

**WATER SECTOR REFORMS IN KENYA: INFLUENCE OF THE  
PRIVATE OPERATOR MODEL ON FINANCIAL SUSTAINABILITY  
OF RURAL WATER SCHEMES IN HOMA BAY  
COUNTY**

**BY**

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**A Thesis Submitted in Partial Fulfilment of the Requirements for the  
Award of the Degree of Master of Arts in Project Planning and  
Management of the University of Nairobi**

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## DECLARATION

This Thesis is my original work and has not been presented for a degree in any other university or for any other award. The work herein has all sources of information supported by relevant references.

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## **DEDICATION**

This work is dedicated to my mother Mrs. Margaret AnyangoAgwa who has stood by me in good and bad times, and always believed in me.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

BOT	Build-Operate-Transfer
CEO	Chief Executive Officer
CVI	Content Validation Index
FGDs	Focus Group Discussions
GoK	Government of Kenya
HOMAWASCO	Homa Bay Water and Sewerage Company
KIIs	Key Informant Interviews
KNBS	Kenyan National Bureau of Statistics
LVSWSB	Lake Victoria South Water Services Board
M&E	Monitoring and Evaluation
NACOSTI	National Commission for Science, Technology and Innovation
NGOs	Non-Governmental Organisations
O&M	Operation and Maintenance
PPP	Public-Private Partnership
RII	Relative Importance Index
SAPs	Structural Adjustment Programmes
SNWSC	South Nyanza Water and Sewerage Company
SPAs	Service Provision Agreements
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organisation
WSBs	Water Service Boards
WSPs	Water Service Providers
WSRB	Water Services Regulatory Board

## ABSTRACT

Water sector reforms focused on: reducing the Government's participation in direct delivery of water services, commercialising water market and encouraging participation of private operators, in order to enhance efficiency and sustainability of water services. Studies conducted in various developing countries show evidence of a significant relationship between the private operator model and financial sustainability of rural water schemes. Nonetheless, no such study had ever examined influence of the private operator model on financial sustainability of rural water schemes in Homa Bay County. Based on key concepts of the four pillars model, this study examined the statistical relationship between various attributes of Homa Bay Water and Sewerage Company (the private operator) and financial sustainability of its rural water services. The study adopted a cross-sectional survey design, with both quantitative and qualitative approaches. Primary data were sourced from the operator's staff, water users and water management committees in April 2017. Both quantitative and qualitative techniques were applied to process and analyse data. Quantitative techniques included cross-tabulation with Chi square tests, Relative Importance Index, Kendall's Coefficient of Concordance and Spearman's Rank Correlation Coefficient. Key findings of the study show a strong level of concordance of participants' views regarding organisational planning aspects (Kendall's  $W = 0.741$ ); income diversification aspects ( $W = 0.686$ ); management practices ( $W = 0.862$ ); and revenue generation aspects ( $W = 0.893$ ). The findings also show that the operator's performance in defraying O&M costs for its rural water schemes positively and significantly correlated with organisational planning ( $r_s = 0.430$ ;  $p\text{-value} = 0.000$ ); income diversification ( $r_s = 0.375$ ;  $p\text{-value} = 0.014$ ); management practices ( $r_s = 0.430$ ;  $p\text{-value} = 0.000$ ); and revenue generation ( $r_s = 0.568$ ;  $p\text{-value} = 0.000$ ). The study concludes that consistent implementation of strategic and financial plans; improving diversification of internal income sources; ensuring that procurement activities are strictly guided by relevant laws and policies; as well as reducing non-revenue water and unaccounted for water, are crucial for improving the operator's competitiveness in the commercialised water market; as well as performance in defraying O&M costs and achieving financial sustainability for its rural water schemes. The study amplifies the need for stakeholders to: ensure consistent implementation of the strategic and financial plans to guide water supply activities; diversify internal income sources to improve the operator's competitiveness; improve procurement practices by sensitising the operator's staff, Board members and tender committee on procurement laws and policies; initiate active partnership forums with community structures to facilitate early detection and reporting of physical leakages, spillage, illegal connections and defective metering equipment; as well as upgrade the billing system and promote mobile phone payment method to improve revenue collection.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Introduction**

This chapter describes introductory elements of systematic investigations, including background of the study, statement of the problem, purpose and objectives, as well as research questions. The chapter also provides a justification, a statement on significance of the study, scope, assumptions, limitation and delimitations, as well as definition of significance terms used and organisation of the study, which provides an outline of all the chapters.

### **1.2 Background of the Study**

By the end of 2015, about 663 million people globally, had no access to drinking water from improved sources, with Sub-Sahara Africa (SSA) bearing nearly one-half (48.1%) of the burden (UNICEF & WHO, 2015). During the same time, about 37% of Kenyans had no access to water from improved sources, which included 18% of the urban and 43% of the rural populations (UNICEF & WHO, 2015). In Homa Bay County, the proportion lacking access to drinking water from improved sources was estimated at 62%, including 41.1% of the urban population and 67.2% of the rural population by the end of 2013 (KNBS, 2013; KNBS & UNICEF, 2013). The statistical data suggests that more than two-thirds of population in the County still lacks access to improved water sources; thus, the need for innovative measures that would address the challenge.

#### ***1.2.1 Water service as a public sector responsibility***

Traditionally, water services have been provided by the public sector because water is a basic need, a service of public interest and a fundamental element of human rights

(Gia&Fugelsnes, 2010; K'Akumu, 2006). However, in many developing countries, public provision of water services has been constrained by challenges such as low revenues, large amounts of unaccounted for water, high price of water, low cost recovery, unreliable services, as well as lack of accountable management systems(Whittington, Davis, Prokopy, Komives, Thorsten, Lukacs&Wakeman, 2009; K'Akumu, 2006; Menard & Clarke, 2000).

In view of the cited challenges, the International Monetary Fund and the World Bank proposed a raft of measures under the Structural Adjustment Programmes (SAPs), which were expected to reduce government participation in direct service delivery; thus, enhance efficiency and sustainability of water services (United Nations, 2011). In Kenya, SAPs were introduced in the late 1980s; and in the water sector, the proposed measures required the government to delegate responsibility for operations, maintenance, financial management and service delivery to the private sector through Public-Private Partnership (PPP) mechanisms(K'Akumu, 2006).

As explained by the World Bank (1997), PPP initiatives describe a range of possible relationships between public and private sector entities in developing facilities and delivering essential public services. The involvement of private sector entities in delivery of public services brings forth benefits such as expertise in commerce and management; capital investments, as well as technological options (Asian Development Bank, 2010; World Bank, 1997).

### ***1.2.2 Public-Private Partnership models***

Public-Private Partnership options range along a continuum. At one end are those in which government retains full responsibility for operations, maintenance, capital investment and commercial risk; while at the other end, are those in which the private sector takes up much of

this responsibility (World Bank, 1997). Based on this criterion, PPP options fall under six broad categories, including service contracts, management contracts, leases, Build-Operate-Transfer (BOT), concessions and divestitures. Table 1.1 describes the main PPP models.

**Table 1.1: Characteristics of Public-Private Partnership models**

<b>PPP Model</b>	<b>Asset ownership</b>	<b>Operations &amp; maintenance</b>	<b>Capital investment</b>	<b>Commercial risk</b>	<b>Contract duration (Years)</b>
Service contract	Public	Public & private	Public	Public	1-2
Management contract	Public	Private	Public	Public	3-5
Lease	Public	Private	Public	Shared	8-15
Concession	Public	Private	Private	Private	25-30
Build-Operate-Transfer (BOT)	Private & public	Private	Private	Private	20-30
Divestiture	Private/private & public	Private	Private	Private	Indefinite

Source: World Bank (1997)

Divestiture refers to complete privatisation of water facilities by selling existing assets or shares or through a management buyout (World Bank, 1997). Divestitures give private operators full responsibility for operations, maintenance, capital investment and commercial risks. The private operator is contracted through a long-term agreement, which in some cases may be indefinite. Divestitures transfer full or partial ownership of assets to private operators; while the public authority retains obligations such as quality monitoring, regulatory, as well as enforcement of health and environmental standards (Asian Development Bank, 2010; World Bank, 1997).

### ***1.2.3 Privatisation of water service delivery in Kenya***

Privatisation is the process of altering management or ownership of a public facility to the private sector. In Kenya, privatisation of public enterprises has occurred in two phases. The first phase, which occurred in the late 1980s and early 1990s, targeted financial, communications, energy, water and manufacturing sectors (K'Akumu, 2006; Wambua, 2004; Karanja, 1989). However, the exercise did not achieve much, particularly in the water sector, because the country did not have a national policy framework on privatisation (Opare, 2011; K'Akumu, 2006).

The second phase of privatisation came in the early 2000, this time guided by sectoral policy and legal frameworks. In the water sector, the National Policy on Water Resources Management and Development Sessional Paper No. 1 of 1999 and the Water Act of 2002 provided a crucial policy and legal basis for privatisation. The Act created various institutions including Water Services Regulatory Board (WSRB) to regulate water market; eight regional Water Service Boards (WSBs) including Athi Water Services Board, Tana Water Services Board, Coast Water Services Board, Lake Victoria South Water Services Board, Lake Victoria North Water Services Board, Northern Water Services Board, Rift Valley Water Services Board and Tanai Water Services. The main functions of WSBs include asset development, ownership, management of Water Service Providers (WSPs), as well as monitoring service provision (Hakijamii Trust, 2014; K'Akumu, 2006). Homa Bay County is under the jurisdiction of Lake Victoria South Water Services Board (LVSWSB).

Furthermore, WSBs are licensed by the WSRB to undertake their functions, including contracting WSPs through Service Provision Agreements (SPAs). The Act defines a WSP as a

company, non-governmental organisation, a person or a body. By the end of 2011, 122 service providers, countrywide had signed SPAs (WASRB, 2011). Nonetheless, ceding full control of water services to private enterprises was opposed by policy critics for disadvantaging consumers with low purchasing power (Wambua, 2004). In view of this, the Act requires local government authorities to establish autonomous water and sewerage companies with independent Boards of directors to provide water services and re-invest water revenues to improve services. This created a leeway for the incorporation of private operators, in which shares were held by the public sector (K' Akumu, 2006).

One such private operator was the then South Nyanza Water and Sewerage Company (SNWSC), which was incorporated in 2007 to provide water and sanitation services in the then, Rachuonyo, Homa Bay and Suba Districts, currently forming Homa Bay County. With promulgation of the new constitution in 2010, SNWSC was taken over by the County Government of Homa Bay and rebranded as Homa Bay Water and Sewerage Company (HOMAWASCO). This study seeks to establish how the privatisation model has influenced the financial sustainability of rural water schemes in Homa Bay County by focusing on HOMAWASCO.

#### ***1.2.4 Private operator model and financial sustainability of service delivery***

Financial sustainability of water supply system is vital for ensuring continuous provision of services. A water system is considered to be financially sustainable if it has adequate fiscal resources from revenues to meet operation and maintenance (O&M) costs as well as capital costs (Adams, 2012; McPhail, Locussol&Perry, 2012; Martin, 2006; Cardone& Fonseca, 2003).



Extant literature reveals that the private operator model has achieved varying levels of success in terms of service delivery efficiency and financial sustainability in various countries. A study conducted by Whittington *et al.* (2009) reported that the private operator model had substantially improved service quality by reducing water rationing. Another multi-country study conducted by Andrés, Diop and Guasch (2008), found that the private operator model improved the efficiency of water services by reducing water loss, improving billing and revenue collection, achieving financial stability, and delivering water services continuously. Similar results have been reported by studies conducted by Adank and Tuffuor (2013), Mimrose and Gunawardena (2011), Rauendorfer and Liemberger, 2010, Fragano (2010) and World Bank (2006), among others.

In Kenya, the private operator model has experienced mixed results of success and failure since water services were privatised, about 14 years ago. A report compiled by the World Bank in 2012 applauded the private operator model for improving revenue collection efficiency, providing a reliable stream of finance for maintenance and expansion of water services (World Bank, 2012). Despite the positive results, certain challenges still undermine the achievement of financial sustainability, including high tariff, huge amount of unaccounted for water and unreliable services (WASRB, 2013; World Bank, 2012). Besides such review reports, there is a dearth of scientific information regarding influence of the private operator model on the financial sustainability of rural water schemes, particularly in Homa Bay County.

