

**AN ASSESMENT OF SUSTAINABILITY STRATEGIES FOR
COMMUNITY MANAGED RURAL WATER SUPPLY SCHEMES
IN NJORO WARD, NAKURU COUNTY, KENYA**

BY

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C50/CTY/PT/24341/2011

**A Project Submitted to the School of Humanities in Partial
Fulfilment of Requirements for the Award of Kenyatta University
Degree of Master of Arts in Community Development**

November, 2020

DECLARATIONS

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I hereby declare that this project is my original work and has not been presented for a degree in any other university:

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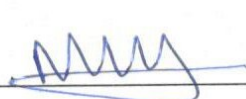
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DEDICATION

I dedicate this project work to my wife Esther, and our three children; Felix, Rachael and Howard. They were supportive as I spent much of their time preparing the document. My parents too, gave me the motivation to pursue this dream right from the time I enrolled for this programme. My father - Francis Mogaka, mother - Miriam Kwamboka and mother in-law, Prisca Kemunto kept me on toes, inquiring every step of my project writing's progress!

ACKNOWLEDGEMENTS

God has always been gracious to me as i worked on this document. May His name be glorified!

This journey of research writing has exposed me to a number of scholars who have immensely encouraged and enriched me to fine tune the project. I wish to acknowledge the vital role played by my lead advisors: Dr. Anne Kamau and Dr. George Evans Owino. Their input enriched this study a great deal. Further, i wish to acknowledge the concerted efforts played by all Kenyatta University's faculty members in preparing me for the noble task. On their behalf i wish to single out Dr. Muia for mentoring me to be a scholar. Above all, i wish to thank God for my good friends - Dr & Mrs Howard Sprague who granted me an opportunity to pursue university education through their finanacial support. May the Lord bless the family richly. I may not be able to mention all those who wished me well in my studies, but God knows all by name and He will definitely reward you according to His riches and glory.

ABSTRACT

Community managed rural water supply schemes (CMRWSS) are community water projects undertaken with and for the community in addressing local interest, needs and aspirations. From preliminary observations, most CMRWSS in the country collapse or perform below expectation soon after the implementation phase. Some literature reviewed in this study attest to the fact that some of these rural water projects which depend on external funding stagger to survive once the support gets withdrawn as a result of what this study view as unreliable sustainability strategies in place. Report from World Bank (WB) reveals that the Government of Kenya receives donor aid from various sources to fund water projects in the country but most projects fail to yield expected results. That scenario opened a research gap the study sought to unravel. Thus, the study embarked on assessing sustainability strategies of CMRWSS by probing how community participation; project financing; management approaches and community training on operations, maintenance and management would influence sustainability frameworks used by CMRWSS. The study site was Njoro Ward of Nakuru County. The study used the stakeholders' participation theory which appreciates the input of both internal (community) and external (donor) stakeholders as integral players in enhancing sustainability. Descriptive survey design was used as it gives an in-depth probe of the phenomenon under study. The target population was 4,743 registered members belonging to seven CMRWSS. The unit of analysis was 'household' because CMRWSS' membership was per each household. Yamane (1967) formulae with an error margin of 5% was used to obtain the sample size of 368 out of the given target population. The sampled respondents were distributed among the four sub-locations in the vast Ward using stratified proportional sampling technique based on membership strength for each sub-location. Respondents from each stratum (sub-location) were selected through a simple random sampling technique. Five key informants were selected purposively to give their opinion on the subject matter. The questionnaire was the primary instrument or tool for data collection for this study. Quantitative data analyzed using SPSS (Version, 20) and descriptive statistics were presented through percentages and frequencies. The information was presented by use of bar charts, graphs and pie charts and discussions. Content analysis was used to analyze data that was qualitative in nature from open-ended questions. The study established that sustainability strategies of community managed rural water supply schemes could be made effective by: involving stakeholders to participate fully, adoption of reliable management approaches, training of community management committee frequently on project operations, maintenance and management. Developing strategic plans for financing water supply systems was also crucial. The study recommends that community members should be engaged actively across all the phases of the project, particularly at the planning and design phases. Also, the study recommends that policy makers could formulate policies to address sustainable financing of community water projects.

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OPERATIONAL DEFINITION OF TERMS

- 1. Community Managed Rural Water Supply Schemes:** These are water projects undertaken with and for the community to address local interest, needs and aspirations. The local people play active roles in the projects.
- 2. Community Participation:** Refers to the involvement of community members throughout the project life cycle in decision-making processes, need assessment activities, project design and implementation.
- 3. Community Training on Project Operations, Maintenance and Management:** Enhancement of knowledge and skills to community members about the project operations and maintenance
- 4. Government Water Policies and Conservation:** These are the laws, statutes and procedures formulated by government to govern, design and implementation of water projects.
- 5. Project Financing:** Refers to the actual financial support provided by donors, government and other local agencies to the community projects.
- 6. Project Management Approaches:** Refers to the methodologies and approaches employed by donors, government and other development partners in initiation, designing, implementation, monitoring, evaluation and closure or transition of projects.
- 7. Project Sustainability:** This is the process of ensuring an adaptive prevention system, sustainable infrastructure and interventions that can be integrated into ongoing operations to benefit diverse stakeholders
- 8. Sustainability Strategies:** These are approaches employed by project designers to enhance project growth and development in order to enhance indefinite functionality of the system

ABBREVIATIONS AND ACRONYMS

ASAL	Arid and Semi-Arid Lands
ADB	Asian Development Bank
CBO	Community Based Organizations
CMRWSS	Community Managed Rural Water Supply Schemes
DFID	Department for International Development
GoK	Government of Kenya
IFAD	International Fund for Agricultural Development
MDGs	Millennium Development Goals
NDMA	National Drought Management Authority
NGOs	Non- Governmental Organizations
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PM	Project Manager
PMI	Project Management Institute
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WB	World Bank
WHO	World Health Organization

WPEP	Water Supply and Sanitation Performance Enhancement Project
WRMA	Water Resource Management Authority
WSP	Water and Sanitation Program
RWSN	Rural Water Supply Network

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Water scarcity is a phenomenon that adversely affects arid and semi-arid lands (ASAL) worldwide. According to Brooks (2006), the ASAL are the most affected as the world faces severe and growing challenges to sustain water quality and to meet the rapidly growing demand for water resources, particularly among rural communities in Africa. Adams (2014) noted that 51 per cent of the people in Sub-Saharan Africa lack access to safe and clean water whilst 14 countries including Kenya were already experiencing water stress and another 11 countries were expected to join them by 2025. Access to water is a basic human right that is threatened by increasing water consumption needs such as domestic, commercial and agricultural purposes.

Even though water is one of the basic needs of a human being, achieving sustainable water supply remains one of the major challenges in 3rd world countries. About 900 million people get water from unsustainable sources. The majority of these people are from rural areas. In Africa's rural masses for instance, have boreholes, rivers and rainwater harvesting as their main water sources. However, respective governments in the continent are troubled by sustainability prospects of these water sources (UN-Water, 2014). The provision of clean drinking water is a fundamental development requirement to reduce waterborne diseases, promote economic and social development (Vammen, 2012). In an earlier finding, over 141 million urbanites and 743 million rural dwellers continue to rely on unsustainable sources for their daily drinking water needs (United Nations, 2011). Worldwide, 84 percent of the people who have limited access to drinking water supplies live in rural areas. Even where rural supply systems are developed, many are in disrepair or not functioning properly (Rural Water Supply Network, 2012).

Unsustainable water points deprive people of intended health and livelihood benefits (Shaw, 2012). Poor management of water and sanitation resources is a major impediment to achieving the Millennium Development Goals (Otti, 2012). Studies show that rural water supply programmes in developing countries have frequently failed to deliver benefits to society over the long term, mainly because of the kind of approaches used. For example, according to Garriga and Pérez-Foguet (2008), the emphasis has been on the fast production of new schemes while sidestepping post-construction support. According to Lockwood and Smits (2011), the non-performance of most rural water supplies is alluded to inadequate sustainability strategies employed by the community managed rural water supply schemes (CMRWSS).

Current drinking water policies for developing countries are based on the premise that rural water supply facilities, such as improved hand-dug wells, hand pump-fitted boreholes, or spring developments are best managed by community organizations of local water users (Sun, Asante & Birner, 2010). Similar to many developing countries, Kenya has adopted a Community Ownership and Management strategy under which community water and sanitation committees handle day-to-day maintenance and repair needs of the water facility. In spite of its wide application in many developing countries, the community-based approach to rural water supply is faced with sustainability related challenges (Harvey and Reed, (2004). Thus this study intention was to assess the sustainability strategies for community managed rural water supply schemes in Njoro Ward , Nakuru County, Kenya.

According to the *National Policy on Disaster Management* (Kenya, 2009), Kenya is among countries in sub-Saharan Africa that face challenges of water scarcity and access. ASAL in Kenya form 80 per cent of the country's land mass occupied by 25 per cent of the country's population (Kenya, 2009). The ASAL in Kenya includes the vast areas of Northern, Eastern and some parts

of Rift Valley. Parts of Njoro Ward recurrently display characteristics of semi-arid lands especially in the months of January, February, November and December when dry spells hits the area.

The Sessional Paper No. 8, Kenya National Policy for the Sustainable Development of Northern Kenya and other Arid Lands (Kenya, 2012), recognizes that ASAL have a potential to enhance economic growth of the country if the scarce resources are accessible to the rural masses. This insight has spurred government and non-governmental organizations to launch community managed rural water supply schemes (CMRWSS) in the ASALs regions including the area of study, Njoro Ward. Not all the ASAL regions of Kenya have been covered and some of the communities have organized themselves and formed their own CMRWSS to ensure that water is closer to their homes like in the case of Njoro Ward (WHO & UNICEF, 2008).

The World Bank report reveals that the Government of Kenya receives donor aid to fund water projects (World Bank, 2014). Unfortunately, most of these community managed rural water supply schemes (CMRWSS) collapse while others operate under capacity soon after initiating implementation because of unreliable sustainability strategies used (Official Development Assistance, 2014). The Kenya government reports that 63 per cent of community managed rural water supply schemes collapse shortly after implementation (Government of Kenya, 2012). The failure of some of these CMRWSS is blamed on low sustainability rates of water supply systems as a result of lack of ownership, inadequate education on water supply and sanitation as well as poor management skills (Harvey & Reed, 2007).

Many CMRWSSs are failing to realize their intended objectives with a good number of them collapsing before completion because of sustainability challenges. Preliminary observations across Njoro Ward had shown that access to safe drinking water remained a major concern in the area. According to Gebrehiwot (2006), collapse and failure of most CMRWSSs is as a result of

inadequate sustainability strategies applied by the implementing agencies. Other findings attribute poor sustainability strategies to inappropriate policy or legislation; insufficient institutional support; unsustainable financing mechanisms; ineffective management systems; and lack of technical knowledge (Niyi Gbadegesin & Felix Olorunfemi, 2007).

According to Johnson, Hays, Center and Daley, (2004) project sustainability is the process of ensuring adaptive prevention system, sustainable infrastructure and interventions that can be integrated into ongoing operations to benefit diverse stakeholders. Sustainability entails the management of resources in a manner that ensures benefits for both current and future generations. This study assumed that appropriate sustainability strategies would aid rural water supply projects to attain their sustainability threshold. According to Asian Development Bank (ADB)'s report, CMRWSS become noticeably unsuccessful even without any technical failures, while others achieve their targets with ease (ADB, 2010). This could be as a result of knowledge disparity on how different development players view sustainability strategies. Thus this study sought to assess sustainability strategies for CMRWSS in Njoro Ward in relation to community participation, project financing, management strategies and community training.

1.2 Statement of the Problem

This study aimed at assessing sustainability strategies for community managed rural water supply schemes (CMRWSS) in the management of water resources in Njoro Ward. In spite of a number of CMRWSS presence in the area, water scarcity phenomenon continued hurting development prospects in the area. This scenario as confirmed by Gebrehiwot (2006), the rural communities do not actually need launch of new multiple water projects but just management of existing ones to yield sustainability. The government of Kenya also confirms the same argument that some of the old rural water supplies either may have collapsed or are operating under capacity

(Kenya, 2012). Thus, establishment of more new rural water projects alone will not address water scarcity issues if appropriate sustainability strategies for CMRWSS are not in place (Gebrehiwot, 2006). Other studies conducted on water project sustainability such as (Ngetich, 2009) showed that most water projects do not function to the full capacity and recommended further studies to be carried out to ascertain factors that would influence sustainability strategies of rural water projects.

Likewise, Habtamu (2012) on his part established that most water projects in rural Ethiopia decline in performance shortly after external support has been withdrawn recommending that further studies be done on factors that would influence sustainability of such projects in other rural parts of African countries. Based on this background, the study sought to determine how community participation, project financing, community training and management approaches as independent variables influenced sustainability strategies (dependent variable) to yield performance of CMRWSS in Njoro Ward. The study assumed that rural water projects will perform optimally if the right sustainability strategies are practiced by CMRWSS. According to Kothari (2004), sustainable projects are those whose performance is able to benefit the intended beneficiaries over a long period of time. Optimal performance of CMRWSS under this context is to be experienced through reliability of the water sources; quality of the water resource; adaptive and sustainable management of the water projects; and tangible benefits enjoyed by the rural populace.

1.3 Research Questions

The study was guided by the following five research questions:

- i. What are the ways of community participation practiced by CMRWSS in Njoro Ward?

- ii. What are the management approaches employed by CMRWSS in Njoro Ward?
- iii. What levels of project training do members of CMRWSS go through in Njoro Ward?
- iv. How do members of CMRWSS fund their water projects in Njoro Ward?
- v. How do government policies and conservation affect sustainability strategies of CMRWSS in Njoro Ward?

1.4 Objectives of the Study

The general objective of the study was to assess the sustainability strategies for community managed rural water supply schemes (CMRWSS) in Njoro Ward.

1.4.1 Specific Objectives

The study was guided by the following specific objectives:

- i. To assess how community participation affects sustainability strategies of CMRWSS in Njoro Ward.
- ii. To examine the management approaches for sustainability strategies of CMRWSS in Njoro Ward.
- iii. To assess how community training on operation, maintenance and management of CMRWSS in Njoro Ward affect sustainability strategies of the water projects.
- iv. To establish how project financing affects sustainability strategies of CMRWSS in Njoro Ward.
- v. To examine how government policies and conservation affect sustainability strategies of CMRWSS in Njoro Ward.

1.5 Assumption of the Study

This study assumes that in the management of Community Managed Rural Water Supply Schemes in Njoro Ward, there is a significant relationship between the sustainability strategies (dependent variable) for the water projects with community participation, management approaches, community training, project financing, and project financing (independent variables).

1.6 Justification of the Study

The study area experiences recurrent water shortages. Njoro Ward falls under Arid and Semi Arid Lands (ASAL) of Kenya in the vast Rift Valley region (Kenya, 2009). Annually, the area is hit by dry spells especially towards the end of the year. When this happens, rivers, streams, dams, boreholes dry up as rain fails. The community members living in this area are forced to trek for kilometers in search of clean water for domestic use. Despite the effort of both national and county governments as well as donors to address water scarcity, there is little success achieved. According Nakuru County Government data on Water Resource Management, more than fifteen (20) government and donor-funded projects have been initiated in the Ward (Nakuru County Government, 2017).

Despite this heavy investment in clean water projects, still water shortage need is high at Njoro Ward. Most of these projects ceased operations while others are underperforming. The County report further indicated that a mere 15.7% are able to access tap water while 49.3% access water from unsafe sources including; untreated wells, rivers, ponds, dams, and streams. Only 35% are able to get their water from water reservoirs served by boreholes and rain water (Nakuru County, 2017).

1.7 Significance of the Study

The study findings are helpful to provide the ways forward to help the government and the concerned communities to arrive at the desired sustainability strategies to manage the water resources sustainability. Further, the findings shall be used by both National and County governments to refine the approaches and policies that have been in use to achieve sustainability of Community Managed Rural Water Supply Schemes (CMRWSS) in Njoro Ward in vain. The communities and other stakeholders in the running of CMRWSS will greatly benefit from the study because the findings have depicted the current scenario on the ground against the ideal situation in regard to sustainability strategies of the water schemes. This study has articulately presented the value of community participation, good project management practices, community training and effective project funding in developing sustainability strategies of the CMRWSS.

The findings of the study are also expected to add to the existing body of knowledge especially in the field of community development and management of water resources and enhance efforts towards sustainable development. The literature will be useful to scholars as a reference material when carrying out further research on issues of sustainability of community development projects. It is expected that the recommendations of the study will inform the government on the need for policy development or review of the existing policies that will ensure a conducive environment for implementing sustainable water projects. This will lead to improved service delivery by concerned government departments.

1.8 Scope of the Study

The study sought to understand sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward. The study covered four sub locations; Njoro, Migaa, Subuku and Mukungugu. The sub locations were specifically considered for this study in the sub

county because of the heavy presence of CMRWSS. Further, each of the project therein had at one point received funding from either community contributions, government subsidies or donor agency and had been in operation for at least one year before the study was carried out.

1.9 Limitations of the Study

The findings of this study were confined to Njoro Ward of Nakuru County. The findings may not be an accurate representation of all other areas not covered by the study. Any generalization must be taken with caution. Further, the study encountered language barrier for a few of the respondents who had limited education background.

1.10 Delimitations of the Study

Even though the findings of this study were confined to Njoro Ward of Nakuru County, the inferences made represent the presence or absence of sustainability strategies studied in Community Managed Rural Water Supply Schemes (CMRWSS). Sustainability strategies may vary from one water project to the other but performance indicators of the rural water projects will always remain similar. Therefore, the findings of this study can still apply to other rural settings with similar characteristics like Njoro Ward. However, the study did not exploit all factors that would influence sustainability strategies. Instead, the study proposed the uncovered areas as potential areas of study by other researchers. Further, the study did not allow language barrier to derail the study work. The study chose to work with local guides in helping respondents with limited education background to understand the questions posed in the questionnaire.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines the literature review related to sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward. The review interrogated various sources of literature such as books, journals, websites and reports. Literature for this study was reviewed under five main themes; community participation, project financing, management approaches, and community training considered as integral in understanding sustainability strategies of community managed rural water supply schemes in Njoro Ward. Further, theoretical review and conceptual framework are discussed under this chapter.

