(60.9.1%) by the village elders and 25(7.9%) by other parties e.g. the area chief or councilors. This indicates that community participation is high in Kinna division. Village elders and water management committees play a vital role in the development of water projects. The community is well represented during consultations and decision making. This significantly enhances participation.

Table 4.6: Roles played by the community in project implementation

Factor	Frequency	Percentage
Provision of communal land	231	72.9%
Financial contribution	0	0%
Provision of local materials	86	27.1%
Total	**317**	**100%**

Table 4.6 above shows the roles community members play in implementation of projects, 231(72.9%) agreed the community provided land, 86(27.1%) agreed the community also gave local materials and they agreed that the community in not involved at all in the initial funding of water projects. This reveals that there is community participation in Kinna division; land is a resource which the community sets aside during development of water projects.

Table 4.7: Opinions on Projects initiated in the community but later failed

Factor	Frequency	Percentage
Yes	132	41.6%
No	185	58.4%
Total	**317**	**100%**

Table 4.7 illustrates the opinions of respondents on projects initiated in the community but later failed, 132 (41.6%) agreed on the presence of failed project initiatives while 185(58.4%) disagree. Majority of the projects have failed due to

poor management practices and lack of training especially on operation and maintenance. The community has participated in operationalizing the systems especially in the desilting of water pans and fencing around water points. Community participation is significantly high.

4.5 Training

Table 4.8: The extent to which aspects of education and training influences community ownership of projects

Factor	Mean	Variance	Standard deviation	Standard error
Consistency	2.09	1.049	1.024	0.058
Language	1.62	0.564	0.751	0.042
Background of the facilitator	1.52	0.529	0.727	0.041
Mode of delivery	1.62	0.452	0.672	0.038
Frequency	1.29	0.414	0.644	0.036
Content	1.42	0.390	0.624	0.035
Choice of Trainer by Gender	1.41	0.364	0.603	0.033

Table 4.8 above shows the influence of various aspects of training on community ownership, consistency ranks first with the highest standard deviation (1.024) and standard error (0.058) Language use in training is second with standard deviation (0.751) and standard error (0.042), Background of the facilitator is third, and choice of trainer by gender is last with standard deviation (0.603) and standard error (0.033).

This indicates that the most important aspects to consider during planning of water management committees or operation and maintenance trainings should focus on consistency this refers to the time period to elapse before refresher trainings are conducted

and the language to be used by facilitators during the trainings. Local language should be used.

4.6 Technology used to extract water

Table 4.9: Technology used to extract water

Factor	Frequency	Percentage
Solar system	4	1.3%
Generators	168	53.1%
Hand pump	55	17.4%
Rope and bucket	56	17.7%
Gravity system	8	2.5%
Others	26	8.2%
Total	**317**	**100%**

Table 4.9 shows findings on technology used to extract water, 4 (1.3%) agreed on use of solar system, 168(53.1%) generators, 55(17.4%) hand pump, 56(17.7%) rope and bucket, 8 (2.5%) are gravity system and 26(8.2%) agreed on not using any technology. They obtain water direct from the water pans. The findings reveal that generators are mostly used in extraction of water. Therefore operation and maintenance training should be geared towards ensuring that local technicians are trained on how to maintain generators and how to replace first moving parts.

Table 4.10: Cases of interruption of water supply

Factor	Frequency	Percentage
Pipe burst and leakages	78	24.6%
Generator failure	142	44.8%
Rationing	39	12.3%
Dry weather conditions	58	18.3%
Total	**317**	**100%**

Table 4.10 shows cases of interruption of water supply, 78(24.6%) of the respondents cited pipe burst and leakages, 142(44.8%) agreed on generator failure, 39 (12.3%) gave rationing and 58(18.3%) sited dry weather conditions. Generator failure is the main cause of interruption of water supply. This is due to poor maintenance and operation practices and lack of locally trained technicians to do the repairs works. There is need for training of local technicians on operation and maintenance of generators and hand pumps.

Table 4.11: Repair of water facilities in case of breakdowns

Factor	Frequency	Percentage
Locally trained technician	90	28.4%
Hired technician	101	31.9%
Ministry of Water and Irrigation	35	11.0%
NGOS	89	28.1%
Others	2	6.0%
Total	**317**	**100%**

Table 4.11 shows who repairs the water facilities in case of breakdowns 90(28.4%) agreed that locally trained technician facilitate repair in case of breakdown, 101(31.9%) indicated that hired technician repair, 35(11.0%) indicated the ministry of water and irrigation does the repairs, 89(28.1%) indicated NGOS are responsible for repairing and 2(6.0%) were not aware of who repairs. Hired technicians are the ones mostly involved in repair works therefore there is need to train more local technicians.

