INFLUENCE OF FINANCIAL MANAGEMENT ON SUSTAINABILITY OF COMMUNITY MANAGED WATER SUPPLY PROJECTS IN KIENI WEST DISTRICT, NYERI COUNTY, KENYA

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DECLARATION

I declare that this research project report is my original work and to the best of my knowledge has not been submitted for academic award in any other University.

Sign: ..... Date: 06.08.2012

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

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DEDICATION

I dedicate this work to my wife Emily Kihiu, my children Mercy Wambui and Catherine Wanjiku, my mother Hannah Wambui and my late father Ayub Mwangi. You have been a great inspiration and I will forever be grateful for all that you have done.

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ABBREVIATIONS AND ACRONYMS

ASAL	Arial and Semi Arid Lands
DWO	District Water Officer
FBO	Faith Based Organization
GoK	Government of Kenya
IEA	Institute of Economic Affairs
KFSSG	Kenya Food Security Steering Group
MDG	Millennium Declaration Goal
MW&I	Ministry of Water and Irrigation
NGO	Non Governmental Organization
O&M	Operation and Maintenance
PMC	Project Management Committee
PRSP	Poverty Reduction Strategy Paper
SPSS	Statistical Package for Social Sciences
UN	United Nation
UNDP	United Nation Development Programme
UNICEF	United Nations Children's Fund
WCED	World Commission on Environment and Development
WHO	World Health Organization

ABSTRACT

Water is the most important natural resource, indispensable for life and at the same time the backbone of growth and prosperity for mankind. In the last decade, the provision of potable water for domestic and rural livelihood needs has moved to centre stage on the international development agenda and in the interventions of many Non Government Organizations (NGO) and National Governments. The Government of Kenya Vision 2030 acknowledges the fact that Kenya is a water scarce country and underscores the central role water plays in the performance of key sectors of the economy and the livelihoods of Kenyans. Under the economic and social pillars of Vision 2030, improved access to safe water and sanitation in both rural and urban areas, and increasing the area under irrigation have been given prominence with the rehabilitation and expansion of water supply identified as some of the flagship projects. The purpose of the study was to investigate financial management factors that influence sustainability of community managed water supply projects in Kieni West District. The research adopted a survey research design. The target population for the study was 150 water committee officials and the sample size was 109 respondents who were selected using the stratified sampling method. Key findings are that adequate understanding, identification and estimation of the operation and maintenance costs is critical for the sustainable delivery of water supply services; transparency of financial management is a key issue in community management in water projects and that without water levies and fees charged for connection and usage, sustainability of the project will not be possible.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Water is the most important natural resource, indispensable for life and at the same time the backbone of growth and prosperity for mankind (Hutton et al. 2007). In the last decade, the provision of potable water for domestic and rural livelihood needs has moved to centre stage on the international development agenda and in the interventions of many non-governmental organizations and national governments according to Scanlon, Cassar, and Nemes (2004). The General Assembly of the United Nations drew critical attention to the importance of water to sustainable development and poverty alleviation by declaring 2003 the International Year of Freshwater with one of its aims being to reassert the Millennium Declaration Goal (MDG) target for water of reducing by half the proportion of people without access to safe drinking water by the year 2015 and to stop the unsustainable exploitation of water resources (UNDP-WSP, 2006).

Overall in spite of the universal recognition of the importance of safe water in poverty alleviation and socio-economic development, access to safe drinking water remains low. Worldwide, Smith and Marin (2005) states that about 2 billion people struggle daily for access to clean and sufficient water. According to Yahaya (2004), Africa is the region that suffers most from inadequate access to water supply with only 62 percent of the population having access to potable water supply. Furthermore, of 55 countries in the world whose domestic water use is below 50 litres per capita per day, 35 are in Africa. In Kenya, estimates of piped water coverage provided by the Ministry of Water and Irrigation in 2007 stood at 47 percent nationally (Republic of Kenya, 2007).

Kenya is classified as a water scarce country with surface water coverage of only 2 percent and registering a water scarce category of 647 cubic metres per capita against the global benchmark of 1000 M^3, making it one of the most water scarce countries in Africa and the world (Republic of Kenya, 2005). Water scarcity is further aggravated by unreliable and changing rainfall patterns, degradation of water resources and periodic droughts and perennial floods. Out of a

total area of 583 000 square km, only 20 percent is medium to high potential agricultural land while the rest is mainly arid or semi arid (ASAL). In contrast, approximately 75 percent of the country's population lives within the medium to high potential agricultural land while 25 percent live in the arid and semi arid region (TI Kenya, 2011).

The present institutional arrangements for the management of the water sector in Kenya can be traced to the launch in 1974 of the National Water Master Plan whose primary aim was to ensure availability of potable water, at reasonable distance, to all households by the year 2000 (Roy, 2006). The water for all by the year 2000 programme which was to be achieved through the development of water supply schemes required the government to directly provide water services to consumers, in addition to its other roles of making policy, regulating the use of water resources and financing activities in the water sector (Mumma, 2005). Unfortunately soon after in the 1980s the Government begun experiencing budgetary constraints and it became clear that, on its own, it could not deliver water to all Kenyans by the year 2000 as promised. Attention therefore turned to finding ways of involving others in the provision of water services in place of the Government (IEA, 2007).

In 1983, the government policy of district focus for rural development became operational, shifting increased responsibility to districts in order to encourage local initiative and improve local capacities. This, together with harambee, the local spirit of working together which was introduced at independence in 1963, gives the general framework for community management of water supply systems in Kenya (Roy, 2006).

For nearly two decades, since the signing of UN Agenda 21 in 1992, the first formal, global commitment to sustainability, the world has struggled with how to integrate sustainability measures into development efforts, especially those of drinking water and sanitation (Montgomery and Elimelech, 2009). The large percentage of nonfunctioning water systems is a stark indicator of inadequate operation and maintenance and lack of sustainable services. In a survey of 11 countries in Sub-Saharan Africa, the percentage of functioning water systems in rural areas ranged from 35 - 80 percent (Sutton, 2004). A study in South Africa documented that

as many as 70 percent of the boreholes in the Eastern Cape were not functional (Mackintosh and Colvin, 2003). In a survey of 7,000 wells and boreholes in Tanzania, on average, 45 percent were in operation, and only 10 percent of water supply systems that were 25 years or older were still functioning (Haysom, 2006).

Kenya has a strong culture of self help, which has been harnessed for many development activities, especially in rural areas (Mumma, 2005). According to Ministry of Water and Irrigation there are approximately 680 piped water systems which provide over 740,000 water connections throughout Kenya. An additional 350 community run water schemes exist in the country. A high percentage of these connections are however inactive as a result of poor management and maintenance. (Republic of Kenya, 2007).

According to the Kenya National Water Development Report of 2005 prepared for the second UN World Water Development Report, among 24 million rural dwellers in Kenya about 10 million have access to an improved water supply through piped or point source systems. Among those with access, 30 percent are served by community managed water supply schemes, many of which are developed by self help groups (Republic of Kenya, 2005). Looking specifically at the water sector in Kieni West District, of the 36 water projects, 83 percent are community managed water supply schemes (DWO, 2011). This underscores the importance of community managed water supply systems in Kieni West District.

In the last 30 years community groups, government and other development partners in Kieni West have in earnest being pursuing to increase water coverage levels in the district. To this end a great deal has been done and enormous amounts of money spent, however coverage levels Kieni West district according to the Department of Water are estimated at 45 percent only (DWO, 2011). Furthermore, according to the 2012 short rains assessment report by Kenya Food Security Steering Group (KFSSG) between 60 percent and 65 percent of all boreholes in Kieni West district either do not function at all, or operate significantly below design expectations (KFSSG, 2012).

1.2 Statement of the problem

In a survey of 11 countries in Sub-Saharan Africa, Sutton (2004) found that the United Nation's Millennium Development Goals (MDGs), which aim to halve from 1990 figures, the proportion without access to water and sanitation by 2015 have been important in galvanizing global attention and support for water and sanitation. However, efforts such as the MDGs, which focus on expansion of new services, run the risk of undermining functional sustainability by encouraging rapid construction of infrastructure rather than long term, critically needed, investments in operation and maintenance. According to Montgomery and Elimelech (2009), what is urgently needed to stem the trend of disrepair and accelerate progress in achieving the MDGs is a coherent focus on sustainability.

In the last 30 years a close to 40 water supply development projects have been implemented in Kieni West District. However, in spite of these efforts water shortage remains a major challenge in the area. On the other hand demand for additional water projects continues, yet there is limited evidence on the current level of functionality and service coverage. According to Bolt and Fonseca (2001) financial management and transparency are among the more problematic aspects of community management. Furthermore the large number of failed, poorly functioning or unsustainable water supply systems raises critical questions about the success of community managed water projects in Kieni hence the need for this study. This study therefore sought to investigate the influence of financial management on sustainability of community water supply projects in Kieni West District, Nyeri County.

1.3 Purpose of the study

The purpose of the study was to investigate financial management factors that influence sustainability of community managed water supply projects in Kieni West District, Nyeri County.

1.4 Objectives of the study

The following four objectives were identified for the research study:-

1. To establish how budgeting for operation and maintenance of water systems influences the sustainability of community water supply projects in Kieni West District, Nyeri County.

2. To explore how water tariffs contributes to the sustainability of community water supply projects in Kieni West District, Nyeri County.

3. To determine how financial administration influences the sustainability of community water supply projects in Kieni West District, Nyeri County.

4. To assess the influence of community financial monitoring on sustainability of community water supply projects in Kieni West District, Nyeri County.

1.5 Research questions

The following research questions guided the study:-

1. How does budgeting for operation and maintenance of water supply projects influence sustainability of community water supply projects in Kieni West District, Nyeri County?

2. To what extent do water tariffs influence sustainability of community water supply projects in Kieni West District, Nyeri County?

3. In which way does financial administration influence sustainability of community water supply projects in Kieni West District, Nyeri County?

4. How does community financial monitoring of projects influence sustainability of community water supply projects in Kieni West District, Nyeri County?

1.6 Significance of the study

As proposed in the Ministry of Water and Irrigation water services strategy report for the period from 2007 to 2015, Kenya aims to improve access to safe water and sanitation with the goal of attaining 75 percent access to safe and reliable water for urban areas and 70 percent for rural areas and reduce unaccounted for water to below 30 percent (Republic of Kenya, 2007). However given the low percentage of functioning water systems in rural areas of Kenya chances of achieving the Millennium Development Goals to half the proportion of people without access to safe water by 2015 will be seriously lowered unless levels of sustainability can be greatly improved.

The findings of this study are expected to assist managers in government, private sector and local communities in the formulation of evidence based strategies aimed at the development of sustainable financing mechanisms to support operation and maintenance of community managed water supply systems. This study would also contribute knowledge on financial management factors that promote long term functionality of rural water supply schemes that will be of value to researchers and scholars.

1.7 Delimitation of the study

The study focused on the influence of financial management factors on sustainability of community water supply projects in Kieni West District, Nyeri County. The study covered 22 community water projects in Kieni West District. In each project, five water project committee officials were chosen at random to a total of 110.

1.8 Limitation of the study

It was expected that time and resources would be limiting factors. However in order to speed up the process, the questionnaires were hand delivered to the water project committee officials. The Researcher also hired 2 Research Assistants who assisted him in the dispatch and collection of the questionnaire.