2.2 Sustainability Determinants

A good number of scholars have carried out substantial research on project sustainability both in local and international arenas. Clamor for sustainability as a concept in community development began in 1980s. It became difficult to define development in the absence of the adjective ‘sustainable’. For example Brundtland, (1987) defined sustainable development as the situation that meets the needs of the present without compromising the ability of future generations meeting their own needs. According to International Fund for Agricultural Development strategic framework, sustainability amounts to ensuring that the benefits realized from projects can be maintained to live longer beyond implementation phase (IFAD, 2007). Sustainability entails determining whether the results of a given project can be sustained much longer even when the project has been handed over to the local beneficiaries. For a project to achieve sustainability, it needs to be implemented through a strategic approach that includes user involvement models which focus on long term benefits of desired interventions (Ingle, 2005). Involving community

water users in planning, implementation, operation, protection and maintenance of water supply systems are key to sustainability of water projects. Community involvement refers to contributions in form of money, labor, material, equipment, and participation in project-related decision-making forums and activities (Davis & Lyer, 2002).

Sustainability of community managed rural water supply schemes (CMRWSS) are influenced by a number of factors which vary from one region to the other. For example, Munyui (2015) researched on factors influencing sustainability of community managed water projects in Kitui West Sub-County and found that sustainability of such projects depended on community participation, technology, management and financial factors. Mochiemo (2014) in a study on factors influencing sustainability of water projects in Kenya - the *Maji ni Maisha* water project in Kibera established that sustainability of water projects is influenced by financing, governance, community participation, monitoring and evaluation of the water projects. Mulwa (2013) conducted a study on factors influencing sustainability of water supply projects in central division, Machakos District of Machakos County. He found that proper planning and implementation, community management, cooperation of stakeholders and proper financial management have a bearing in determining sustainability of community water projects.

The following sections discusses the sustainability determinants (independent variables) the researcher picked to aid this study in understanding sustainability strategies of community managed rural water supply schemes (CMRWSS):

2.2.1 Community Participation

According to Mwangi (2006), community participation refers to taking part in the formation, implementation and management of initiatives by community members. It is the process by which community members' opinions and views affect decision making at community

level. Participation is either directly or through a legitimate intermediate institution or representatives. Good participation needs to be informed and organized. Participation of community members in development initiatives creates awareness, motivates, organizes actors and helps draw out priorities to help build long-term capacities to manage and negotiate, improve accountability by bringing different actors in a good relationship. Community participation is the glue that binds together all actors in a project (Roodt, 2001).

Involving the community from the onset of project initiatives and addressing the local situation and socio-economic needs of the community, project activities could be effectively planned and even implemented. It is important to focus on both community needs and assets to ensure positivism in both project and community (Mancini, Marek & Brock, 2003). According to Regional Partnership for Resource Development (2009), participatory development is an end because it initiates an empowerment process which allows those affected by the project to assume responsibility for designing initiatives, implementing them and maintaining high levels of project sustainability. It is a goal in itself and which can be expressed as an empowerment process of their acquiring the skills, knowledge and experience to take greater responsibility for their development. Community participative approaches depend on people and nothing happens or succeeds without their cooperation and involvement. Many development projects have stalled or collapsed as a result of lack of certain fundamental participatory processes involving people and because of these lapses management gaps emerge and threaten the survival of the projects and their fruition (Mulwa, 2008).

Evidence from several cases show that availability of project funds alone is not a guarantee for the success of the project and by extension its sustainability. People's participation in management, monitoring and evaluation is important. The traditional community structures must

be respected because they legitimize the project whether funded by the government of a Donor Agency. Their involvement in the management allows them to accept the project and hold the local leadership accountable for the funds being used and how the project quality shapes up. Other scholars have stated that cultural factors are important in the success and sustainability of community projects. The relevance of a project to the cultural norms and taste of the local people should be established early to avoid unnecessary losses on projects which turn out to be white elephants.

In addition to creating local committees at the conception stage, it is also important to involve them in the management of the project throughout the entire project life (Mulwa, 2008). If this is not done the development interventions from the external donors may fail to sustain the required level of development activity once support is withdrawn by the funding agencies (Kumar, 2002). It has been argued that people's participation has many advantages. Chief among them are sustainability of the project, ownership of the process and the final product by members of a given community. When people participate and take control of the process it means that either the funding agency or the government has to relinquish some authority, power and control. Increased empowerment of people lead to increased capacity to manage processes, monitor, evaluate, make decisions and gain analytical ability to understand their own difficult situations and therefore increased agitation to be involved in all aspects of development (Kumar, 2002).

2.2.2 Management Approaches

Management of projects involves increasing the alignment of development projects with host community's priorities and coordinating aid efforts at all levels (local, national, and international) to increase ownership and efficient delivery of services. It is therefore basically offering leadership to achieve certain laid project objectives. According to McDade (2014), good

management ensures that sufficient local resources and capacity exist to continue the project in the absence of outside resources. Community based projects are complex (Weinberg, 2008) and require multifaceted management skills. A project manager (PM) has to manifest not only project management related skills (Kirsch, Ko & Haney, 2010), but also technical and expertise as required by the project (Thite, 2011). Project management activities include but are not limited to defining project scope and requirements gathering, managing resources and relevant training issues within a project, advising about technical architecture, identifying specific and general project management practices and escalation procedures, estimating project schedule and budget, ascertaining and managing risks within a project and preparing risk mitigation. The study noted that skilled and focused management approaches with clear objectives can spur performance of water projects by managing resources efficiently.

In Colombia, management competencies were enhanced by professionalizing community based water service providers through promoting good business practices such as proper book keeping, billing, customer relations, hiring and paying competent personnel and outsourcing some service provision tasks to private operators (Kleemeier, 2010). Mesa, Tamekawa, Ezbakhe, Cuadrado and Chan (2014) did a critical analysis of the past 30 years development of 130 successful community managed water projects across Latin America, the Caribbean, Pakistan and Sub Saharan Africa and found that adds-on (plus factors) that included community leadership, initiative, transparency and accountability were necessary for sustainability to occur. The most successful community managed rural water supplies in the case study were because of formal support for the community management and capacity building on management. A case study review for Colombia's Sucuneta multi village

water scheme found that it had improved in management when it hired competent personnel that included a manager, a supervisor, an accountant and plumbers within the community members (Mesa, et al. 2014).

Lockwood and Smits (2011) found that there was marked success in sustainability of community managed rural water supplies after instituting professional management in 13 countries namely; the United States of America, South Africa, Sri Lanka , India, Mozambique, Uganda, Benin, Burkina Faso, Colombia, Ethiopia, Honduras, Thailand, and Ghana. As the rural water supply expanded from basic point sources to reticulated systems serving more people, more improved management skills and competencies were required. Naiga, Penker, and Hogl (2015) found that about 50% of community managed rural water points' projects in Uganda were characterised by pool resources problem such as over use and free riding and this posed a problem in operations and sustaining water infrastructure.

Tadese, (2013) found out that in Adama region of Ethiopia 21% community managed water supply projects relied on the government and NGOs for sustainability and therefore community management capacities were low. Water Aid (2009) found that the major cause of poor sustainability of 38 community managed rural water supplies in Dodoma villages in Tanzania was as a result of weak revenue collection, lack of accountability from the water committees, poor financial management and inability to meet cost recovery. Mesa et al. (2014) attributed success of Manduli water supply project in Tanzania to community leadership and emphasis that was put on training water management together with users on book keeping skills, transparent management of funds and the O&M management aspects.

2.2.3 Community Training on Project Operation, Maintenance and Management

Human resource development through specialized training of project managers, staff, community members and the whole project team is important for project success and sustainability. Campo (2008), in an intervention model introduced in Peru for water supply considered community training as an important component in which the project used various methods of training such as audio-visuals arguing that training on issues like operation and maintenance empowers the communities to look after water supply systems thus aiding sustainability.

Lack of community training could lead to breakdown and non-sustainability of water supply projects in developing countries (Ademiluyi & Odugbesan, 2008). In their study, they pointed out that even where full community participation or management is planned from the start, community-level committees and care takers may lose interest or trained individuals may move away. This can be a particular risk if community level organization is on a voluntary basis. Mengesha, Abera and Mesganaw (2003) in their study on sustainability of drinking water supply projects in rural North Gondar, Ethiopia, recommended that building adequate skills and capacity in maintenance of water sources is an essential factor to sustain the water system. Nerubucha (2011) observes that competent operating personnel are important for sustained and safe operation of small water systems. Community members must be equipped with the necessary knowledge on how to operate, repair and maintain water supply system as this will enhance sustainability of the project (Campos, 2008). It was noted by the study that informed trainers with right content, and appropriate training aids, the recipients are likely to benefit with requisite skills to run the water projects even when external implementers are long gone.

2.2.4 Project Financing

The financial factors that contribute to sustainability of a water supply system include efficient revenue collection, the ability to meet the cost of operation and maintenance and the willingness to pay for the services. According to World Bank (2007) evaluation report, sustainability of water supply projects can only be ensured if tariffs generate enough resources to operate the system and replace the infrastructure after its useful life. Finances Are needed for Operation and Maintenance (O&M) to keep the system functioning.

According to Cardone & Fonseca, (2003), a water system is regarded as being financially sustainable if there is a full recovery of all costs. After system construction, these costs are not only the costs for operation and maintenance but also other costs such as external government support. Baumann (2006) stated that the inability of communities to collect sufficient revenue for repairs could reduce the life expectancy of installed water supplies. Most rural supplies serve poor communities. The question of whether such communities are actually able to pay for O&M of low cost technologies is often raised, but research suggests that willingness to pay is a more important issue than ability to pay (Harvey, 2008). Mommen & Nekesa,(2010) argue that most users of rural water supplies are relatively poor and not able to pay for water service without external support. External support available to communities can be from NGOs, national and local government institutions, as well as the private sector (Carter, 2010). In recognizing that communities cannot autonomously manage services, Gine and Perez-Foguet (2008) call for appropriate institutional support where governments don't neglect their responsibilities to train technicians, encourage and motivate communities, as well as monitor service performance.

According to Binder (2008), the financing process which involves raising and maintaining adequate funding for water facilities is of critical importance to sustainability. Insufficient

financing is a major factor for poor maintenance, which is often cited as the main reason for project failure. Particular problems exist in rural areas, where the cost of water services is higher while affordability is lower as tariffs rarely cover operation, maintenance, repair and replacement costs. It can be observed that various approaches have been tried by donors, and governments to address sustainability in financing of water projects. Such approaches include, promoting increased capital cost recovery from users, in-kind contributions, improving community level financial management and resource mobilization (especially for major repairs/replacements and service expansion) financing mechanisms through public/private partnerships, special arrangements with the banking sector or other water-related organizations to bridge the gap between donor and user funding (UNESCO, 2003).

Ijjasz (2006) argues that there is potential in funding of rural water supplies through microfinance. New alternative financing avenues need to be explored for financing future expansion after initial project is completed and this is especially more critical where there is basically no grant financing. Management of cash flow generated from water sales is key in ensuring the project pays back the grants provided by the Microfinance agency and to continue providing the services in a sustainable manner. Further, Ijjasz (2006) also observes that for effective sustainability of programmes, a seamless downscaling of expatriate roles and responsibilities should be commenced and the proportional increase in the local talent during the project life. This is predicated on the assumption that over the project period enough local capacity was built among the local experts to gain professional and technical knowledge to manage the project. Usually, as the project approaches its final stage, the donor input into direct operations and leadership declines significantly and only limited to consultations and support. This now calls

for leadership on the part of expatriate staff to begin preparations for a smooth exit strategy and start mentoring replacement staff early.

2.2.5 Government Policies and Conservation Strategies

Policy integration involves the coordination of government policies and the corresponding and complementary positions and initiatives of governance actors. Organization for Economic Co-operation and Development (OECD, 2002) agrees that sustainability requires policy integration, along with improved interaction between government and non-government institutions. According to the United Nations Economic and Social Council, Economic Commission for Africa (2005), appropriate regulatory frameworks and institutions at national level to oversee water and sanitation services provision are essential to operationalize national policies, protect property rights, and generate equitable returns on private investments through efficient tariff structures and levels, service standards, and expansion targets. Better governance is a prerequisite for, and probably also a product of, steps towards sustainability. According to Kemp, Parto and Gibson (2005), good governance consists of open participation, accountability, effective coherence, and efficiency.

In Kenya, the main objective of the National Water Policy (NWP, 2012) is to develop a comprehensive framework for sustainable development and management of the country's water resources. The policy aims at ensuring that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes. Additionally, this policy seeks to address cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Also, the policy lays a foundation for sustainable development and management of water resources in the changing roles of the central government from service provider to that of coordination, policy and guidelines formulation, and regulation.

In the Water Act 2016, the passage of Kenya's 2010 Constitution has had a wide set of implications for the water sector. Primarily, the Constitution acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to 47 newly established counties. The purpose of the 2016 Water Act is to align the water sector with the Constitution's primary objective of devolution. The act recognizes that water related functions are a shared responsibility between the national government and the county government. It also gives priority to use of abstracted water for domestic purposes over irrigation and other uses. (Government of the Republic of Kenya Laws, 2016)

2.3 Summary of Literature Review and Research Gaps

Baker (2000), asserts that despite the billions of dollars spent on development assistance year after year, the actual impact of projects on the poor is not feasible and this implies that sustainability of such development intervention is yet to be addressed. External support on community managed rural water supply schemes (CMRWSS) often does not consider post impact evaluation of the projects. The literature reviewed reveals that in spite of what is known about the value of enhancing sustainability and what has been instituted by different institutions, there are still indicators of poor and even no sustainability of CMRWSS. This means that further studies can unearth some of the factors that contribute to this.

It emerged from the reviewed literature that CMRWSS are established to provide beneficial effects (access to clean water) to the target communities. However, it is not the number of water project established that would solve water scarcity phenomenon experienced in areas like Njoro Ward. As argued by Gebrehiwot (2006), project implementers should consider captivating sustainability prospects of the water projects already existing. This gap informed the choice of this study area to assess sustainability strategies for community managed rural water supply schemes

(CMRWSS) in Njoro Ward. This was made possible by evaluating the influence sustainability determinants; community participation, project financing, project management approaches and community training would have on sustainability strategies for community managed rural water supply schemes (CMRWSS) in Njoro Ward.

2.4 Theoretical Framework

This study was hinged on Stakeholder's theory. Stakeholder theory argues that every legitimate person or group participating in the activities of a project do so to obtain benefits, and that the priority of the interest of all legitimate stakeholders is not self-evident (Donaldson & Preston, 1995). According to Freeman (1984), a stakeholder is any group or individual who can be affected or is affected by the achievement of the project's objectives. Project Management Institute's Standards Committee based in the US view project stakeholders as individuals or agencies actively involved in the project or whose interests may be affected by the execution of the project or by successful project completion (PMI, 2004).

Chinyio and Olomolaiye (2010) in their findings found that stakeholders can affect a project's functioning, goals, development and even survival. They also viewed stakeholders as beneficial when they help achieve project goals and antagonistic when they oppose to the mission. Stakeholders are vital to the successful completion of a project because their unwillingness to continuously support the vision or objectives of the project leads many projects to fail. It is therefore imperative owing to the above arguments that Community Managed Rural Water Supply Schemes (CMRWSS) can optimally meet their sustainability prospects through participation of each and every stakeholder throughout the project cycle. This explains why the study chose Stakeholder's theory.