Table 4.12: Payment for repair works

Factor	Frequency	Percentage
Water management committee	158	49.8%
CDF	3	0.94%
Ministry of Water and Irrigation	39	12.3%
NGOS	107	33.8%
Individual philanthropist	10	3.2%
Others	0	0%
Total	**317**	**100%**

Table 4.12 shows findings of payment for the repair works in cases of breakdown, 158(49.8%) agreed payment was made by water management committees, 3(0.94%) by Constituency development fund, 39(12.3%) by the Ministry of water, 107(33.8%) by NGOs and 10(3.2%) by individual philanthropist. This indicates that the Ministry of water plays a vital role in the operation and maintenance of the water systems. There is need to empower the existing water management committees so that they own up the process of operation and maintenance of their community water systems. This will enhance ownership of water project

Table 4.13: Payment for water

Factor	Frequency	Percentage
Yes	262	82.6%
No	55	17.4%
Total	**317**	**100%**

Table 4.13 shows payment for water, 262(82.6%) the community agreed in payment of water bills and the minority 55(17.4%) disagreed. This reveals that water is treated as an economic resource by the community. This indicates that community members are willing to pay for water services therefore the water committee needs to be trained on proper financial management skills and how to plough back the water revenues or utilize them in cases of breakdowns. Finances should be managed in a transparent manner and bank account should be opened for each water system. This influences the long term sustainability of water projects.

4.7 Distance between the user and the water point

Table 4.14: Main source of water during dry season

Factor	Frequency	Percentage
Borehole	176	55.5%
Water Kiosk	35	11.0%
Shallow Well	55	17.4%
Others	51	16.1%
Total	**317**	**100%**

Table 4.14 shows findings of the main source of water during the dry season, 176 (55.5%) agreed on boreholes, 35(11%) water kiosk, 55(17.4%) shallow wells and 51(16.1%) agreed on other sources e.g. waterpans and water vendors. This reveals that boreholes are the most reliable sources of water. Pipeline extensions should be laid to reduce the distance between the water source and the end user. This will enhance community ownership.

Table 4.15: Time spent to obtain water from the main water source during dry season

Factor	Frequency	Percentage
Less than 30 minutes	161	50.8%
Within 1 hour	82	25.9%
More than 1 hour	74	23.3%
Total	**317**	**100%**

Table 4.15 illustrates the time spent to obtain water from the main water source during dry season, 161(50.8%) agreed on less than 30 minutes, 82(25.9%) within 0ne hour and 74(23.3%) more than one hour. Pipeline extensions should be laid to reduce the distance between the water source and the end user. This will reduce the travel time to and from the water source. Thus enhancing community ownership.

Table 4.16: Main source of water during wet season

Factor	Frequency	Percentage
Rain water	78	24.6%
Borehole	167	52.7%
Water pan	38	12.0%
Shallow well	34	10.7%
Total	**317**	**100%**

Table 4.16 shows findings of the main source of water during the wet season, 78 (24.6%) agreed on rain water, 167(52.7%) boreholes, 38(12.0%) water pans and 34(10.7%) agreed on shallow well. Pipeline extensions should be laid to reduce the distance between the water source and the end user. Thus enhancing community ownership.

Table 4.17: Time spent to obtain water from the main water source during wet season

Factor	Frequency	Percentage
Less than 30 minutes	222	70.0%
Within 1 hour	66	20.8%
More than 1 hour	29	9.1%
Total	**317**	**100%**

Table 4.17 illustrates the time spent to obtain water from the main water source during wet season, 222(70 %) agreed on less than 30 minutes, 66(20.8%) within one hour and 29(9.1%) more than one hour. Pipeline extensions should be laid to reduce the distance between the water source and the end user. Awareness should be created on safe harvesting and use of rain water this will ensure water is not wasted away during the rainy seasons.

4.8 Multivariate regression analysis

The researcher used a multivariate regression model to establish the level of significance of the relationship between the independent variables; community participation in project implementation, community training, technology used in extraction of water and the distance to water access point and the dependent variable which was community ownership of the project. The researcher used Statistical Package for Social Sciences (SPSS) to code, enter and compute the measurements of the multiple regressions. The multivariate regression model for this study was;

$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$ Where;

Y = ownership of water projects

β_0 = Intercept/Constant

β_1 = coefficient of community participation during project Implementation

β_2 = coefficient of community training

β_3 = coefficient of technology used in extraction of water

β_4 = coefficient of distance to water access point

X_1 = Variable representing community participation during project Implementation

X_2 = Variable representing community training

X_3 = Variable representing technology used in extraction of water

X_4 = Variable representing distance to water access point

ε = Standard error of estimate

The researcher used a multivariate regression model to establish the relationship between independent variable community participation in project implementation, community training ,technology used in extraction of water and the distance to water access point and the dependent variable which was community ownership of the project. The research used statistical package for social sciences (SPSS V 21.0) to code, enter and compute the measurements of the multiple regressions.