1.9 Assumptions of the study

The study had assumed that the the water project management committee officials were more informed about the current status and operations of their respective water schemes. During the study, the researcher observed that respondents were cooperative in all respects as the high return rate of the questionnaire indicates.

1.10 Definitions of significant terms

Community	In this study community is defined as a group of people living in a distinct area that is served by a water supply project. common water facility or water scheme. Community responsibilities in a water project include providing required contribution, participating during project inception, implementation and monitoring of project tasks. Other community roles include attending meetings in order to give suggestions and ideas to improve the performance of the water project.
Community financial monitoring	Is a regular and continuous process that seeks to establish the extent to which work schedules, budgets, other required actions and targeted outputs are proceeding according to plan. It includes making the water management committee accountable to the water users by stipulating that they regularly present financial reports during community meetings and publicize the financial situation of the water supply service. It also provides for the establishment of a community supervision committee that audits the accounts of the water project.

Financial administration	Involves developing and maintaining financial procedures that a water supply project employs in the implementation of its budget plan. It covers the keeping of all records, documents, information and books concerned with financial and accounting aspects of the community water supply. These measures also ensure that financial transactions are in accordance with the water project's rules and guidelines on how funds are collected and utilized.
Financial management	Means forecasting and planning, organizing, controlling and making decisions that enable collection of water payments, including activities such as procurement, allocation and utilization of funds of the water project. It consists of tasks such as setting tariffs, budgeting for water supply operations, recording financial transactions and informing water users about the water supply financial situation.
Water tariffs	Refers to the price at which users are charged for water. In order for a water project to set an appropriate water rate, the community needs to estimate the costs of running their water supply and draw up a budget followed by a decision on how much and how often water users need to be charged to match the budget. Tariffs can be set per volume of water consumed or standardized as one uniform price paid by all members of the community regardless of usage.

Operation and maintenance (O&M) budgeting	The process through which a water supply project develops its financial plan for a determined period of time. It involves on one hand establishing in advance the amount of money required to cover expenditure in respect to the everyday running and handling of a water supply including the cost of fuel, carrying out repairs and replacing worn out parts. The second component of budgeting for O & M entails estimating the revenue that the water project expects to receive from the water charges and projecting the movement of money into and out of the water project.
Sustainability in community water supply projects	The ability of a water supply facility to continue functioning properly and delivering the required quantity and quality of water for the entire period of time for which it was designed. In this study, sustainability also means that the water system is managed by the community and its operation and maintenance costs are covered through user fees.

1.11 Organization of the study

The study has five chapters. Chapter 1 outlines the importance of water as a natural resource that supports life, prosperity, sustainable development and poverty alleviation. It also highlights the current situation in sub-Saharan Africa, the region that suffers most from inadequate access to water supply. The chapter also provides the purpose, objectives, rationale scope and limitations of the study. Chapter 2 reviews relevant literature on the influence of community financial management on sustainability of community water supply projects from global, African and local perspectives. The chapter also presents a theoretical and conceptual framework. Chapter 3 describes the research methodology used in the study. The chapter discusses the research design, target population, sampling procedure, as well as the data collection and data analysis methods employed in the study. In the last part of the chapter, the operational definition of variables table that specifies how the various indicators were measured is presented. Chapter 4 has dealt with data analysis, presentation and interpretation of results of the study. Summary, conclusions and recommendation of the study are presented in Chapter 5.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the relevant literature on influence of financial management on sustainability of community water supply projects. The literature is reviewed from global, African and local perspectives. The chapter also presents a theoretical framework and a conceptual framework on which the study is based.

2.2 Sustainability of community water supply projects

The concept of sustainability has been closely linked to environmental issues and, in ecology, is defined as the amount or degree to which the earth's resources may be exploited without damage to the environment (Carter and Rwamwanja, 2006). Sustainability is a concept that has arisen from the debate on sustainable development, which became important from the 1970 onwards. However, for many organizations in the development sector, the United Nations (UN) document written in 1987, entitled 'Our Common Future', is probably the most widely quoted definition. The United Nation World Commission on Environment and Development (WCED) report defined sustainable development as development that meets the needs of the present generation without compromising the ability of future generations to meet their needs (WCED, 1987). This definition marked an important shift away from the idea of sustainability as primarily a concern of ecology to one that emphasizes the economic and social processes of development (DFID, 2000).

The World Health Organization (WHO) Global water and sanitation assessment report (WHO, 2000) differentiates between functional and environmental sustainability. Kimberly (1998) maintains that sustainability in water projects means, ensuring water supply services and interventions continue to operate satisfactorily and that they generate benefits over time as expected. He further pointed out that, sustainability is all about ability to operate and maintain initial project service standards. However, to achieve this it has to be planned from the very beginning of the project, so as to ensure prerequisites for long term sustainability and strategies aimed at seeing that sustainable projects are in place and are in good working order are adapted.

Abrams (1998) in defining the concept of sustainability of water and sanitation services refers to a sustainable intervention as one which continues to work over time. Abrams views sustainability of water projects as a continued flow of water at the same rate and quality, as when the supply system was designed. To him if water flows, then all elements of sustainability would be in place. On the other hand Richard (1999) defined sustainability as a continued delivery of a particular service. Richard emphasized on the need to involve all stakeholders in consumption and cost recovery strategies to ensure delivery of high quality services and sustainable development projects. Brikke and Davis (1995) also refer sustainability in rural water supply to mean that water facilities are maintained in a condition which ensures a reliable and adequate water supply and that benefits of water provision continue to be realized over a prolonged period of time.

According to Harvey and Reed (2007) reason for non-sustainability of most water projects in developing countries may include among others; lack of acceptance and non affordability of

community contribution, lack of community ownership and lack of community education. In addition, lack of interest and motivation by management structures like caretakers and project committees also contributes to the high rates of poorly functioning or unsustainable water supply systems.

A number of studies have identified various determinants of sustainability of rural water supply system. However according to Harvey and Skinner (2002) sustainability of rural water supply facilities is dependent on many factors. These actors include policy, legal and institutional framework, social factors such as demand for water, community participation and community organization; economic and financial factors such as ability to meet the cost of maintenance and ability to pay for services; technological factors such as technology choice, availability of spare parts and operation and maintenance and lastly management factors.

2.3 Operation and maintenance budgeting and sustainability of community water projects

Operation and maintenance (O&M) covers the efficient day to day running of the water supply facilities, regular preventive maintenance and the assurance of proper use. The long term success, according to Mogane-Ramahotswa (1995) of any water programme, depends almost entirely on effective maintenance although it is as an aspect that is very often neglected. It does not just entail having technical aspects but also encompasses social, gender, economics and many other aspects (Brikke et al, 2003). Water supply is a service, and just like any service it involves manpower, repairs, spare parts, energy and other inputs. These services as argued by Boland and Whittington (2000) are not free and therefore in order to provide a safe and sustainable water supply, a cost recovery system has to be introduced.

Nyoni (1999) argues that the tendency is to make beneficiaries pay for the water they use, in order to recover partially or totally the costs of supplying this service, and to give to the communities more responsibility in the actual management of the water supply system gathered momentum in the 1980s when governments especially in sub Saharan Africa faced greatest difficulties in meeting recurrent water provision costs.

According to Folifac and Gaskin (2011) provision of potable water supply services involves costs which are incurred at the design, construction and operational stages of any water supply system. However, the magnitude of these costs is utility specific and would depend in part on the type of technology used, management practices, and the geology. The costs associated with potable water provision can be classified according to the subunits of operation (Whittington, 2003) which consists of: production costs such as reservoir, tanks, pumps and treatment plants; transportation costs for instance major pipelines and pumping facilities; distribution costs which include connection costs, metering and local reticulation; and administrative costs such as billing, collection and consumers relation.

Cardone and Fonseca (2003) differentiate investment costs associated with the development of water supplies from recurrent costs. They describe investment costs as the initial or sunk costs of the utility or the purchase of movable and immovable assets. These include, but are not limited to, all capital costs related to the purchase of land, the design and construction of the utility, the purchase of water treatment and office equipment, storage tanks, vehicles, pumping stations, distribution mains and pipes. These are the most tangible costs due to the fact that they have a market value. They are usually very huge and constitute the block of the costs associated with

potable water supply. Capital expenditure has traditionally been financed by government grants and external aid packages, which suggests why these costs are not typically up for recovery unlike the operation and maintenance costs. On the other hand operation and maintenance costs are recurrent costs incurred in the daily operations of the water utilities.

According to Brikke and Rojas (2001), an adequate understanding, identification and estimation of the operation and maintenance costs is critical for the sustainable delivery of potable water supply services. The components of these costs are typically wide, varied and utility specific and may include: cost of chemicals for water treatment, cost of electricity and other utilities, purchase of software and capacity building, cost of fuel for equipment and vehicles, personnel expenses, cost of support services, repair costs, rehabilitation and extension, costs of billing and collection, payment of contractors and suppliers. The pay back cost and depreciation costs of assets and equipment should also be accounted for in operation and maintenance costs so as to provide capital funds for future growth extension of distribution network, additional storage and pumping facilities, as well as replacement of equipment. The operation and maintenance costs constitute a key component of the costs involved in potable water supply because of the daily occurrence of these costs needed for the functioning of the utility and delivery of services.

A study by Harvey and Reed in 2004 which analyzed 20 sub-Saharan African countries with completed poverty reduction strategy papers (PRSPs) revealed that 85 percent of those countries had stressed the importance of community management and financing of rural water supplies in key national strategy documents, but this did not adequately address the determination, nor affordability, of associated costs. According to Sami and Murray (1998) although O&M is

critical to the sustainability of the water supply facilities, analysis of water supply systems revealed that inadequate arrangement for O&M is the major cause of failure. This is because few water supply agencies considered operation and maintenance a major priority. They instead consider construction of new facilities and systems expansion more important, due to the unmet backlog of communities that require new water supply facilities.

Effective operation and maintenance (O&M) of rural water supply systems is a crucial element for the sustainability of the water project. According to Cardone and Fonseca (2003) sustainability of a service is achieved when the community wants and accepts the level of service provided, is able to pay for it and the skills are available locally to service the system. As argued by Harvey and Reed (2007) the presumption that once a new water supply is constructed and handed over to the user community it can be sustained by community financing of O&M costs is over simplistic, especially since the long term O&M costs are neither calculated nor communicated to water users. According to Binder (2008) budgeting sufficient O&M funding for rural water supply systems is an important factor for sustainability and proper maintenance.

2.4 Water tariffs and sustainability of community water supply projects

Levying of water tariffs is generally subjected to two ideological views (Whittington, 2003). On the one hand, water is viewed as a social good that should be provided for free and on the other hand, it is considered as an economic good that should be priced. However, in the past few decades, there seems to be a consensus that water should be priced despite increasing diversity on what is a fair price for water (Evans, 1992).

According to Nyoni (1999) water pricing in the form of water tariffs is based on user pays principle whereby users are charged for the services provided. World Bank (1993) and other international donors have argued that public or government funds can no longer provide for all the expenses associated with the provision of potable water services. According to critics of free water supply, this practice promotes unsustainable use of water and is partly responsible for the poor financial stability of water utilities in many low income countries. They argue that with increasing competition and debt burden on state budgets, governments can no longer afford to provide water for free.