2.4.1 Conceptual Framework

Independent Variables

Dependent Variable

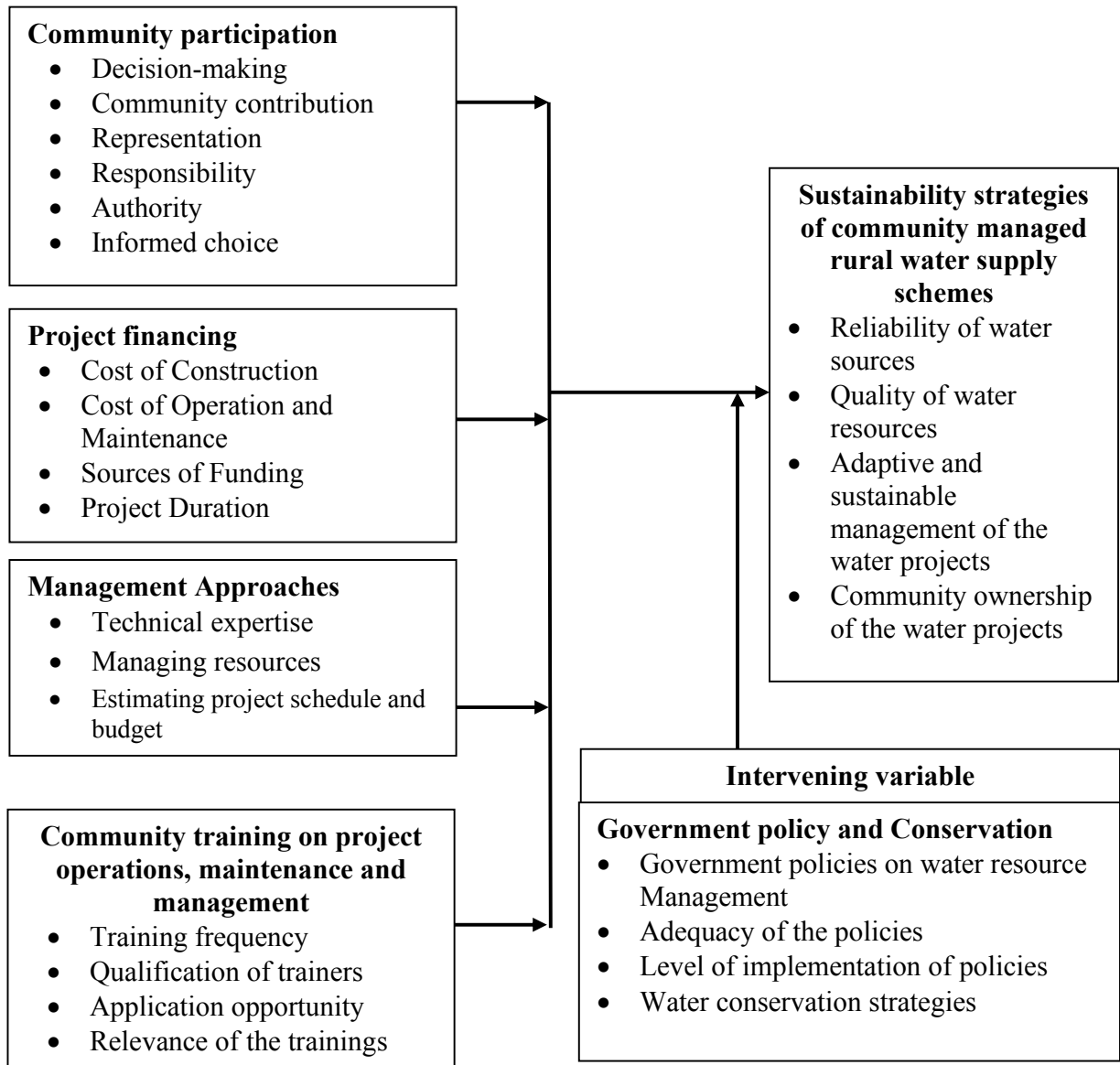


Figure 2.4.1: Conceptual Framework

Source: Researcher, 2019

As expressed in the theoretical framework (2.4) above, stakeholders' theory values both internal and external stakeholders. In the case of Njoro Ward, internal stakeholders would include the community whose involvement in the water projects would spur ownership, an important aspect in project sustainability. External stakeholders would bring in players like the government with regulatory mandate, donors and other development partners will bring in funding and requisite skills. According to Harvey and Reed (2007) participation of project stakeholders enhances the sense of ownership of the project from all players. This is important in ensuring that water projects are operated and maintained even after the implementation phase.

Stakeholders' involvement is attained through collaborative or joint involvement of project beneficiaries and the implementing agencies (Khwaja, 2004). Conceptually, sustainability strategies have been operationalized as the dependent variable, being influenced by independent variables; community participation, project financing, management approaches and community training as explained in the two paragraphs above and the illustrations presented in Figure 2.4.1. Further, the study presents government policies as intervening variable with express influence on sustainability strategies.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter discusses the methodology approach for the study and highlights key sections of: research design; study area description; target population; sampling technique; data collection instruments; validity and reliability of research instrument; data analysis and presentation; and ethical and logistical conclusions.

3.2 Research Design

The researcher considered descriptive survey design as the most appropriate in understanding sustainability strategies of CMRWSS in Njoro Ward. According to Cooper and Schindler (2006), a descriptive study is concerned with finding out the what, where and how of a phenomenon in a large population like in the case of Njoro Ward. The explicit nature of the design aided this study to assess sustainability strategies for community managed rural water supply schemes (CMRWSS) in Njoro Ward, Nakuru County.

3.3 Study Area Description

The study was carried out in Njoro Ward's four administrative sub locations (Njoro, Migaa, Subuku and Mukungugu). The community managed rural water supply schemes (CMRWSS) were either launched by community members, government or donor agencies operating in the area. The water projects which were initially implemented by the government or donor agencies have since been handed over to the community to manage. The communities living in Njoro Ward have diverse water uses. There are those who use the water for domestic use, livestock and agriculture. In Njoro Ward, there are several water supply sources available including protected springs, piped

water from Njoro River, community boreholes, County Government water projects and rain-water harvesting programs. This study concentrated on community managed water projects.

3.4 Target Population

Njoro Ward has a population of 57,429 with 124.46 square kilometers surface area (National Population and Housing Census, 2009). The sample frame for this study was 4,743 registered members belonging to 7 community managed rural water supply schemes (CMRWSS). Njoro Ward had a total of 10 rural water projects spread across the 4 sub locations. The criterion for picking the first 7 water projects was based on the fact that the water projects have been in existence for at least one year before this study, have elaborate management structures, the membership was active, the projects had received donor funding previously, and the records were well documented. Five key informants were also sought to give their opinion.

3.5 Sampling Technique and Procedures

The seven (7) water projects had a membership population of 4,743 registered members. The inclusion criterion that favored the first 7 water projects was informed by elaborate management structures of the water projects, having received external funding in the past, active membership, well kept records and the fact that the 7 water projects have been in existence for over one year before this study. The other 3 projects did not meet the criterion. This study adopted Yamane (1967) simplified formula for proportions to determine the appropriate sample size for this study with acceptable margin error of 5%. Thus:

$$n = N / [1 + N (e)^2];$$

Where n is the sample size

N is the population size

e is the acceptable margin of error

$$n = \frac{4,743}{1 + 4,743 * 0.0025} = 368$$

Taking the population size of 4,743 and a desired acceptable margin error of 5%, the formula generates a sample size of 368 respondents. The 368 respondents from the 7 CMRWSS were distributed through a stratified proportional sampling technique to the 4 sub locations as strata considering the numbers of projects and strength of membership each sub location (stratum) prides as expressed in Table 3.1 below. Simple random technique was then applied to pick the respondents from each of the stratum (sub location). Five key informants were purposively sampled to give their informed opinion on the phenomenon under study. Purposively sampling allows researchers to use cases that have the required information with respect to the objectives of the study (Cresswell JW & Plano Clark VL, 2011). The study purposed to gather elaborate information from household consumers (registered members to each water project) and key informants on how each of the variables affected sustainability strategies of CMRWSS in Njoro Ward.

Table 3.1: Sampling Procedures' Table

Sub locations	No. of Water Projects	Membership Population	Sample Weight (%)	Sample Size
Njoro	3	1517	32%	118
Migaa	2	1329	28%	103
Mukungugu	1	1138	24%	88
Subuku	1	759	16%	59
TOTALS	7	4,743	100%	368

3.6 Data Collection Instruments

The questionnaire was the primary tool for data collection while 'household' was the unit of analysis in this study. Interview guide was used to collect information from key informants. The

questionnaire was administered to registered members of the water schemes while the interview guide was exclusively used on selected opinion leaders with vast experience on the subject matter. The questionnaire and interview guide were developed with reference to the research objectives aimed at answering the research questions. The questionnaire had both open and close-ended questions. The closed ended questions contained a list of possible alternatives from which respondents were required to select the answer that best describes their situation. Semi-structured interview guide was employed to collect information from key informants.

The close-ended questions provide more structured responses to facilitate tangible recommendations. Further, closed-ended questions were used to test the rating of various attributes and this helped in reducing the number of related responses in order to obtain more varied responses. The open-ended questions provided additional information that was useful for generating additional information to complement qualitative data of the study.

3.7 Validity and Reliability of Research Instrument

The aim of this research process was to present results that are representative of the phenomenon under study by having accurate and meaningful conclusions and keeping the locality of data collection constant. This aspect was achieved through a pilot study discussed in the next section. The exercise facilitated the necessary revision and modification of the research instrument thereby enhancing validity. The researcher enhanced the instrument validity by seeking the opinion of University dons in the department of Sociology during the project proposal defense meeting that preceded fieldwork. This is in line with Kombo and Tromp (2006), who says content validity judgment is made better by a team of experts in the field of the research. On the other hand, reliability refers to the consistency of measurement and is frequently assessed using the test–retest reliability method. Reliability is increased by including many similar items on a measure, by

testing a diverse sample of individuals and by using uniform testing procedures (Shanghverzy, 2003).

3.7.1 Pilot Study

Pilot study is a smaller version of a large study that is conducted in order to prepare for the study and also provide a basis for the design (Orodho, 2004). It involves pre-testing of the instruments to assess their validity and reliability. According to Mugenda and Mugenda (2003), a pilot size of between 1% and 10% is considered appropriate. For this study the researcher selected 36 members of the water schemes for pilot testing drawn from the neighboring Lare Ward in Nakuru County. The few respondents confirmed that the questionnaire was appropriate and the aspects investigated were generally understandable. Further, the study sought to confirm the reliability of the research instrument by evaluating the five constructs: Project Financing; Community Participation; Management Approaches; Government policy and Conservation; and Community Training on Operations, Maintenance and Management using Cronbach's Alpha Value as demonstrated in Table 3.2 below.

Table 3.2: Cronbach's Alpha Value

Construct	Cronbach's Alpha
Project Financing	0.806
Community Participation	0.707
Management Approaches	0.768
Government Policy and Conservation	0.813
Community Training on Operations, Maintenance and Management	0.859

As illustrated in Table 3.2, the five constructs were studied. With a few adjustments on the questionnaire, reliability threshold of the items obtained. According to the findings 'project

financing’ scale was found to have an Alpha value of 0.806, ‘community participation’ 0.707, ‘management approaches’ 0.768, ‘government policy and conservation’ 0.813 and ‘community training on operation, maintenance and management’ scale was found to have an Alpha value of 0.859. According to Mugenda & Mugenda, (2003) coefficient of 0.6 - 0.7 is an acceptable reliability while 0.8 or higher denotes good reliability. These findings clearly show that the research instrument used in the study was therefore reliable.

3.8 Data Collection Procedures

The researcher used trained research assistants to administer the questionnaires and interview guides to respective study respondents. The questionnaires for respondents drawn from community managed rural water supply schemes (CMRWSS) were distributed by the researcher with the help of field assistants. Further, the researcher engaged the key informants into a discussion using the interview guide on appointed dates.

3.9 Data Analysis and Presentation

The quantitative data collected was analyzed by the use of descriptive statistics using SPSS (Version, 20) and presented through percentages and frequencies. The information was displayed by use of bar charts, graphs and pie charts and in prose-form. This was done by tallying up responses, computing percentages of variations in responses as well as describing and interpreting the data in line with the study objectives and assumptions through use of SPSS (Version 20) to communicate research findings. Content analysis was used to test data that is qualitative in nature or aspect of the data collected from the open-ended questions.

3.10 Ethical Considerations

The researcher sought the necessary authorization from relevant authorities first from Kenyatta University’s Graduate School and later got cleared by the University’s Ethics Committee.

The researcher further applied for research permit from National Commission for Science, Technology and Innovation (NACOSTI) which was issued. The permit was required the researcher to collaborate with line ministries both in County and National Governments.

The researcher ensured that respondents adequately understood the research they were participating in. Integrity and honesty were the guiding values of the researcher and the assistant researchers in the field throughout the data collection process from the beginning to the end. The researcher and research assistants exercised utmost caution while administering the data collection instruments to the respondents to ensure their rights and privacy are upheld. To ensure confidentiality, the respondents' names did not appear on the questionnaire. Furthermore, no respondent was coerced into the exercise at any level. The study findings were presented without any manipulation or influence by the researcher in any way. Raw questionnaires and useful computer data were kept away from unauthorized access through password encryption of the files/folders.

3.11 Response Rate

The sample size in this research was 368 registered members belonging to community managed rural water supply schemes. The researcher distributed the questionnaires to all the anticipated respondents of the study out of which over 300 responses were acquired. The response rate translates to about 81.52% of the total sample size. Mugenda and Mugenda (2003) indicates that for generalization, a return rate of 50% is enough to go ahead with analysis or to come up with a report, a 60% response rate is termed as good, while a response rate of above 70% and above is termed as excellent. The high return rate can be said to be due to the data collection procedure and persistent following by the researcher and the research assistants. Use of drop and pick method enabled the respondents to have enough duration to fill and return the questionnaire. However,

some omissions in some questions may have compromised the quality of data collected to a small extend.

Table 3.3: Response Rate

Questionnaire	Frequency	Percent
Administered	368	100%
Returned	300	81.52%
Sub locations	Returned Frequency	Percent
Njoro	71	23.8
Migaa	84	28
Mukungugu	95	31.8
Subuku	50	16.5
Total	300	100

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents analysis and interpretations of the research findings in line with the study objectives. The general objective of this study was to understand the sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward. Further, the study sought to establish the influence of community participation; management approaches; community training on project operations, maintenance and management; project financing and government policies on sustainability of community water schemes. Charts, tables and graphs were used to present the study findings.

4.2 Social and Demographic Characteristics

Background information of this study entailed; gender, age group, marital status, level of education and type of family.

4.2.1 Gender of the Respondents

The study sought to determine the gender of the participants. The results were as shown in Figure 4.1

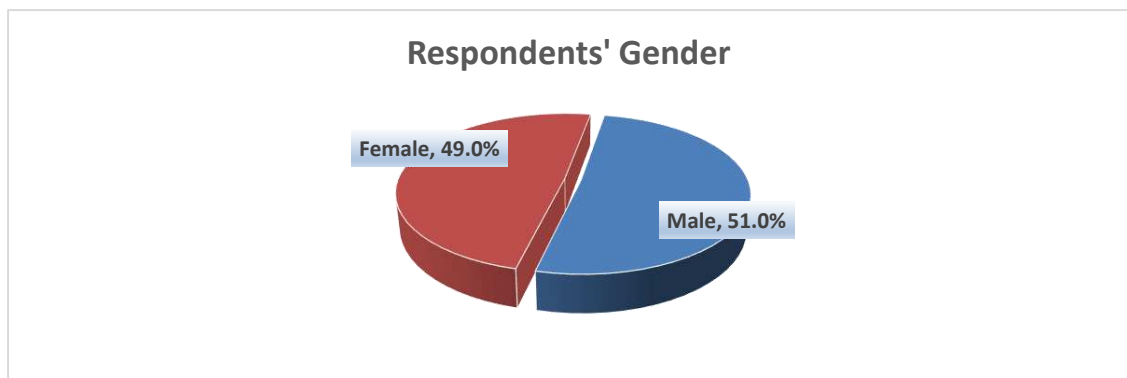


Figure 4.1: Gender of the Respondents

Results show that majority (51.0%) of the respondents were females while minority (49.0%) were males. This implies that both men and women contributed to the research and their views were considered vital in the study. This also implies that both genders were well-presented in the research. It further confirmed the fact that both men and women's representation in the water schemes was almost equal.

4.2.2 Age group of the respondents

The respondents were requested to indicate their age group. The results were presented by Figure 4.2.

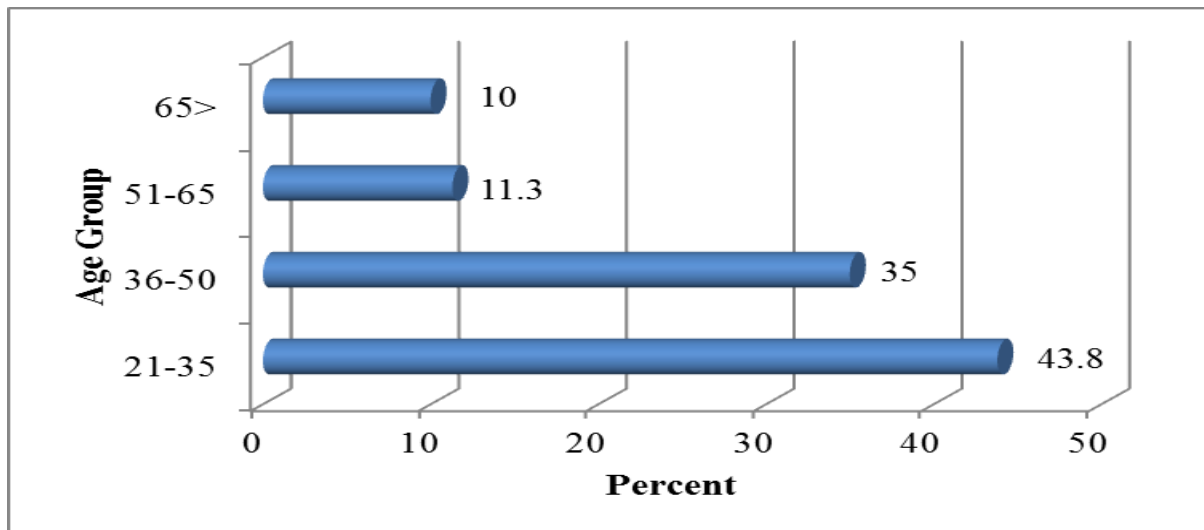


Figure 4.2: Age Group of the Respondents

According to the findings, the minimum age of the respondents was 21 and the oldest 70 years. Thus 43.8% of the respondents were of the age bracket 21-35 years. The respondents who were between 36-50 years were 35% and those who were aged between 51 and 65 years were 11.3%. Finally, the study found that that the respondents who were 65 years and above were 10%. This implies that majority of the respondents were youthful whereas the elderly ones seemed to reduce as the age advances.

4.2.3 Marital status of the respondents

The respondents were requested to indicate their marital status. The results were presented in Figure 4.3.