Table 4.18 Symmetric measures based on normal approximation.

	Pearson R		Spearman Rank	
Factor	Value	Sig	Value	Sig
Gender against ownership	-0.127	0.024	-0.117	0.037
Age against ownership	0.046	0.418	0.043	0.446
Level of education against ownership	0.071	0.210	0.056	0.317
Period of stay against ownership	0.081	0.152	0.077	0.170
Decision on selection of site against ownership	0.109	0.053	0.099	0.079
Presence of water committee against ownership	0.093	0.098	0.079	0.163

Table 4.18 shows findings and analysis based on normal approximation it indicates that Age has the highest significance with 0.418 and 0.446 and 0.046 and 0.043 correlation coefficients for Pearson and Spearman rank correlation respectively. Level of education come second with 0.210 and 0.317 and 0.210 and 0.056 correlation coefficients, Period of stay come third with 0.152 and 0.170 and 0.081 and 0.077 correlation coefficients. Presence of water committee come fourth with 0.098 and 0.163 significances and 0.093 and 0.079 values for Pearson and Spearman rank correlation. Gender is ranked last with minimum significance 0.024 and 0.037 and values -0.127 and - .0117 for Pearson and Spearman rank correlations respectively

NB: 1. Positive correlation indicates that there is influence in Ownership of the project

2. Negative correlation indicates that the factor does not determine ownership

Table 4.19 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.460	0.211	0.201	1.037

R-Squared is a commonly used statistic to evaluate model fit. R-square is 1 minus the ratio of residual variability. Table 4.19 shows the adjusted $R^{2,}$ also called the coefficient of multiple determinations, and is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. **77.4%** of the community ownership of the projects could be the combined effect of the predictor variables

Table 4.20 Summary of One-Way ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	90.032	4	22.508	20.911	0.0432
	Residual	335.829	312	1.076		
	Total	425.861	316			

Table 4.20 shows the summary of one way ANOVA results. Probability value of 0.0432 indicates that the regression relationship was highly significant in predicting how the independent variable community participation in project implementation, community training, and technology used in extraction of water and the distance to water access point

and the dependent variable which was community ownership of the project. The F critical at 5% level of significance was 20.911 since F calculated is greater than the F critical (value = 2.87), this shows that the overall model was significant.

Table 4.21 Regression coefficients of the relationship between community ownership and four predictive variables

		Unstandardized Coefficients		Standardized Coefficients		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig**
	(Constant)	0.950	0.218		4.352	0.001
	Community participation in project implementation	0.100	0.064	0.81	1.562	0.026
	Community training	0.031	0.054	0.029	0.562	0.574
	Technology used in extraction of water	0.008	0.051	0.446	8.274	0.001
	The distance to water access point	0.633	0.076	0.008	0.152	0.879

Table 4.21 shows that taking all factors into account community participation in project implementation, community training, and technology used in extraction of water and the distance to water access point constant at zero community ownership of the project will be 0.95. The findings presented also show that taking all other independent variables at zero, a unit increase in the community training would lead to a 0.031, increase in sensitizing the community on technology used in extraction would lead to a 0.008, decrease in distance to

water access point would lead to a 0.633 and increase in community participation in implementation would lead to 0.1. Further, the findings shows that at 5% level of significance and 95% level of confidence, community participation had a 0.026 level of significance; community training showed a 0.0574 level of significance, technology used to extract water had 0.001 a level of significance while distance to water access point showed 0.879 level of significance hence the most significant factor is access to distance to water access point.

As per the SPSS generated table above, the equation ($\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$) becomes**:** $\mathbf{Y = 0.95 + 0.1 X_1 + 0.031 X_2 + 0.008 X_3 - + 0.633 X_4}$.
The effect of the Standard error of estimate $\boldsymbol{\varepsilon}$ is assumed to be negligible ($\boldsymbol{\varepsilon}$=0)

Overall, there was a positive and significant relationship between all the independent variables and the dependent variable. Distance to water access point had the greatest effect on community ownership of the project, followed by community training, then technology use to extract while community participation showed least effect to community ownership.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The aim of this study was to investigate the factors that influence community ownership of water projects in Kinna Division Isiolo County Kenya. This chapter presents a summary of the findings from the study, conclusions and recommendations.

5.2 Summary of key findings

The findings of the study have been summarized according to the four variables of the study namely; community participation, community training, technology used to extract water and distance between the user and the water point.

5.2.1 Community participation

The study reveals that community participation is high in Kinna division. The community is involved in decision making on selection of construction sites, provision of community land and the pay for water thus able to do repair works in case of breakdowns. However the community does not participate in financial contribution for development of new water systems.