### **1.3 Statement of the Problem**

In Kenya, water is one of the strategic sectors that were targeted by privatisation, which was expected to enhance efficiency and sustainable delivery of services (Hakijamii Trust, 2014;

K'Akumu, 2006). Sustainable delivery of water services requires financial sustainability, which involves generating sufficient revenue to recover O&M as well as capital costs (McPhail *et al.*, 2012; Adams, 2012; Martin, 2006; Cardone & Fonseca, 2003). Studies conducted in developing countries show evidence of positive correlation between the private operator model and financial sustainability of rural water schemes (Adank & Tuffuor, 2013; Mimrose & Gunawardena, 2011; Rauendorfer & Liemberger, 2010; Whittington *et al.*, 2009). Some of the successes associated with the model include reduction of water rationing and water loss through leakages; improvement of billing and revenue collection, as well as achievement of financial stability.

Water sector review reports associate the private operator model with improved revenue collection efficiency, a reliable stream of finances, as well as a reduction in the amount of water lost through burst pipes, leakages and pilferage (World Bank, 2012). However, rural water services remain constrained by low coverage at about 43%; poor corporate governance practices, diversion of water revenues, non-responsiveness to client needs, high levels of unaccounted for water and low O&M cost recovery, among other challenges (UNICEF & WHO, 2015; WASRB, 2013; World Bank, 2012).

Just two years after privatisation of water services, Wambua (2004) conducted case studies of three private operators, namely, Nyeri Water and Sewerage Company, Eldoret Water and Sanitation Company and Nairobi Water and Sewerage Company. The study revealed several common challenges, including diversion of water revenues to irrelevant expenditures, which contributed to delays in maintenance of water systems, loss of water and loss of revenue. As a result, none of the operators had achieved financial and service sustainability (Wambua, 2004).

Even though the theme of Wambua's study is relevant to this study, a few fundamental differences are notable in terms of geographical setting, timing and methodological approaches. Consequently, no systematic investigation has ever examined the influence of HOMAWASCO's water service delivery on the financial sustainability of rural water supply schemes of Homa Bay County. The study intended to address this information gap.

#### **1.4 Purpose of the Study**

The study assessed the influence of various attributes of HOMAWASCO on the sustainability of rural water schemes in Homa Bay County, with a view to determining how well the operator was prepared to sustainably deliver water services in the commercialised water market. Based on the results, the study has made recommendations, which should inform stakeholders as well as influence policy and programming decisions.

#### **1.5 Objectives of the Study**

The study was guided by the following specific objectives relating to HOMAWASCO and which were designed in line with the four pillars of financial sustainability model: -

1. Establish the influence of organisational planning on the financial sustainability of rural water schemes in Homa Bay County.
2. Examine how income diversification influences the financial sustainability of rural water schemes in Homa Bay County.
3. Establish the influence of management practices on the financial sustainability of rural water schemes in Homa Bay County.
4. Examine how revenue generation influences financial sustainability of rural water schemes in Homa Bay County.

## **1.6 Research Questions**

1. How does organisational planning influence the financial sustainability of rural water schemes in Homa Bay County?
2. What is the influence of income diversification on the financial sustainability of rural water schemes in Homa Bay County?
3. How do management practices influence the financial sustainability of rural water schemes in Homa Bay County?
4. What is the relationship between revenue generation and financial sustainability of rural water schemes in Homa Bay County?

## **1.7 Null Hypotheses of the Study**

H<sub>0</sub>1: There is no significant correlation between organisational planning and financial sustainability of rural water schemes in Homa Bay County.

H<sub>0</sub>2: There is no significant correlation between income diversification and financial sustainability of rural water schemes in Homa Bay County.

H<sub>0</sub>3: There is no significant correlation between management practices and financial sustainability of rural water schemes in Homa Bay County.

H<sub>0</sub>4: There is no significant correlation between revenue generation and financial sustainability of rural water schemes in Homa Bay County.

## **1.8 Justification of the Study**

The right to safe drinking water is recognised by international human rights instruments such as the International Convention on Economic, Social and Cultural Rights, as well as Article 43(1) of the national constitution (Hakijamii Trust, 2014; GoK, 2010). Similarly, Kenya's Vision

2030 recognises the need to increase access to safe water and sanitation in order to reduce the burden of water-borne diseases and spur economic productivity (GoK, 2008). Privatisation of water services was initiated at the turn of the 21<sup>st</sup> Century to improve efficiency of service delivery and sustainable access to water for all citizens (Hakijamii Trust, 2014; K' Akumu, 2006; Wambua, 2004). However, the proportion of Kenyans accessing water from improved sources stood at 63% in 2015, against a target of 78%, specified by the Millennium Development Goals, which have since transitioned to Sustainable Development Goals (SDGs) (UNICEF & WHO, 2015; GoK, 2013).

In Homa Bay County, only 38% of the population had access to water from improved sources by the end of 2013, including 58.9% in urban and 32.8% in rural settings (KNBS, 2013; KNBS & UNICEF, 2013). Even though access to safe drinking water is a fundamental right, it remains elusive for more than two-thirds of Homa Bay County citizens. This necessitates a comprehensive investigation focusing on performance of the private operator model, which was introduced to enhance sustainable access to water. Moreover, the study focuses on financial sustainability because it is an indispensable prerequisite for sustainable service delivery.

## **1.9 Significance of the Study**

The study was expected to generate information that would inform policy and programmatic deliberations, at the private operator, sector and county levels, towards appropriate corrective or facilitative interventions. In view of this, the findings and recommendations are important to various stakeholders, including rural communities, HOMAWASCO, Ministry of Water Services and Environment, County Government of Homa Bay, associated ministries,

NGOs and civil society groups, among others. In addition, the output of this study improves existing body of literature and serves as a useful resource material for staff and scholars.

### **1.10 Scope of the Study**

The study was conducted in Homa Bay County, consisting of seven sub-counties, namely Suba, Mbita, Ndhiwa, Homa Bay, Rangwe, Rachuonyo South and Rachuonyo North. HOMAWASCO is the private operator mandated to manage six water schemes in West Karachuonyo, Kendu Bay, Oyugis, Asego and Mbita. The operator is also obligated to commercialize delivery of water services within catchment areas of the cited communities.

### **1.11 Limitations of the Study**

The scope of this study was limited to four pillars of financial sustainability, viz. organisational planning, income diversification, management practices and revenue generation, which were operationalised in terms of measurable indicators. Even though water service providers includes companies, NGOs, community-based organisations, groups and individuals, the scope of this study was limited to HOMAWASCO, because fulfilment of the right to water is a primary function of the County Government.

### **1.12 Delimitations of the Study**

The County has seven sub-counties; however, targeted water schemes are distributed in only four sub-counties, namely, Rachuonyo South, Rachuonyo North, Homa Bay and Mbita. This means that Suba, Ndhiwa and Rangwe sub-counties did not participate in the study; thus, the results obtained may be faulted on the basis geographical representativeness. By focusing on one organisation, certain data such as total operating revenue, total O&M expenditure and total

billing for the last reporting period, among others, may not be accurate if reported by all the targeted participants. Such data were obtained through desk review and verified through Key Informant Interviews (KIIs) with relevant officers. Lastly, targeted participants were required to provide information about their organisation, some of which were sensitive. Although this was likely to affect accuracy of the information, the investigator assured participants about confidentiality of the information.

### **1.13 Assumptions of the Study**

The study assumed that service delivery data relating to finances was up-to-date and complete. The study also assumed that participants would provide views regarding each variable without deliberate subversion. Lastly, the study was designed on the assumption that all targeted participants, including managerial, operations, technical, commercial and finance officers understood the mandate of their organisation and that they would freely share their independent professional views about aspects of interest to the study.

### **1.14 Definition of Terms Used in the Study**

Readers should refer to descriptions provided below, regarding significant terms used in this study.

<b>Collection efficiency:</b>	The total amount of revenue collected by a WSP compared to the total amount billed in a given period.
<b>Cost recovery:</b>	The extent that revenues are adequate to meet O&M costs.
<b>Financial sustainability:</b>	Ability of privately operated water scheme to meet O&M

costs; thereby, provide services consistently.

<b>Management capacity:</b>	Derived from the third pillar of financial sustainability model ‘Sound administration and financial management’. Includes the capacity of administrative organs such as Boards in leadership, oversight, policy formulation. Also includes financial management practices of the private operator.
<b>Metering ratio:</b>	The number of connections with operational metres compared to the total number of connections.
<b>Non-revenue water:</b>	The difference between the volume of water put into a water distribution system and the volume that is billed to customers.
<b>Operation &amp; maintenance:</b>	Mechanisms put in place for efficient management and repair of water supply facilities.
<b>Organisational planning:</b>	Coined from the first pillar of financial sustainability model ‘Strategic and financial planning’. Refers to existence and implementation of both strategic and financial plans. Also includes effectiveness of M&E systems relating to such plans.
<b>Service sustainability:</b>	Ensuring a reliable and adequate potable water supply over a prolonged period of time.
<b>Unaccounted for water:</b>	Water lost in the network of pipelines between treatment plants and consumers as a result of leakage, or other reasons.

### **1.15 Organisation of the Thesis**

The Thesis is organised into five chapters. Chapter one presents background information of study, statement of the problem, purpose of the study, objectives, research question and hypotheses, justification and significance, limitations and delimitations, assumptions, as well as



definition of significant terms as used in the study. Chapter two provides a review of empirical and theoretical literature regarding various aspects of the private operator model and financial sustainability of rural water supply schemes. The third chapter consists of the research paradigms used, design and methodology that was applied to source and process data, including sections on research design, target population, sample sizes and sampling procedures, data collection instruments, validity and reliability issues, data collection and analysis procedures, as well as operationalisation of variables. The fourth chapter presents study findings, discussions, and interpretations of the findings; followed by chapter five, which provides a summary of the findings, conclusions and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents a critical analysis of policy, theoretical and empirical literature regarding practice of Public-Private Partnership (PPP) in the context of public service delivery; as well as financial sustainability of rural water schemes in various countries. The chapter also describes a theoretical model within which results of this study have been contextualised. A synthesis of the theoretical and empirical literature culminates to a conceptual framework, showing the hypothesised relationship between independent and dependent variables.

#### **2.2 The Concept of Public-Private Partnership**

Public-Private Partnership (PPP) has had different meanings to various scholars. Whereas some perceive PPP as new governance tool that will replace the traditional method of contracting for the provision of public services through competitive tendering; others view PPP as a new expression in the language of public management - one intended to include older, established procedures of involvement of private organisations in the delivery of public services (Linder, 1999). There are also those who apparently use the terms “contracting” and “public-private partnership” interchangeably. Graeme & Carsten (2007) have categorised, broadly, the conceptualisations into two - a group that regards PPP as a form of institutional and financial arrangement and the other that sees it as basically a “language game”.

The school of thought that views PPP as institutional and financial arrangement is led by Vaillancourt Rousenau (1999). The proponents of this school of thought argue that both the private and public sectors have specific qualities which when combined, result in better services

or products. The implied argument is that a synergy of effectiveness of state bureaucracy and the efficiency of the private sector shall yield improved quality of public services and goods by infusing market principles.

Public management scholars, led by Okeyo(2013), define PPP as a cooperation of some sort of durability between public and private actors in which they jointly develop products and services, share risks, costs and resources which are connected with these products. In this regard, Okeyo(2013) argues that the language of PPP is a game designed to “cloud” other strategies and purposes. One such purpose is privatisation and the encouragement of private providers to supply public services at the expense of public organisations themselves. Okeyo(2013) further argues that “contracting out” and “privatisation” are expressions that generate opposition quickly and that expressions such as “alternative delivery systems” and “public-private partnerships” invite more people and organisations to join the debate and enable private organisations to get a market share of public service provision. Thus, they all agree that the use of the term “public-private partnership” must be seen in relation to previous, more pejorative terms, such as “contracting out” and “privatisation”. It is therefore, common to find a number of governments avoiding using terms like “privatisation” and “contracting out” in favour of partnerships (Graeme &Carsten, 2007).

Partnerships are found in many different types and sizes, and the boundaries between public and private are sometimes blurred, which makes PPPs difficult to classify and to clearly define. Some scholars have used it interchangeably with the terms commercialisation, privatisation and liberalisation. However, it is important to notethat privatisation, commercialisation and liberalisation are three concepts with different meanings.

Commercialisation refers to the use, by the public sector, of private sector management practices, such as commercial practices and goals, management and organisational styles drawn from the private sector (Bakker, 2003a).