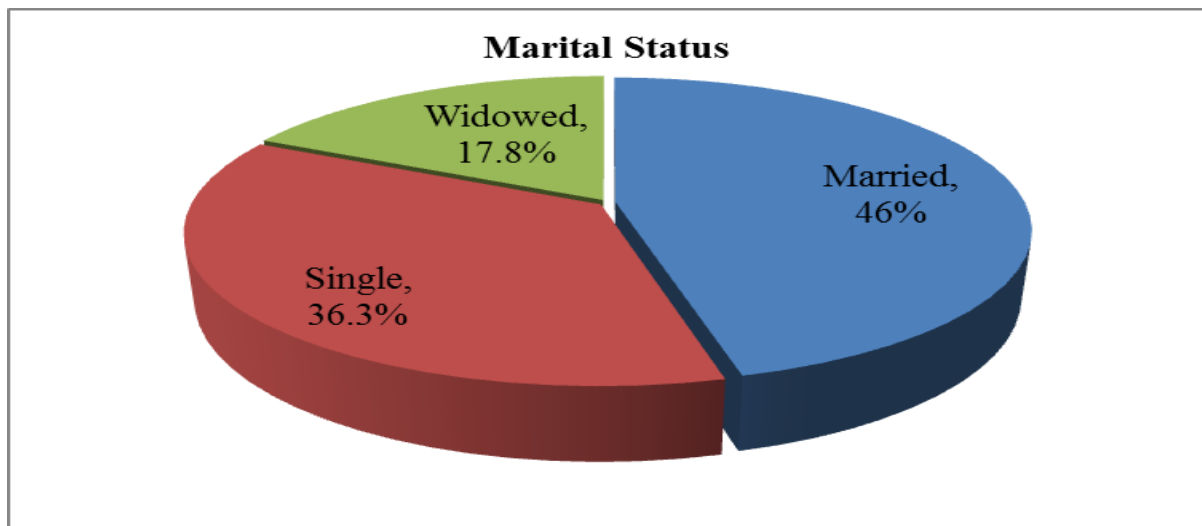


Figure 4.3: Marital Status

From the results, 46.0% of the respondents were married, 36.3% of the respondents were single and 17.8% of the respondents were widowed. This scenario was a clear indication that the main family set ups were represented in the survey as also inferred by key informants.

4.2.4 Respondents' level of education

The respondents were required to include their highest education level achieved. Figure 4.4 shows the findings.

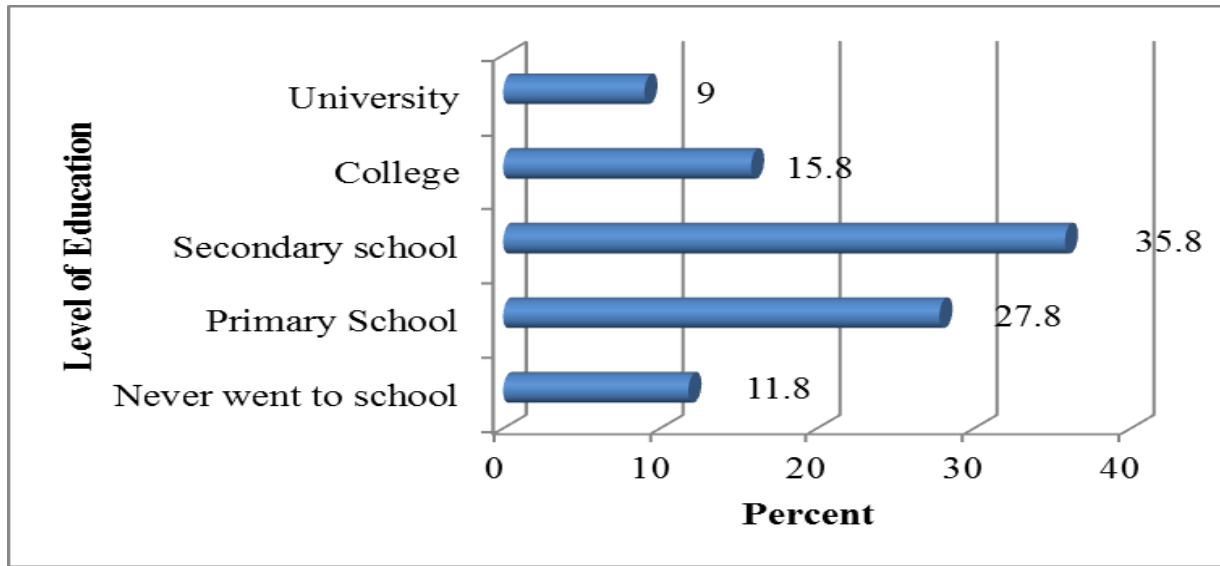


Figure 4.4: Respondents' Level of Education

The results showed that those who had attained secondary school certificate were 35.8%, 27.8% had reached primary school, 15.8% had attained college education and 9% had attained a university education. However, the study found that 11.8% of the respondents had never attended school. It can be inferred that most of the respondents had not gone beyond secondary education. This could also mean that more time was required to impart relevant training to aid in management, operations and maintenance of the water projects. The implication was also confirmed by key informants in their responses.

4.2.5 Respondents' type of family

The study sought to determine the type of family the registered members of the scheme came from. The results were as shown in Table 4.2.

Table 4.1: Respondents' Type of Family

Type of Families	Frequency	Percent
Male Headed	173	57.6
Female Headed	110	36.6
Child Headed	17	5.7
Total	300	100

According to the results, 57.6% of the families were male headed, 36.6% of the families were female headed and 5.7 % of the families were child headed. The composition of the varied family heads confirmed what key informant shared with the researcher the Njoro Ward is a settlement scheme attracting settlers from all social classes. The study targeted all registered members of the rural water projects regardless of family background.

4.3 Sustainability of CMRWSS

The general objective of the study was to understand the sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward.

4.3.1 Main sources of water for CMRWSS

The study sought to determine main sources of water for community projects. The results were as indicated in Table 4.3.

Table 4.2: Main Sources of Water for CMRWSS

Main sources of water	Frequency	Percent
Boreholes	138	46.5
River	71	23.4
Rain water harvesting	44	14.2
Dams	32	10.7
Tanks	8	2.7
CDF Centres	7	2.4

According to the results, out of the 300 respondents 138 (46.5%) sourced their water mainly from boreholes, 71 (23.40%) sourced their drinking water from rivers, 44 (14.2%) of the respondents sourced their water from rain water harvesting, 32 (10.70%) source water from dams, 8 (2.7%) of the respondents sourced their water from tanks and 7 (2.4) indicated to source their water from Community Development Fund (CDF) funded water points. These depict that majority of the respondents sourced their water from boreholes. It further inferred that underground water aquifer that feeds the boreholes could be a reliable source of underground water if sustainability strategies are put in place to conserve the source. According to the information collected from the key informants, the government has put mechanism in place to control multiple sinking of boreholes close to each other as a sustainability strategy to prevent depleting of underground water sources.

4.3.2 Strategies practiced by CMRWSS to conserve water resources

Community Managed Rural Water Supply Schemes (CMRWSS) are community owned water projects started through pulling resources together to address perennial water shortage witnessed in rural areas. An external agent like the government or Non-Governmental organizations like Plan International could also start such projects only to hand over the same to the locals for management after implementation. The study sought to assess the strategies practiced by Community Managed Rural Water Supply Schemes (CMRWSS) to conserve the water resources. The findings have been presented in Table 4.4 next.

Table 4.3: Strategies Practiced by CMRWSS to Conserve Water Resources

Water Conservation Strategies	Frequency	Percent
Planting Trees	68	22.7
Civic Education	30	10.0
Community tanks	21	7.0

Use of water sparingly	20	6.7
Storm Water Harvesting	18	6.0
Water Treatment	18	6.0
Pumping water	17	5.7
Effective Drainage	16	5.3
Wells	15	5.0
Ensure no pollution	12	4.0
Building Gabions	6	2.0
Bridge to avoid water pollution	5	1.7

From the study results, 68 (22.7%) of the respondents indicated that planting trees is a strategy of conserving water. Further, 30 (10.0%) of the respondents indicated that they had adopted use of civic education to impart water conservation skills, 21 (7.0%) indicated that they had adopted community tanks to conserve water, 20 (6.7%) indicated that they use water sparingly, 18 (6.0%) indicated that harvest storm water as a strategy to conserve water, the same percent 18 (6.0%) indicated that they treat water, 17(5.7%) pump water, 16 (5.3%) have effective drainage, 15 (5.0%) use wells, 12 (4.0%) indicated that they ensure no pollution, 6 (2.0%) indicated that they build gabions and 5(1.7%) indicated that they built bridges to avoid water pollution.

4.3.3 The extent to which the water conservation measures have been implemented

The study sought to determine the extent the measures and strategies implemented to conserve the present water resources contribute to sustainability of the water projects. The results were as shown in Figure 4.5.

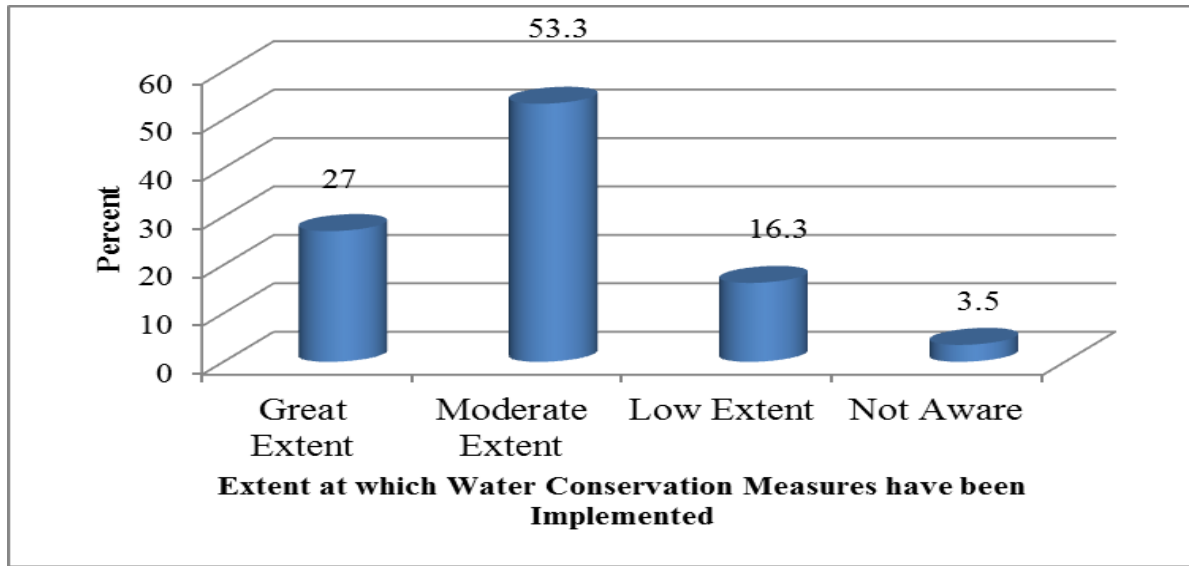


Figure 4.5: Extent at which Water Conservation Measures have been Implemented

According to the research findings, 53.3% of the respondents indicated moderate extent, 27.0% indicated the implementation of measures were to great extent, 16.3% of the respondents indicated the implementation was to low extent and 3.5% of the respondents indicated were not aware of measures and strategies implemented to conserve water resources. These imply that conservation strategies that enhance sustainability strategies as suggested by the respondents were not fully implemented owing to the neutrality (moderate extent) of their answers. The scenario was also echoed by the key informants who affirmed that majority of the locals are ignorant of water conservation measures.

4.4 Community Participation on Sustainability Strategies of CMRWSS

The first objective of the study was to assess how community participation affects sustainability strategies of CMRWSS in Njoro Ward.

4.4.1 Extent at which community members participate in CMRWSS

The study sought to determine the extent to which the community members participate in the conception, design and implementation of the water projects. The results were as shown in Table 4.5.

Table 4.4: Extent at which Community members' Participate in CMRWSS

Extent of Participation	Frequency	Percent
Great Extent	67	22.3
Moderate Extent	162	54.0
Low Extent	66	22.0
N/A	5	1.7
Total	300	100

According to the results, 54.0% of the respondents indicated that they participated to a moderate extent, 22.3% of the respondents participated to a great extent, 22.0% of the respondents indicated that they participated to a low extent. However, 5% of the respondents did not respond on the same. The table attest to the fact that majority of respondents do not think that their participation is to a great extent. Similarly, the key informants confirmed this by indicating that members of the water project are actually left out on technical issues during inception, planning, and implementation of the rural water schemes. This implies that external stakeholders rarely find it useful to consult with the locals when coming up with a water project, a concern which was also raised by the key informants.

4.4.2 Contributions of community members

The study sought to determine whether community members make contributions in-kind, labor or cash for operations and maintenance of the water projects. The results were as shown in Table 4.6.

Table 4.5: Contributions of Community members

Acknowledgement	Frequency	Percent
Yes	194	64.7
No	102	34.0
N/A	4	1.3
Total	300	100

From the results, 64.7% of the respondents indicated that they were contributing in-kind, labor or cash for operations and maintenance of the water projects while 34.0% indicated otherwise. However, 1.3% of the respondents did not respond. This concurs with Roodt (2001) who argued that community participation is the glue that binds together all actors in a project. Some of the members made obligatory monthly cash contributions while those who are constrained financially could offer free labor or donate construction materials when contribution needs arose.

4.4.3 Extent at which community contributions influence decisions

The study sought to determine the extent do community contributions influence decisions made during conception, design and implementation of water projects. The results were as shown in Figure 4.6.

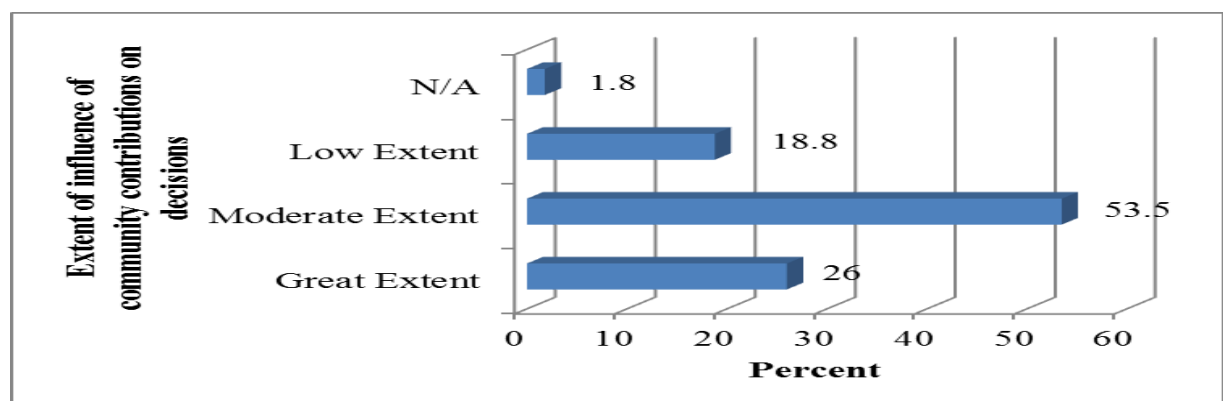


Figure 4.6: Extent at which Community Contributions Influence Decisions

From the results, 53.5% of the respondents indicated that they contributed to decisions made during conception, design and implementation to a moderate extent, 26.0% of the respondents indicated they contributed to a great extent and 18.8% indicated they contributed to a low extent. However, 1.8% of the respondents did not know or understand whether they contributed in any way or not. The study findings concur with Mancini, Marek and Brock (2003) who argues that involving the community from the onset of project initiatives and addressing the local situation and socio-economic needs of the community, project activities could be effectively planned and even implemented.

4.4.4 Stakeholders representation

The study sought to determine how stakeholders' representation in the committee structures for management of water projects fared. The results were as shown in Figure 4.7

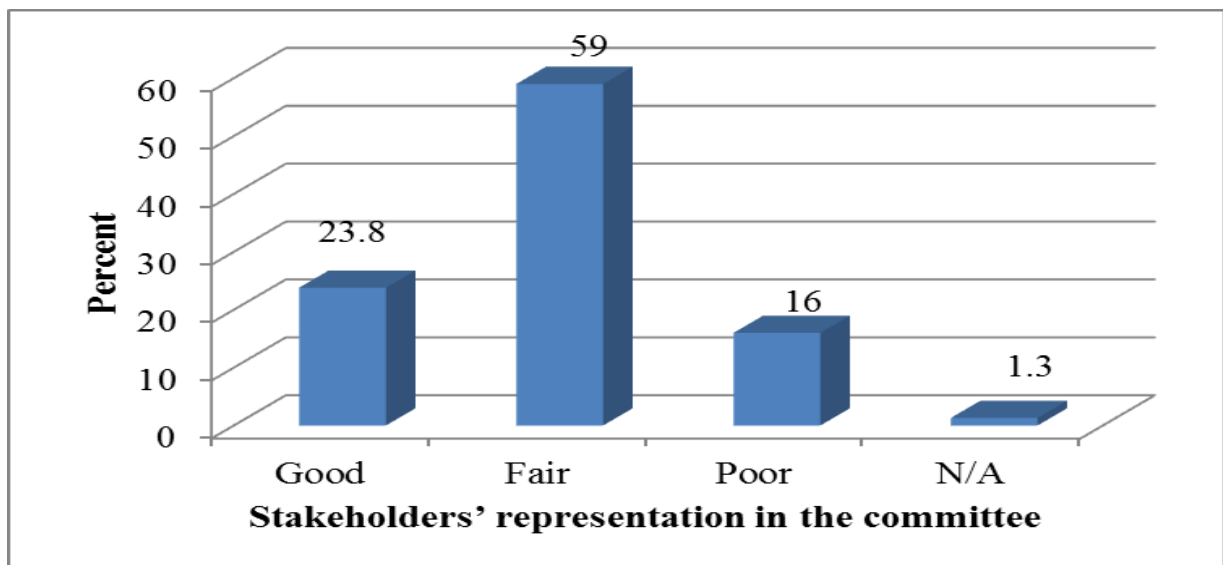


Figure 4.7: Stakeholders Representation

From the findings, 23.8% of respondents indicated that stakeholders' representation was good while 59% said representation was fair. Meanwhile, 16.0% indicated that their representation

was poor while only 1.3% of the respondents did not respond. Mwangi (2006) notes that good participation requires deliberate effort to send meeting notice and agenda item clarified so that invitees' input is informed and organized. In this case, when a large proportion of respondents indicate that stakeholders' representation was fair, it implies that project implementers (external stakeholders) do not value the community's participation as a key stakeholder. Likewise, the key informants in their responses opined that community representation in decision making forums was wanting.