According to the findings of the study, decisions on selection of construction sites for water projects are made mostly by village elders at 60.9% , followed by the project implementers at 17%, then by the water management committees at 14.2%, and finally by other parties e.g. area chiefs at 7.9%.

Community members play various roles in implementation of water projects, 72.9% of the respondents indicated that the community provided land, while 27.1% indicated that the community provided locally available materials. The study revealed that the community is not at all involved in the initial funding of water projects.

All the 16 focus groups agreed that the community participates in water projects by provision of communal land, offering of security and fencing around the project sites. This was also the opinion of the key informant who is the district water officer.

The 16 water committees have a total of 174 active members. In which only 39 (22.41%) are women and 135 (77.59%) are men.

5.2.2 Community training

With regard to community training, the study established that various aspects of training influence ownership of water projects. Consistency ranks first with the highest standard deviation (1.024) and standard error (0.058) Language use in training is second with standard deviation (0.751) and standard error (0.042), Background of the facilitator is third, and choice of trainer by gender is last with standard deviation (0.603) and standard error (0.033).

Only 7 water management committees have been trained on operation and maintenance of water facilities out of the 16 water management committees in the division.

According to the key informant, water committees are trained on management issues e.g. financial management, record keeping, leadership and conflict resolution. Few committee members are also trained on operation and maintenance of the water systems.

5.2.3 Technology used to extract water

The study revealed that generators and hand pumps are mostly used in the extraction of water. The study revealed that 1.3% use solar system, majority of the respondents indicated the use of generators at 53.1% hand pump use at 17.4%,rope and bucket at 17.7% ,gravity system at 2.5% and 8.2% of the respondents indicated not using any technology. They obtain water direct from the water pans.

On causes of interruption of water supply, 24.6% of the respondents cited pipe burst and leakages, while 44.8% agreed on generator failure, 12.3% indicated rationing and 18.3% cited dry weather conditions.

In case of breakdowns majority of the respondents, at 31.9% indicated that repair works are carried out by hired technicians, 28.4% indicated locally trained technician, and 28.1% indicated NGOs, 11% of the respondents agreed on the Ministry of water and irrigation while 6% were not aware of who does the repair works.

On payment for repair works in cases of breakdown, 49.8% agreed payment was made by water management committees, 0.94% indicated Constituency development fund, 12.3% by the Ministry of water, 33.8% by NGOs and 3.2% by individual philanthropist.

On payment for water, majority of the respondents at 82.6% agreed on payment of water bills and the minority 17.4% indicated water is not paid for.

The key informant and 11 focus groups indicated that spare parts are not locally available and there is need to train local technicians on operation and maintenance.

5.2.4 Distance between the user and the water point

The study revealed that most water points are far from the community. This increases the time spent to fetch water. Water points far from the community have low levels of ownership. There is need to construct new pipe systems and increase the number of water points. According to the study findings, majority of the respondents agreed that the main source of water during the dry season, at 55.5% are boreholes, 11% indicated water kiosk, while 17.4% of the respondents indicated shallow wells while 16.1% agreed on other sources e.g. waterpans and water vendors.

The time spent to obtain water from the main water source during dry season, 50.8% agreed on less than 30 minutes, 25.9% within one hour and 23.3% more than one hour.

Majority of the respondents agreed that the main source of water during the wet season, at 52.7% are boreholes,24.6% indicated rain water, while 12% of the respondents indicated water pans while 10.7% agreed on shallow wells.

The time spent to obtain water from the main water source during wet season, 70 % agreed on less than 30 minutes, 20.8% within one hour and 29.1% more than one hour.

The 16 focus groups and the key informant pointed out that the distance between the user and the water point influences ownership of water projects to a great extent. There is need to develop more pipeline extensions and water kiosks.

5.3 Discussion of key findings

The findings of the study have been discussed according to the four variables of the study namely; community participation, community training, technology used to extract water and distance between the user and the water point.

5.3.1 Community participation

According to the findings of the study, decisions on selection of construction sites for water projects are made mostly by village elders. Community members play various roles in implementation of water projects they provide communal land, locally available materials and offer security. These findings agree with Mushtaq (2004) where Community participation is defined as a process by which people from all sects of community (rich, poor, Men, women, uneducated, educated, and so on) can influence or Control those decisions, which affect their lives. This involves participation of project beneficiaries, women and men in decision making, design, construction and operation and maintenance of community projects. Community participation is vital in all projects implemented in a community. Communities should be involved in all stages of the project, from the planning through to the building and managing, of systems, by doing this, long term solutions can

be found that are suited to their own needs and locally available resources. Rather than being imposed by outsiders, e.g. development agencies, donors and governments projects should solve the communitiesô own problems which in most cases are different from other communities. The findings are in agreement with the observations made by Harvey and Reed (2007) that the process of involving people extends to decisions about installation of water points, where these should be sited, what technology should be chosen, what management arrangements should be introduced, as well as contribution to costs. Therefore community participation in provision of communal land, making key decisions on selection of sites for construction of water facilities, willingness to pay for water services, the presence of a functional water management committee influences community ownership of water projects.