In economic terms, privatisation is the transfer of ownership and/or management of supply of goods and services from the public sector to the private sector; and thus, includes: the total or partial sale of assets by the state; transfer of assets to the private sector under leasing or management contracting arrangements. Neither privatisation nor commercialisation necessarily implies liberalisation (or deregulation), which is the introduction of competition and the removal of laws and regulations that restrict market competition. For instance, in England and Wales, water companies remained monopolies even after privatisation (Bakker, 2003a).

### ***2.2.1 Forms of Public-Private Partnership***

There is no fixed nomenclature for the forms taken by PPPs. Scholars have used different features to describe and classify PPPs depending on what is being emphasised. Some classifications also have disciplinary biases. For example, economists emphasise economic relationships, while political scientists and public administration scholars emphasise political and governance relationships. In this regard, Skelcher(2005) identifies five types or forms of PPPs, namely public leverage, contracting out, franchising, joint ventures and strategic partnering.

Adapting the classification of Onjala (2002) and UN-Habitat (2003), K'Akumu (2006) identifies ten types of PPPs applicable to water enterprises. These range, in a continuum from public enterprises where asset ownership, management and tariff regulation are all under statutory control, followed by public limited companies, service contracts, management contracts,

affermage contracts, lease contracts, concession contracts, Built-Operate-Transfer (BOT), joint ventures, to divestitures (K' Akumu, 2006). In divestitures, other than quality monitoring which is in the hands of the public authority, all other controls including asset ownership, capital, management and tariff regulation, among others, are under private control. Although some forms of PPPs such as contract and lease management, might resemble privatisation, they are actually not similar. PPPs fall in between public enterprises at one end of the continuum and divestiture to the very extreme end. It is divestiture, which for all practical purposes, involves privatisation.

Traditionally, water services have been provided by the public sector. They have been owned and controlled by the public sector in terms of responsibility for day-to-day management of the utility. Privatisation occurs with the introduction of private sector participation in the ownership and/or control of a water service delivery. As noted by K' Akumu (2006), the more the private sector is involved in the ownership and control of a water institution, the more private sector-oriented it becomes. Forms of privatisation differ in the magnitude to which they move ownership, financing and accountability responsibilities from the public to private sectors. For instance, with a service contract (operations, management and sometimes leases), a government sub-contracts operations and maintenance for a period of time, ranging between five to seven years. The government pays a predetermined fee for the service and sets a performance standard to be met. There is no implied financial risk for the private contractor or responsibility for investment, although under a leasing arrangement (the French '*affermage*' system) companies may be responsible for network maintenance, which could involve significant expenditure.

As regards concessions, which usually last 20 to 30 years, the private contractor has full responsibility for all capital and operating costs. In return, the contractor receives all revenue and

is the residual claimant (receiving whatever is left from the income after all other expenses have been deducted). The tariff level is established by the concession contract with specified performance targets. Assets are returned to the public utility at the end of the contract, and the private firm is compensated for its own investment that is not fully amortised (Okeyo,2013). Finally, full privatisation is the same as a concession but with a transfer of the ownership of assets to the private sector, rather than the more lease-like arrangement of a concession.It is worth noting that in all cases, the public sector remains responsible for regulation and monitoring performance hence privatisation does not necessarily result in less government regulation.

Water supply has many characteristics that challenge private sector involvement in its distribution; hence, making regulatory design and enforcement are crucial determinants of PPPs' performance. The challenges include: high investment specificity, natural monopoly features of the sector, buried assets(water pipes buried underground), externalities involving public health and environment, the need for universal provision and the fact that water supply is location-specific. In England and Wales, fixed costs represent 80 percent of total cost (Okeyo, 2013).

### ***2.2.2PPP in the water sector***

According to Bakker (2003b), commercialisation refers to “a networking of management institutions (rules, norms and customs) and entails the introduction of markets as allocation mechanism, market stimulating decision-making techniques and the displacement of Keynesian-welfare state principles in policymaking”. In this regard, commercialisation is a way of transacting business, which may be introduced under public or private enterprise. According to Prasad (2006), privatisation is a political strategy which creates new rules and allocates rules among the state, the market and civil society. Okeyo (2013) is even more specific by stating that

there are four types of privatisation: ideological (less government), populist (more government), pragmatic (effective solutions), and commercial (more business). It is important to note that PPPs, irrespective of the form adopted, usually imply some form of reduction of state/public involvement in the management, ownership and provision of public services by introducing privatisation principles. Although different countries follow different models in terms of degree of public and private sector involvement in the provision of operators, a common trend was observed across the range of country contexts examined.

There seems to be a general consensus among policy makers and experts that government should disengage from operators sectors like electricity and telecommunications but not supply of water services. Water is seen as unavoidably social in nature and evokes political emotions like no other form of public service (Prasad, 2006; Okeyo, 2013). Privatisation, and other varieties of private sector participation in water services, tends to be associated with neo-liberal reform strategies which emphasise the importance of market, fiscal discipline, trade, investment and financial liberalisation, deregulation, decentralisation, privatisation and a reduced role for the state (Okeyo, 2013).

According to Prasad (2006), the objectives of privatisation are a limited welfare state, flexible labour market and restrictive fiscal policies which are given priority over those of traditional social policies. It was hoped that private sector participation would bring in much needed investment, increase access and improve quality of water supply in the developing world in the same way it did to the developed world. By the end of the 1980s, water supply systems in most cities of the developing world were facing growing problems of quality, reliability, and coverage. A vicious circle had developed: without maintenance, systems deteriorated, delivery

became unreliable, and water quality worsened. Ill-served customers neglected to pay their water bills and resisted tariff increases, leaving even fewer resources to maintain the infrastructure (Marin, 2009).

The private sector involvement in the provision of water services has been controversial. It has attracted three different schools of thought (Prasad, 2006). First, there is the group dominated by major international financial institutions like the World Bank arguing that since the government has failed to provide access for everyone, it is worth turning to the private sector and market principles to solve the problem. The second group argues that water is a common good whose supply should not be in the hands of the private sector since it should never be treated as a commodity based on market principles being essence of life itself. This school of thought holds that access to water is a human right and it is the government's obligation to provide such a vital resource to everyone. The third group believes that better services could be realised by considering water as an economic good and a human right at the same time. It is the position of the third group that has given rise to PPPs in the supply of water by emphasising both access and sustainability.

### **2.3 Sustainability of Water Service Delivery**

Sustainability is a concept that arose from the policy debate that dominated the global development agenda in the last two decades of the 20<sup>th</sup> Century. In 1987, the World Commission on Environment and Development coined the term *sustainable development* through its landmark report - *Our Common Future*, which was published in the same year. Sustainable development was defined as a consumption process that enables the current generation to meet its needs without compromising the ability of future generations to meet their own needs (Macharia,



Mbassana&Oduor, 2015). In the context of development projects, Hodgkin (1994) believes that sustainability is a key indicator of success, which enables projects to maintain a level of benefits to an expanding population after the cessation of donor assistance.

In the water sector, the concept refers to the ability of water supply schemes to meet Operations and Management (O&M) costs, and to maintain an acceptable level of services throughout the designed lifespan (Kibuika&Wanyoike, 2012; Sanders &Fitts, 2011; Black, 1985). Being a key aspect of human rights, delivery of water services has traditionally rested on the shoulders of public sector agencies. However, sustainability of water services in many countries has been a source of concern to sector players, particularly, due to the inability of water schemes to sustain services, despite huge amount of resources invested in such projects over the years (Macharia *et al.*, 2015). In the late 1980s, water sector players, including multilateral financiers introduced various strategies to enhance sustainability of water services in developing countries. One such strategy involved bringing on Board the private sector to inject expertise and technology in service delivery, management, operations and innovation, as well as investment capital through PPP initiatives (Philippe &Izaguirre, 2006; Farlam, 2005).

A water supply system is perceived to be financially sustainable if the management is able to recover full costs for O&M as well as retain enough revenues for capital investments (Adams, 2012; McPhail *et al.*, 2012; Castro *et al.*, 2009; Cardone& Fonseca, 2003). Castro *et al.* (2009) differentiates the two concepts of ‘operations’ and ‘maintenance’. Whereas *operations* entails daily management of water schemes, including pump operation, water treatment, rationing, network surveying, recording and reporting, *maintenance* deals with technical aspects

such as availability of spare parts and technical skills, as well as administrative and managerial actions that keep water supply systems in a proper working condition (Castro *et al.*, 2009).

The literature review further reveals three types of maintenance for water service schemes, including *preventive*, *corrective* and *rehabilitative* (Castro *et al.*, 2009; Harvey & Reed, 2004). Whereas preventive maintenance is planned and executed regularly to keep water infrastructure in good working condition, corrective maintenance involves activities carried out as a result of breakdowns or infrastructure deterioration, while rehabilitation involves repair of major defects to restore water supply (Castro *et al.*, 2009; Harvey & Reed, 2004). Key indicators of financial sustainability associated with maintenance of water schemes include the consistency of preventive maintenance, duration between occurrence of breakdowns and onset of corrective maintenance, as well as interludes between any two successive rehabilitation sessions (Castro *et al.*, 2009; Harvey & Reed, 2004). In this study, financial sustainability was measured in terms of ability of the private operator to recover O&M costs, over the preceding one-year period.

The most common and widely applied conceptualisation of sustainable delivery of social services is one that was developed by the World Bank in 1990, focusing on technical, institutional, social, environmental and financial concepts (Macharia *et al.*, 2015; Abrams, 1998; World Bank, 1997). Based on the World Bank's conceptualisation, development agencies have come up with better models to deepen understanding of project sustainability and to strengthen the capacity of their implementing partners. One such initiative culminated to the *Four Pillars Model of Financial Sustainability*, which was developed in 2001 by Nature Conservancy, in collaboration with the United States Agency for International Development (USAID). The model's purpose was to strengthen institutional capacity of partner organisations to achieve

financial sustainability and deliver lasting services (McPhail, Locussol& Perry, 2012; León, 2001). Details of the model and its applicability to the private operator context of water service delivery are described in the following section.

## **2.4 Theoretical Literature: Four Pillars of Financial Sustainability**

Financial sustainability is a value that all organisations, be they profit or non-profit, strive to achieve, in order to deliver services consistently and for a long time without depending on donor-funding (McPhailet *al.*, 2012; Ellsworth, 2002; León, 2001). The model posits that achievement of financial sustainability requires organisations to develop four pillars, including strategic and financial planning, income diversification, sound administration and financial management, as well as own revenue generation (McPhailet *al.*, 2012; Ellsworth, 2002; León, 2001).

### ***2.4.1 First pillar: strategic and financial planning***

Strategic planning is a mechanism that clarifies organisational mission, vision and objectives; as well as prioritises actions required to accomplish them. The model posits that organisations are likely to achieve financial sustainability when their core business is strategically planned, implemented and managed (McPhailet *al.*, 2012; León, 2001). Strategic plans are complemented by financial plans, which consist of projected expenditures and revenues. The ultimate purpose of financial plans is to determine if an organisation is going to have sufficient resources, in the medium term, to meet objectives stated in strategic plans (McPhailet *al.*, 2012). Financial plans operate on the basis of scenarios. For instance, at the minimum feasible scenario, financial plans quantify priorities that should be fulfilled within a specific timeframe, in order to cover O&M costs (León, 2001).

The general perception has been that the use of strategic planning is an effective way to improve corporate performance. A closer look at the empirical literature on the subject reveals a somewhat different picture. Some studies show that there is a positive relationship between strategic planning and organisational performance (Awino, 2014; Bracker & Pearson, 1986). Planning does not guarantee business success (Mintzberg, 1994); however, it is maintained that many of the contributing factors to business failures may be addressed during early stages of business development when strategic planning is employed; thereby, decreasing failure rates (Awino, 2014).

According to Okeyo (2013) allowing management to personally contribute both emotionally and intellectually towards influencing the direction of the firm, creates commitment from them such that they are personally accountable for organisational performance. This motivates and in effect, improves performance. Adding to this view point are Quinn (1980), Kotter (1996) and Awino (2014) who note that the identification of strategic issues, strategy analysis and selection, often facilitate achievement of efficient allocation of resources, sustainable competitive advantage and improved innovations.