Davis et al (1993) argue that operation and maintenance costs money, whether it is done by the community or by the water supply agency. The question that is raised with community based O&M system is whether or not the poor rural communities can meet the full cost of operation and maintenance. Some actors in the water supply sector argue that beneficiaries can fully meet maintenance costs (WHO 1993), while others argue that meeting full costs of O&M by rural communities is difficult because of high poverty levels. Even in cases where the community members are willing to contribute financially to O&M they are hampered by lack of resources for O&M (Briscoe & de Ferranti 1998).

Those who promote the idea that maintenance costs should be met by local communities argue that there is growing evidence that even the poorest and most under privileged segments of society are willing to pay for water supply as long as it is reliable (McPherson, 1994). Furthermore they argue that recent studies on water demand have generally found that people are willing to pay a higher proportion of their income for improved services than their rich

neighbours (UNCHS, 1997). Churchill (1998) also supports this view. He argues that although there are undoubtedly some areas in various countries where poverty is extreme, the review of global situation reveals that most rural communities can afford to pay for improved services, provided that appropriate technology is used. The reason for this argument is that people in rural areas are already spending large amount of time and energy in water collection.

Water tariffs can be implemented for different reasons under different structures. In most cases water pricing is implemented to provide revenue to utilities for the efficient delivery of potable water services. The recovery of at least the operation and maintenance cost is essential for the financial sustainability of water utilities, adequate system maintenance, and hence the provision of quality services (Brikke and Rojas, 2001). According to Magnusson (2004) water pricing promotes efficient and sustainable use of water. This is essentially a water demand management and resource conservation tool, aimed at fostering wise water use and demand driven service delivery.

Whittington (2003) suggests that water pricing promotes fairness and equity in access to water and water use. Based on the principles of user pays, it is argued that there is the need for equity and thus transparency in pricing. Brown and Holcombe (2004) said that a consumer who consumes twice as much water as another consumer should pay a bill that is at least twice as large as that of the latter. However Ruijs et al (2008) argued that fairness is more about pricing consumption on the basis of affordability and socio-economic characteristics of the household given that water is essential for human survival. Fairness in water pricing is essential to prevent negative externalities associated with the lack of access to safe and sufficient water supply.

Water tariffs can also be used to promote poverty alleviation. This seems to be a controversial objective at first sight considering that paying for water will reduce disposal income and could prevent access to other fundamental services. However the argument is that water tariffs will generate revenue for the extension of improved water supply services to the poor with relatively high social and economic returns (World Bank, 1993).

The poor usually spend their limited finances on medical bills due to the consumption of water of poor quality, pay more for less to water vendors, waste productive time in the process of water collection, walk long distance to and spend long waiting time, at collection points, loss of productive time due to ailments caused by the consumption of unsafe water. Aiga and Umenai (2002), and Thompson et al. (2001) have documented that the presence of improved water sources within households in Manila and East Africa respectively freed up time for water collectors to engage in productive activities which generate revenue for their households, as well as reduced their medical bills due to improvement in health.

Brikke and Rojas (2001) states that decisions that need to be made when designing a system of cost recovery include deciding on appropriate rate and type of tariff to apply to water users. Tariffs can be set per volume of water consumed or standardized as one uniform price paid by all members of the community regardless of usage. Annis (2006) in a study on community managed gravity flow water supply systems in Madagascar showed that the uses of community funds must also be well defined and the method of periodic funds collection must also be clear including: who, where and when monies will be collected.

2.5 Financial administration and sustainability of community water supply projects

Financial administration in water supply systems covers the keeping of financial records, documents, information and books concerned with financial and accounting aspects (Bolt & Fonseca, 2002). A simple but reliable system of financial records can greatly improve community management. The production of records, documents and information is necessary to: keep clear and accurate accounts about the resources needed to provide the water service, control income and expenditure, make decisions based on clear and accurate information, provide information to users who are interested in checking the financial management and in addition maintain the confidence and trust of users.

According to Appleton and Evans (1993) transparency of financial management is a key issue in community management in water projects. The whole structure of community management can fail rapidly if there is a suspicion that community funds collected for water supply services are being mismanaged or misappropriated. Adequate book keeping and regular review of accounts is therefore a major requirement (Lockwood, 2004).

Brikke and Rojas (2001) argue that the records must be clear, simple, complete and understandable. Clear, in the sense that they show the information without hiding anything; simple, because they have to be easy to carry out and appropriate for the type of administration; complete, in the sense that they provide enough information to make good decisions possible, and understandable, because they have to be easy to read and understand for all users, institutions, water committee members, and other stakeholders. Evans and Appleton (1993)

recommend simple administrative structure for rural or peri-urban areas where he following records could be used: user registration forms, a diary, minutes book, work attendance register stock and issue registers.

A high level of unaccounted for or non-revenue, water is an indicator of poor efficiency. According to Moran and Waughray (2003) unaccounted for water is the difference between the volume of water produced or delivered into the network and the volume of water consumed, whether metered or not. Many factors can produce unaccounted for water: leakage, wastage, fraud, illegal tapping, inaccurate meter readings, poor billing, and poor identification of payment centres. These factors are not only of a physical nature, but also administrative, and hence are strongly related to the managerial practices of the organization running the service.

Levels of unaccounted for water in developing countries can be as high as 30 to 50 percent according to WHO (2000). Control of unaccounted for water is a result of efficient management, which helps the organization managing the service to attain its objectives at the lowest cost (IRC, 1989). A programme to reduce levels of unaccounted for water must not only address faults, but also investigate their causes and ways to reduce them. Schouten and Moriarty (2004) argues that the problem of unaccounted for water can be reduced by involving communities in identifying sources of wastage or leaks and promoting the benefits of conservation and the rational use of water.

McCommon, Warner and Yohalem (1990) pointed out that community management in water projects can only be sustained when there is a system of organizing the community. Community

organization therefore entails that a community has the institutional capacity to manage the development and operation of the water supply facility. According to Mogane-Ramahotswa (1995) without proper community organization structures, effective community participation has no hope for sustainability. As a result Sami and Murray (1998) argue that the responsibility to manage water supply projects should not be transferred on the community structure that does not have the capacity to operate and maintain it.

Community participation cannot take place without information. Community members should therefore have access to information: so that they can make informed decisions (Brikke 1993). One of the possible constraints on cost recovery is the poor relationship between users and organizations managing the water service. This is partly due to lack of information on both sides, but is mainly because organizations do not consider the users as customers. The traditional approach has been to estimate users' needs, provide a level of service considered of good enough quality and then expect the users to pay.

As Yacubu (1997) pointed out marketing and total customer service can be effective ways to recognize customer needs and to stimulate their willingness to pay. Consumers have the right to receive a good service and to be informed about its quality including aspects such as quantity, tariffs structures, changes to tariffs contracts and other financial matters, and also have an obligation to pay for the service according to their ability to pay. Community organizations have an obligation to deliver those rights to users and to manage and operate the system in an efficient way.

2.6 Community financial monitoring and sustainability of community water supply projects

Participatory community monitoring and evaluation practices are extremely important for learning about the achievement or deviation from original concerns and problems faced by local development projects being implemented, so that corrective measures can be taken in time (White, 1981). One feature that is common to almost all village water schemes is the lack of regulation of those responsible for financial management. The term community management can be defined as the management through democratically elected representatives of the communities (Wood, 1994). Schouten and Moriarty (2004) defined community management to mean that a community took on the full range of management tasks related to maintaining and in some cases developing a domestic water supply. These tasks include, setting tariffs and collecting payment, carrying out routine maintenance, and making decisions about system extension.

Community monitoring involves engaging local beneficiaries in measuring, recording, collecting, processing and communicating information to assist water committee members in decision making. Making the management organization accountable to users is important factor in sustaining services (IRC, 1989). This includes observing transparent financial management and making regular reports and accounts to community meetings. According to Appleton and Evans (1993) effective control and monitoring is an on-going, regular necessity as part of financial management. This relies on accurate information, which will be mainly found in the records and books kept by the community. Control and monitoring are effective if they use clear, reliable, impartial and good quality information as a starting point.

Wegelin-Schuringa (1998) considers community management as a form of community participation while McCommon et al (1990) distinguished community management from community participation by stating that community management is taken to mean that the beneficiaries of the service have responsibility, authority and control over the development of such services, sustainability being the point of emphasis. All the authors have used different terminology in defining community management but conceptually they are describing the same thing: a bottom-up development approach where the community members have a say in their own development; and the community assumes control in the management, operational and maintenance in addition to taking responsibility for the development and running of their water supply system through their elected representatives. According to van Wijk-Sijbesma (1989) community development is therefore operationalized through community management.

According to Brikke and Davis (1995) one way to be impartial in the monitoring of community water projects is to establish a supervision committee to audit the accounts once a year. This committee should include members of the community. Parry-Jones et al (2006) recommended the use of community score card as a tool for monitoring the performance and efficiency of organizations such as service providers or community level committees as perceived by users. The main objective is to improve performance and governance more in general, by promoting dialogue and exchange between committees and users at public meetings. Sound control and monitoring also includes the use of indicators that provide a good overview of what is happening, without the possibility of misunderstanding or manipulation (Ockelford & Reed, 2006).

Harvey and Reed (2004) supports that the final objective of control and monitoring is to inform users about the financial situation of the water supply service. Control and monitoring has three stages: developing indicators and checking and analyzing information, presenting information to users, discussing information and decision making. According to Bolt and Fonseca (2002), monitoring indicators that can be used include: monthly revenue, payment received, O&M cost per user and expenditure per category. Monthly revenue: shows the capacity to recover costs, payment received: shows the rate of payment and therefore of non-payment; while average O&M cost per user: can be compared with the average tariff paid and level of expenditure per category: can help to detect abnormal expenditures.

According to Wong and Guggenheim (2005) several community driven development (CDD) programmes have systematically introduced participatory public expenditure management of micro projects. Community representatives are tracking the implementation of thousands of micro-projects in a number of countries. Ad-hoc committees are set up and in charge of overseeing implementation. Mechanisms used include information disclosure and transparency on project budget, financing, contracting and procurement; anonymous grievance procedures; and community monitoring of contracts and implementation. This information is discussed publicly in villages and displayed (Narayan, 1993). Village committees established to oversee the project are required to report back regularly to the community. As a result community members are in a better position to influence local level planning and decision making.

2.7 Theoretical framework

A theoretical framework is a collection of interrelated ideas based on theories. It accounts for or explains phenomena. Therefore a theoretical framework attempts to clarify why things are the way they are based on theories. The researcher will adopt the sustainability theoretical framework developed by Carter et al (1999). Sustainability pertains to multiple aspects of a rural water supply, with institutional, social, technical, environmental and financial dimensions (WELL, 1998). This accounts for the fact that understanding and measuring sustainability is so difficult, and why solutions are highly context specific. The sustainability chain has been developed to capture the inter-linkages that relate to sustainability, a weakness in anyone of which can lead to failure of the scheme.

The theoretical framework to achieve sustainability by Carter et al (1999) for rural water supply and sanitation services is depicted in Figure 1. According to these authors, a motivated community is the one that needs the service more and therefore considers the scheme as its own property. As a result schemes constructed by a motivated community are likely to be sustainable. Effective O&M is essential for sustainability and village level O&M is one of the ways through which sustainability can be achieved. In cases of scarce government resources the money collected from cost recovery can be used for capacity building such as sanitation education and village level maintenance training which can play great role in sustaining the services. Services cannot be always managed by the community alone. For example at times where village level maintenance trainees are lost from the community new training should be given to the trainees. Village level rural operation and maintenance has limited success if ongoing support is not provided.