5.3.2 Community training

On community training, the study established that various aspects of training influence ownership of water projects. Consistency ranks first followed by language used in the training, then the Background of the facilitator is third, and finally the choice of trainer by gender.

From the study findings only 7 water management committees have been trained on operation and maintenance of water facilities out of the 16 water management committees in the division.

Water committees are trained on management issues e.g. financial management, record keeping, leadership and conflict resolution. Few committee members are also trained on operation and maintenance of the water systems. These findings agree with Toole (2002), that capacity building sessions to develop community awareness of water supply problems will increase local participation in developing and demanding a project that will satisfy the needs of the community. Technical training in construction, operation and maintenance will teach selected individualsô practical skills and may create an understanding and the

sense of responsibility for water facilities in the beneficiary community and this enhances community ownership of water projects. The findings also agree with observations by Campos (2008), that training on issues such as operation and maintenance empower the communities to look after their water supply systems thus enhancing sustainability. Therefore key aspects of training such as the language used during training, consistency and the back ground of the facilitator should be considered. Training of community structures especially water management committee and community members as local technicians influences community ownership of water projects.

5.3.3 Technology used to extract water

The study revealed that, generators and hand pumps are mostly used to extract water. Interruption of water supply in most cases is due to generator failures. To repair the generators, hired technicians are involved in most cases. Payment for these repair works is done by water management committees, NGOs and the Ministry of water. The study findings also indicate that spare parts are not locally available and there is need to train local technicians on operation and maintenance. This is in agreement with observations made by Gleitsmann (2005) in a study conducted in Koro region of Mali, West Africa, that sustainability of various types of water supply infrastructure is dependent upon the degree to which the technology used corresponds to the needs of the local community and the communityôs ability to maintain and repair it over time. Considering the non functional state of most manual hand pumps in Koro, it is apparent that efforts need to be made to ameliorate the situation. The findings also agree with Mwakila (2008), that learning from previous development projects, the latest approaches are addressing the problems of limited availability of spare parts, absence of trained technicians at the local level and the limited role of women in the pump management scheme. These factors influence ownership of water projects by the beneficiary community. Availability of spare parts, locally trained technicians and ease of operation influence community ownership of water projects.

5.3.4 Distance between the user and the water point

The study established that boreholes are the main source of water during the dry season and rain water during the wet season. The study revealed that water pans sited far from the community tend to have low levels of ownership in that the beneficiary communities cannot control the water use by the neighbouring pastoralists. They also pose some level of security concerns. The distance between the user and the water point influences ownership of water projects to a great extent. There is need to develop more pipeline extensions and water kiosks in the division. This is in agreement with Gicheru (2012) that distance to water points influences the time taken and quantities drawn since there are no water distribution systems in most arid and semi arid lands, ASALs. According to Baur and Woodhouse (2009), if the distances are beyond a kilometre distribution networks should be considered. The findings are also in agreement with the study conducted in Ethiopia funded by African Development Fund (2005), indicated that women in rural areas travel long distance to collect water, accounting for two to six hours per day. As the amount of time spent on water collection increases, womenós involvement in other economically beneficial activities significantly decreases. Therefore water facilities should be as accessible as possible to all segments of the population to better satisfy water requirements of members of the community. The findings agree with Boru (2012) that there is a significant relationship between distance from the water source and ownership of community water projects. As distance to the water point increases the community members do not participate in the affairs of the water projects. Therefore the distance between the user and the water point influence community ownership of water projects.

5.4 Conclusions

The study concludes that community participation, training, technology used to extract water and the distance between the user and the water point influences community

ownership of water projects. Community participation in provision of communal land, making key decisions on selection of sites for construction of water facilities, willingness to pay for water services, the presence of a functional water management committee influences community ownership of water projects. Training of community structures especially water management committee and community members as local technicians is important in ensuring ownership of water projects. Availability of spare parts, locally trained technicians and ease of operation also influences community ownership of water projects. It clear that as the distance to the water point increases the community members do not participate in the affairs of the water projects. Therefore the distance between the user and the water point influence community ownership of water projects.

5.5 Recommendations of the study

From the findings and conclusions the study recommends that;

1. The Isiolo County Government and stakeholders allocates funding towards the development of water infrastructure especially in construction of new pipeline extensions and constructing of new water points in Kinna division. The use of solar energy as an option to replace the diesel generators or a hybrid system should be explored.
2. More local technicians should be trained on operation and maintenance of generators and hand pumps. The water management committees should be trained on financial management and record keeping. This should be done by the Ministry of Environment, Water and Natural resources.
3. When water management committee are being formed and registered, participation and membership of women should be encouraged to avoid gender discrepancy.