Strategic planning seems to be an iterative loop between manager's experience and formal planning. The decision to undertake formal planning seems dependent on there being enough organisational slack to allow the time and resources needed to engage in strategic planning (Awino, 2014). While such planning may be informal, a manager's ability to use strategic thinking to make resource allocation decisions is important (Mazzarolet *et al.*, 2009). Suklev and Debarliev (2012) define strategic planning as an attempt to alter a company's

strength relative to that of its competitors, in the most efficient and effective way. These authors argue that strategic planning focuses on the direction of the organisation and actions necessary to improve its performance (Awino,2014).

The performance implications of strategic planning have been a central area of investigation for researchers over the past three decades. There is a plethora of research findings on the relationship between strategic planning and organisational performance, but many of these findings have proved inconclusive. Early studies suggested that strategic planning enhanced performance; whereas, later studies concluded that there was no clear systematic relationship between strategic planning and firm performance (Awino, 2014). It has been argued that strategic planning may be dysfunctional if it introduces rigidity and encourages excessive bureaucracy. It is recognised; however, that there may be non-financial consequences of strategic planning which provide benefits to the organisation (Glaister *et al.*, 2008;Awino, 2014). Miller and Cardinal (1994) claimed that planning produces better results than non-planning. According to Taiwo and Idunnu (2007), firms that engage in strategic planning significantly outperform those that do not have strategic plans since they spent most of their times realising and reacting to unexpected changes and problems, instead of anticipating and preparing for them and are always in crisis management situations (Awino, 2014). Strategic planning improves organisational performance as it helps firms to develop strategic understanding which, in effect, focus on company direction. In this regard, focus drives performance and performance drives results.

Thompson and Strickland (1987) argue that strategic planning improves organisational performance because it generates information, ensures a complete and thorough consideration of

all feasible options after a firm has evaluated its environment; it stimulates new ideas, increases motivation, commitment and improves internal communication and interactions. Malik (1975) in their study compared financial performance of strategic planners to non-planners and found that the former outperformed the latter on 9 out of 13 financial variables. They concluded that in regards to growth and in earnings and sales, formal planners outperformed those who did not plan (Awino, 2014). Regarding the relationship, Barney (1995) points out that firm performance is central in the study and practice of strategy. He explains that firms that gain competitive advantage outperform firms that gain only parity or a competitive advantage. According to Suklev and Debarliev (2012), strategic planning consists of planning processes that are undertaken in firms to develop strategies that might contribute to performance. It also involves resource allocation, priorities, and actions needed to reach strategic goals.

Regarding the relationship between strategic planning and firm performance, these authors point out that firm performance is central in the study and practice of strategy (Awino, 2014). While there is evidence for a positive relationship between strategic decisions and performance, the links between formal strategic plans and performance, particularly financial performance, is unclear. This raises a question as to whether it is the plan or the planning process that is as important, even though a manager may not have a formal business plan, he or she is likely to be engaged in informal or “intuitive” business planning. Research suggests that successful entrepreneurs are unlikely to have formal planning in the early stages of their business development. Additional studies have found out that the link between a firm’s resources and performance is moderated by strategic decisions (Mazzarol et al., 2009; Awino, 2014).

Furthermore, Kathama (2012) examined the relationship between strategic planning practices and performance of state corporations in Kenya. The study found out that

such corporations adopted a number of strategic planning practices that have a positive impact on corporations but the impact was not significant at 5% level of confidence. The study therefore, failed to establish the relationship, even though the model was fit at the same level of confidence (Awino, 2014). This may suggest that some of the practice could have shown significant impact had the researcher modelled the strategic planning practices individually rather than lumping all the practices together into one variable while running the regression model.

Awino, Muturia and Oeba (2012) investigated the influence of strategic planning and planning outcome on banks' performance. The study found out that there was a positive relationship between strategic planning and firm performance. This study is significant since it has contributed to the body of knowledge of strategic planning where key variables have been linked to organisational performance. The major deviation with the present study is the focus on the banking industry while the present focuses on the water sector (Awino, 2014). These industries are different in their operations and the study will; therefore, provide different results as far as the relationship is concerned.

More still, Mukhokho (2010) examined the influence of strategic planning on performance of the University of Nairobi (UoN). The study found out that strategic planning had a positive effect on the institution's performance on a number of performance measures, including compliance with set budgetary allocations, work environment, implementation of service delivery charter, research innovation and technology, as well as outreach and extension activities (Awino, 2014). The major weakness is its data analysis and it concludes that the existence of relationships based on descriptive analysis and more specifically mean scores (Awino, 2014).

Odundo (2012) examined the moderating effect of environmental context on the relationship between level of implementation of strategic plans and performance of state corporations in Kenya. The study revealed that for commercial state corporations, political goodwill and support had a significant effect on the relationship between the extent of implementation of strategic plans and their financial performance on the one hand, and their effectiveness on the other hand. Policy framework did not moderate the relationship between the extent of implementation of strategic plans and the financial performance of state corporations but had a significant effect on the relationship between their extent of implementation of strategic plans and efficiency. Both dimensions on environmental context did not moderate the relationship between the extent of implementation of strategic plans and effectiveness of either commercial or non-commercial state corporations (Awino, 2014). This study provides empirical evidence to support the theory that effective strategic planning and implementation, within a positive environment of political goodwill and support leads to higher performance.

In the context of rural water schemes through the private operator system, the model emphasises the importance of strategic and financial planning to guide service delivery activities, as well as decisions related to expenditure and revenue-generation. As noted by McPhail *et al.* (2012), having strategic and financial plans may not necessarily lead to financial sustainability, unless they are implemented, monitored, evaluated and improved. Consequently, private operators need to focus on implementation, monitoring and evaluation of their strategic and financial plans, in order to improve water service delivery, revenues and financial sustainability. The concept was named as ‘organisational planning’ to ease its application in the context of HOMAWASCO.



#### ***2.4.2 Second pillar: income diversification***

Organisations need both internally generated income and external funding to attain financial sustainability. Depending on organisation type, external sources of income may include grants and loans, subsidies, partnership capitalisation, and equity financing, among others. Diversification of income is particularly crucial in situations where a large proportion of an organisation's funding comes from external sources. In this regard, the model posits that an organisation whose budget is largely funded by a single donor or financial institution remains vulnerable to financial crises and disruption of service delivery. For such organisations, policy change at the funding source may induce financial crises and sudden termination of services. The model prescribes that organisations relying on external funding should diversify 60% of their budget to five different sources in order to avert the risk of financial crises (McPhail *et al.*, 2012; Ellsworth, 2002; León, 2001). Lewis (2011) defined income diversification as the practice of sourcing funds from multiple sources, including the governments, donors, well-wishers, business community, own revenues, loans and grants. Quite often external funding is restricted with recipient organisations using the resources only for specified purposes (Lewis, 2011).

Whereas León(2001) observes that an organisation is financially sustainable, when it's able to draw up to 60% of its external funding from at least five sources. This means that an organisation whose two-thirds of external funding comes from a single source is vulnerable and is at risk of experiencing financial constraints. However, León (2001) does not provide any criterion for judging the financial sustainability based on internally generated revenue. This stems from the realisation that organisations can achieve financial sustainability from internally generated revenue and that overreliance on a single source of income heightens the risk of

financial constraints in the event of market economic turbulences. For this reason, Lewis (2011) suggests the criterion proposed by León (2001) should also be applied to gauge an organisation's financial sustainability, based on the sources of internally generated revenue. This study applied Lewis's suggestion by examining perceptions regarding the extent to which the operator's internally generated revenue was diversified. Lewis (2011) notes that diversification of income, whether internally generated revenues or external funding, is vital for protecting an organisation from financial shocks arising from macro and micro-economic dynamics, as well as changes in donor funding policies and priorities.

Boas (2012) examined the concept of income diversification and its importance to the financial sustainability of organisations. In this regard, income diversification involves a number of practices that focus on reducing the dependence on a specific type of revenue, a dominating customer, donor or a grant maker, among others. The author emphasises that diversifying income is a strategy for ensuring financial sustainability and continuous delivery of services. However, Boas (2012) lays greater emphasis on the diversification of external funding, with little cognisance of internally generated revenues. Recent changes in funding priorities in the external funding landscape suggest that diversification of external funding sources is less likely to propel organisations to financial sustainability, which in turn, brings to the fore the need for organisations to extend diversification towards internally generated revenues to improve chances of survival and performance. Five years earlier, Alter (2007) cautioned that even though income diversification is a strategic measure towards financial independence for organisations, its success largely depends on the statutory obligations as well as the taxation, macro-economic and political environment in which they operate. These factors often determine the performance of diversification projects.

Moore (2010) observes that diversification of external funding sources is constrained by diminishing resources and changing funding priorities. As a result, most organisations find it difficult to access sufficient, appropriate and continuous funding for their work. In this regard, accessing donors is as challenging as dealing with their funding conditions (Moore, 2010). Notably, as conditionalities around external funding sources change, so should be the strategies adopted by organisations to diversify external funding sources. Notably though, diversification of external funding often fail due to various factors, including inadequacy of competitive skills for resource mobilisation, emergence of cartels that control the funding landscape, as well as inability to design interventions that conform to funding conditionalities (Moore, 2010).

In the context of divestitures, private operators take up O&M, commercial and capital investments risks. However, depending on contractual agreements, capital investments may be shared with public authorities (Asian Development Bank, 2010). Even though the private operators' primary source of income is user fees, external funding from government, partners and development agencies remains crucial for capital investments, particularly necessary where user fees fail to recover capital costs. Under such circumstances, chances of financial sustainability may be improved by diversifying types and sources of funding.

#### ***2.4.3 Third pillar: sound administration and financial management***

Organisational capacity for sound administrative and financial management is essential for achieving financial sustainability. Sound administrative and financial management capacities are governed by institutional policies that optimise delivery of quality services, improving willingness of consumers to pay, improving revenues, influencing external funding sources,

enhancing human resource productivity, as well as optimising utilisation of revenues (León, 2001; Ellsworth, 2002). However, McPhail *et al.* (2012) points out that having administrative and financial management systems may not necessarily lead to organisational financial sustainability, unless such systems are supported, monitored, evaluated and improved.

Sound administration practices have something to do with the competence of leadership organs charged with oversight and management responsibilities (León, 2001; Ansoff & McDonnell, 2010; Lewis, 2011). The two aspects are as important to an organisation as the head is to a human body, particularly by formulating appropriate policies and mechanisms for ensuring prudent utilisation of an organisation's financial resources. Sound administration further manifests itself through competence, experience, commitment and capacity to oversee the execution of an organisation's core mandate, performance monitoring as well as maintenance of good work relations between staff, management and boards (Muriithi, 2014; Okorley & Nkrumah, 2012). However, it's important to note that sound administration is not just about competence among board members and the management, it's demonstrable through governance mechanisms that connects organisational leadership and management to all employees, including those at the lowest cadre. An organisation is poised to achieve financial sustainability when its administration focuses on managing performance, motivating staff, cultivating team spirit, creating a conducive work environment and prioritising staff needs. This suggests that achievement of financial sustainability is a collective responsibility that requires the contribution of organisational leadership, management and workforce.

Sound administration also contributes to financial sustainability of organisations by establishing and maintaining partnerships and collaborations. As noted by Renz (2010),

partnerships and collaborations have become necessary in the 21<sup>st</sup> Century in response to incessant changes in the funding climate and economic turbulences. Through partnerships and collaborations, organisations are able to respond to the changing resource environment by minimising competition for funding sources, maximising impact with limited resources, as well as facilitating sharing of non-monetary resources, knowledge and skills, which are essential to optimising utilisation of available resources, towards financial sustainability. According to Besel, Charlotte and Joanne (2011), establishing and maintaining partnerships and collaborations is a key attribute of competent organisational management, which facilitate acquisition of critical resources and reduction of financial uncertainty.

Sound financial management practices include the involvement of board members in fiscal oversight; production of relevant financial statements on a regular basis and accounting to stakeholders, including funding partners and beneficiaries (León, 2001). This is based on the realization that funding partners increasingly want access to up-to-date information about an organisation's operations and finances and how the organisation is collecting the information. Accountability is both a legal and ethical obligation for organisations, regardless of whether the resources expended are from internally generated income or external funding sources.