4.5 Management Approaches on Sustainability Strategies of CMRWSS

The second objective of the study was to examine how management approaches affect sustainability strategies of CMRWSS in Njoro Ward.

4.5.1 Regular management meetings by CMRWSS

The study sought to determine whether the Community Managed Rural Water Supply Schemes (CMRWSS) held regular management meetings to transact business of the community water projects. The results were as in Figure 4.8

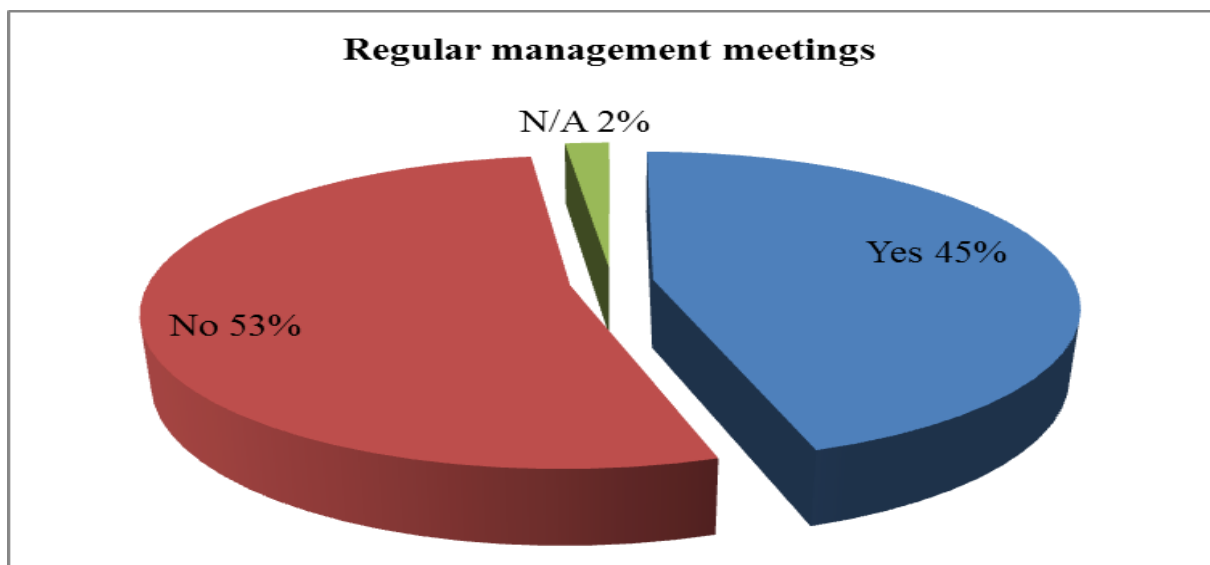


Figure 4.8: Regular management meetings by CMRWSS

From the findings, 45.0% of the respondents indicated that that the Community Managed Rural Water Supply Schemes (CMRWSS) held regular management meetings but 53.0% of the respondents indicated otherwise. However, 2.0% of the respondents did not respond to the question. Further, the study sought to determine the number of meetings held on monthly basis. From the results, 55.6% indicated one meeting and 40.7% indicated two to four meetings. However, 3.7% indicated that the community managed rural water supply schemes (CMRWSS) did not hold any monthly meeting.

Table 4.6: Number of Meetings held Monthly

Number of Meetings	Frequency	Percent
One	75	55.6
None	5	3.7
Two – Four	55	40.7
Total	135	100

4.5.2 Executive committee members’ awareness of scheduled meetings

The study sought to determine whether all members of the executive committee were aware when meetings were scheduled. The results were as shown in Table 4.8.

Table 4.7: Executive Committee Members’ Awareness of Scheduled Meetings

Acknowledgement	Frequency	Percent
Yes	105	77.8
No	25	20.0
N/A	5	2.2
Total	135	100

From the results, 77.8% of the respondents indicated that members of executive committee were aware of the meetings scheduled and that they attended but 20.0% of the respondents

indicated otherwise. However, 2.2% of the respondents did not respond on the question. The implication of this response affirmed to the fact that the executive committee members are conveners of proposed meetings to miss any of them.

4.5.3 Members Participation

The study sought to determine whether all the members participated in discussing the project progress reports, audit reports and monitoring and evaluation reports. The results were as shown in Figure 4.9.

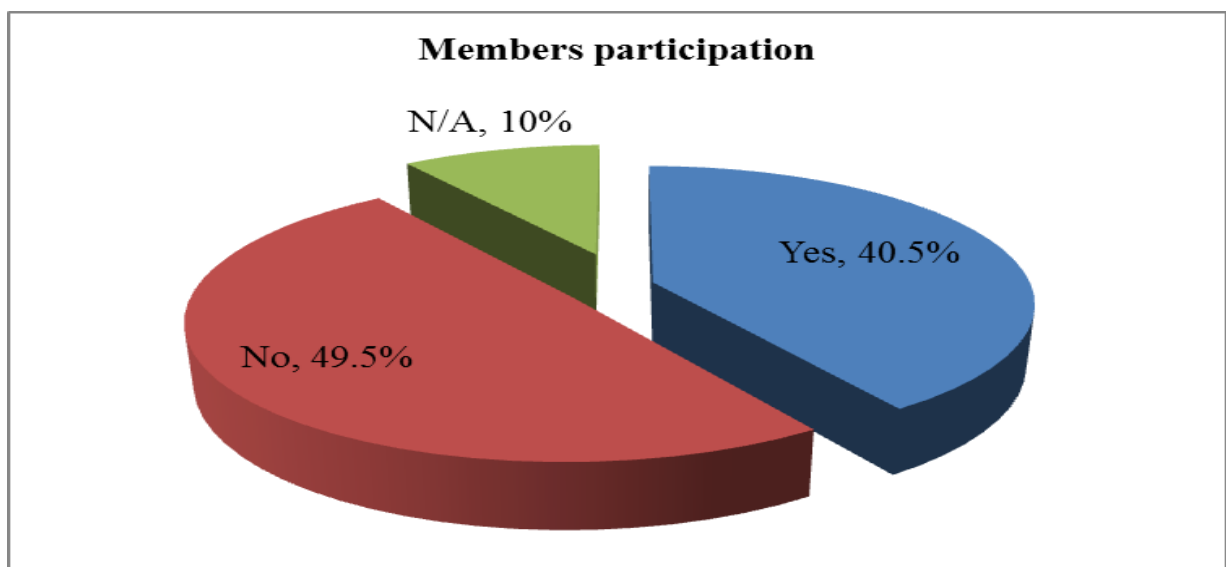


Figure 4.9: Members Participation

According to the findings, 40.5% of the respondents indicated that they participated but 49.5% indicated otherwise. However, 10.0% of the respondents were not sure on the same. This was an indication that majority of members do not participate in discussing progress reports. The same observation was also made by the key informants who held the view that members of CMRWSS were not fully involved to discuss crucial reports mentioned.

4.5.4 Regular AGM by the Management

The study sought assesses whether the management conducted regular AGM for the project and provide all the information to members. The results were as shown in Table 4.9.

Table 4.8: Regular AGM by the Management

Responses	Frequency	Percent
Yes	180	60.0
No	111	37.0
N/A	9	3.0
Total	300	100

From the results, 60.0% of the respondents indicated that management conducted regular Annual General Meeting but 37.0% of the respondents indicated otherwise. However, 3.0% of the respondents were not sure on the same.

4.6 Community Training on Operation, Maintenance and Management of CMRWS

The third objective of the study was to assess how community training on operation, maintenance and management of CMRWSS in Njoro Ward affect sustainability strategies of the water projects.

4.6.1 Training of management committee members

The respondents were asked to indicate whether the water management committee members had been trained on operation, management and maintenance of the water systems. The results were as shown in Figure 4.10.

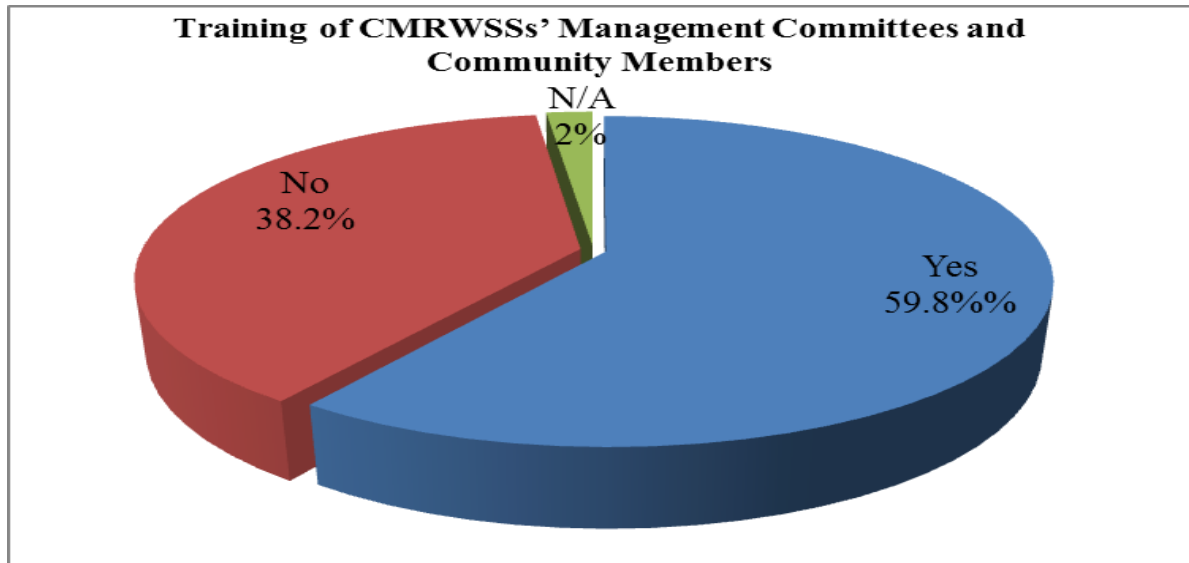


Figure 4.10: Training of CMRWSSs' Management Committees and Community Members

From the results, 59.8% of the respondents agreed that the water management committee members have been trained on operation, management and maintenance of the water systems but 38.2% of the respondents indicated otherwise. However, 2.0% of the respondents were not sure on the same. Nerubucha (2011) argues that competent operating personnel are vitally important for sustained and safe operation of small water systems. This outcome can only be achieved through focused and regular training programs of operations personnel as expressed by majority of the respondents.

4.6.2 Relevance of the training carried out

The study sought to determine the relevance of trainings carried out towards enhancing the capacity of the community members to operate and maintain the water systems. The results were as shown in Figure 4.11.

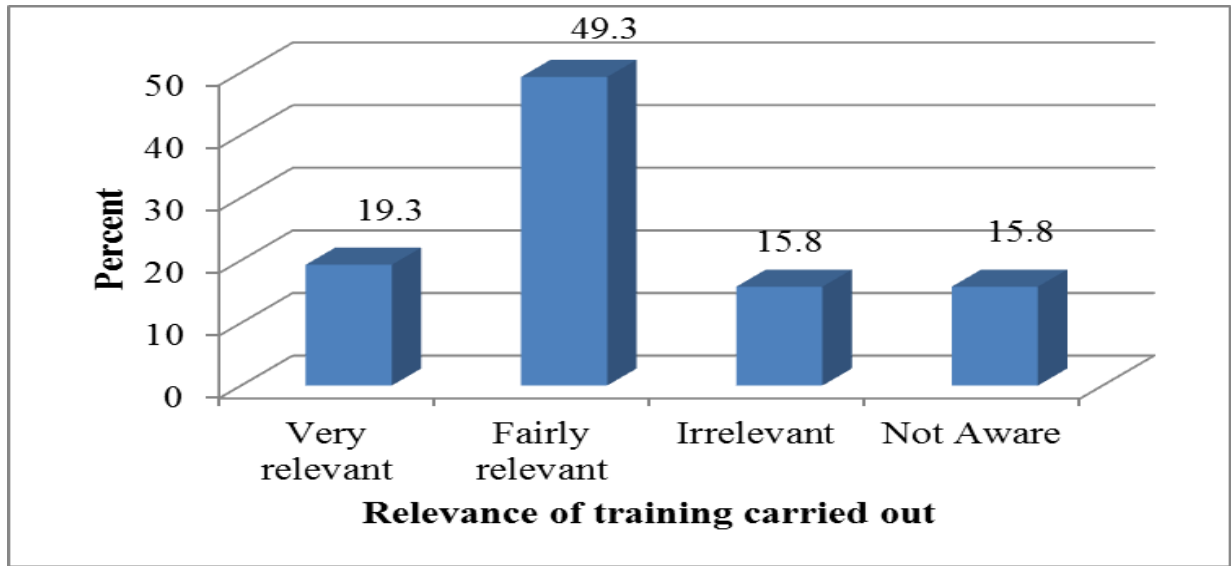


Figure 4.11: Relevance of Training Carried out

According to the findings, 49.3% of the respondents were fairly relevant and 19.2% of the respondents indicated that the training was very relevant. However, 15.8% of the respondents indicated that the training was irrelevant. Further, 15.8% of the respondents were not aware. Ademiluyi and Odugbesan (2008) argue that lack of relevant community training is cited as one of the factors which could lead to breakdown and non-sustainability of water supply projects in developing countries. In this case, close to half of the respondents felt that the training is fairly relevant implying that the training content is not fully tailor-made to address local need.

4.6.3 Trainers’ skills and quality of content delivered

The study sought to rate the trainers skills and quality of content delivered. The results were as shown in Figure 4.12 next.



Figure 4.12: Training Skills and Quality of Content Delivered

To gauge the quality of training received, the study sought to evaluate the trainers and the content delivered. Thus, 51.5% of the respondents indicated that the skills and the quality of content were fairly good, 16.5% of the respondents indicated that the trainers skills and content were excellent but 14.5% of the respondents indicated that the trainers skills and content were poor. However, 17.5% of the respondents indicated that they were not aware. This is a clear indication that majority of members who attended the training were rated the training content averagely. The key informants had similar view to the effect that training curriculum used is too academic to integrate with real needs on the ground.

4.7 Project Financing on Sustainability Strategies of CMRWSS

The fourth objective of the study was to establish how project financing affects sustainability strategies of CMRWSS in Njoro Ward.

4.7.1 Appreciating the effects of project financing on sustainability strategies

The study sought to examine whether project financing affect the sustainability strategies of community water projects in Njoro Ward. The findings were as in Figure 4.13.

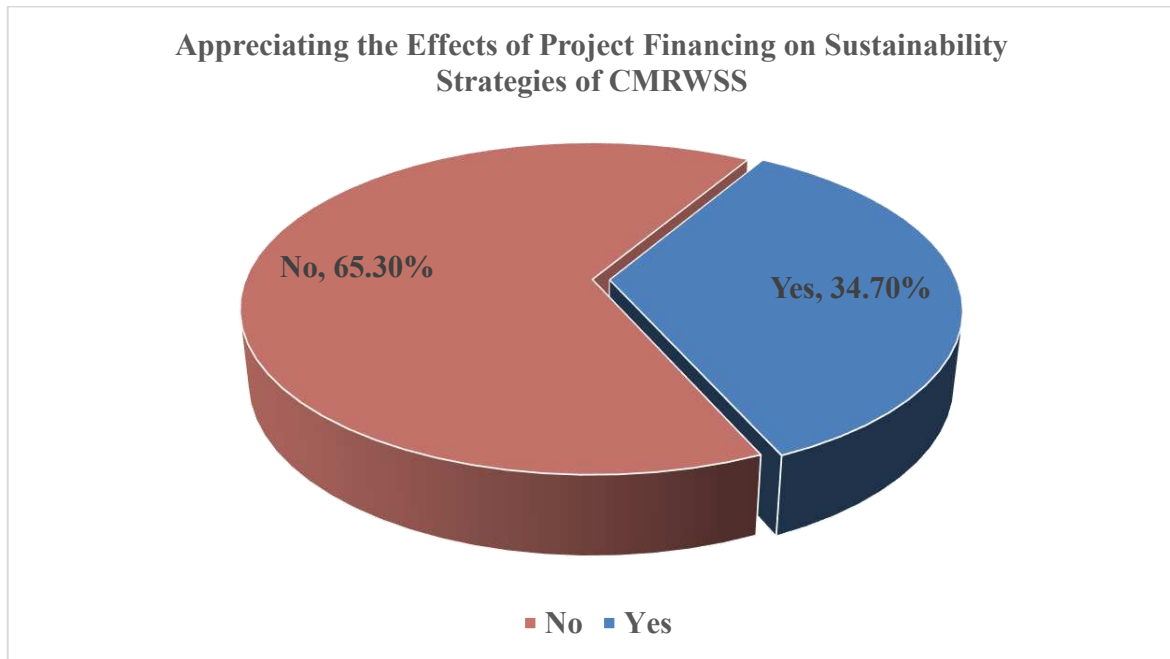


Figure 4.13: Appreciating the effects of Project Financing on Sustainability Strategies

From the results, 34.7% of the respondents indicated that project financing affect the sustainability strategies of community water projects but 65.3% of the respondents indicated otherwise. Further, the respondents were asked to indicate how the project financing affect the sustainability strategies of community water projects in Njoro Ward. From Table 4.10, 30.8% of the respondents indicated that project financing influence project equipment and resources, 13.7% of the respondents indicated that project financing influenced meeting labor cost, 5.7% indicated low living standard and 21.0% indicated that project financing influenced prevention of leakage occurrence.