5.6 Recommendations for further studies

The researcher recommends further studies on;

1. Factors influencing community ownership of water projects in other regions so as to allow for generalization of factors influencing community ownership of water projects in Kenya.

2. The influence of social cultural factors on long term sustainability of water projects. Especially age, gender and education levels of members of water management committees.

REFERENCES

African Development Fund. (2005) *Rural Water Supply and Sanitation Program in Ethiopia: Appraisal Report, Infrastructure Department North, East and South Onin.*

Baumann, E. (2009). *Rural water supply in East Africa,* Discussion Paper 2, St. Gallen,

Baur P. and Woodhouse. (2009) *Enhancing private sector in rural water supply: An action-oriented study.*

Boru A.J.(2012) *Determinants of community ownership of water projects in Kenya , a case of central division, Isiolo County*. Unpublished MA Thesis UoN

Campos, M. (2008). *Making sustainable water and sanitation in the Peruvian Andes: an intervention model*. Journal of Water and Health 6 (1) 2008.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods and approaches (2nd ed.)*. Thousand Oaks, CA: Sage.

Fielmua Nicholas (2011). *The role of the community ownership and management strategy towards sustainable access to water in Ghana : A case of Nadowli district.* Journal for sustainable development Vol4, No.3

Gicheru C.M (2012).*Preparatory water resources assessment study. Isiolo, Garbatulla, Merti and Samburu East districts.*

Gleitsmann, B. (2005). *The importance of community involvement in the planning and design phases of rural water supply development projects in the Koro Region of Mali, West Africa* .

Guliani S, Gertler P, Schargrodosky E (2005).*Water for life: The Impact of the privatization of water on child mortality*.

Harvey, P.A. and R.A. Reed (2007). *Community-Managed Water Supplies in Africa: Sustainable or Dispensable?'* Community Development Journal 42(3): 365.

Ibrahim F.(2011). *Factors influencing the implementation of sustainable community based project in Kenya a case of Raya water project in Garissa County*. Unpublished MA Thesis UoN

IRC (2012). *Presentation for the first Northern Uganda regional learning forum in Gulu.*

Keen. J. J. (2007). *Methods of initiating community participation in water supply and sanitation Programs.*

Khwaja, Asim Ijaz (2004). *Is Increasing Community Participation Always a Good Thing?* Journal of the European Economic Association

Lachapelle Paul (2008). *Community development:* Journal of the community development society, vol.39, N0.2, 2008.

Majory Ruderman. (2009) *Resource guide to concepts and methods for community based and collaborative problem solving*. Johns Hopkins University.

McCommon, C. et al (2009), *Community Management of Rural Water Supply and Sanitation Services,* Washington DC, USA.

Mackenzie David and Isha Ray (2005). *Household water delivery options in urban and rural India.* Working paper No.224

Mclvor Chris (2008), *Community participation in water management, experiences from Zimbabwe.*

Minar W. and Greer S. (2007). *The concept of community: Readings with interpretations.* New Jersey, Aldine Transaction.

Mugenda M. O. and Mugenda A. (1999). *Research Methods*: *Qualitative and Quantitative Approaches,* African Centre for Technology Studies, Nairobi, Kenya.

Mukunga F. M. (2012). *Influence of community participation on the performance of Kiserian dam water project, Kajiado county Kenya*. Unpublished MA Thesis UoN

Munguti, J.M. (2008). *Does Local Knowledge Count in NGO-Driven Community Development Processes?: The Case of Participatory Approaches in Water Projects in Kitui District, Kenya.* Rotterdam: Erasmus University Rotterdam.

Mushtaq.A.M (2004). *Community participation in water supply and sanitation schemes around Hyderabad, Pakistan.*

Mwakila M. W. (2008). *An Assessment of Community Participation in Water Supply and Sanitation Services: The Case of Yombo Dovya and Barabara ya Mwinyi, Water Community Projects, Temeke, Tanzania*

Ngetich R C. (2009). *An assessment of factors influencing sustainability: The case of community water projects in Keekonyokie Central Location of Kajiado District, Kenya.* Unpublished MA Thesis UoN

Nkongo Diana (2009). *Management and regulation for sustainable water supply schemes in rural communities in Tanzania*

Nwankwoala H.O (2011) *Localizing the strategy for achieving rural water supply and sanitation in Nigeria*. African Journal of Environmental Science and Technology

Ochelle G.O (2012) *Factors influencing sustainability of community water projects in Kenya, a case of water projects in Mulala division, Makueni County*

Ravena K. M. (2009).*An assessment of factors influencing sustainability of foreign aid projects: A survey of Imenti North District Kenya*. Unpublished MA Thesis UoN

Sutton, S. (2005). *The Sub-Saharan Potential for Household Level Water Supply Improvement: Maximizing the Benefits from Water and Environmental Sanitation*, 31st WEDC Conference, Kampala, Uganda, WEDC, Loughborough University, UK.