The ultimate goal of sound financial management practices is to enable organisations achieve financial sustainability and to deliver quality services over time. As noted by Lewis (2011), sound management of financial resources focuses on two aspects, namely, financing the long-term objectives of an organisation and reducing the impact of threats on the organisation's resources. By reducing risks and safeguarding financial resources, sound financial management enables organisations to maintain liquidity over a period of time, which give them the ability to

seize opportunities and react to unexpected threats while maintaining general operations of the organisation (Bowman, 2011). In this regard, sound financial management practice is also reflected by the degree of managerial flexibility to reallocate assets in response to opportunities and threats; as well as the level of resilience to occasional economic shocks in the short term, including monthly variability in currency exchange rates (Bowman, 2011). According to Eikenberry (2008), sound financial management is not just about safeguarding an organisation's financial resources, or flexibility or resilience, but also coming up with innovative fundraising strategies to overcome the challenge of overreliance on limited external funding sources.

In the context of rural water service delivery, private operators need to have in place active boards of directors, with relevant standing committees, which should always provide leadership, oversee organisational revenues and expenditure management, as well as set policies (León, 2001). The proportion of board members that is actively involved is also a key indicator for achieving financial sustainability. Sound financial management involves the type of accounting systems - whether computerised or manual, efficiency of procurement procedures, non-diversion of water revenues into irrelevant expenditures, consistency of internal and external auditing, financial reporting systems, as well as utilisation of audited financial reports in decision-making. To ease application in the context of HOMAWASCO, the concept has been renamed 'management capacity'.

#### ***2.4.4 Fourth pillar: own revenue generation***

Organisations generate own revenues by selling goods and/or services, in accordance with underpinning statutory obligations, mission and vision (Williams, 2009; Johnson, 1995; León, 2001). The importance of revenue generation in relation to financial sustainability of organisations is an aspect that has been explored and documented by many studies conducted in multiple disciplines (Gebreyes, 2015; Sanyal & Johnstone, 2011; Rollwagen, 2010; Jones & Wellman, 2010). For instance, León (2001) notes that generating own revenue is the primary avenue through which organisations achieve financial sustainability, particularly by enabling organisations to cushion themselves against shocks that may arise from sudden discontinuation of external funding (McPhail *et al.*, 2012; León, 2001). The advantage of own revenue is that organisations have unrestricted authority on how it can be spent, so long as they are able to account to stakeholders.

There are many ways through which organisations can generate own revenue, and the ones adopted depend on an organisation's core business and strategic objectives. Whichever ways chosen, organisations must put in place appropriate measures to enhance efficiency and optimise opportunities (McPhail *et al.*, 2012; Ellsworth, 2002; León, 2001). In the changing global market, organisations must generate sufficient revenue to enable them fulfil their missions and visions. However, one may wonder about how much revenue qualify as sufficient. Castro *et al.* (2009) address this concern by indicating revenue sufficiency can be determined by gauging it against Operation and Maintenance (O&M) costs. Similarly, Jones and Wellman (2010) observe that own revenue is the propelling power towards financial freedom and sustainable delivery of services to communities. The higher the amount of revenue generated over a period of time the sooner the organisation achieves financial freedom and sustainability. This is particularly so because own revenue is spendable to further organisational interests without as

much conditionalities as donor funding, provided that the management is able to justify and account for such expenditure (Jones & Wellman, 2010).

Nonetheless, Sanyal and Johnstone (2011) observe that in a competitive and free market system, meeting revenue targets may not be as easy as it may appear. The probability of an organisation meeting revenue targets is a function of incessant changes in market forces, as well as effectiveness of internal structures in revenue collection, handling and management. Whereas most organisations have no control over market forces, a lot more grapple with challenges of ineffective internal structures and systems, which leads to loss or misuse of revenues. These challenges present opportunities for organisational leadership to shift focus away from the traditional methods of revenue generation, towards new opportunities that are not only innovative but also promising. In this regard, Sanyal and Johnstone (2011) further observe that revitalising or changing revenue generation strategies may not necessarily increase revenues, unless an organisation works towards strengthening internal structures and systems for revenue collection, handling and management.

According to Rollwagen (2010), organisations need to generate revenue more efficiently in order to fill up funding gaps caused by competition and dwindling resources. In the water sector, Marin (2009) opine that efficiency for revenue generation may be enhanced by reducing water losses, improving the accuracy of billing system and bill collection, as well as rationalisation of labour productivity. A little earlier, Cardone and Fonseca (2003) observed that improving operational efficiency and service quality are key strategies for improving an organisation's revenue generation, particularly by making customers to see value for their money, which stimulates willingness to pay their bills. The larger the customer base, the greater



the amount of revenue collected, the better the chances of an organisation achieving financial sustainability.

In the context of rural water supply, own revenue is principally generated through delivery of water services. Various aspects require attention in order to enhance revenue generation by private operators, including billing and revenue collection efficiency, level of water tariffs, payment methods, water connection coverage, metering ratio, non-revenue water and unaccounted for water, as well as economic status of communities served and consumers' willingness to pay for services.

## **2.5 Privatisation of Water Services and Financial Sustainability of Rural Water Schemes**

Existing empirical literature suggests that the private operator model has influenced the financial sustainability of rural water supply schemes differently in various countries. The literature review findings are organised in line with objectives of the study and four pillars of the financial sustainability model. Details are described in the following sub-sections.

### ***2.5.1 Influence of planning aspects on the financial sustainability of rural water schemes***

The literature review reveals that the relationship between financial sustainability of privately operated rural water schemes and organisational planning, including strategic and financial planning, is an area that has not attracted many studies. However, the few studies that have tackled the subject have reported significant relationships between the aspects. For instance, Adank and Tuffuor (2013) found that in Ghana, the private operator model was more stable financially than the municipal model. One of the factors attributed to the variation was the existence of strategic plans. The study revealed that more than one-half of privately operated

water schemes based their activities on strategic plans, compared to none of the municipal operated schemes (Adank&Tuffuor, 2013). Reportedly, strategic plans contributed to financial performance by enabling water schemes to maintain infrastructural systems proactively, enhance operational efficiency, improve quality of services; thereby, motivate consumers to pay.

In Sri Lanka, Mimrose and Gunawardena (2011) found that 14 out of 20 rural water schemes had functional strategic plans, which contributed positively to their financial sustainability. In this regard, 54% of the water schemes having strategic plans had no challenge meeting O&M costs over the preceding one year. Contrastingly, all the schemes with no strategic plans experienced financial constraints in meeting O&M costs. The study reported a significant association between the existence of strategic plans and financial performance.

Notably though, none of the two studies that have been cited performed detailed analyses regarding financial sustainability of rural water schemes in relation to organisational planning. More specifically, even though the studies suggested that existence of strategic plans had a significant influence on the financial sustainability of rural water schemes, none went to the extent of influencing whether implementation of such plans would have similar effects. Furthermore, the focus of the cited studies was skewed towards strategic planning; thus, leaving out aspects of financial planning, which calls for further systematic investigations.

### ***2.5.2 Income diversification and financial sustainability of rural water schemes***

The review shows that few studies have examined the relationship between income diversification and financial sustainability of water supply schemes. A few studies such as Fragano (2010) and Storto (2013) only explored the main sources of income for rural water

schemes, but never went to the extent of influencing statistical relationship between income diversification and financial sustainability. For instance, the study conducted by Fragano (2010) in Sri Lanka found that peri-urban water schemes had multiple sources of income, including user fees, owners' resources, loans from commercial banks and international financial institutions, donations, and tax rebates. In Italy, private water providers in rural areas cited revenue collections, government subsidies and bank loans as the main sources of internal and external incomes (Storto, 2013). Nonetheless, these studies failed to show the influence of income diversification on financial sustainability of privately operated water schemes, which makes it a rich area for investigation.

### ***2.5.3 Influence of management practices on financial sustainability of rural water schemes***

The literature review shows that the influence of management practices, including administrative and financial management systems, on the achievement of financial sustainability by rural water schemes has been assessed by many studies, including Adank and Tuffuor (2013), Jansz (2011), Mimrose and Gunawardena (2011), as well as Fragano (2010). For instance, Jansz (2011) reported a positive correlation between financial performance of rural water schemes in Mozambique, and the training status of management Boards/committees. In this regard, 35% of the schemes whose Boards/committees had been trained, compared to 68% whose committees had not accessed training, experienced more than three episodes of financial crises over the preceding twelve-month period. The study emphasised the importance of enhancing the capacity of management Boards/committees in order to improve financial performance of water schemes.

In Paraguay, Fragano (2010) attributed the success of peri-urban water projects to the introduction of computerised accounting systems, which improved efficiency in management of

cash flows, budgets, procurement activities, as well as expenditure of water revenues. The achievements were also attributed to professional management of project operations by a full-time manager, which left the Board to focus on policy and leadership issues. The influence of professional management on the financial stability of private water schemes was also reported by Adank and Tuffuor (2013) in Ghana, where a high level of efficiency of procurement activities minimised wastage of water revenues and improved financial performance.

A study conducted by Mimrose and Gunawardena (2011) in Sri Lanka found that sustainability of privately operated rural water supply projects was influenced professional experience Board/committee members, as cited by 57% of the participants; skill diversity (54%), lack of training in financial management (60%), rudimentary financial management and reporting systems (45%) and lack of accountability (30%), among other factors. Still on financial management and reporting systems, Adank and Tuffuor (2013) found a significant relationship between financial sustainability of private water schemes and auditing of financial statements, disclosure of financial reports, as well as implementation of actions recommended by such reports. Financial reporting systems are critical for enhancing accountability and financial sustainability of water supply operators.

#### ***2.5.4 Income generation aspects and financial sustainability of rural water schemes***

The literature review reveals that various studies such as Adank and Tuffuor (2013), Mimrose and Gunawardena (2011), Rauendorfer and Liemberger (2010), Fragano (2010) and World Bank (2006), among others, have assessed the relationship between financial sustainability of rural water service schemes and various aspects of revenue generation. For instance, Adank and Tuffuor (2013) reported significant associations between financial stability

of privately operated water schemes in Ghana and factors such as unaccounted for water, proportion of metered consumers and efficiency of general operations. The influence of operational efficiency on financial sustainability of community water schemes was also reported in Sri Lanka by Mimrose and Gunawardena (2011). Operational efficiency aspects covered by the study included timeliness of repairs, as cited by 75% of the participants, frequency of breakdowns (70%), and availability of operator manuals (55%), among others.

The influence of unaccounted for water and non-revenue water on financial sustainability of rural water schemes was also reported in a multi-county study conducted by the World Bank. The study reported that water loss through leakages and non-invoiced consumption affected financial viability of operators in developing countries, particularly through revenue loss and high operation costs (Rauendorfer&Liemberger, 2010; World Bank, 2006). In Kenya, Kibuika associated the financial sustainability of water schemes with factors such as delayed maintenance of distribution lines, low operational efficiency, theft, poor billing, bad metres and low revenue collection efficiency. The influence of unaccounted for water and non-revenue water has also been reported in Paraguay by Fragano (2010) and in China by Wang, Wu and Zheng (2011).

In Paraguay, Fragano (2010) reported that 67% of the projects examined were providing water continuously because they were financially stable, 54% were in a good state of maintenance, 29% had either expanded or were in the process of expanding their water supply infrastructure in response to growing demand. The achievements were attributed to various factors including near-universal metering, computerised billing systems, a high level of revenue collection efficiency, as well as favourable water tariff coupled with reliable services, which stimulated consumers to pay.

In their study, Sanders and Fitts (2011) found a significant relationship between cost recovery of water supply schemes and the amount of tariffs charged per unit of water consumed. The study further indicated that tariffs and user fees are crucial primary elements of cost recovery in water service schemes. Although in some communities charging user fees still raises ethical concerns, balancing the amount of fees charged and parameters such as O&M costs as well as purchasing power of a community remains a delicate issue.

Still on community purchasing power, Check (2015) reported a significant correlation between financial sustainability of private water schemes in Uganda and the level of household income. In this regard, a water scheme located in communities with regular income was about thrice as likely to fully recover O&M costs as that located in communities with seasonal income. Besides, water schemes in communities with regular incomes were found to be more reliable in providing services than those in communities with seasonal income (Check, 2015); which suggests that a higher purchasing power is likely to influence willingness to pay for water services.