Table 4.9: Effect of project financing on sustainability strategies

Factors affected by project financing	Frequency	Percent
Project Equipment and Resources	32	30.8
Meeting labor cost	21	13.7
Low living standard	23	5.7
Prevention of leakage occurrence	22	21.0

4.7.2 Extent to which project financing affect sustainability strategies

The study sought to determine the extent to which project financing affect the sustainability strategies of community water projects in Njoro Ward. The results were as shown in figure 4.14

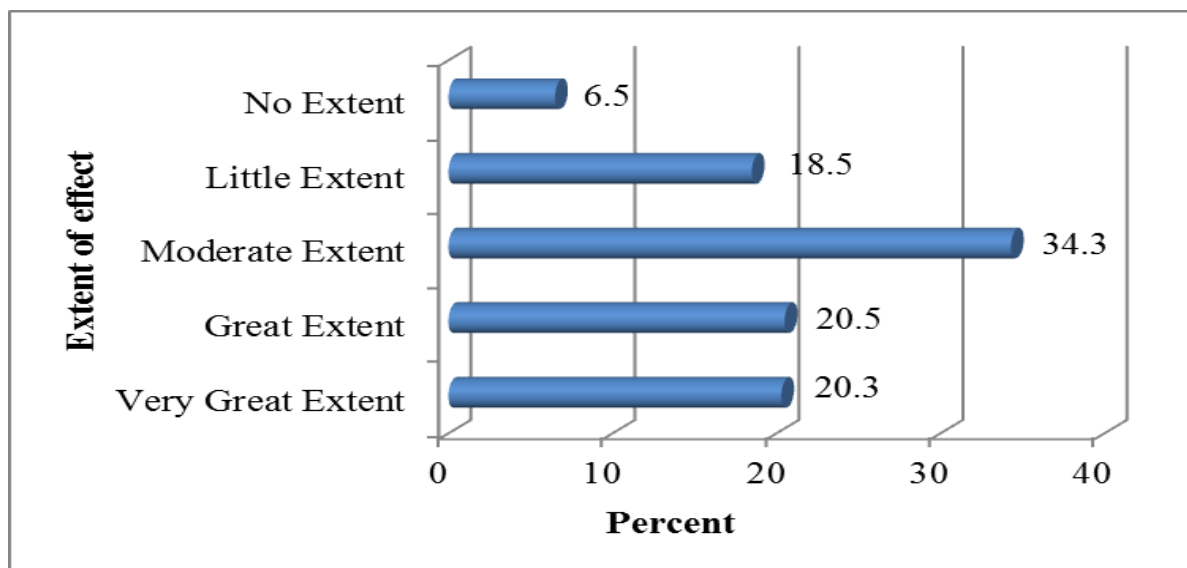


Figure 4.14: Extent to which Project Financing affect the Sustainability Strategies

From the results, 34.3% of the respondents indicated that project financing affect the sustainability strategies to a moderate extent, 20.5% of the respondents indicated to a great extent, 20.3% indicated to a very great extent and 18.5% of the respondents indicated to a little extent. However, 6.5% of the respondents indicated that project financing did not affect the sustainability

strategies. This is an implication that majority respondents believe that project financing does not affect sustainability strategies to a large extent but moderately. The study view this perception as an outcome of an implementing agency who does not involve the local community in the financial planning for desired water projects to be established.

4.7.3 Sources of project financing

The respondents were asked to indicate sources of project finance. The results were as shown in Table 4.11.

Table 4.10: Sources of Project Financing

Sources of project financing	Frequency	Percent
Loan	20	6.7
Member contribution	142	47.3
Water Revenue	83	27.8
Donor Grant	33	11.0
Not Aware	5	1.7
Loan, Members, Water revenue and Donor grants	17	5.7
Total	300	100

According to the study results, 47.3% of the respondents indicated that project financing was achieved through member contribution, 27.8% of the respondents indicated water revenue at water points, 11.0% indicated project financing was through donor grant, 6.7% was done through loans and 5.7% of the respondents indicated that the financing was sourced from loans, members, water revenue and donor grants. However, 1.7% of the respondents were not aware of the source of financing. This concurs with Binder (2008) who posits that various approaches have been tried by donors and governments to address the issue of sustainability in financing of water projects.

4.7.4 Contribution by each member

The study further sought to determine the amount each member contributed. The results were as shown in Table 4.12.

Table 4.11: Monthly contribution by each Member

Amount	Frequency	Percent
100 – 150	8	5.6
200 – 250	35	24.6
300	14	9.9
400	5	3.5
500	24	16.9
600	2	1.4
700	8	5.6
800	8	5.6
900	5	3.5
1000	11	7.7
1500	12	8.5
None	9	6.3
Total	142	100

The variations in the amount of money contributed is informed by the unique needs of each water project, the point at which the new member joins in, external subsidies/grants or loans earned individually enjoyed and ad hoc financial requirements. Further, some of the contributions are a onetime registration fee, monthly subscription or as need arises. From the results, 24.3% of the respondents indicated between Kshs 200-250, 16.9% indicated Kshs 500, 9.9% indicated Kshs 300, 8.5% indicated Kshs 1,500, 7.7% indicated Kshs 1,000, 5.6% indicated Kshs between 100 to Kshs 150, the same percent indicated Kshs 700 and Kshs 800 respectively. In addition, 3.5% indicated Kshs 400 and another 3.5% of the respondents indicated Kshs 900. In addition, 1.4% of the respondents indicated Kshs 600. However, 6.3% of the respondents indicated none.

4.7.5 Sources of financing project's operation and maintenance

The study sought to determine the sources of financing project's Operation and Maintenance. The results were as shown in 4.15.

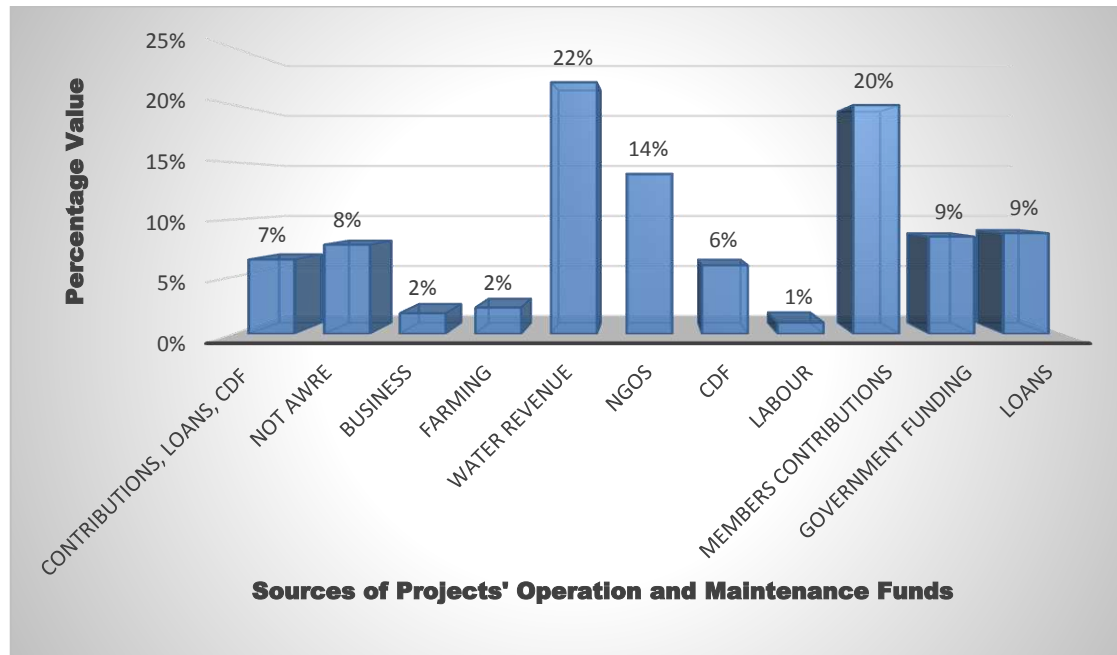


Figure 4.15: Sources of Financing Project's Operation and Maintenance

The study further sought to understand sources of funds used to meet specifically operation and maintenance costs of the water projects. From the research findings, 22.0 % of the respondents indicated water revenue, 20.0% indicated members contribution, 14.0% indicated through Non-Government Organizations, 9.0% indicated through loans, 9.0% indicated through government funding, 7.0% indicated through contributions, loans and CDF, 2.0% of the respondents indicated through farming, 2.0% indicated through business and 1% of the respondents indicated through labor. However, 8.0% of the respondents indicated that they were not aware. These findings confirms a report by UNESCO (2003) that argued that financing mechanisms through

public/private partnerships, special arrangements with the banking sector or other water-related organizations bridges the gap between donor and user funding.

4.8 The Influence of Government Policies and Conservation on Sustainability Strategies of CMRWSS

The fifth objective sought to determine how the government policies and conservation affect sustainability strategies of CMRWSS in Njoro Ward.

4.8.1 Presence of government policies and conservation strategies

The study sought to determine whether there are government policies on community management water project. The results were as shown in Figure 4.16

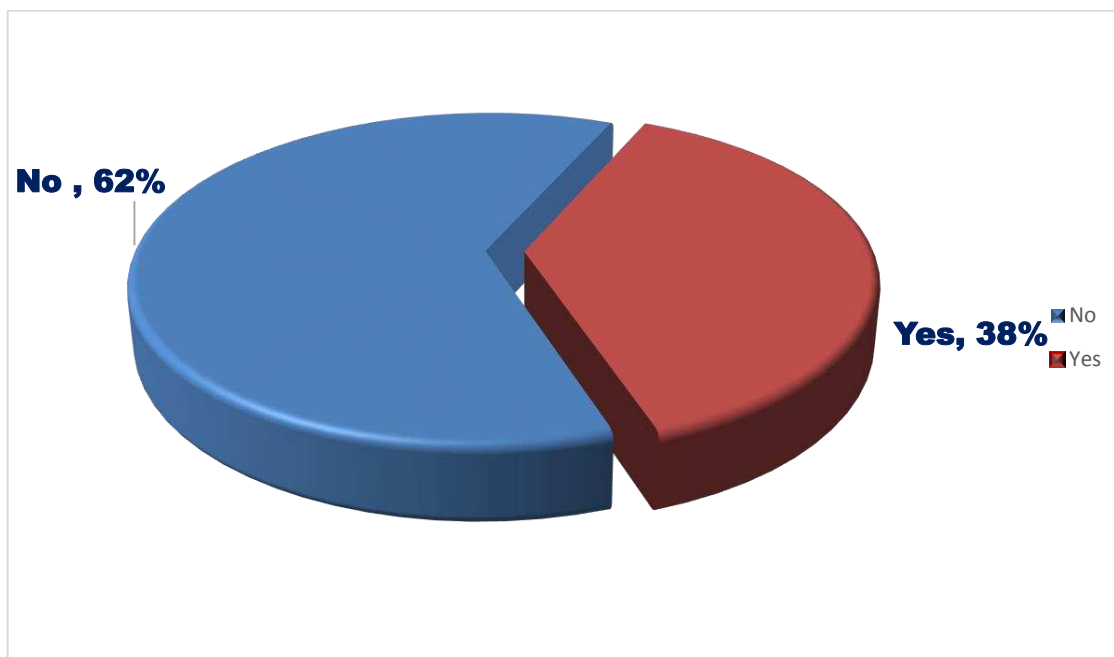


Figure 4.16: Use of Government Policies and Conservation Strategies

According to the findings, 38.0% of the respondents indicated that there were government policies governing community water projects but majority 62.0% indicated otherwise. Further, the

respondents were asked to indicate any of the water conservation policies they know as provided for by Water Resources Management Authority (WARMA). From Table 4.13, 8.0% of the respondents indicated that the policies touched on maintenance of forests and natural environment, 10% of the respondents indicated that the policies played a regulatory role such as licensing, 2.7% indicated that policies were on conservation of underground water and 16.0% of the respondents indicated that the government policies were on modalities of conserving water sources. A report from the Organization for Economic Co-operation and Development argues that sustainability requires policy integration, along with improved interaction between government and non-government institutions on how best to manage water sources (OECD, 2002).

Table 4.12: Respondents Knowledge on Government Policies and Conservation Strategies

Policies	Response	Frequency	Percentage
Maintaining of forests and natural environment	Yes	24	8.0
Regulatory role such as licensing	Yes	30	10.0
Underground water preservation	Yes	8	2.7
Protection of water sources	Yes	48	16.0

4.8.2 How Government Policies and Conservation strategies affect Sustainability

The study sought to determine whether the policies mentioned previously affected sustainability of community managed water project in the region. The results were as shown in Figure 4.17

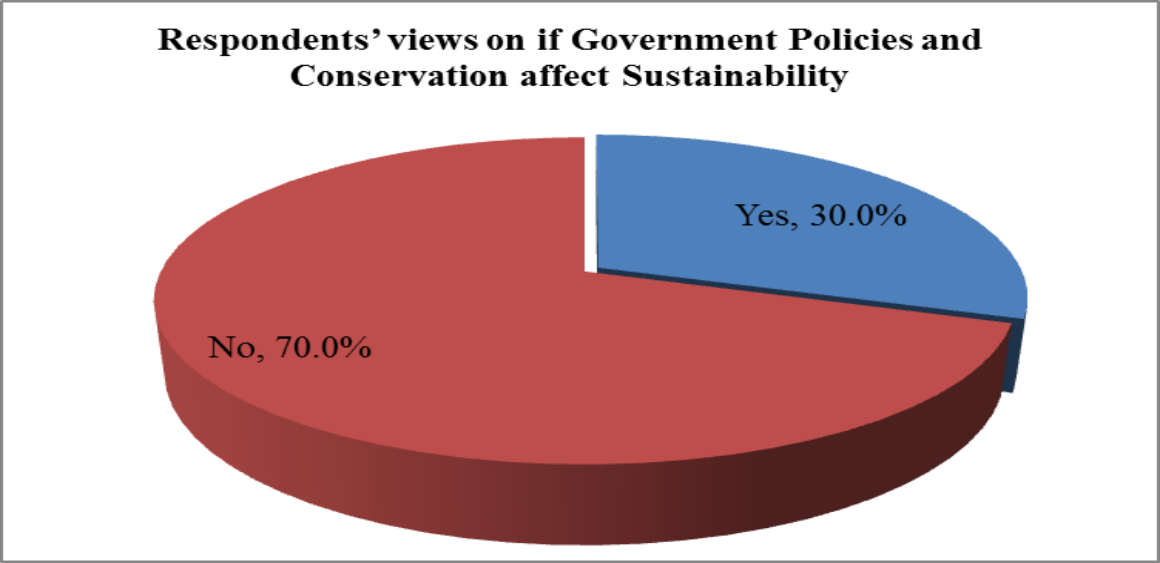


Figure 4.17: Respondents' views on if Government Policies and Conservation affect Sustainability

From the research findings, 30% of the respondents indicated that the policies affect sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward but 70% of the respondents indicated otherwise. This can be best explained from the data collected from key informants that a good number of respondents were ignorant of the government policies and conservation role in project maintenance and operation.

4.8.3 Effect of government policies and conservation on sustainability strategies

The respondents were asked to indicate the way the government policies affect the sustainability of community managed water project in Njoro Ward. Results were as indicated in Table 4.14.

Table 4.13: Effect of Government Policies and Conservation on Sustainability Strategies

Effect of policies on sustainability	Responses	Frequency	Percent
Compliance to state laws	Yes	40	13.3
	No	260	86.7
Increase water availability	Yes	43	14.3
	No	257	85.7

Again, just like in the previous inquiry where the study had in vain sought to confirm if the respondents were aware of the government policies in place, it was clear under this subsection that majority of the respondents also had difficulties linking the effects of the same policies with sustainability strategies. Nevertheless, about 13.3% of the respondents indicated that the policies enhanced compliance to state laws but 86.7% indicated otherwise. Further, 14.3% of the respondents indicated that presence of policies increased water availability.

In summary, this chapter has tried to present analysis and discussions for each of the study's 5 objectives. It was clear from the findings that community participation was moderately and fairly employed by Community Managed Rural Water Supply Schemes (CMRWSS) as observed by majority of the respondents. Meanwhile in the second objective, the study sought to understand how management approaches would influence sustainability strategies. A good number of respondents indicated that there were no regular meetings to discuss project progress that would involve all stakeholders. Thus majority of the respondents insinuated that members' involvement was casual. Trying to evaluate training aspect in objective number 3, the study observed that the indeed, training was carried out to benefit both the management and the general membership but the content's relevance and professionalism of the trainers was rated as fair.

In the fourth objective, the study noted that majority of the respondents did not believe that project financing would impact on sustainability strategies of CMRWSS. However, as the study further probed the minority of respondents who thought that project financing would influence sustainability strategies of CMRWSS, a good number of them cited some of the functions that would be affected if financial resources were inadequate. They included, project equipment, labor, and maintenance costs. Asked on the extent at which project finance would affect sustainability

strategies of CMRWSS, majority of them said moderate. The respondents were however aware of sources of finances listing avenues like; loans, water revenue, grants, and members contributions.

On the fifth objective, majority of the respondents did not agree that government policies were fully in use by Community Managed Rural Water Supply Schemes (CMRWSS). However, the minority of the respondents who confirmed that the government policies were in use went ahead to list scenarios where the policies manifested themselves. Efforts to conserve natural environment was mentioned, underground water management laws, and protection of water sources. They further affirmed that the aim of government policies is to ensure increased water availability to the masses and compliance to water conservation laws.

4.9 Key informants Views on the Study Objectives

The key informants views have been summarized according to individual objective as presented below:

Objective One: Community Participation

They team unanimously agreed that community participation is not optimally practiced in the management of Community Managed Rural Water Schemes in Njoro Ward. They argued that project implementers assume that the locals are just recipients of the project benefits and not necessarily stakeholders. They suggested more training is required on the concept of community participation.