Toole Nicole. (2002).*Community Participation in water projects, Volume 14.*

UNICEF (2013). *Millennium development goals progress report, New York.*

UNICEF/WHO (2010), *Progress on Sanitation and drinking water*, 2010 updates, http://www.wssinfo.org/fileadmin/user_upload/resources/1278061137 JMP_report_2010_en.pdf assessed on 20th February,2014

Uphoff, N.T. (1987). *Approaches to Community Participation in Agriculture and Rural Development, Cornell University, Rural Development Committee.*

Van S.C (2008) *Gender in water resources management, water supply and sanitation: Roles and realities revisited. International Research Centre for Water and Sanitation. Delft, the Netherlands*

Appendix I: LETTER OF TRANSMITTAL

Peter Nyamoko Mamburi,
P.O Box 2274
Eldoret
Cell phone: 0720748719
nyamokopeter@gmail.com

Dear Sir/Madam,

I am a student at the University of Nairobi undertaking a Masters of Arts Degree in project planning and management. Pursuant to the pre-requisite course work, I would like to conduct a research project to assess the factors influencing community ownership of water projects in Kinna division, Isiolo County.

You have been selected to participate in this study and your voluntary contribution is highly valued. I kindly therefore request you to fill out these questionnaires as accurate as possible .The information you provide will be used for academic research purposes only. You identity will be held with the greatest level of confidentiality.

In case of any information or clarifications, please contact the researcher on telephone number 0720748719.

Thank you.

Peter Nyamoko Mamburi.

L50/83735/2012

Appendix II:Questionnaire for Households

SECTION A: GENERAL INFORMATION

1. Questionnaire Number: é é é é é é é é é é Date: é é é é é é é é é é

2. Name of Interviewer: é .

3. Name of Location:. é é é é é é é é é Sub- Location: é é é é é é é

4. Gender Male ☐ Female ☐

5. How old are you? Please tick appropriate box ã

   ☐ 18-30 years
   ☐ 31-40 years
   ☐ 41-55 years
   ☐ Above 55 years

6. What is your highest level of educational
   ☐ None
   ☐ Primary
   ☐ Secondary
   ☐ Post Secondary

7. a).For how long have you stayed in this area?

   ☐ 0 - 3 months
   ☐ 1 - 3 years
   ☐ 3 - 5 years
   ☐ More than 5 years

b). Can you please tell me the number of all the members of your household who usually live here, eat together and sleep here including yourself? é é é é é é é é é é é é é .

SECTION B: COMMUNITY PARTICIPATION

8. When water projects were implemented in this community who made the decision on selection of construction sites for facilities?

- ☐ Water management committee members
- ☐ The project implementer
- ☐ Village elders
- ☐ Other specifyé é é é é é é é é é é é é é .

9. Which role (s) have the community members played in the implementation of water projects in this community?

- ☐ Provision of communal land
- ☐ Financial contribution
- ☐ Provision of locally available materials

10. In this community is there a water management committee?

- ☐ Yes
- ☐ No

11. In your opinion to what extent does community participation influence community ownership of water projects in this community?

- ☐ To a very great extent
- ☐ To a great extent
- ☐ To no extent
- ☐ To a little extent

12. Is there a water project that you are aware of that was initiated in this community but later it failed?

- ☐ Yes
- ☐ No

If yes why did it fail? Explain

é .

é .

SECTION C: TRAINING

Instruction: *Tick appropriately where applicable***,** *for open ended questions provide brief answer as possible*

13. How does education and training affect community ownership of water projects in your community?

.é é

14. To what extent does education and training affect community ownership of water projects in your division?

☐ To a very great extent

☐ To no extent

☐ To a little extent

☐ To a very little extent

15. What is the extent to which the following aspects of education and training affect community ownership of water projects in your community? Tick appropriate answer

	Very great extent	Great extent	Moderate extent	Little extent	Not at all
Consistency					
Frequency					
Content					
Mode of delivery					
Language					
Background of the facilitator					
Choice of trainer/gender					

Source: (Boru 2012)

SECTION D: TECHNOLOGY USED IN EXTRACTION OF WATER.

16. a) Do you experience interruption of water supply in this area?

□ Yes □ No

b) If yes what causes the interruption (Tick appropriately)

□ Pipe burst and leakages

□ Dry weather conditions

□Generator failure

□ Rationing

□ Lack of fuel

□ Pump breakdown

17. Who repairs the water facility in case of a breakdown?

□ Local Technician trained on maintenance

□ Hired Technician

□ Ministry of Water and Irrigation

□ NGOs

□ Other (s) Specifyé é é é é é é é é é é é é é é é .