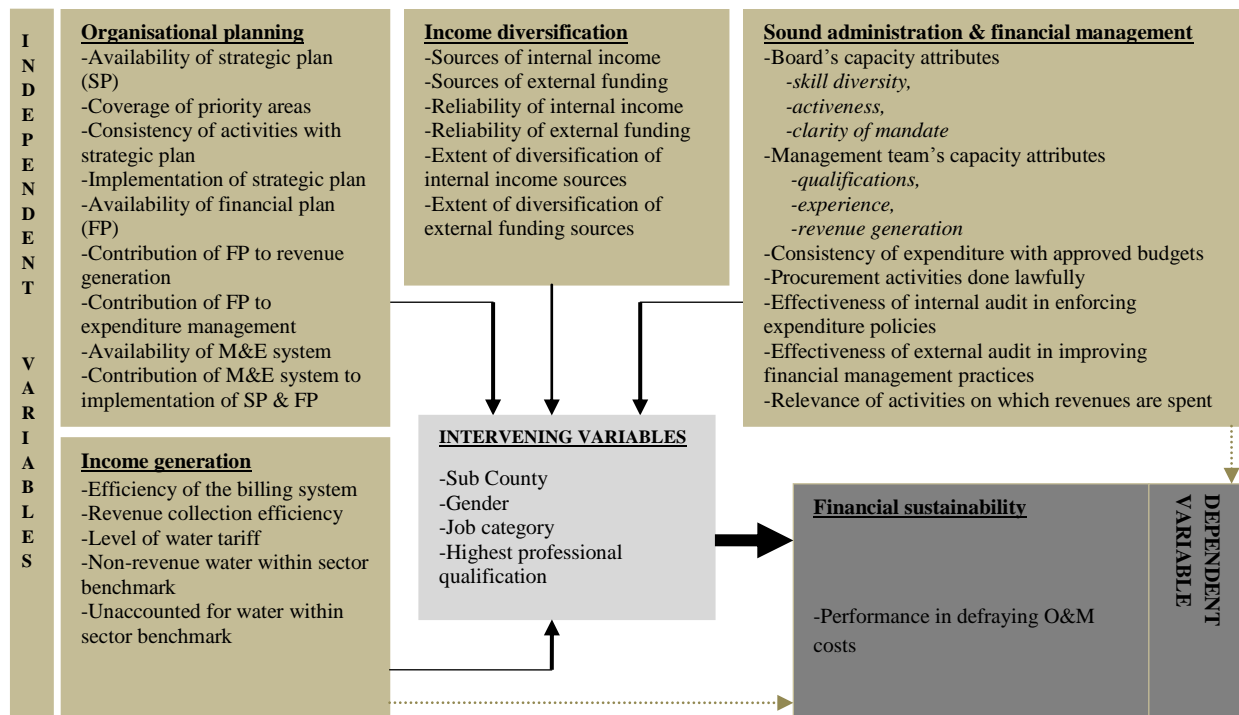
Willingness to pay for services is an indication of consumer satisfaction with quality of services. A study conducted by Abebe, Bosona and Gebresenbet (2013) in Central Ethiopia reported that about 55% of participants were dissatisfied with the quality of services provided by privately operated rural water schemes due to rationing, prompting many households to use water from unsafe sources. Rationing affected willingness to pay for services, as some decided to wholly depend on water from alternative sources. When people are not satisfied with quality of

services, the level of demand reduces and so is the amount of revenue collected and ability of water scheme to achieve financial sustainability for its rural water schemes.

The introduction of electronic payment methods using mobile phones is another factor that has been linked to financial sustainability of rural water schemes. A study conducted in Kenya showed that introduction of mobile phone payment method, helped residents of Kiamumbi community in the outskirts of Nairobi to pay their bills without going to queue in banks, which in turn, improved revenue collection efficiency and cost recovery (Norman & Parker, 2011).

## **2.6 Conceptual Framework**

The conceptual framework, which was founded on the four pillars of financial sustainability model, shows the hypothesised relationship between various attributes of the private operator – HOMAWASCO and financial sustainability of rural water schemes in Homa Bay County. The key attributes (concepts) in question include organisational planning, income diversification, management practices and revenue generation. Figure 2.1 shows that each attribute has been operationalised in terms of measurable indicators, which have been designated as independent variables. Notably, the perceived effect of each independent variable on the dependent variable (ability to meet O&M costs) is influenced by a set of intervening variables. The investigator applied various techniques to determine statistical significance of the hypothesised relationships between independent and dependent variables, while factoring in the influence of intervening variables.



**Figure 2.1: Conceptual framework showing hypothetical relationship between key concepts**



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter describes the design, approaches and methods that were used to source, process, analyse and interpret data. Methodological elements described in the chapter include research paradigm and approach, research design, target population, sampling procedures and sample size, research instruments, pre-testing, validity and reliability aspects, data collection, processing and analysis techniques; as well as ethical considerations and operational definition of variables.

#### **3.2 Research Paradigms and Approaches**

The study was founded on two philosophical schools of thought, namely, positivism and constructivism. Positivist scholars believe that information derived from interaction with phenomena is an exclusive source of all authoritative knowledge. Such phenomena are external and objective; implying that investigators must be completely independent of the phenomena being observed, in order to generate authoritative knowledge. A positivist investigator looks for causality between phenomena, which entails formulating and testing null hypotheses. Concepts are operationalised into simplest forms that can be measured and results used to either confirm or refute null hypotheses (Wong, 2014; Ashley & Orenstein, 2005; Hussey & Hussey, 1997).

Contrastingly, the constructivist school of thought believes that the world is socially constructed and subjective, implying that an investigator is part of the phenomena under investigation (Wong, 2014; Ashley & Orenstein, 2005). According to Easterby-Smith, Thorpe and Lowe (1991), a constructivist investigator focuses on the meaning of reality being observed,

examines totality of reality and induces generalisations. The methods used under constructivist paradigm are numerous and are often combined to better understand reality. Besides, samples used are relatively smaller than that used under the positivist paradigm (Wong, 2014; Ashley & Orenstein, 2005; Hussey & Hussey, 1997).

The study was founded on both positivist and constructivist paradigms. Based on positivist thoughts, the investigator determined causal relationships between concepts of the four pillars model (organisational planning, income diversification, management practices and revenue generation) and financial sustainability of rural water schemes in Homa Bay County. The concepts were broken down to measurable variables, while null hypotheses were tested to explain influence of the private operator model on financial sustainability of rural water schemes.

Under the constructivist paradigm, the study involved a detailed case analysis of the private operator in question - HOMAWASCO, from where requisite information was sourced using a combination of Key Informant Interviews (KIIs), Focus Group Discussions (FGDs) and observation. The resultant information was used to examine the totality of relationship between the concepts of four pillar model and financial sustainability of rural water schemes.

Based on the positivist and constructivist thoughts, the investigator applied a mixed methods approach, which entails combining quantitative and qualitative research methods in a study to understand phenomena better (Sale, Lohfeld & Brazil, 2002; Hussey & Hussey, 1997). As noted by Hughes and Sharrock (1997), each method has its philosophical basis, including a patterned set of assumptions concerning reality (ontology), knowledge of that reality (epistemology), and particular ways of knowing that reality (methodology).

### **3.3 Research Design**

The cross-sectional survey design was applied to capture requisite information. The quantitative approach, consisting of closed-ended questions, elicited information to be used for descriptive and inferential purposes. The design enabled the investigator to determine causal relationships between independent variables and the dependent variable. The qualitative approach with open-ended questions obtained in-depth information from water users and management committee members. A cross-sectional survey design is relatively cheaper than a longitudinal design; thus, making it more appropriate for academic investigators, who in most cases, are limited by budgetary constraints (Rindfleisch, Malter, Ganesan& Moorman, 2008).

In a cross-sectional survey design, data is collected at one point in time; thus, making such studies less vulnerable to confounders. Furthermore, a cross-sectional survey design is capable of providing a wider range of information than other designs; examine externally-oriented constructs and employ a diverse array of measurement scales (Rindfleisch *et al.*, 2008; Bryman& Cramer, 1997). Nonetheless, a cross-sectional survey design is faulted for being vulnerable to a high non-response rate and yielding socially desirable responses. In this study, the investigator took necessary precautions to overcome weaknesses of the design.

### **3.4 Target Population**

The study targeted six rural water schemes, managed by HOMAWASCO. Table 3.1 shows distribution of the water schemes across the administrative units. Within the schemes, the study targeted staff, who were grouped into five categories, including managerial, operations, technical, commercial and finance. The same groups of participants were targeted at HOMAWASCO office.

**Table 3.1: Distribution of water schemes managed by HOMAWASCO**

<b>Sub-County</b>	<b>Division</b>	<b>No. of water schemes</b>
Rachuonyo North	West Karachuonyo	1
	Kendu Bay	2
Rachuonyo South	Kabondo	-
	Oyugis	1
Homa Bay	Rangwe	-
	Asego	1
Ndhiwa	Nyarongi	-
	Ndhiwa	-
Mbita	Mbita	1
Suba	Suba	-
<b>Total</b>		<b>6</b>

The study also targeted three groups of water users, including commercial, government and domestic. Commercial users included hotels and guest houses, fish processors, laundries, and car washers. Government institutions included health facilities, ministries and academic institutions; while domestic users included household heads accessing water from the targeted water schemes. In addition, the study targeted management committee members affiliated to the schemes.

### **3.5 Sample Size and Sampling Procedures**

Samples are sub-sets of populations that can be examined and analysed at reasonable cost and used to predict population parameters (Mugenda&Mugenda, 1999). Samples should be as representative as possible, because a small sample is likely to under-estimate population attributes due to sampling errors. In situations where a population is too small to be sampled, it is logical to include all elements in a sample (Mugenda&Mugenda, 1999).

### 3.5.1 Sample size

Within the framework of positivism, investigators use samples to estimate population parameters (Denzin& Lincoln, 1994). In this study, the quantitative approach targeted staff, under each of the five groups, including managerial, operations, technical, commercial and finance. Table 3.2 shows the distribution of sample sizes for each category of participant.

**Table 3.2: Population and sample size for staff**

Group	Specific cadre	Population (N <sub>i</sub> )	Sample (n <sub>i</sub> )	Sampling method
Managerial	CEO + Departmental heads	5	5	Census
	Scheme managers	6	6	„
Operations	Coordinators	12	12	„
	Station in-charges	24	24	„
Technical	Water engineers/technicians	108	67	Fisher’s formula
Commercial	Commercial officers	150	86	„
Finance	Finance officers	10	10	Census
<b>Total</b>		<b>315</b>	<b>167</b>	

The sample sizes in Table 3.2 have been obtained using a census method and computation using one of Fisher’s formulae. A census method gives all potential participants opportunity to participate in a study, enhances accuracy of results and relatively easier to administer than sample surveys (Parker, 2014). Mugenda and Mugenda (1999) emphasise the need to include all elements in a study in situations where populations are too small to be sampled. Fisher’s formula for sample size determination from finite populations states that:

$$n_0 = \frac{p(1-p)}{\left[\left(\frac{\alpha}{Z}\right)^2 + p(1-p)/N_0\right]} = \frac{0.5(1-0.5)}{\left[\left(\frac{0.05}{1.96}\right)^2 + 0.5(1-0.5)/150\right]} = 108 \quad (1)$$

Where:  $n_0$  = sample size,  $N_0$  = population,  $p$  = estimated population variance: 0.5,  $\alpha$  = desired precision: 0.05,  $Z$  = confidence level: 1.96 for 95% on the normal distribution curve

(Fink, 1995). Taking an example of commercial officers ( $N_0 = 150$ ), the computation obtains a sample size of 108 participants. When the computed sample size is adjusted for design effects, a sample size of 86 participants was obtained. Under the constructivist paradigm, water users were engaged in KIIs. Table 3.3 shows sample sizes, including 10 for commercial users and 10 for government institutions.

**Table 3.3: Distribution of key informant interviews and focus group discussions**

<b>Water users/group</b>	<b>Key Informant Interviews</b>	<b>Focus Group Discussions</b>
Commercial users	10	-
Government institutions	10	-
Domestic users	-	6
Water Management Committee	-	6
<b>Total</b>	<b>12</b>	<b>12</b>

In addition, 12 FGDs were conducted, 6 with domestic water users and 6 with management committee members. This implies that in each water scheme, 1 group of domestic users and 1 group of committee members was engaged. Each group consisted of 6 to 12 discussants.

### ***3.5.2 Sampling procedures***

Probability and non-probability sampling procedures were applied to select participants in each category. Firstly, water schemes were sampled purposively, based on direct involvement of HOMA WASCO in their management. Secondly, staff were sampled purposively, based on their incumbency as well as involvement in management, M&O, revenue collection, water connection and financial management. Thirdly, commercial and government users were also sampled purposively, by virtue of accessing water from targeted schemes. Domestic users were sampled through a systematic random sampling process. In this regard, the investigator used household

registers, upon which participants were identified through a pre-determined interval, starting from a random point. Fourthly, management committee members were sampled purposively, and the selection was based on active membership over the preceding one year period.