Objective 2: Management Approaches

It was also noted by the key informants that the kind of management approaches practiced by CMRWSS were old models that lacked inclusivity. Community members are not engaged in decision making, nor are they given a chance to interrogate audit reports among other crucial information.

Objective 3: Community Training

Under training, the key informants accused some of the management committees for insincerity in sourcing for training facilitators. Some of the trainers lacked capacity to integrate their content with local need. It was observed that procurement of training personnel was mired with corruption and therefore the training objective was rarely attained.

Objective 4: Project Financing

On the issue of project financing, the respondents observed that most members were not aware the magnitude of external funding because the management of CMRWSS would keep the records confidential. This aspect explains why most of the main respondents were unaware about the role of project financing in sustainability strategies of the water projects. However, the key informants were categorical that members are forced to update their subscription monthly or lest they get barred from accessing the precious commodity - water.

Objective 5: Government policies and Conservation

The key informants were of the view that a number of water CMRWSS members are not aware of government policies that regulate water resource management. Again, this is as a result of ignorance and ineffective training programs. However, they suggested that a focused empowerment program would build capacities among the local to appreciate government efforts in ensuring rural population is able to be served with sustainable water sources.

These assertions by the key informants confirm the views aired by the main respondents earlier presented. In the absence of community participation, sound management practices, focused training programs, adequate project financing and appreciating government policies it will be hard for the Community Managed Rural Water Supply Schemes (CMRWSS) management committees to develop sustainability strategies for the water projects.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter gives a summary of the findings, conclusion, recommendations and suggestions for further research.

5.2 Summary of the Findings

5.2.1 Community participation on sustainability strategies of CMRWSS

The first objective of the study was to assess how community participation affects sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro Ward. The study established that majority of the respondents participated in the conception, design and implementation of the water projects to a moderate extent. Further, the study established that majority of the community members were contributing in-kind, labor or cash for operations and maintenance of the water projects. In addition, the study found that majority of the respondents contributed to decisions made during conception, design and implementation to a moderate extent. Further, the study established that the stakeholders' representation in the committee structures for management of water projects was fair.

5.2.2 Management approaches on sustainability strategies of CMRWSS

The second objective of the study was to examine how management approaches affect sustainability strategies of CMRWSS in Njoro Ward. The study established that community-based organizations did not hold regular meetings to transact business of the water projects. However, the study established that majority of CMRWSS hold two to four meetings on monthly basis. In

addition, the study established that majority of the executive committee members are aware of the scheduled meetings. However, it was established that majority of the project members did not participate in discussing the project progress reports, audit reports and monitoring and evaluation reports. In addition, the study revealed that the management conducted regular AGM for the project and provides all the information to members.

5.2.3 Community training on operation, maintenance and management of CMRWS

The third objective of the study was to assess how community training on operation, maintenance and management of CMRWSS in Njoro Ward affect sustainability strategies of the water projects. The study established that majority water management committee members have been trained on operation, management and maintenance of the water systems. Further, the study revealed that the training offered was relevant hence enhancing the capacity of the community members to operate and maintain the water systems. In regard to rating the quality of training content, skills and qualifications of the trainers, the study established that majority of respondents rated all these aspects as fair.

5.2.4 Project financing on sustainability strategies of CMRWSS

The fourth objective of the study was to establish how project financing affects sustainability strategies of CMRWSS in Njoro Ward. From the research findings, majority of the participants revealed that project financing does not affect the sustainability strategies of community water projects in Njoro Ward. Further, the study established that project financing did not necessarily influence project equipment and resources, meet labor costs and lower living standard. In addition, the study established that project financing did not necessarily influence prevention of leakage occurrence. Further, the study has revealed that project financing affect the sustainability strategies of community managed rural water supply schemes (CMRWSS) in Njoro

Ward to a great extent. In regard to the financing of the project, the study established the sources of project finance to be members' contribution, water revenue, donors' grants and loans. Further, the study established that the amount members contribution were in categories ranging from Kshs. 100 – 1,500 per month.. In addition, the study established that financing of projects operations and maintenance was achieved through water revenue followed by members contribution, then Non-Government Organization, loans, government funding, contributions, and CDF, farming, through business and labor. However, 7.8% of the respondents indicated that they were not aware of any source of finance to manage project operation and maintenance.

5.2.5 Influence of Government Policies and Conservation on Sustainability Strategies of CMRWSS

The fifth objective of the study sought to determine the government policies and conservation that affect sustainability strategies of CMRWSS in Njoro Ward. The study established that there were no well-known government policies and conservation in all community management rural water supply schemes (CMRWSS). However, the study established that the few policies recalled by the respondents were on maintaining of forest and environment, licensing, digging borehole and conserving water. Further, the study revealed that the policies do not necessarily affect sustainability of community managed water project in the region owing to the large number of respondents who seemed unaware of the policies in place. In relation to effect of policies on sustainability of community managed water project in Njoro Ward, the study established that the policies enhanced compliance to state laws by the members and that it increased water availability.

5.3 Conclusion

The study concluded that sustainability of community managed rural water supply schemes (CMRWSS) could be achieved through enhancing the level of community participation as they

contribute in-kind, labour or cash for operations and maintenance of the water projects. Furthermore, community participation has made moderate impact on decisions made during conception, design and implementation. Sustainability of rural water supplies is associated with high levels of management approaches of the CMRWSS. Holding regular meetings is a great strategy to sustainability of the water projects as members of the community members get a chance to discuss the project progress reports, audit reports and monitoring and evaluation reports. The Water Resources of Management Authority (WRMA) should be able to offer guide in setting sustainability strategies of community managed rural water supply schemes.

Strengthening the capacity of the management committees and regular membership through training on management, operation and maintenance ensures that they understand their responsibilities and therefore able to implement their mandate effectively. Capacity building trainings enhance management committee skills and competencies. Financial factors also influence the sustainability of community managed rural water supply systems (CMRWSS) in Njoro Ward. Adequate financing influences project equipment and resources, meet labor cost and lower living standard of the community members. The study concluded that sustainability of community managed rural water supply schemes could be made effective by: involving stakeholders to participate fully, adoption of reliable management approaches, training of community management committee frequently on the current matters concerning water supply systems and developing strategic plans for financing the water supply systems

5.4 Recommendations

Community members should be engaged actively across all the phases of the project particularly during the planning and design phase. Engagement of community members needs to

go beyond mere site selection and contribution of cash and provision of labor but input into the design and planning for the project. The management team needs to be trained well and occasionally in order to be up-to-date with emerging challenges in water supply services in the area. Skilled water management committees are fundamental to achieving sustainable rural water supplies. Managing water supplies involves complex operations, processes and decisions in addition to coordination challenges with multiple stakeholders. Skills of water committees must therefore be continuously increased including setting minimum education and skills levels for effective participation in water committees. Incentivizing water committees should also be considered as a strategy for attracting and retaining people with skills as volunteerism in the long run is unsustainable. Such incentives may include participation in learning exchange visits and regional or national level recognition awards for community service.

The government and other providers of funds should increase the amounts of funds channeled towards purchasing the water supply systems and managing the existing ones. The funds are also important in purchasing spares. In addition, policy makers should also formulate policies to address sustainable financing of operations and maintenance of community water projects. Further, the National and County Governments should develop policies for rural water supply and development mechanisms for implementation of the policies which will provide clear guidelines for the government and partners supporting rural water supply hence facilitating the sustainability of the projects.

5.5 Suggestions for further research

The current study concentrated in the water supply schemes in Njoro Ward, Nakuru County. The researcher recommends that a similar study should be carried out in other counties where community projects are carried out as well to compare results with those of Nakuru County.

The researcher also recommends a study to assess the impact of adequate funding on sustainability of community water projects implemented by government and other agencies. In addition, a study to evaluate the impact of community participation in the planning and design phases on sustainability of community water projects can be considered.

REFERENCES

- Adams, W.M. (2014). Indigenous Farmer-Managed Irrigation in Sonjo, Tanzania. *The Geographical Journal*.
- Ademiluyi, I.A. & Odugbesan, J.A. (2008). *African Journal of Agricultural Research* Vol. 3 (12), pp. 811-817, December, 2008.
- Asian Development Bank (2010). *Impact of Rural Water Supply and Sanitation*. Independent Evaluation Department, Pakistan
- Baker, C.V. (2000). *Gender in Community and Water Supply, Sanitation and Water Resource Protection: A Guide to Methods and Techniques*. The Hague: IRC International Water and Sanitation Centre.
- Baumann, E. (2006, July). Do Operational and Maintenance pay? *Waterlines* Vol. 25. No. 1
- Binder, D. (2008). *Sustainability of Water Service Delivery in Rural Environment: Past Approaches and the Way Forward*. Emerging Markets Group
- Brooks C.P.J., (2006). *Getting the Private Sector Involved in Water-What to Do in the Poorest of Countries?* Public Policy of Private Sector. Washington D.C.: TheWorld Bank.
- Brundtland, G.H., (1987). *Our common future* - call for action. *Environmental Conservation* 14(4): 291-294.
- Campos, M. (2008). *Making sustainable water and sanitation in the Peruvian Andes: An Intervention Model*. *Journal of Water and Health* 6 (1), 2008.
- Cardone, R., & Fonseca, C. (2003). *Financing Cost Recovery; Thematic Overview Paper; The Netherlands: IRC International Water and Sanitation Centre*.
- Carter, R. C. (2010). *Study of Sustainability of water supply services in Madagascar*. United Kingdom: Water Aid.
- Chinyio, E.; P. Olomolaiye, (2010). *Construction Stakeholder Management*, 1st ed.; Wiley-Blackwell: London, UK; pp. 1–349.
- Cooper, D.R., Schindler, P.S., (2006) *Business Research Methods*, 12th Edition: McGraw-Hill, New York, USA
- Cresswell JW & Plano Clark, V.L. (2011). *Designing and conducting mixed method research*. 2nd Sage; Thousand Oaks, CA
- Davis, J., Lyer, P., Yavuz, E. & Evans, B., (2002) *Rural Water Supply, Sanitation and Hygiene: A Review of 25 Years of World Bank Lending(1978–2003): Water Supply & Sanitation Working Notes*, World Bank.
- Donaldson T., Preston L. E., (1995), “*The stakeholder theory of the Corporation: Concepts, Evidence, and Implications*”, *Academy of Management Review*, vol. 20, n°1, pp. 65-91
- Freeman, R.E., (1984). *Strategic Management: A Stakeholder Approach*, 1st ed.; Pitman Publishing: Boston, MA, USA; pp. 24–25.
- Gebrehiwot, M. (2006). *An Assessment of Challenges of Sustainable Rural Water Supply: The Case of Ofla Woreda in Tigray Region*. Msc Thesis, Regional and Local Development Study (RLDS). A.A.U. Ethiopia.
- Gine, R., & Perez -Foguet, A. (2008). Sustainability assessment of National Rural Water Supply Program in Tanzania. *Natural Resources Forum* Volume 32 , 327-342.
- GOK, (2009). *National Policy for the Sustainable Development of Arid and Semi-Arid Lands of Kenya*.
- GOK, (2009). *Kenya National Population and Housing Census*: Kenya Bureau of Statistics, Government Printers, Nairobi, Kenya

- GOK, (2012). *Sessional Paper No. 8 of 2012 on the National Policy for the Sustainable Development of Northern Kenya and other Arid Lands: 'Releasing Our Full Potential'*; October, 2012.
- GOK, (2012) National Water Policy. Ministry of Water and Sanitation
- GOK, (2016) Water Act 2016. Constitution of the Republic of Kenya
- Habtamu Addis, B., (2012). *Factors Affecting the Sustainability of Rural Water Supply Systems. The Case of Mecha Woreda Amhara Region, Ethiopia*. Unpublished Thesis of Cornell University.
- Harvey, Y. & Reed, K. (2007) *Participatory evaluation: tools for managing change in water and sanitation*. World Bank Technical Paper Number 207. Washington, DC: The World Bank.
- Harvey, P. (2008). Poverty Reduction Strategies: Opportunities and Threats for Sustainable Rural Water Services in Sub-Saharan Africa. *Progress in Development Studies* , 8(1): 115-128.
- IFAD, (2007). IFAD Strategic Framework 2007-2010. Rome.
- Ijjasz, E. (2006). Exploring Access to Microfinance for Community-Managed Rural Water Supply Projects: Emerging Experience from Kenya. Water and Sanitation Program, World Water Forum, Mexico
- Ingle B. (2005). *Ensuring Sustained Beneficial Outcomes for Water and Sanitation Programmes in the Developing World*. IRC International Water and Sanitation Centre Occasional Paper Series, Delft, NL.
- Johnson, K., Hays, C., Center, H., & Daley, C (2004). *Building Capacity and Sustainable Prevention Innovations: A Sustainable Planning Model*. *Evaluation and Program Planning*, 27, 135-149.
- Kemp, R., Parto, S. & Gibson R.B., (2005). *Governance for sustainable development: moving from theory to practice*. *International Journal Sustainable Development*, Vol.8 (1/2).
- Khwaja, A. I., (2004): *Is Increasing Community Participation Always a Good Thing?* *Journal of the European Economic Association*, 2(2-3): 427 - 436.
- Kleemeier, L.E. (2010). *Private Operators and rural water supplies, A desk review of experience*. Retrieved May 10th, 2017, from <http://www.documents.worldbank.org>
- Kombo, D. K., & Tromp, D.L., (2006). *Proposal and thesis writing: An introduction*. Nairobi: Pauline's Publications Africa.
- Kirsch LJ, Ko D-G, Haney M.H., (2010): *Investigating the antecedents of team-based clan control: Adding social capital as a predictor*. *Organ. Sci.* 21(2):469-489.
- Kumar, S. (2002). *Methods for Community Participation: A Complete Guide for Practitioners*, Vistar Publications, New Delhi India
- Lockwood, H., & Smits, S. (2011). *Supporting rural water supply: moving towards a service delivery approach*. Retrieved from <http://www.rural-water.supply.net/en/resources> Downloaded on May 7th, 2017.
- Mancini, J.A., Marek, L.I. & Brock D.J. (2003). *Sustaining Community Based Programs for Families*. Program Development Implications from Longitudinal Research, Virginia State University.
- McDade, (2014). *The Cinotepeque Range of central El Salvador: Geology, magma origin and volcanism*. *Bulletin of Geosciences*, 80(4): 277-286.
- Mengesha, A., Abera K. & Misganaw, F. (2003). Sustainability of Drinking Water Supply Projects in Rural of North Gondar, Ethiopia.

- Mesa, B., Tamekawa, C., Ezbakhe, F., Cuadrado, L., & Chan, M. Y. (2014) *Searching for success in community management for rural water supplies over 30 years*. Retrieved From <http://www.ircwash.org>
- Mochiemo, M.E., (2014): *Factors influencing Sustainability of Water Projects in Slum areas of Nairobi County: A case of Maji ni Maisha Water Projects*. Unpublished MA Project, University of Nairobi.
- Mommen, B., & Nekesa, J. (2010). Connected hand pump mechanics for improved service delivery: A key study of district-based associations of hand-pump mechanics in Uganda as a supporting mechanism
- Mulwa, F. (2008). *Participatory Monitoring and Evaluation of Community projects*, Paulines Publications Africa, Nairobi, Kenya
- Mulwa, M. M., (2013). *Factors influencing sustainability of water supply projects in Central Division, Machakos District of Machakos County*. Unpublished MA Project, University of Nairobi.
- Mugenda, O.M. & Mugenda, A.G., (2003). *Research Methods: Qualitative and Quantitative Approaches*. Acts Press, Nairobi – KENYA.
- Munyui, K., (2015). *Factors Influencing Sustainability of Community Water Projects: A Case of Kitui West Sub-County, Kitui County*. Unpublished MA Project, University of Nairobi.
- Mwangi, W.S., (2006). Project Planning and Administration, Departments of Sociology, Anthropology and Economics, Egerton University, Njoro Kenya. Unpublished Thesis.
- Naiga, R., Penker, M., & Hogl, K. (2015). Challenging pathways to safe water access in rural Uganda: From supply to demand – driven water governance: *International Journal of the Commons*, 9(1), 237-260. Retrieved, from <http://www.thecommonsjournal.org> Downloaded May 10th 2017
- Nerubucha, D.W., (2011). *The Determinants of choice of Improved Water Supply among Rural Households in Kenya*. Who Participates in Community Decision Making Lessons for Bungoma-Sikulu Water Project, The MDG Team-Sauri, Kenya.
- Niyi Gbadegesin and Felix Olorunfemi, (2007) *Assessment of Rural Water Supply Management in Selected Rural Areas of Oyo State, Nigeria*. ATPS Working Paper, Series No. 49 (African Technology Policy Studies)
- Ngetich, R. C., (2009). *Assessment of Factors Influencing Projects Sustainability: the Case of Community Water Projects in Keekonyokie Central Location of Kajiado North District, Kenya*. Unpublished Thesis of University of Nairobi.
- Official Development Assistance - ODA, (2014). *Development aid stable in 2014 but flows to poorest countries still falling*, Development assistance Committee, Paris, 8 April 2015
- Organization for Economic Co-operation and Development- OECD, (2002) *Governance for Sustainable Development: Five OECD Case Studies*, OECD, Paris, France.
- Orodho A.J., (2004). *Techniques of writing proposal and reports in education and science: (1st edition)*. Reater Printers Nairobi.
- Project Management Institute - PMI, (2004). *A Guide to the Project Management Body of Knowledge*. 3rd ed.; Project Management Institute (PMI): Pennsylvania, PA, USA, 2004; pp. 81–86.
- Regional Partnership for Resource Development. (2009). *People's Participation in Development*, Signal Printers, Nairobi

- Roodt, M., (2001). *Participation, civil society and development*. In KJ Coetzee, J Graaff, F Hendricks & G Wood (eds.), *Development: Theory, policy, and practice*. Oxford: Oxford University Press.
- Shenghverzy, N.J., (2003). *Statistics for People in Statistics* (2nd edition). Sage publication, New York, USA
- Tadese, A., Bosona, T., & Gebresenbet, G. (2013). Rural water supply management and sustainability: The case of Adama area Ethiopia. *Journal of Water Resources and Protection*, 5(2), 208-221. Retrieved on May 7th 2017, from <http://dx.doi.org>
- Thite, (2011). The Purchasing Power Parity Puzzle. *Journal of Economic Literature*, 34: 647-668
- UNESCO, (2003). *Globalization, Uneven Development and Poverty: Recent Trends and Policy Implications*. UNDP.
- Water Aid. (2009). *Management for sustainability practical lessons from three studies on management of rural water supply schemes*. Retrieved 22 March, 2017, from <http://www.wateraid.org>
- Weinberg, (2008): *Improving Leadership Effectiveness: The Leader Match Concept* (2nd Ed.). New York: Wiley
- WHO/UNICEF (2008). *Progress in Drinking Water and Sanitation: Special Focus on Sanitation*. Available on: http://www.who.int/water_sanitation_health/monitoring/jmp2008/en/. Accessed on 26.09.2016.
- World Bank, (2007). *Making Finance Work for Africa*. Washington, DC: World Bank, Africa Region
- World Bank: Water, (2014). *Water and Sanitation Program End of Year Report*: <http://www.worldbank.org> (Downloaded on October 28th 2016).
- Yamane, Taro. (1967). *Statistics: An Introductory Analysis*, 2nd Edition, New York: Harper and Row.