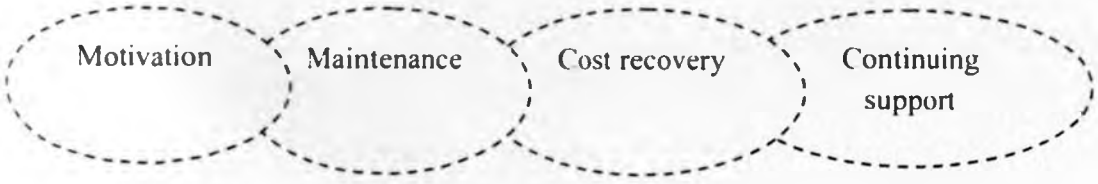

Figure 1: The sustainability chain adopted from Carter et al (1999)

Water supply development projects need to extend their scope beyond simply the provision of sustainable water supply infrastructure. Demand driven approaches are effective since

communities are capable of making decisions, maintaining services, and making their contributions to capital costs, operations and maintenance. In addition, a strong and well-structured information campaign is necessary to empower communities to make an informed choice.

Livingstone et al (1993) explained that poor program conceptualization, unimaginative planning, use of inappropriate technologies, and rigid management approaches had contributed to high rates of program failure. Implementation approaches which resulted in non-sustainability of water supply projects should be identified so that they would not be repeated in the future. At the same time implementation approaches, which resulted in sustainability of water supply projects should be identified so that they can be used as a base for future project implementations.

2.8 Conceptual framework

The interrelationship between the key variables identified for investigation in this study is shown in figure 2.

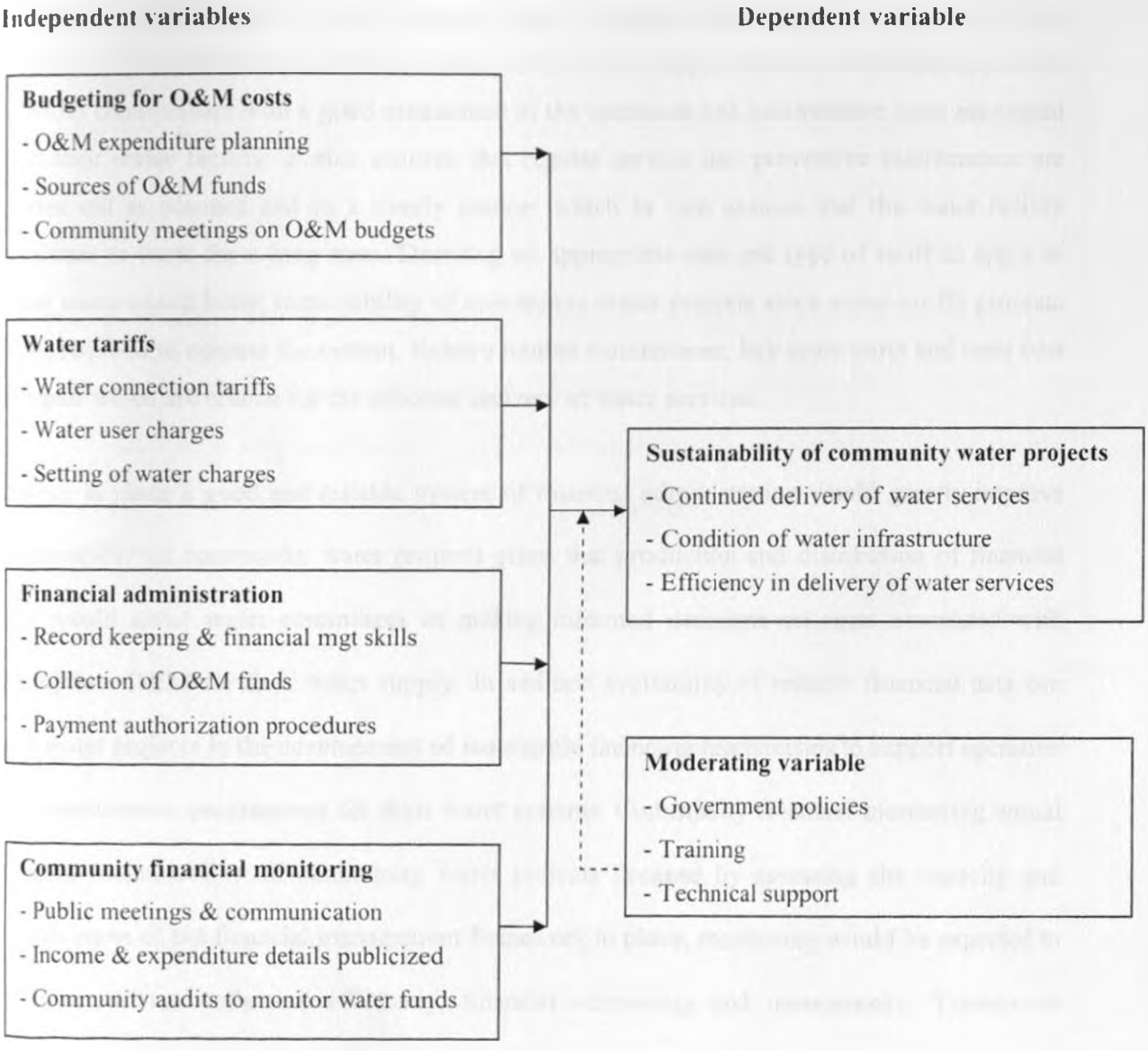

Figure 2 Conceptual framework

In this study sustainability of community water supply projects is conceptualized as the dependent variable while budgeting for operation and maintenance expenses, water tariff structure, financial administration and community financial monitoring are the independent variables. Government policies, training and technical support are considered as the moderating variable.

Budgeting for O&M costs of water systems would enhance sustainability of community water projects as it would enhance efficient running of the water supply because the budgeting process provides communities with a good assessment of the operation and maintenance costs associated with their water facility. It also ensures that regular service and preventive maintenance are carried out as planned and in a timely manner which in turn ensures that the water facility continues to work for a long time. Deciding on appropriate rate and type of tariff to apply to water users would boost sustainability of community water projects since water tariffs generate funds required to operate the system, finance routine maintenance, buy spare parts and meet cost of repair which are crucial for the efficient delivery of water services.

Having in place a good and reliable system of financial administration would greatly improve sustainability of community water projects given that production and distribution of financial data would assist water committees in making informed decisions on costs associated with appropriate O&M for their water supply. In addition availability of reliable financial data can help water projects in the development of sustainable financing mechanisms to support operation and maintenance programmes for their water systems. Community financial monitoring would augment sustainability of community water projects because by assessing the capacity and effectiveness of the financial management framework in place, monitoring would be expected to increase revenue collection efficiency, financial accounting and transparency. Transparent accounting of community funds can make the difference between sustainable and unsustainable services and it is therefore important to determine whether or not governance performance in community water projects is satisfactory.

2.9 Summary

This chapter has reviewed the relevant literature on the influence of community financial management on sustainability of community water supply projects. The wide range of literature reviewed on community management points out that an adequate understanding, identification and estimation of the operation and maintenance costs is critical for the sustainable delivery of water supply services with the focus being the degree to which community members are involved in operation and maintenance budget and financial management decisions. The chapter also presented a conceptual framework on which the study was based.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the research design chosen for the study. It outlines the target population, sampling procedure as well as the data collection methods employed. It explains how validity and reliability were established and the data analysis methods that the study adopted. In the last part of the chapter an operational definition of variables table is presented.

3.2 Research Design

A research design is the plan of action that helps answer research questions and realize the objectives of the study. This study used a survey design. According to Mugenda and Mugenda (1999) survey research is one of the best method available to researchers interested in collecting original data for the purposes of describing a population which is too large to observe directly. Use of the survey design permitted the gathering of information from respondents relatively quickly and inexpensively which was a major advantage for this study considering that Kieni West District is vast in size and the researcher had limitations in terms of time and resources.

3.3 Target Population

Target population is defined as a group of individuals, objects or items from which samples are taken for measurement (Kombo & Tromp, 2006). According to the Kenya Food Security Steering Group (KFSSG) short rains assessment report (KFSSG, 2012), there are a total of 30 water projects in Kieni West District. Out of these 30 water projects: 13 are gravity fed piped water systems, 5 are boreholes while 12 are dams. Each of the 30 water projects has 5 project management committee (PMC) members who constitute the executive committee. Consequently the target population for this study was 150 individuals. The decision to take this population to be sampled was based on the fact that the water PMC officials were more informed about the current status and operations of their relevant water schemes. Table 3.1 shows the target population by categories of the water systems.

Table 3.1 Population of the study

Category	Number of water projects per category	Target population
Gravity flow piped systems	13	65
Boreholes	5	25
Dams and water pans	12	60
Total	**30**	**150**

3.4 Sampling procedure

Sampling is the process of selection of appropriate number of subjects from a defined population (Kothari, 2004). The primary purpose of sampling is that by selecting some elements of a population the researcher can draw conclusions about the whole population. When populations vary, it is advantageous to sample each subpopulation or stratum independently. There are three categories of water projects in Kieni West District and therefore the researcher used stratified sampling method to divide the study population into homogeneous subgroups and then took simple random samples in each subgroup. Simple random sampling ensured that each individual water project had an equal chance of being selected and therefore avoided bias.

The sample size was determined through the use of the sample size calculator software developed by Raosoft Business Incorporated (Raosoft Inc, 2004). Raosoft sample size calculator takes into consideration four factors in determining sample size. These factors include the margin of error, the confidence level, the population and the response distribution. The Raosoft calculator is based on the normal distribution statistical method given by the formula:

$x = Z(^{c}/100)^2 r(100 - r)$

$n = ^{Nx}/((N - 1) E^2 + x)$

$E = Sqrt[\ ^{(N - n)x}/n(N - 1)]$

Where n is the sample size, E is the margin of error, N is the population size, r is the fraction of responses of interest and Z(c/100) is the critical value for the confidence level c. Using the Raosoft online sample size calculator and entering the target population of 150, with a margin of

error of 5 percent and 95 percent confidence level the recommended sample size generated was 109. To obtain the proportionate sample size per stratum the desired sample size was weighted against the target population then multiplied by the target population per each stratum. Out of the total of 150 water committee officials in Kieni West District, 73 percent of them took part in the study. In total, the study had 109 respondents as shown in Table 3.2

Table 3.2 Sample size by category of water project

Category	Target population	Sample size
Gravity flow piped systems	65	47
Boreholes	25	18
Dams and water pans	60	44
Total	**150**	**109**

3.5 Data collection method

Data was collected using self administered questionnaires. The choice of this method of data collection was selected because questionnaires can reach a large group of respondents within a short time and with little cost, at the same time use of questionnaires will enable the respondents to remain anonymous and be honest in their responses (Kasomo, 2007). Each questionnaire had five sections, namely section A, B, C, D and E to gather information on background information, O&M budgeting, water tariffs, financial administration and community financial monitoring respectively.The questionnaires with adequate instructions and easy to understand language were hand delivered to the already identified samples of the population by the researcher and the trained research assistants. Dates of collecting the filled questionnaires were agreed upon at the time of delivery and follow up was made through use of mobile phones.