### **3.6 Research Instruments**

The investigator applied four sets of data collection instruments, including a survey questionnaire for staff; a KII Guide for commercial and government institution users; an FGD Guide I for domestic water users and an FGD Guide II for water management committee members. The application of multiple instruments was important for enhancing validity of data, while minimising the effect of interviewer biases that may have influenced participants to provide pleasing information even where negative aspects were predominant (Jaeger, 1984).

### **3.7 Pre-testing Research Instruments**

In social science research, pre-testing enables investigators to improve the validity, applicability, and accuracy of data collection instruments and methods. In this study, the instruments were pre-tested in two water schemes located in Siaya County, managed by Siaya-Bondo Water and Sewerage Company. The pre-test involved all the three categories of participants targeted by the study, including staff, water users and management committee members. Again, the pre-test covered about 10% of participants in each category, which according to Sheatsley (1983), is sufficient to discover flaws in data collection instruments. Based on pre-test results, necessary adjustments were effected before data collection.

#### ***3.7.1 Validity of research instruments***

Validity is the degree to which an instrument measures what it is supposed to measure; and the acceptable level largely depends on logic and investigators' experience (UNESCO, 2004; Mugenda&Mugenda, 1999). In this study, a high level of validity was achieved by designing questions using simple and clear language, integrating clear instructions in the instruments to guide participants, as well as applying multiple instruments to capture the same information. In addition, the investigator applied Content Validation Index (CVI) method to assess validity of the instruments' contents, using the formula, which states that:

$$CVI = \left[ \frac{x_r}{\sum(x_r + x_i)} \right] \times 100$$

Where, CVI - Content Validation Index,  $x_r$  - number of items rated as relevant to study objectives, and  $x_i$ - number of items rated as not relevant to study objectives. A CVI value of 50% or more indicates that contents of an instrument are valid, while a CVI value of less than 50% indicates weak or lack of content validity. The analysis obtained a CVI of 64.7%, which suggests that content validity was good, according to Polit and Beck (2006).

### ***3.7.2 Reliability of research instruments***

Reliability is the consistency of a research instrument in measuring various attributes of a phenomenon over time(UNESCO, 2004; Nachmias&Nachmias, 1996). In this study, split-half technique was used to estimate reliability of the instruments, and it was performed using the Statistical Package for Social Sciences (SPSS) to determine Spearman-Brown Prophecy Coefficient(Nachmias&Nachmias, 1996; Bryman& Cramer, 1997). According to Garson (2009), Spearman-Brown Prophecy Coefficient of 0.80 to 0.89 shows adequate reliability, while 0.90 and above is an indication of good reliability. The results summarised in Table 3.4 below shows three indices of reliability test, viz. Cronbach's alpha, Spearman-Brown Coefficient



and Guttman Split-Half Coefficient, all of which indicate the reliability of the questionnaires used for pretesting and for main data collection, based on selected items, with similar measurement scales.

**Table 3.4: Reliability Summary Statistics**

Cronbach's Alpha	Part 1	Value	0.524
		N of Items	25
	Part 2	Value	0.663
		N of Items	25
	Total N of Items		50
Correlation Between Forms			0.741
Spearman-Brown Coefficient	Equal Length		0.828
	Unequal Length		0.828
Guttman Split-Half Coefficient			0.524

The results indicate that a Spearman-Brown Coefficient value of 0.828 ( $\approx 0.83$ ) was obtained from the reliability analysis; suggesting that pre-testing data and main data were consistent; thus, the instrument used to source the two sets of data was adequately reliable. According to Garson (2009), Spearman-Brown Coefficient of 0.80 to 0.89 shows adequate reliability, while 0.90 and above is an indication of good reliability.

### **3.8 Data Collection Procedures**

Data collection began with recruitment of two research assistants. A training session was held with the research assistants to enhance familiarity with data collection instruments and refresh their data sourcing skills. The investigator sought a research permit and authorisation letter from National Commission for Science, Technology and Innovation (NACOSTI), as well as Ministry of Water Services and Environment, Homa Bay County, respectively. The following sub-sections highlight detailed procedures of data collection.

The investigator engaged with top-level management of HOMAWASCO regarding the study, built consensus, as well as sought approval and support to issue out self-administered questionnaires to staff. The investigator and designated research assistants made regular follow-ups to address emerging concerns, while collecting completed questionnaires. The investigator identified commercial and government users of water from targeted water schemes; and relevant officers engaged in KIIs at a convenient date, time and venue. Regarding FGDs, the investigator notified, consented and mobilised sampled domestic users and management committee members to participate in FGDs at convenient dates, time and venues. The investigator also facilitated the KIIs and FGDs with the support of research assistants.

### **3.9 Data Processing and Analysis Techniques**

Both quantitative and qualitative techniques were applied to process and analyse data. Quantitative techniques included cross-tabulation with Chi-square tests, Relative Importance Index, Kendall's Coefficient of Concordance and multiple regression analysis. Chi-square ( $\chi^2$ ) statistic establishes statistical associations between two variables, both of which must be in nominal or ordinal scales. The use of the  $\chi^2$  test necessitates preparation of cross-tabulations of the variables, which then generates significance test results. The  $\chi^2$  test can only show the presence or lack of statistical association; it cannot determine the magnitude and direction of statistical effects of an independent variable on a dependent variable, while controlling for intervening variables (Nachmias & Nachmias, 1996). In this study,  $\chi^2$  was applied to determine the presence or lack of statistical association between various attributes of the private operator (independent variables) and financial sustainability of rural water schemes (dependent variable).

Relative Importance Index (RII) is a ratio of response weights, often expressed as:  $RII = \frac{\sum W}{A * N}$ , where  $W$  is the weighting of each response on a scale of 1 to 5 corresponding with lowest to highest,  $A$  is the highest weight, and  $N$  is the number of participants. RII yields values in the range of  $0 < x \leq 1$ ; the higher the value of RII the more important the factor in relation to a phenomenon being analysed (Kometa, Oloimolaiye & Harris, 1994). In this study, RII was used to determine the relative importance of each attribute of the private operator in relation to financial sustainability of rural water schemes.

Kendall's Coefficient of Concordance was applied to determine the degree of agreement among the five categories of staff, viz. managerial, operations, technical, commercial and finance, with respect to their ranking of private operator's attributes vis-à-vis financial sustainability of rural water schemes. The Coefficient states that  $W$  gives the degree of agreement on a 0 to 1 scale, such that:-

$$W = \frac{12U - 3m^2n(n-1)^2}{m^2n(n-1)}$$

Where  $U = \sum_{j=1}^n (\sum R)^2$ ;  $n$  is the number of factors;  $m$  is the number of groups;  $j$  represent the factors 1, 2, 3 ...  $n$  (Frimpong, Olowoye & Crawford, 2003). All the quantitative analyses were performed using the SPSS and Microsoft Excel packages.

Spearman's Rank Correlation Coefficient is a non-parametric statistical measure of the strength of monotonic relationships between paired data, measured at interval or ratio level or ordinal scales. In a sample, it is denoted by  $r_s$  and is by design constrained as,  $-1 \leq r_s \leq 1$  (Lehman, 2005; Nachmias & Nachmias, 1996). There are two types of monotonic relationships,

viz., monotonically increasing and monotonically decreasing. Monotonically increasing occurs when the value of a dependent variable (y) never decreases as the value of an independent variable (x) increases. Monotonically decreasing occurs when the value of a dependent variable never increases as the value of an independent variable increases. As noted by (Lehman, 2005), Spearman's Rank Correlation Coefficient is used as a statistical method to aid with either proving or disproving null hypotheses. Its value is interpreted the same way Pearson's Correlation Coefficient is interpreted. Thus, the larger the absolute value of  $r_s$ , the stronger the degree of correlation between the two variables (Myers & Well, 2003). The outcomes of Spearman's Rank Correlation Coefficient analysis are ranked on a defined scale; thus, 0.00 to 0.19 is a 'very weak' correlation; 0.20 to 0.39 is 'weak'; 0.40 to 0.59 is 'moderate'; 0.60 to 0.79 is 'strong'; while 0.80 to 1.00 signify a 'very strong' relationship.

Multiple regression analysis was applied to determine the effect of independent variables under each objective on the financial sustainability of rural water schemes (dependent variable), which was measured in terms of the operator's performance in defraying O&M costs over the preceding one year period. The model assumes that for each set of values for the  $k$  independent variables ( $X_{1j}, X_{2j}, X_{3j}, \dots, X_{kj}$ ), there is a distribution of  $Y_j$  values such that the mean of the distribution is represented by the equation.

$$Y_j = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \dots + \beta_k X_{kj} + \varepsilon_j$$

Where:  $\beta_0$  is the intercept;  $\beta_1 \dots \beta_k$  are partial regression co-efficient;  $\varepsilon_j$  is the error term;  $Y_j$  is the dependent variable;  $X_1 \dots X_k$  are independent variables (Bryman & Cramer, 1997). In this study, the dependent variable ( $Y_j$ ) was the financial sustainability of rural water schemes, while independent variables ( $X_1 \dots X_k$ ) included independent variables under each objective. For

instance, under the first objective, the independent variables included *coverage of priority areas by the operator's strategic plan; consistency of water supply activities with the operator's strategic plan; strategic plan implementation status; contribution of the financial plan to revenue generation; contribution of financial plan on expenditure management; as well as contribution of the M&E system to implementation of the operator's strategic and financial plans*. The regression analysis generated four result indicators of interest to this study, namely, standardised regression co-efficients (*Beta* weights), adjusted co-efficient of determination ( $R^2$ ), and the significance of the F statistic. All the quantitative analyses were performed using the SPSS and Microsoft Excel packages.

*Beta* weights showed the effect of each independent variable on the financial sustainability of rural water schemes in terms of direction (either positive or negative) as well as magnitude. Whereas a negative (-) sign before a *beta* weight shows a reduction in operator's performance in defraying O&M costs, a positive (+) sign suggests an increment effect. The effect of independent variables is nil at 0.0, but increases away from 0.0 in both directions ( $\pm$ ). The bigger the deviation from the equilibrium, the stronger the effect associated with a particular independent variable. Besides, a reduction in the operator's performance signifies reduced chances of achieving financial sustainability, while an increment in the same shows improvement in chances of achieving financial sustainability. In this study, improvement or lack of improvement in the operator's performance is a crucial indicator of how well or bad reforms in the water sector had influenced the financial sustainability of rural water schemes.

More still, the goodness-of-fit of a regression model refers to its strength in predicting a dependent variable from a set of independent and intervening variables. In multiple linear

regression analysis, the model's strength is determined by the adjusted  $R^2$ , also known as the coefficient of determination. The adjusted  $R^2$  shows how well the independent variables under each objective explain variation in the operator's performance on defraying O&M costs; while the significance of F statistic indicates whether the effect of the independent variables on the operator's performance is statistically significant or not.

Qualitative data obtained through KIIs and FGDs were processed and analysed following three steps. In the first step, data were organised and summarised in line with objectives of the study. The second step involved description of data to produce a preliminary report. The third step involved thematic analysis to identify emerging sub-themes, as well as patterns and trends of change in financial sustainability of rural water supply (Best & Khan, 2004).

### **3.10 Data Quality Control**

Data quality was achieved through various ways including: integrating instructions in self-administered questionnaires and pre-testing of the tools; training research assistants, assessing performance daily and addressing issues arising, back-checking information; verification of digitalised data; as well as reviewing outputs by supervisors for critique.

### **3.11 Ethical Considerations and Research Authorization**

The study was conducted within the framework of ethical principles for social science research. In this regard, the investigator sought informed consent from sampled participants, who were briefed about the research, its purpose and their participation. The participants were notified about voluntary participation, right to withdraw consent and confidentiality measures. In addition, participants were assured that the information they provided would be handled and processed in

confidentiality. Authorisation letters were obtained from the University of Nairobi and the National Commission for Science, Technology, and Innovation (NACOSTI).

### 3.12 Operational Definition of Variables

This section provides a summary of how each independent and dependent variables was measured, such as indicated in Table 3.5. Important aspects of operational definition of variables include indicators, measurement scales and analysis techniques required.