Appendix I: Questionnaire for CMRWSS members

Instructions

Please tick in the appropriate box and also fill in the blank spaces provided for those questions where elaborate answers are required. Please do not include your name on the questionnaire. Participation will be voluntary and information will be used for research purpose only. Kindly spare your time to provide answers as honestly and objectively as possible.

Respondents location

A. Demographic Characteristics

1. Please indicate your gender?
Male () Female ()
2. Please indicate your age group?
21-35 years () 36-50 years () 51-65 year () Over 65 years ()
3. What is your marital status?
Married () Single () Windowed () Separated/Divorced ()
4. Please indicate the highest level of education attained?
Never attended school () Primary level () Secondary level () University level ()
5. Please indicate the type of your family?
Male headed () Female headed () Child headed ()

B: Sustainability of CMRWSS

6. What are the main sources of water for community water projects?
.....
.....
7. What strategies does your CBO practice to conserve the water resources?
.....
.....
8. To what extent do the measures and strategies implemented to conserve the present water resources contribute to sustainability of the water projects?
Great extent () Moderate extent () Low extent ()

C. Project Financing

9. Does project financing affect the sustainability strategies of community water projects in Njoro Ward?
Yes () No ()
If yes please explain?
.....
.....
10. To what extent does project financing affect the sustainability strategies of community water projects in Njoro Ward?
Very great extent ()

- Great extent ()
- Moderate extent ()
- Little extent ()
- No extent ()

11. What are the sources of project financing?
 Loans () Member contributions () Water revenue () Donor grants ()
12. If member contribution; how much does each member contribute?

-
13. What are the sources of financing project's Operation & Maintenance?

D. Community Participation

14. To what extent do community members participate in the conception, design and implementation of the water projects?
 Great extent () Moderate extent () Low extent ()
15. Do community members make contributions in-kind, labour or cash for operations and maintenance of the water projects?
 Yes () No ()
16. To what extent do community contributions influence decisions made during conception, design and implementation of water projects?
 Great extent () Moderate extent () Low extent ()
17. How is the stakeholders' representation in the committee structures for management of water projects?
 Good () Fair () Poor ()

E. Community Training on Project Operations, Maintenance and Management

18. Have water management committee members been trained on operation, management and maintenance of the water systems?
 Yes () No ()
19. How relevant were the trainings carried out towards enhancing the capacity of the community members to operate and maintain the water systems?
 Very relevant () Fairly relevant () Irrelevant ()
20. How do you rate the skills and qualifications of the trainers?
 Poor () Fairly good () Excellent ()

F. Management Approaches

21. Does the CBO hold regular management meetings to transact business of the water project?
 Yes () No ()
 If yes, how many meeting are held monthly?

22. Are all members of the executive committee aware when meetings are scheduled and do they all attend?
 Yes () No ()
23. Do all the members participate in discussing the project progress reports, audit reports and Monitoring & Evaluation reports?
 Yes () No ()

24. Does the management conduct regular AGM for the project and provide all the information to members?
Yes () No ()

Section G: Government Policies and Conservation

25. Are there government policies on community management water project?
Yes () No ()

26. Which are these policies

.....

.....

27. Does those policies affect the sustainability of community managed water project in the region?
Yes () No ()

28. How do these policies affect the sustainability of community managed water project in Njoro Ward?

.....

.....

Thank you

Appendix II: Interview Guide for Key Informants

Instructions

Kindly spare your time to provide answers as honestly and objectively as possible. Do not include your name on the questionnaire. Participation will be voluntary and information will be used for research purpose only.

A: Respondents Details

1. Position of the respondent.....

B: Sustainability of CMRWSS

2. In your own assessment, what is the main source of water for community water projects?
3. In your own opinion are the water sources adequate to sustain the beneficiaries throughout the year?
4. What strategies are in place to conserving the water resources?
5. In your own opinion, what measures and strategies can the stakeholders implement to ensure conservation of the present water resources?

C. Management Approaches

6. In your own assessment, do community water projects have clear goals and objectives?
7. In your own observation are the functions, responsibilities and lines of authority of the project management and water committees properly defined?
8. In your own opinion does the project operator in possession of necessary knowledge and skills required for successful implementation of water projects?
9. Do community members use standard management tools and techniques such as work plans, monitoring and evaluation plans in managing the water project?
10. In your own assessment how often do water committee members hold project meetings to report implementation, operation and maintenances of the water project?

D. Community Participation

11. To what extent do community members participate in the conception and design of the water projects?
12. How do community members participate in the implementation of the water projects?

13. In your opinion, do you feel that your contributions influenced decisions made during conception, design and implementation of water projects?
14. Do community members make contributions in kind, labor or cash for implementation and maintenance of water projects?
15. In your own assessment how is women representation in the membership of community structures for management of water projects?

E. Community Training on Project Operation, Maintenance and Management

16. Have water management committee members been trained on operation and maintenance and management of water systems?
17. In your opinion, were the trainings carried out relevant towards enhancing the capacity of the community members to operate and maintain the water systems?
18. Who facilitated the training sessions and what were their qualifications?
19. What are your recommendations in improving sustainability of water projects?

F. Government Policies and Conservation

29. Which are the government policies on community management water project?
30. How do these policies affect the sustainability of community managed water project in the region?
31. What are your recommendations in improving sustainability of water projects?

Thank you

Appendix III: Consent to Participate in a Research Study

Kenyatta University, Nairobi – Kenya, MA

Title of Study

A STUDY OF SUSTAINABILITY STRATEGIES OF COMMUNITY
MANAGED RURAL WATER SUPPLY SCHEMES IN NJORO WARD, NAKURU COUNTY
KENYA

Name of Principal Investigator

Elkanah Ombiro Mogaka
(MA Student, Kenyatta University)

Name of 1st Co-investigator

Dr. Anne Kamau (University of Nairobi)

Name of 2nd Co-investigator

Dr. George Owino (Kenyatta University)

Introduction

Welcome to participate in this research study aimed at understanding sustainability strategies of community managed rural water supply schemes in Njoro Ward, Nakuru County Kenya. You were selected as a possible participant because of your vast experience in the subject matter and as a water consumer at the sampled areas. Kindly read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of study

The purpose of the study is purely academic to understand the role of community participation, management practices, community training and effective project funding in sustainability strategies of community management rural water supply schemes. Ultimately, this research may be published as an academic paper.

Description of the study procedures

If you agree to be in this study, you will be asked to answer questions appearing in a questionnaire/interview guide you will be given

Risks/discomforts of being in this study

There are no reasonable foreseeable (or expected) risks. There may be unknown risks though the researcher is unaware of.

Benefits of being in the study

There may not be direct benefits for participating in this research project apart from the joy of being one of the volunteers who will provide information that will benefit this rural water research project.

Confidentiality

This study is anonymous. The researcher will not be collecting or retaining any information about your identity.

Payments

You will not receive any payment for volunteering information relevant to this study.

Right to refuse or withdraw

The decision to participate in this study is entirely upon you. You may refuse to take part in the study at any time without affecting your relationship with the researcher of this study or Kenyatta University.

Right to Ask Questions and Report Concerns

You have the right to ask questions about this research study and to have those questions answered by the researcher before, during or after the research. If you have any further questions about the study, at any time feel free to contact the researcher on email melkanah2@gmail.com or mobile No. 0721 987 683. If you have any other concerns about your rights as a research participant that may not have been answered by the researcher, you may contact Dr. Ombaka, the Chairman of Sociology Department, Kenyatta University on mobile No. 0733 414 019.

Consent

Your signature below indicates that you have decided to volunteer as the research participant for this study, and that you have read and understood the information provided above. You will be given a signed and dated copy of this form to keep, along with any other printed materials deemed necessary by the study researcher:

Participant's Name _____

Participant's Signature _____

Researcher's Name _____

Researcher's Signature _____

Appendix IV: Research Authorization Letters and Nacosti Permit



KENYATTA UNIVERSITY GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

P.O. Box 43844, 00100

NAIROBI, KENYA

Tel. 810901 Ext. 4150

Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School

DATE: 24th August, 2017

TO: Elkanah Ombiro Mogaka
C/o Sociology Dept.

REF: C50/CTY/PT/24341/2011

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 12th July, 2017 entitled "A study of sustainability strategies of Community Managed Rural Water Supply Schemes in Njoro Ward, Nakuru County Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

A handwritten signature in blue ink, appearing to read 'Gideon Kaimenyi', written over a horizontal line.

GIDEON KAIMENYI

FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Sociology

Supervisors:

1. Dr. Anne Kamau
C/o Institute for Development Studies (IDS),
University of Nairobi
2. Dr. George Owino
C/o Department of Sociology
Kenyatta University

GK/inn



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: C50/CTY/PT/24341/2011

DATE: 24th August, 2017

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

**RE: RESEARCH AUTHORIZATION FOR ELKANAH OMBIRO MOGAKA – REG.
NO. C50/CTY/PT/24341/2011**

I write to introduce Mr. Elkanah Ombiro Mogaka who is a Postgraduate Student of this University. He is registered for M.A degree programme in the **Department of Sociology**.

Mr. Elkanah Ombiro intends to conduct research for a M.A Thesis Proposal entitled, “**A study of sustainability strategies of Community Managed Rural Water Supply Schemes in Njoro Ward, Nakuru County Kenya**”.

Any assistance given will be highly appreciated.

Yours faithfully,

**MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL**

GK/inn



**KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE**

Fax: 8711242/8711575
Email: chairman.kuerc@ku.ac.ke
secretary.kuerc@ku.ac.ke
Website: www.ku.ac.ke

P. O. Box 43844,
00100-Nairobi
Tel: 8710901/12

Our Ref: **KU/ERC/APPROVAL/VOL.1** (120)

Date: 17th January, 2018

Elkanah Ombiro Mogaka
Kenya University
P.O. Box 43844-00100
NAIROBI.

Dear Elkanah,

APPLICATION NUMBER PKU/787/I855 “A STUDY OF SUSTAINABILITY STRATEGIES OF COMMUNITY MANAGED RURAL WATER SUPPLY SCHEMES IN NJORO WARD, NAKURU COUNTY, KENYA.”

1. IDENTIFICATION OF PROTOCOL

The application before the Committee is with a research topic Application Number **PKU/787/I855**-“A Study of Sustainability Strategies of Community Managed Rural Water Supply Schemes in Njoro Ward, Nakuru County, Kenya” received on 7th September, 2017 and discussed on 16th January, 2018.

2. APPLICANT

Elkanah Ombiro Mogaka

3. SITE

Nakuru County, Kenya

4. DECISION

The Committee has considered the research protocol in accordance with the Kenya University Research Policy (Section 7.2.1.3) and the Kenya University Review Committee Guidelines



AND APPROVED that the research may proceed for a period of ONE year from 16th January 2018.

ADVICE/CONDITIONS

Consider reducing the margin of error from 10% to 5% which is more reasonable. This may increase the sample size from 99 to 368.

In addition ensure that:

- i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
- ii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.
- iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
- iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space Provided below and return to KU-ERC a copy of the letter.



DR. TITUS KAHIGA,
CHAIRMAN ETHICS REVIEW COMMITTEE

I Elkanah Ombira Moga..... accept the advice given and will fulfill the conditions therein.

Signature..... [Signature]..... Dated this day of... 25th January.....2018.

C.c. DVC Research Innovation and Outreach



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone:+254-20-2213471,
2241349,33 10571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/75756/21169**

Date: **16th February, 2018**

Elkanah Ombiro Mogaka
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“A study of sustainability strategies of community managed rural water supply schemes in Njoro Ward, Nakuru County Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Nakuru County** for the period ending **16th February, 2019.**

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

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.


GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nakuru County.

The County Director of Education
Nakuru County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

**THIS IS TO CERTIFY THAT:
MR. ELKANAH OMBIRO MOGAKA
of KENYATTA UNIVERSITY, 0-100
Nairobi, has been permitted to conduct
research in Nakuru County**

**Permit No : NACOSTI/P/18/75756/21169
Date Of Issue : 19th February,2018
Fee Received :Ksh 1000**

**on the topic: A STUDY OF
SUSTAINABILITY STRATEGIES OF
COMMUNITY MANAGED RURAL WATER
SUPPLY SCHEMES IN NJORO WARD,
NAKURU COUNTY KENYA**

**for the period ending:
16th February,2019**

.....
**Applicant's
Signature**



.....
SD Kalerwa

**Director General
National Commission for Science,
Technology & Innovation**

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
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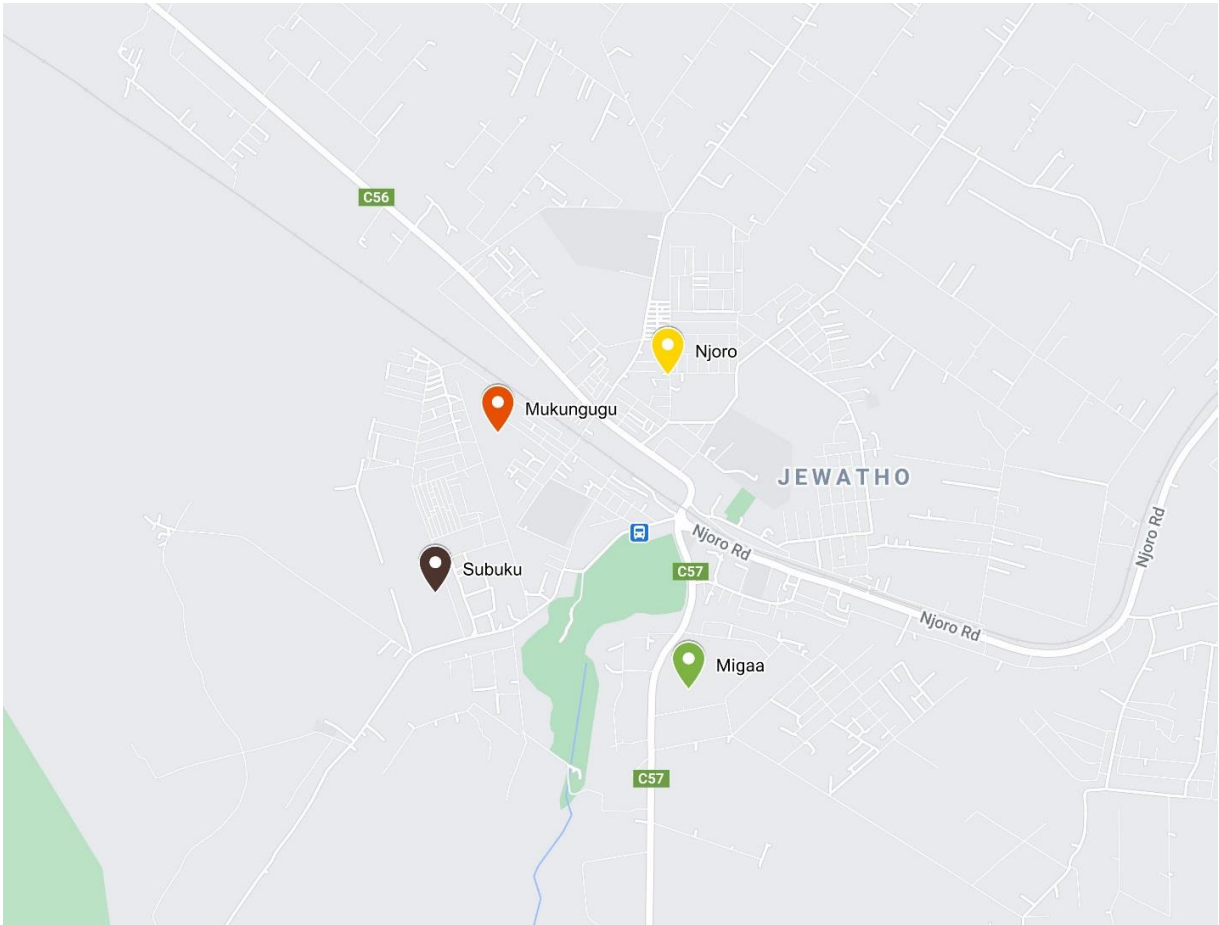
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RESEARCH CLEARANCE
PERMIT

Serial No.A **17463**

CONDITIONS: see back page

Appendix VII: Map of Njoro County Assembly Ward



Source: Researcher, (2020)