3.6 Validity of research instrument

Kathuri and Pals (1993) defined validity as the accuracy and meaningfulness of inferences which are based on the research results. This implies that validity is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. Two colleagues who are experts in research from Kenya Agricultural Research Institute (KARI)

Embu were requested to assess the content used in the questionnaire developed and after examining the instruments validity they gave feedback which assisted in making the necessary improvements. Finally the supervisor was consulted to review the questionnaire to ensure it measured the concept as was intended.

3.7 Reliability of data collection instrument

Reliability of the research instrument is its level of internal consistency over time. According to Mugenda and Mugenda (1999) reliability of measurement concerns the degree to which a particular measuring procedure gives similar results over a number of repeated trials. A reliable instrument therefore, is the one that constantly produces the expected results when used more than once to collect data from two samples drawn from the same population.

A pilot study which used the split-half method was conducted in Kieni East District, whose inhabitants have similar characteristics as the study's target population. The split-half method was preferred because it is a simple and easy to perform method. The method is also time and cost effective because it makes it possible to create two tests using a single test eliminating the need for multiple administrations (Kombo & Tromp, 2006). The Pearson product moment correlation coefficient formula was employed to compute the correlation coefficient in order to establish the extent to which the contents of the questionnaire were consistent in eliciting the same responses every time the instrument was administered. The questionnaires were accepted at a correlation coefficient of 0.86. According to Orodho (2004) a correlation coefficient above 0.8 should be considered strong enough to judge the instrument as reliable for a study.

3.8 Method of data analysis

Kasomo (2007) defines data analysis as the process of bringing order to data and manipulating it. It involves organizing data into patterns, categories and basic descriptive units. For this study, descriptive data analysis was done. The researcher organized the data to ensure that raw data was sorted and coded. Data analysis was done with guidance of a statistician using the Statistical Package for Social Sciences (SPSS) computer software. Information from the analyzed data was presented using percentages and frequency distribution tables.

3.9 Ethical considerations

Ethics in research is a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal and social obligations to the study participants (Brydon, 2006). The researcher provided explanations about the research and answered all the relevant questions that were asked by the respondents about the purpose of the study. In addition respondents were informed of their right to voluntarily decide to participate in the study and anonymity of the respondents was guaranteed by not requesting them to write their names on the questionnaires. Finally the integrity of the study was ascertained by producing original data and authentic results. All consulted sources were acknowledged and listed in the list of references of the research project.

3.10 Operational definition of variables

An operational definition specifies precisely how a concept will be measured and therefore the purpose of operationalizing or operationally defining a concept is to make it measurable. Table 3.3 describes the variables that will be used as indicators in the study and the corresponding measurement scales.

Table 3.3 Operationalization of variables

Objective	Variable	Indicator	Measurement	Scale	Method of data analysis
To establish how budgeting for O & M influences sustainability of community water supply projects	**Independent variable** O & M budgeting	Frequency of community participation in O & M budget preparation process	- Never - Rarely - Occasionally - Always	Ordinal	Descriptive
To explore how pricing of water services contributes to the sustainability of community water supply projects	**Independent variable** Pricing of water services	Water connection charges	- 10,000/= and below - 10,001 to 30,000/= - 30,001 to 50,000/= - 50,001 to 70,000/= - Above 70,000/=	Ordinal	Descriptive
		Projects with fixed water tariffs (Kshs/Month)	- No charges - 50 to 100/= - 101 to 150/= - 151 to 200/= - Above 200/=	Ordinal	Descriptive
To determine how financial administration practices influences sustainability of community water supply projects	**Independent variable** Financial administration practice	Type of financial records kept	- Budgeting records - User registration forms - Minutes book - Work attendance register - Stock and issue registers	Ordinal	Descriptive

Objective	Variable	Indicator	Measurement	Scale	Method of data analysis
To assess the influence community financial monitoring has on sustainability of community water supply projects	**Independent variable** Community financial monitoring	Public meetings for water users to discuss water project income & expenditure	- Never - Monthly - Quarterly - Half yearly - Annually	Ordinal	Descriptive
		Use of notice boards to publicise project income & expenditure statements	- Never - Half yearly - Annually	Ordinal	Descriptive
To determine the degree of sustainability of community water supply projects	**Dependent variable** Sustainability of community water supply project	Current level of operation of the water system	- Not functioning at all - Functioning with problems - Well functioning	Ordinal	Descriptive
		Water project service delivery rating	- Very inefficient - Inefficient - Moderately efficient - Efficient - Very efficient	Ordinal	Descriptive
		Condition of the water project infrastructure	- Very poor - Poor - Fair - Good	Ordinal	Descriptive

3.11 Summary

The chapter discussed the research design chosen for the study. Stratified sampling technique was used in selecting respondents who participated in the study. Data was collected by use of self administered questionnaires. Details of the data collection process were described as well as the ethical principles pertaining to this study. An operational definition of variables table which analysis the key variables identified for investigation in this study was also presented.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents data analysis and the findings of the study. Data collected during the study was analyzed using descriptive statistics. Analysis of data was based on the study objectives and research questions. Research findings were presented in tables.

4.2 Questionnaire return rate

Out of 125 questionnaires which had been administered to the respondents, 110 of them were filled and returned for data analysis. Therefore the study achieved a high questionnaire return rate of 88 percent. According to Linder and Wingerbach (2002), questionnaire return rate of above 50 percent is considered good for a study. The authors further state that surveys that have high response rates provide a measure of assurance that the findings can be projected to a population from which the sample is drawn. The reason for this high response can be attributed to the fact that the questionnaires were hand delivered to the respondents by the Researcher and two Research Assistants.

4.3 Gender composition in water PMCs

All the 22 water supply facilities sampled in the study had a water management committee in place. Water committees organize community contributions in term of both labour and cash. Keep project records of expenditure and payment, collect water tariffs and convene community meetings to discuss and decide on issues and problems affecting the running of water projects.

In order to assess the composition of water committees in terms of gender, respondents were asked to indicate their gender. Table 4.1 presents gender composition of the respondents.

Table 4.1 Gender composition in water PMCs

Gender composition	Frequency	Percentage
Female	39	39
Male	71	71
Total	110	100

Table 4.1 shows that majority of the water committee officials were men. Overall 71 percent of the water committee members constituted males with only 39 percent females. Women's involvement in water project activities is essential because in water projects women are the main stakeholders. Therefore, women participation and role in leadership positions in water PMCs is inevitable for attainment of sustainable water projects.

4.4 Type of water facility

The type of water technology in place has a big influence on sustainability of water schemes. In order to establish the various sources of water in Kieni West District, respondents were asked to specify their particular type of water facility. This information is presented in Table 4.2.

Table 4.2 Type of water facility

Type of water facility	Frequency	Percentage
Gravity fed water systems	47	43
Boreholes	28	25
Dams or water pans	35	32
Total	110	100

Table 4.2 shows that the main source of water in Kieni West District are gravity fed water projects. Boreholes and dams are also significant water sources. Gravity flow systems are popular because they are cheap to run and the technology matches the technical skill of the community to operate and maintain the installed water infrastructure

4.5 Age of water project

The researcher wanted to establish the age of the water supply facilities and how age influences sustainability of community water projects. Respondents were therefore asked to indicate the age of their water facilities and their responses are presented in Table 4.3

Table 4.3 Age of water project

Age of water project	Frequency	Percentage
Less than 5 years	8	7
6 to 10 years	27	25
11 to 20 years	43	39
21 to 30 years	15	14
More than 30 years ago	17	15
Total	110	100

Table 4.3 indicates that most water projects in Kieni West are quite old with about 70 percent of them being more that 10 years old. Out of this number, almost 30 percent have been in operation for more than 20 years. Majority of the water facilities that were either inefficient in service delivery or were in poor physical state were constructed over 20 years ago.

4.6 Water project funding agency

Strong partnership between communities and water project funding agency was considered to have a high likelihood of promoting sustainability of community water projects. As a result respondents were asked to specify who funded the construction of the water facility as shown in Table 4.4

Table 4.4 Water project funding agency

Water project funding agency	Frequency	Percentage
Government	42	38
Donors	21	19
NGO/FBO	12	11
Community	35	32
Total	110	100

Table 4.4 shows that 38 percent of water facilities were funded by the Government, 19 percent by Donors while NGOs/FBOs and community funded 11% and 32% of the water facilities respectively. This confirms that Government and communities are the main funders of water projects in Kieni West District. It also reveals that Donors, NGOs and FBOs are also key stakeholders in the water sector with 30 percent of all the water projects funded by them.

4.7 Current level of operation of water facilities

In establishing a linkage between the level of functionality of water facilities and sustainability of community water projects the study examined the level of operation of the various water systems. Table 4.5 presents the current level of operation of water facilities.

Table 4.5 Current level of operation of water facilities

Current level of operation	Frequency	Percentage
Not functioning at all	18	17
Functioning with problems	86	78
Well functioning	6	5
Total	110	100

Table 4.5 indicates that 17 percent of the water projects were not functioning at all while 78 percent were functioning with some problems. This points out that the current level of functionality of water facilities in Kieni West is poor as only 5 percent of the water projects were currently functioning well.

4.8 Reason for water system not functioning

The study looked into the reasons why some of the water projects were not functioning well. Table 4.6 presents the reasons why various water projects in Kieni West District were not performing well.

Table 4.6 Reason for water systems not functioning

Reason projects not working	frequency	percentage
Damaged water intake	21	19
Broken pipeline	23	21
Pump not working	14	13
Water source dried up	6	5
Siltation	21	19
Poor management	25	23
Total	110	100

Table 4.6 points out the reasons why the water projects were not functioning well. 19 percent were due to damaged water intakes, 21 percent had broken pipes, 13 percent because pumps were not working and in 5 percent of the water projects the water source had dried up. In addition 19 percent of the water projects were not functioning well due to siltation while 23 percent was owing to poor management. Generally technical problems accounted for the main reasons why water projects were not functioning well. However a significant percentage of 23% blamed poor management as the reason why water projects were not operating well.

4.9 Efficiency of water projects in delivery of water services

The study sought to find out how efficient the various water projects were in delivering water services. This information is given Table 4.7

Table 4.7 Efficiency of water projects in delivery of water services

Rate of service delivery	Frequency	Percentage
Very inefficient	8	8
Inefficient	20	22
Moderate efficient	45	49
Efficient	19	21
Very efficient	0	0
Total	110	100

Table 4.7 shows that majority of water projects in Kieni West are not efficient in delivering water services. 49 percent of the facilities were rated as moderately efficient while a high percentage of 30% of the respondents were dissatisfied with the rate of service delivery and rated their projects as either inefficient or very inefficient with a percentage of 22% and 8% respectively. Only 21 percent of the water supplies were ranked as efficient.

4.10 State of water infrastructure

The physical condition of a water infrastructure is an indicator towards achieving sustainability of water projects. It was therefore important to know how the respondents rated their water projects in terms of the condition of the water infrastructure. This information is presented in Table 4.8

Table 4.8 Current state of water infrastructure

State of infrastructure	Frequency	Percentage
Very poor	10	9
Poor	30	28
Fair	54	49
Good	16	14
Excellent	0	0
Total	110	100

Table 4.8 illustrates that 9 percent of the respondents rated the physical state of their water infrastructure as very poor, 28 percent poor, 49 percent fair and 14 percent good. This verifies that the state of water infrastructure in Kieni West district is wanting. Only 14 percent of the water projects had good facilities while none were rated as excellent.