18 a) Who pays for the repair works?

□ Water management committee

□ CDF

□ Ministry of Water and Irrigation

□ NGOs

□ Individual philanthropist

□ Others, specifyé é é é é é é é é é é é é é é é .

19. a) Do you pay for water ?

□ Yes □ No

b) If yes how much do you pay per jerrican of wateré é é é

c) If No in **19a** above probe for reasons why water is not paid for?

.....

20. Which type of technology is used in extraction of water in this area?

TICK		TICK	
1	Solar system	5	Gravity system
2	Generators	6	Otheré é é é é é é é é
3	Hand pump		
4	Rope and bucket		

SECTION E: DISTANCE BETWEEN THE USER AND THE WATER POINT

Instruction: Indicate your response in the boxes provided using a tick (ã).In questions which are open ended, please provide a brief answer as possible

21 .a).What is the one main source of water for members of your household during the **DRY** season? **Mark only one answer**

□ Open well

□ Water kiosk

□ River bed

□ Borehole

□ Rain water

□ Water pan

□ Shallow well

□ Water trucking

□ Others (Specify)é .

b) How do you view the distance to the water source mentioned above from your house?

□ Convenient □ it is very far

c) How long does it take to go there, get water and come back?

□ Less than 30 minutes □ within 1 hour □ More than 1 hour

22. a) What is the one main source of water for members of your household during the **WET** season? **Mark only one answer**

□ Open well

□ Water kiosk

□ River bed

□ Borehole

□ Rain water

□ Water pan

□ Shallow well

□ Water trucking

□ Others (Specify)é .

b) How do you view the distance to the water source mentioned above from your house?

□ Convenient □ it is very far

c) How long does it take to go there, get water and come back?

□ Less than 30 minutes □ within 1 hour □ More than 1 hour

b) In a day how frequently do you obtain water from the water source?

□ Once □ twice □ more than twice

23. In your opinion which factor would contribute most towards ownership of water projects in your area? **Tick one answer only**

☐ Community participation during implementation

☐ Community training

☐ Technology used to extract water

☐ Distance between the user and the water point.

THANK YOU FOR YOUR COOPERATION

Appendix III: Questions for Focus group discussion

1. How many members are actively involved in this water management committee?

2. How many women are actively involved in this water management committee?

3. In which way has the community participated in development of water projects in this area?

4. What is the influence of training on community ownership of water projects?

5. Was the water management committee trained on operation and maintenance after the water projects were implemented in this area?

6. What is your opinion on technology used to extract water and the availability of spare parts for the water supply projects in this area?

7. To what extent does distance between the user and the water point influence community ownership of water projects?

Appendix IV:Questionnaire for Key Informant Interview

1. In your opinion how do communities participate in development of water projects in Kinna division?

2. What is the influence of training on community ownership of water projects in Kinna division?

3. Which trainings have been offered to water management committees to ensure sustainability of water projects in the division?

4. What is your opinion on technology used to extract water and the availability of spare parts for the water supply projects in this division?

5. To what extent does distance between the user and the water point influence community ownership of water projects in this division?

Appendix V: List of water projects in Kinna division

	NAME OF WATER PROJECT	TYPE OF WATER STRUCTURE	LOCATION	ESTIMATED NO. OF BENEFICIARIES	YEAR OF CONSTRUCTION	OPERATIONAL STATUS
1.	Yaq-barsadi	Borehole	Kulamawe	880	2007	operational
2.	Kinna	Borehole	Kinna	1500	2012	Non-operational
3.	Kulamawe BH 1	Borehole	Kulamawe	600	2000	Non - operational
4.	Kulamawe AP BH	Borehole	Kulamawe	1200	1995	operational
5.	Kulamawe Sec BH	Borehole	Kulamawe	900	2009	Non-operational
6.	Bibi moliti	Borehole	Kinna	1200	1998	Non - operational
7.	Kifunguo	Shallow well	Kinna	400	1994	Non-operational
8.	Moliti	Shallow	Kinna	550	2009	Non-

		well				operational
9.	Galmadido	Shallow well	Kinna	670	2002	Non-operational
10.	Korbesa	Shallow well	Rapsu	320	2011	Operational
11.	Barambate	Shallow well	Madoyaka	800	2006	Operational
12.	Duse	Water pan	Duse	200	2011	Operational
13.	Hardimtu	Water pan	Duse	150	1972	Operational
14.	Harbur	Water pan	Duse	250	2008	Non operational
15.	Girisa	Water pan	Kinna	180	2000	Non operational
16.	Bibi	Water pan	Duse	120	1978	Operational

Source: District Water Office Garbatulla District (2014)