4.11 Form of community contribution during project construction phase

The design of projects should include elements of sustainability at initial stages, to ensure their sustainability. Consequently the study sought to verify whether sustainability issues were addressed at the project implementation stage by asking respondents about the form of community contribution made during project construction phase. Table 4.9 presents their responses.

Table 4.9 Form of community contribution during project construction phase

Form of community contribution	Frequency	Percentage
Providing labour	29	26
Providing cash	24	22
Providing local building materials	19	17
Decision making	17	15
None	21	20
Total	110	100

Table 4.9 shows that there was significant community involvement during project construction phase with the various forms of contributions accounting for a total of 80 percent. The table also reveals that community members contributed in the form of cash, labour and through provision of local building materials. However labour contribution with a percentage of 26% was the main form of community contribution during project implementation stage.

4.12 Preparation of water systems O&M budgets

To achieve sustainability of water projects, the communities are required to pay fully the operational and maintenance costs. The plans and budgets to cover O&M should be discussed during public meetings to enable communities to choose appropriate ways of raising O&M funds that corresponds to their ability to pay. The researcher wanted to establish whether water projects prepare O&M expenditure plans and revenue forecasts on regular basis. Table 4.10 presents the response to whether water projects prepare O&M budgets.

Table 4.10 Preparation of water systems O&M budgets

Preparation of O&M budgets	Frequency	Percentage
None	72	67
Monthly	9	8
Quarterly	2	1
Half yearly	9	8
Annually	18	16
Total	110	100

Table 4.10 reveals that 8 percent of the water projects prepare O&M budgets on monthly basis, one percent quarterly, 8 percent half yearly while 16 percent annually. It also points out that 67 percent of the water projects do not prepare O&M budgets. Without knowledge of the exact amount of money that the water systems generate and need it is not possible to plan on how to meet the O&M requirements of the various water facilities.

4.13 Sources of funds for operation and maintenance

Funding of operation and maintenance is an important aspect that influences the functionality of water facilities. The study looked into the sources of funds for operation and maintenance of water systems in Kieni West District. This information is given in Table 4.11.

Table 4.11 Sources of funds for operation and maintenance

Sources of O&M funds	Frequency	Percentage
Government	49	45
Donors	6	5
NGO/FBO	11	10
Membership fee	23	21
Water user fee	15	14
Voluntary contributions/Harambee	6	5
Total	110	100

Table 4.11 shows that 45 percent of water systems receive operation and maintenance funds from the Government, 5 percent from Donors while NGOs & FBOs puts in 10 percent. In addition 21 percent of the water projects get their O&M funds from membership fee. 14 percent from water user fee while 11 percent depend on voluntary contributions. This indicates that Government is the main source of operation and maintenance funds for water projects in Kieni West District. Communities also contribute a fair share of O&M funds through membership fee and water user fee which accounts for 35 percent.

4.14 Adequacy of O&M funds

The study wanted to establish whether water projects had adequate funds to cover recurring operation and maintenance costs. The findings are presented in Table 4.12

Table 4.12 Adequacy of O&M funds

Adequacy of O&M funds	Frequency	Percentage
No	86	78
To an extent	24	22
Yes	0	0
Total	110	100

Table 4.12 shows that 78 percent of water projects do not have adequate funds to cover recurring operation and maintenance cost, 22 percent only to an extent while none of water projects stated that they had sufficient funds to meet their O&M requirements fully. This points out that in general all the water projects do not have adequate funds to cover their O&M costs. It also confirms that although water committees were collecting money for water service charges, the amount collected was small.

4.15 Community meetings held to discuss O&M budgets

Community participation in financial decisions is an important aspect that influences the sustainability of water projects. To assess how community meetings contributes to sustainability of community water supply projects, the study looked into the frequency of community meetings held by the water project during the last one year to discuss O&M budgets and financial management decisions. Table 4.13 presents this information.

Table 4.13 Community meetings on O&M budgets

Community meetings	Frequency	Percentage
None	26	24
Monthly	3	2
Quarterly	0	0
Half yearly	0	0
Annually	81	74
Total	110	100

Table 4.13 shows that 24 percent of the water project did not hold community meetings to discuss O&M budgets and financial management decisions during the last one year, 2 percent met monthly and 74 percent annually. This reveals that water projects do not hold community meetings to discuss O&M budgets and financial management decisions regularly considering that a high percentage of 74% of the water projects meet to discuss their O&M budgets only once in a year. It further confirms that taking into account that O&M requirements are recurrent in nature; public meetings are not used in making decisions on financing water supplies O&M costs.

4.16 Water connection fee

Charging for water promotes sustainable use of water and also supports financial stability of water utilities. Therefore the researcher sought to establish the amount of money that water projects charge for water connection which in some of the projects is also referred to as membership fee. The findings are set out in Table 4.14.

Table 4.14 Water connection fee

Charges for water connection	Frequency	Percentage
None	65	60
10,000 and below	0	0
10,001 to 30,000	17	15
30,001 to 50,000	8	7
50,001 to 70,000	20	18
Above 70,000	0	0
Total	110	100

Table 4.14 shows that 60 percent of the water projects do not charge for water connection or membership fee, 15 percent charge between Kshs 10,001/= and 30,000/=, 7 percent charge between Kshs 30,001/= and 50,000/=, 18 percent charge Kshs 50,001 to 70,000. This reveals that majority of the water projects do not charge for water connection fee. It also points out that connection fee is fairly expensive with 25 percent of the water projects charging above Kshs 30,000/= for a water connection.

4.17 Water user charges

Payment of water user fees means that water consumers reimburse the water project money to pay for the water service. This aspect is not only associated with the O&M aspect of water project, but also to its sustainability point of view in the sense that the water project has enough funds available to carry out the required O&M costs. The community which pays charges to the water services gives a good signal that the water supply project will operate for long period of time. The study therefore wanted to establish the amount of money that water projects charge for use of water. This information is given in Table 4.15

Table 4.15 Water user fee per month

Water user fee per month	Frequency	Percentage
No charges	68	62
50 to 100	7	6
101 to 150	13	12
151 to 200	16	14
Above 200	6	6
Total	110	100

Table 4.15 indicates that 62 percent of the respondent do not pay any user fee, 6 percent pay between Kshs 50/= and 100/= while 32 percent pay above Kshs 100/= per month. This explains that majority of the water projects do not charge fees for use of water. On the other hand it also reveals that the amount collected by a significant number of projects for water service charges is fairly small.

4.18 Responsibility for setting water charges

When community members participate in setting water charges it is easier to contribute cash willingly for operation and maintenance cost. The water committees are also likely to be more accountable on income and expenditures of the project. Hence sustainability of the water project is further assured. Consequently respondents were asked to indicate who was responsible for setting water charges. Table 4.16 presents this information.

Table 4.16 Responsibility for setting water charges

Setting of water charges	Frequency	Percentage
Government	25	23
Water committee	38	35
Community	16	14
Others	31	28
Total	110	100

Table 4.16 shows that 23 percent of the respondents felt that Government was responsible for setting water charges, 35 percent water committee, 14 percent community and 28 percent said others. This means that water committees and members of the community are mainly responsible for setting water charges. But also Government plays a big part in setting water charges.

4.19 Requirements for the water project in order to function well

In order to get the needs of individual water project in terms of repairs, respondents were asked to specify what form of repairs were required for their water project to work well. The findings are presented in Table 4.17

Table 4.17 Requirements for the water project in order to function well

Repairs required	Frequency	Percentage
Minor repair	11	10
Major repairs	43	39
Rehabilitation	56	51
Total	110	100

Table 4.17 shows that 10 percent of the water projects require minor repairs to be done to enable them function well; major repairs are required in 39 percent of the water projects while 51 percent require rehabilitation. This indicates that most of the water projects require rehabilitation or major repairs to enable them function well.

4.20 Recipient of water project funds

The researcher wanted to establish who receives the funds that are collected by the water project. Table 4.18 presents this information.

Table 4.18 Recipient of water project funds

Receivers of project funds	Frequency	Percentage
Chairman	31	28
Treasurer	36	33
Secretary	6	5
Committee members	14	13
Water project clerk	23	21
Total	110	100

Table 4.18 shows that 28 percent of the funds collected by water projects are received by the chairmen, 33 percent by water committee treasurers, 5 percent by the secretaries while members of the water committee receive 13 percent. On the other hand 21 percent of the funds collected by water projects are received by water project clerks. This explains that funds collected by water projects are mostly received by the chairmen and treasurers. Water project clerks are also key players in funds collection in 21 percent of the water projects. This further confirms that the responsibility of funds collection in water projects is not harmonized.

4.21 Record keeping

Transparency of financial management is a key issue in community management in water projects. To establish the situation in Kieni West District respondents were asked whether their projects kept financial record books. Table 4.19 presents this information.

Table 4.19 Record keeping

Record keeping	Frequency	Percentage
Yes	52	47
No	58	53
Total	110	100

Table 4.19 points out that 47 percent keep books that record funds collection while a high percentage of 53% do not keep financial record books. This demonstrates that majority of the water projects in Kieni West District do not keep financial record books.

4.22 Operation and maintenance funds collection

Water supply systems require financial resources to ensure longevity and proper system functioning. To meet this challenge, an effective system of community funds collection must be implemented and followed over the lifetime of the system. Implementing and maintaining a sustainable system of funds collection is critical for sustainability of community water supply projects to be achieved. The researcher wanted to establish when water projects in Kieni West District raised or collected money to cover operation and maintenance expenses. This information is given in Table 4.20

Table 4.20 Operations and maintenance funds collection

O&M funds collection	frequency	percentage
Monthly	43	39
Quarterly	15	14
Half yearly	11	10
Annually	8	7
When there is a breakdown	33	30
Total	110	100

Table 4.20 shows that 39 percent of the projects raised money to cover operation and maintenance expenses monthly, 7 percent yearly, 10 percent half yearly, 14 percent quarterly while 30 percent when there was a breakdown. This illustrates that water projects raise money to cover operation and maintenance expenses most often on monthly basis and when the water system breaks down.

4.23 Authorization of use of funds

The study sought to establish who authorizes purchases, payments and other uses of funds for the water project. This is presented in Table 4.21

Table 4.21 Authorization of use of funds

Authorization of use of funds	frequency	percentage
Chairman	49	45
Treasurer	39	35
Secretary	15	14
Committee members	7	6
Water project clerk	0	0
Total	110	100

Table 4.21 indicates that authority to spent project funds is in most cases held by committee chairmen and treasurers. However project secretaries and committee members do also have authority to commit water project funds to some extent.

4.24 Financial management skills of the water management committee

Financial aspects are very crucial as far as operation and maintenance activities are concerned. Therefore financial management skills are an important component that influences sustainability of community water projects. The study looked into the financial management skills of the various water management committees. This information is given in Table 4.22

Table 4.22 Financial management skills of the water management committee

Financial management skills	Frequency	Percentage
Very poor	12	11
Poor	28	25
Fair	52	48
Good	18	16
Very good	0	0
Total	110	100

Table 4.22 indicates that 16 percent of the respondents rated the water management committee as having good financial management skills. 48 percent fair, 25 percent poor, while 11 percent were rated as very poor. This shows that water management committee officials possess inadequate financial management skills with only 16 percent of them rated as having satisfactory financial management skills.

4.25 Dissemination of information on income and expenditure

The researcher wanted to establish how community members are informed about the income accrued from water services and project expenditure incurred by water projects. Table 4.23 provides this information.

Table 4.23 Dissemination of information on income and expenditure

Information on income & expenditure	Frequency	Percentage
Public meeting	76	70
Notice boards	7	6
Reports	6	5
No reports	21	19
Total	110	100

Table 4.23 shows that 70 percent of the respondents are informed about income accrued from water services and project expenditure in public meetings, 6 percent through notice boards, 5 percent through reports while 19 percent of the water projects did not give financial reports. This further point out that public meetings are the main source of information about income accrued from water services and water project expenditures. However many respondents said that they were not involved in financial matters, given that income and expenditure were only disclosed to them during annual general meetings.

4.26 Community audits to monitor water project accounts

Effective O&M of community water projects requires that financial management be in the hands of community members. In this regard, the study examined how members of the community monitor the water project accounts. Specifically, the researcher wanted to establish whether there was a mechanism put in place for the community to set up an independent committee to check and monitor the water project accounts. Table 4.24 presents this information.

Table 4.24 Community audits to monitor water project accounts

Community audits	Frequency	Percentage
Yes	0	0
No	110	100
Total	110	100

Table 4.24 shows that none of the water projects in Kieni West District has established an independent committee to monitor and audit projects accounts.

4.27 Communication on water projects financial matters

Community participation cannot take place without information. In order to determine the current situation on communication on financial matters in water projects, the researcher sought to establish how respondents rated the flow of information and communication on financial management issues between the water committee and community members. This information is given in Table 4.25

Table 4.25 Communication on water projects financial matters

Communication on financial matters	Frequency	Percentage
Very poor	0	0
Poor	37	34
Fair	43	39
Good	30	27
Excellent	0	0
Total	110	100

Table 4.25 shows that 34 percent of the respondents rated financial information flow from water committees to community members as poor, 39 percent fair and 27 percent good. However none of the respondents rated the information flow as either excellent or very poor. This implies that majority of the respondents felt that communication on water projects financial matters was inadequate.

4.28 Summary

This chapter covered data analysis, data presentation and interpretation. Data was analyzed in line with the study objectives and research questions. Research findings were summarized and presented in tables with summary findings given at the end of each table.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This Chapter contains summary of the major findings, conclusion and recommendations in relation to the research objectives and research questions in Chapter One. This is also based on the major research findings of the whole study as analyzed and presented in Chapter Four.

5.2 Summary of findings

The study revealed that majority of the water committee officials were men and that the main source of water in Kieni West District are the gravity fed water systems. Boreholes and dams are also significant water sources. Most water projects in Kieni West are quite old with 70 percent of them being more that 10 years old. Out of this number, almost 30 percent have been in operation for more than 20 years. Only 14 percent of the water projects had good water infrastructure and barely 5 percent of the water projects were currently functioning well. Technical problems accounted for the main reasons why water projects were not functioning well. On the other hand poor management was also blamed for the high inefficiency in the delivery of water services by community water supply projects. Government and communities are the main funders of water projects in Kieni West District, but Donors, NGOs and FBOs are also key stakeholders in the water sector with 30 percent of all the water projects funded by them.

The research established that 67 percent of the water projects do not prepare operations and maintenance expenditure plans and revenue forecasts. Furthermore whereas 33 percent of the water project had O&M plans only 8 percent prepared them on monthly basis. In general all the water projects do not have adequate funds to cover their operation and maintenance cost and although communities provide a fair amount towards meeting their water facilities O&M expenses they still depend heavily on government support. Public participation on O&M budget preparation and financial management decisions was found to be low.

The study found that water tariffs were fairly high with 25 percent of the water projects charging above Kshs 30,000/= for a water connection. Majority of the water projects represented by 62 percent. do not however charge fees for use of water and for those that levy user fees the amounts range between Kshs 50/= and Kshs 200/= per month. The research further established that water committees and members of the community are mainly responsible for setting water charges but the government also plays a big part in regulating water charges.

The study revealed that funds collected by water projects are mostly received by the chairmen and treasurers although water project clerks also key players in funds collection in water projects. Majority of the water projects in Kieni West District do not keep financial record books. 30 percent of the water projects raise money to cover operation and maintenance expenses when their water system breaks down. Water management committee officials lack adequate financial management skills with only 16 percent of them rated as having good financial management skills.

Public meetings are the main source of information about income accrued from water services and water project expenditures. However a large number, 19 percent of water projects do not give feed back to their members in form of financial reports. None of the water projects in Kieni West District has established an independent committee to monitor and audit their water project accounts. While majority of the respondents rated communication on water projects financial matters from water committees to community members as inadequate.

5.3 Discussion of findings

This part presents discussion of the findings based on the study objectives.

5.3.1 Operation and maintenance budgeting

The study Objective One sought to establish how budgeting for operation and maintenance of water systems influences the sustainability of community water supply projects in Kieni West District, Nyeri County. The research established that 67 percent of the water projects do not prepare operations and maintenance expenditure plans and revenue forecasts. Furthermore whereas 33 percent of the water project had O&M plans, only 8 percent prepared them on monthly basis. In general all the water projects do not have adequate funds to cover their operation and maintenance cost and although communities provide a fair amount of cash which was about 35 percent towards meeting their water facilities O&M expenses they still depend heavily on government support. Public participation on O&M budget preparation financial management decisions was found to be low. These findings concurs with Brikke and Rojas (2001) which also found that an adequate understanding, identification and estimation of the operation and maintenance costs is critical for the sustainable delivery of potable water supply

services. Sami and Murray (1998) further said that although O&M was critical to the sustainability of the water supply facilities inadequate arrangement towards financing O&M was the major cause of failure. This is because most water supply development agencies give low priority to O&M in water supplies, but instead consider construction of new facilities and systems expansion more important, due to the unmet backlog of communities that require new water supply facilities.

5.3.2 Water tariffs

Objective Two of the study sought to explore how water tariffs contribute to the sustainability of community water supply projects in Kieni West District, Nyeri County. The study found that water tariffs were fairly expensive with 25 percent of the water projects charging above Kshs 30,000/= for a water connection. Majority of the water projects do not however charge fees for use of water and for those that levy user fees the amounts range between Kshs 50/= and Kshs 200/= per month. Water committees and members of the community are mainly responsible for setting water charges but the government also plays a big part in regulating water charges. The findings of Brikke and Rojas, (2001) noted that, the recovery of at least the operation and maintenance cost is essential for the financial sustainability of water utilities, adequate system maintenance, and hence the provision of quality services. The findings of this study therefore confirms that without water levies and fees charged for connection and usage, sustainability of the project will not be possible. According to Magnusson (2004) water pricing promotes efficient and sustainable use of water. This is essentially a water demand management and resource conservation tool, aimed at fostering wise water use and demand driven service delivery. Whittington (2003) suggests that water pricing promotes fairness and equity in access

to water and water use. Based on the principles of user pays, it is argued that there is the need for equity and thus transparency in pricing. A consumer who consumes twice as much water as another consumer should pay a bill that is at least twice as large as that of the latter. Fairness is more about pricing consumption on the basis of affordability and socio-economic characteristics of the household given that water is essential for human survival (Brown and Holcombe2004; Ruijs et al., 2008). Fairness in water pricing is essential to prevent negative externalities associated with the lack of access to safe and sufficient water supply. This is what is lacking in Kieni West District water projects.

5.3.3 Financial administration

Study Objective Three sought to determine how financial administration influences the sustainability of community water supply projects in Kieni West District, Nyeri County. The study revealed that funds collected by water projects are mostly received by the chairmen and treasurers although water project clerks are also key players in funds collection in water projects which indicates that the responsibility of funds collection in many water projects is not harmonized. In terms of bookkeeping, majority of the water projects in Kieni West District do not keep financial records. 30 percent of the water projects raise money to cover operation and maintenance expenses when their water system breaks down which points to poor management in the collection of water revenues that are meant to cover water systems maintenance and repair expenses. Water management committee officials in Kieni West District lack adequate financial management skills with only 16 percent of them rated as having good financial management skills. This finding concurs with the findings of Appleton and Evans (1993) which emphasized that transparency in financial management is a key issue in community management in water

projects. The authors further argued that whole structure of community management can fail rapidly if there is a suspicion that community funds collected for water supply services are being mismanaged or misappropriated. Lockwood (2004)also stated that adequate book keeping and regular review of accounts is a major requirement for the sustainability of community water supply systems.

5.3.4 Community financial monitoring

Study Objective Four sought to assess the influence of community financial monitoring on sustainability of community water supply projects in Kieni West District, Nyeri County. The study found out that, there were poor financial monitoring structures in all community water projects. Public meetings are the main source of information about income accrued from water services and water project expenditures. However a large number, 19 percent of water projects do not give financial reports. In addition none of the water projects in Kieni West District has established independent committees to monitor and audit their water project accounts While water committees are charged with the responsibility of informing their respective members on important financial decisions affecting their water projects, the study revealed that only 27 percent of the projects were rated as good in communicating financial matters to their members. This study finding concurs with those of White, (1981) who found that one feature that was common to almost all non operational village water schemes was the lack of regulation of those responsible for financial management. Community monitoring involves engaging local beneficiaries in measuring, recording, collecting, processing and communicating information to assist water committee members in decision making. A study conducted by IRC in 1989 also established that making the management organization accountable to users was an important

factor in sustaining services. This includes observing transparent financial management and making regular reports and accounts to community meetings. According to Appleton and Evans (1993) effective control and monitoring is an on-going, regular necessity as part of financial management. This relies on accurate information, which will be mainly found in the records and books kept by the community. Control and monitoring are effective if they use clear, reliable, impartial and good quality information as a starting point. Harvey and Reed (2004) also said that the final objective of control and monitoring was to inform users about the financial situation of the water supply service. Narayan (1993) suggested that community control and monitoring mechanisms could include information disclosure and transparency on project budget, financing, contracting and procurement; anonymous grievance procedures; and community monitoring of contracts and implementation. This information is discussed publicly in villages and displayed. Village committees established to oversee the project are required to report back regularly to the community. As a result community members are in a better position to influence local level planning and decision making.

5.4 Conclusion

The study established that the shift towards giving increased responsibility to communities to manage their water supplies although noble has also many challenges. The large percentage of non functioning water systems in Kieni West District is a stark indicator of inadequate operation and maintenance and lack of sustainable services. Although operation and maintenance (O&M) is critical to the sustainability of the water supply facilities, analysis of water supply systems in Kieni West District revealed that inadequate arrangement for O&M is the major cause of failure. The Kenya Government tends to pay more attention to building new facilities than to ensuring

the use of existing ones. Although communities are usually expected to provide a share of O&M costs it is often unclear how the level of contribution, rate and type of tariff to apply to water users has been determined or how the fees relates to sustainability of water supply systems. In many cases, affordability of the service is not factored into a scheme at the planning stage. Consequently many schemes developed have been very expensive to maintain, resulting in their collapse. Furthermore even where communities are willing and able to pay for operation and maintenance costs, poor financial management systems often lead to these resources being inappropriately or inefficiently spent which further reduces the viability of the water systems.

5.5 Recommendations

The following recommendations to ensure that rural water supply is sustainable are made:-

1. In order to strenghten community management of rural water supply, the researcher recommends that the government should build the capacity of community members and water project committees on financial management.

2. Poor collection of user fees is one of the major threats to sustainability of rural water supply in Kieni. The Ministry of Water and Irrigation should therefore ensure that an effective user fee collection system is put in place for every water supply facility that is constructed, if sustanability is to be achieved.

3. The researcher recommends that use of water for productive purposes should be promoted. Promotion of Agriculture, income generating activities or small scale business enterprises should be promoted along side water programmes. This will enable communities to have the ability to meet the cost of operation and maintenance of their respective water supply.

5.6 Suggestion for further research

The following are suggested areas for further study.

1. The influence of user fee collection system for sustainance of rural water supply systems.

2. An assessment of the current policy and legal framework in rural water supply.

3. The effective ways of strengthening the financial management capacity of water committees to enable them effectively manage water supplies

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

John K. Mwangi
P.O. Box 582
NYERI

27th June 2012

Dear Respondent

RE: ACADEMIC RESEARCH QUESTIONNAIRE

I am a student at University of Nairobi pursuing a Masters Degree in Project Planning and Management. This questionnaire is part of my research project for which I am collecting data on financial management factors that influence sustainability of community managed water supply projects in Kieni West District, Nyeri County. Your water project has been selected to provide the desired information.

I would be grateful if you could spare some time and complete the enclosed questionnaire. Remember participation in this exercise is voluntary. You are however encouraged to answer all questions. Your identity will be treated with utmost confidentiality and the information provided will be used purely for the purpose of the study and no other reason whatsoever. Your timely response will be highly appreciated.

Yours faithfully,

John K. Mwangi

APPENDIX II: QUESTIONNAIRE FOR WATER PMCs

This questionnaire is intended to collect data that will be used in a study to assess financial management factors that influence sustainability of community water projects in Kieni West District, Nyeri County. In answering my questions, please remember that there are no correct or wrong answers. I am just after your honest opinion. I appreciate your contribution towards this study and look forward to your response. All your responses will be treated in confidence. If you have any questions, please do not hesitate to contact me.

Mark with a tick (√) where applicable or write your responses in the spaces provided.

SECTION A: BACKGROUND INFORMATION

1. Respondent information:-

a) Gender: Female ☐ Male ☐

b) Leadership position in the water project management committee

Chairman ☐

Secretary ☐

Treasurer ☐

Vice chairman ☐

Vice secretary ☐

2. About your water project:-

a) Type of water system:

1 = Gravity fed water project ☐

2 = Borehole ☐

3 = Dam or water pan ☐

b) When was your water project built?

1 = Less than 5 years ago ☐

2 = 6 to 10 years ☐

3 = 11 to 20 years ☐

4 = 21 to 30 years ☐

5 = More than 30 years ago ☐

c) Who funded the water facility?

1 = Government ☐

2 = Donor ☐

3 = NGO/FBO ☐

4 = Community ☐

5 = Other (please specify) .....

d) What is the current level of operation of your water system?

1 = Not functioning at all ☐

2 = Functioning with some problems ☐

3 = Well functioning ☐

e) Why is the water project not functioning well?

1 = Damaged water intake ☐

2 = Broken pipeline ☐

3 = Pump not working ☐

4 = Water source dried up

5 = Siltation ☐

6 = Other (please specify) .....

f) Has your water project been providing enough water to meet existing demand?

Yes ☐ No ☐

g) If your answer to question f) above is No, why?

1 = Population increase ☐

2 = Yield at water source has gone down ☐

3 = Poor management of water project ☐

h) What are your priority uses for water obtained from this water source? (Please rank the top 4, 1 being the most important use)

1 = Livestock ☐

2 = Domestic ☐

3 = Irrigation ☐

4 = Other (please specify) .....

i) How would you rate the delivery of water services by your water project?

1 = Very inefficient ☐

2 = Inefficient ☐

3 = Moderately efficient ☐

4 = Efficient ☐

5 = Very efficient ☐

j) How would you rate the current state of your water project infrastructure?

☐

1 = Very poor

2 = poor ☐

3 = Fair ☐

4 = Good ☐

5 = Excellent ☐

SECTION B: OPERATION & MAINTENANCE COSTS BUDGETING

3. What was your contribution as part of community participation during project implementation or construction? (Indicate one or more based on your contribution)

1 = Providing labour ☐

2 = Providing cash ☐

3 = Providing local building materials ☐

4 = Decision making as a member of committee ☐

5. = Other (please specify) .....

4. Did all people contribute the same amount?

Yes ☐ No ☐

5. How would you rate the degree of community participation during the project implementation or construction stage?

1 = None at all ☐

2 = Low ☐

3 = Moderate ☐

4 = High ☐

5 = Very high ☐

6. Did the project design specify the responsibilities of the community in respect to the financing mechanisms for operation and maintenance of the water project?

Yes ☐ No ☐

7. What is the source of funds for operation and maintenance of your water project?

1 = Government ☐

2 = Donor ☐

3 = NGO/ FBO ☐

4 = Membership fee ☐

5 = User fee ☐

6 = Voluntary contributions/harambee ☐

7 = Other (please specify) .....

8. Does your water project prepare operation and maintenance expenditure plans and revenue forecasts on regular basis?

1 = None ☐

2 = Monthly ☐

3 = Quarterly ☐

4 = Half yearly ☐

5 = Annually ☐

6 = Other (please specify) .....

9. Does the water project have adequate funds to cover recurring operation and maintenance costs? ☐

1 = No

2 = To some extent ☐

3 = Yes ☐

10. What is the overall degree of participation on operation and maintenance financial decisions at the water project management committee level?

1 = Very low ☐

2 = Low ☐

3 = Moderate ☐

4 = Good ☐

5 = Excellent ☐

11. What has been the frequency of community meetings held by the water project during the last one year to discuss operation and maintenance budget and financial management decisions?

1 = None ☐

2 = Monthly ☐

3 = Quarterly ☐

4 = Half yearly ☐

5 = Annually ☐

6 = Other (please specify) .....

12. How would you rate the level of community participation in public meeting deliberations on financing methods for your water project operation and maintenance services?

1 = None ☐

2 = Low ☐

3 = Moderate ☐

4 = High ☐

5 = Very high ☐

SECTION C: WATER TARIFFS

13. How much does the water project charge for water connection or as membership fee?

1 = None ☐

2 = 10,000/= and below ☐

3 = 10,001 to 30,000/= ☐

4 = 30,001 to 50,000/= ☐

5 = 50,001 to 70,000/= ☐

6 = Above 70,000/= ☐

14. Are community members paying any user fees to cover the water projects operations and maintenance costs?

Yes ☐ No ☐

15. Do all members pay the same amount of user fee irrespective of the amount used or purpose?

Yes ☐ No ☐

16. How much in Kshs per month does the water project charge as user fee?

1 = No charges ☐

2 = 50 to 100/= ☐

3 = 101 to 150/= ☐

4 = 151 to 200/= ☐

5 = Above 200/= ☐

17. Who is responsible for setting the water charges?

1 = Government ☐

2 = Water committee ☐

3 = Community ☐

4 = Other (please specify) .....

18. Is the amount of money collected as user fee enough to cover operation and maintenance costs of your water project?

Yes ☐ No ☐

19. If your answer to question 18 is No, where does the water project get extra money to cover the operation and maintenance of the water system?

1 = Government ☐

2 = Donors/NGO/FBO ☐

3 = Membership fee ☐

4 = Voluntary contributions/harambee ☐

5 = Other (please specify) .....

20. Does the community feel that the user fees or water costs charged by the water project is appropriate against the level and quality of service delivered?

1 = Not satisfied at all ☐

2 =Somewhat dissatisfied ☐

3 = Partially satisfied ☐

4 = Satisfied ☐

5 = Highly satisfied ☐

21. Considering the current level of operation of your water project what does it require for it to function well?

1 = Minor repairs ☐

2 =Major repairs ☐

3 = Rehabilitation/expansion ☐

4 = Other (please specify) .....

22. What are the sources of money for carrying out major repairs, system expansion or augmentation of your water project?

1 = Government ☐

2 = Donors/NGO/FBO ☐

3 = Water project ☐

4 = Voluntary contributions/harambee ☐

5 = Other (please specify) .....

SECTION D: FINANCIAL ADMINISTRATION

23. Who receives the funds that are collected by the water project?

1 = Chairman ☐

2 = Treasurer ☐

3 = Secretary ☐

4 = Committee member ☐

5 = Water project clerk ☐

6 = Other (please specify) .....

24. Are there books that record funds collection?

Yes ☐ No ☐

25. Where are the water project funds kept?

1 = House ☐

2 = Water project office ☐

3 = Bank ☐

4 = Other (please specify) .....

26. What type of financial records does the water project keep?

1 = Members/water users register ☐

2 = Ledger book ☐

3.= Minutes book ☐

4 = Work attendance register ☐

5 = Stock and issue registers ☐

6 = Other (please specify) .....

27. When is money to cover operations and maintenance expenses of your water project raised or collected?

1 = Monthly ☐

2 = Quarterly ☐

3 = Half yearly ☐

4 = Annually ☐

5 = When there is a breakdown ☐

6 = Other (please specify) .....

28. Who authorizes purchases, payments and other uses of funds for the water project?

1 = Chairman ☐

2 = Treasurer ☐

3 = Secretary ☐

4 = Committee member ☐

5 = Water project clerk ☐

6 = Other (please specify) .....

29. How would you rate the water management committee's financial management skills?

1 = Very poor ☐

2 = poor ☐

3 = Fair ☐

4 = Good ☐

5 = Very good ☐

30. Has your water project developed rules and procedures on collection and use of community funds?

Yes ☐ No ☐

31. How would you rate the effectiveness of the methods used by your water project in the collection, management and use of collected funds?

1 = Very poor ☐

2 = poor ☐

3 = Fair ☐

4 = Good ☐

5 = Excellent ☐

SECTION E: COMMUNITY FINANCIAL MONITORING

32. How are community members informed about the income accrued from water services and project expenditure?

1 = Public meetings ☐

2 = Notice boards ☐

3 = Reports ☐

4 = Other (please specify) .....

33. What has been the frequency of community meetings during the last one year to discuss income and expenditure accounts of the water project?

1 = None ☐

2 = Once ☐

3 = Twice ☐

4 = Other (please specify) .....

34. How are income and expenditure statements of the water project publicized?

1 = Not publicized ☐

2 = Notice boards ☐

3 = Circulation of copies of treasurers report ☐

4 = Newspapers or radio ☐

5 = Other (please specify) .....

35. Is there a mechanism put in place for the community to establish an independent committee to check and monitor the water project accounts?

Yes ☐ No ☐

36. How would you rate the level of transparency and accountability on financial management that your water project has put in place to facilitate collection and use of public funds?

1 = Accountable and transparent ☐

2 = Moderately accountable and transparent ☐

3 = Unaccountable and not transparent ☐

4 = Other (please specify) .....

37. How would you rate the flow of information and communication on financial management issues between the water committee and community members?

1 = Very poor ☐

2 = poor ☐

3 = Fair ☐

4 = Good ☐

5 = Excellent ☐

THANK YOU VERY MUCH FOR YOUR TIME AND PARTICIPATION