**Table 3.5: Operational definition of variables**

Objectives	Predictors	Indicators	Measurement scale	Tools of data collection	Types of analysis
1. Establish the influence of organisational planning on the financial sustainability of rural water schemes in Homa Bay County	-Organisational planning attributes	-Availability of strategic plan	-Ordinal -Nominal	-Survey Questionnaire	-Relative Importance Index
		-Implementation of strategic plan		-KII Guide	-Kendall's Coefficient of Concordance
		-Availability of financial plan		-FGD Guides	-Spearman's Rank Correlation Coefficient
		-Implementation of financial plan			-Multiple regression analysis
		-Monitoring & evaluation system			
2. Examine how income diversification influences the financial sustainability of rural water schemes in Homa Bay County	-Income diversification attributes	-Sources of internal income	-Ordinal -Nominal	-Survey Questionnaire	-Relative Importance Index
		-Significance of internal income		-KII Guide	-Kendall's Coefficient of Concordance
		-Sources of external income		-FGD Guides	-Spearman's Rank Correlation Coefficient
		-Significance of external income			-Multiple regression analysis
		-Overall income diversification			

3. Establish the influence of management practices on the financial sustainability of rural water schemes in Homa Bay County	-Management practices	-Existence of a Board -Skill diversity -Gender composition -Clarity of mandate -Activeness of members -Motivation of members -Professional management -Accounting systems -Budgeting -Cash flow management -Procurement procedures	-Ordinal -Nominal	-Survey Questionnaire -KII Guide -FGD Guides	-Relative Importance Index  -Kendall's Coefficient of Concordance  -Spearman's Rank Correlation Coefficient  -Multiple regression analysis
4. Examine how revenue generation influences financial sustainability of rural water schemes in Homa Bay County	-Revenue generation factors	-Billing efficiency -Collection efficiency -Payment methods -Level of water tariff -Operational efficiency -Total water connection -Non-revenue water -Metering ratio -Unaccounted for water -Economic status of population served -Willingness to pay for services	-Ordinal -Interval	-Survey Questionnaire -KII Guide -FGD Guides	-Relative Importance Index  -Kendall's Coefficient of Concordance  -Spearman's Rank Correlation Coefficient  -Multiple regression analysis



## **CHAPTER FOUR**

### **DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS**

#### **4.1 Introduction**

This chapter presents, interprets and discusses findings of the study, which are organised under seven thematic sections, including questionnaire return rate, participants' perceptions on financial sustainability of rural water schemes operated by HOMAWASCO, participants' background profile, organisational planning, income diversification, management practices as well as revenue generation. Details are presented and discussed under the following sections and sub-sections.

#### **4.2 Questionnaire Return Rate**

Questionnaire return rate is the ratio of the number of people successfully interviewed, or who completes and returns self-reporting questionnaires, to the total number of people requested to participate in a study. Questionnaire return rate is a primary indicator of accuracy in the findings of socio-economic and behavioural research initiatives. In this regard, a low questionnaire return rate increases the risk of sampling bias, particularly where non-response is unequal among various categories of participants, which in turn, affects accuracy in the estimation of population parameters using samples (National Research Council, 2013; Center for Disease Control, 2010; Werner, 2004). In this study, 237 self-reporting questionnaires were issued out to staff, who were requested to fill in requisite information in three weeks. Notably, the number of questionnaires issued out was slightly higher than the targeted sample size, because the investigator was keen on obtaining 100% return rate. The variation was expected to compensate for non-response. Table 4.1 shows that of the 237 questionnaires that were issued out, 210 questionnaires were successfully completed and returned; which represents 88.6% return

rate. However, based on the targeted sample size, a return rate of 100.0% was achieved as desired. According to Werner (2004), questionnaire return rate of 80% or above is sufficient for accurate estimation of population parameters from samples. Based on this premise, the aggregate return rate of 88.6% was above the minimum threshold for accuracy.

**Table 4.1: Details of questionnaire return rate**

<b>Group</b>	<b>Target Participant</b>	<b>Sample</b>	<b>No. issued out</b>	<b>Response</b>	<b>Return rate (%)</b>
Managerial	CEO + Departmental heads	5	5	5	100.0
	Scheme managers	6	6	6	100.0
Operations	Coordinators	12	12	10	84.3
	Station in-charges	24	24	19	79.1
Technical	Water engineers/technicians	67	80	69	86.3
Commercial	Commercial officers	86	100	94	94.0
Finance	Finance officers	10	10	7	70.0
<b>Total</b>		<b>210</b>	<b>237</b>	<b>210</b>	<b>88.6</b>

In an organisational context, questionnaire return rate is primarily affected by participants' unfavourable official circumstances, or personal perceptions of benefits and risks, as well as clarity of questions, among other factors. In this study, the investigator sought the support of institutional leadership who, through an internal memo, urged participants to cooperate and offer necessary support. The investigator also explained the study to all participants, detailing its purpose, significance and the need for voluntary participation. These actions, plus issuance of excess questionnaires contributed to the achievement of 100% response rate.

### **4.3 Participant's Perceptions Regarding Financial Sustainability of Rural Water Schemes**

Financial sustainability was operationalised in terms of HOMAWASCO's performance in defraying O&M costs for its rural water schemes over the preceding one year period. In view of this, participants were requested to indicate views regarding the operator's performance in defraying O&M costs for its rural water schemes on a four-point measurement scale, which was calibrated as 'very good', 'good', 'poor' and 'very poor'. The results show that of the 210 participants, 45 (21.4%) rated the operator's performance as 'very good', 52 (24.8%) described it as 'good', 87 (41.4%) felt the performance was 'poor', while 26 (12.4%) said it was 'very poor'. For the convenience of data analysis, 'very good' and 'good' performances were merged into one category designated as 'GOOD', while 'poor' and 'very poor' performances were fused into the category designated as 'POOR'. Based on this, cumulative results show that of the 210 participants, 94 (44.8%) rated the operator's performance as GOOD, while more than one-half, 116 (55.2%), described it as 'POOR'. Whereas GOOD performance signified financial sustainability of the rural water schemes, POOR performance indicated lack of the same. The following sections identify factors that significantly associated or correlated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

### **4.4 Participants' Background Profile and Financial Sustainability of Rural Water Schemes**

The study captured information on participants' background attributes, which were cross-tabulated against the financial sustainability, which was measured in terms of participants' views regarding the operator's performance in defraying O&M costs for its rural water schemes. The results presented in Table 4.2 show that of the 210 participants, 84 (40.0%) were stationed in Homa Bay Town, 62 (29.5%) worked in Rachuonyo North, 47 (22.4%) indicated Rachuonyo South, while 17 (8.1%) were stationed in Mbita Sub County. In relation to the operator's

performance in defraying O&M costs for its rural water schemes, Table 4.2 shows that of the 94 participants who felt that the operator's performance was GOOD, 46 (48.9%) were stationed in Rachuonyo South, while 23 (24.5%) worked in Homa Bay Town. Among those who rated the operator's performance as POOR (116), 39 (33.6%) were stationed in Homa Bay Town, while 38 (32.8%) worked in Rachuonyo South. Based on the cross-tabulation, the analysis obtained a computed Chi square ( $\chi^2$ ) value of 5.753, with 3 degrees of freedom (df) and a p-value of 0.124, which suggests lack of a significant association between Sub Counties of work stations and the operator's performance in defraying O&M costs for its rural water schemes. The results further suggest that perceptions regarding the operator's performance were homogenous across the four Sub Counties.

**Table 4.2: Cross-tabulation of participants' attributes and the operator's performance**

Participants' attributes	Operator's performance in defraying O&M costs						Chi square results		
	GOOD		POOR		TOTAL				
	Count	%	Count	%	Count	%	$\chi^2$	df	p-value
<i>Sub County of work station</i>									
Homa Bay Town	23	24.5	39	33.6	62	29.5	5.753	3	0.124
Rachuonyo North	18	19.1	29	25.0	47	22.4			
Rachuonyo South	46	48.9	38	32.8	84	40.0			
Mbita	7	7.4	10	8.6	17	8.1			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Job category</i>									
Managerial	24	25.5	5	4.3	29	13.8	23.921	4	0.000***
Operations	16	17.0	13	11.2	29	13.8			
Technical	31	33.0	54	46.6	85	40.5			
Commercial	16	17.0	27	23.3	43	20.5			
Finance	7	7.4	17	14.7	24	11.4			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Gender</i>									
Male	76	80.9	93	80.2	169	80.5	0.051	1	0.902
Female	18	19.1	23	19.8	41	19.5			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Highest professional qualification</i>									
Certificate	47	50.0	57	49.1	104	49.5	1.885	3	0.597
Diploma	39	41.5	53	45.7	92	43.8			
Bachelors degree	7	7.4	6	5.2	13	6.2			
Masters degree	1	1.1	0	0.0	1	0.5			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			

Regarding job categories, the results in Table 4.2 show that 85 (40.5%) participants were in technical positions, 43 (20.5%) stated job titles that fall under the commercial category, 29 (13.8%) indicated managerial positions, another 29 (13.8%) were in operations, while 24 (11.4%) served in the finance department. Among those who felt that the operator's performance in defraying O&M costs was GOOD (94), 31 (33.0%) were in the technical job category, while 24 (25.5%) held managerial positions. Among the 116 participants who rated the operator's performance as POOR, 54 (46.6%) belonged to the technical category, while 27 (23.3%) indicated titles affiliated to the commercial job category. Based on this, the analysis obtained a computed  $\chi^2$  of 23.921, with 4 degrees of freedom and a p-value of 0.000, which suggests up to 99% chance that participants' job category significantly associated with the operator's performance in defraying O&M costs for its rural water schemes. This further suggests that views regarding the operator's performance varied significantly among participants in the five job categories.

In terms of gender, the participants included 169 (80.5%) men and 41 (19.5%) women. Among those who described the operator's performance as GOOD (94), up to 76 (80.9%) were men; while among those who felt the operator's performance was POOR (116), men still formed the majority at 93 (80.2%). However, the analysis revealed lack of a significant association between participants' gender and the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 0.051$ ,  $df = 1$  &  $p\text{-value} = 0.902$ ), which suggests that there was no significant variation in views expressed by male and female participants regarding the operator's performance.

The results in Table 4.2 further show that the participants had attained various levels of professional qualifications, with nearly one-half, 104 (49.5%), holding certificates and 92 (43.8%) having diplomas; while 13 (6.2%) indicated bachelors degree qualifications. Among those who rated the operator's performance as GOOD (94), 47 (50.0%) held certificate level qualifications and 39 (41.5%) stated diplomas; while among those who described performance as POOR (116), 57 (49.1%) stated certificate qualifications and 53 (45.7%) mentioned diplomas. Based on this, the analysis obtained a computed  $\chi^2$  value of 1.885, with 3 degrees of freedom and a p-value of 0.597, which suggests lack of a significant association between participants' highest professional qualifications and perceptions regarding the operator's performance in defraying O&M costs for its rural water schemes. This further suggests that views expressed by degree, diploma and certificate holders regarding the operator's performance were homogenous.

#### **4.5 Organisational Planning and Financial Sustainability of Rural Water Schemes**

Organisational planning is an essential prerequisite for the achievement of financial sustainability. In the water sector reforms, commercialisation of services was expected to spur planning of service delivery, resource utilisation, as well as revenue generation and expenditure management, among other aspects (McPhail *et al.*, 2012; León, 2001). The ultimate goal of planning is to enable operators generate sufficient revenues for defraying O&M costs as well as for investing in the expansion of infrastructural systems, in order to reach more people with quality services (Castro *et al.*, 2009). The ability of operators to defray O&M costs for its rural water schemes and to invest in infrastructural systems are crucial indicators of financial sustainability. The following sub-sections present descriptive results on organisational planning and the operator's performance in defraying O&M costs for its rural water schemes.

#### ***4.5.1 Analysis of organisational planning and financial sustainability of water schemes***

The study covered three main components of organisational planning, including strategic planning, financial planning, as well as monitoring and evaluation (M&E). Each component was operationalised in terms of distinctive variables or hypothetical assertions, against which participants were requested to indicate the extent of agreement or disagreement. This sub-section examines the statistical relationship between the aspects of organisational planning and the operator's performance in defraying O&M costs.

##### ***4.5.1.1 Availability of a strategic plan***

The results presented in Table 4.3 show that of the 210 participants, 205 (97.6%) acknowledged that the operator had a strategic plan, which guided the conduct of its business. Besides, 4 (1.9%) participants did not know whether the operator had a strategic plan or not, while 1 (0.5%) stated that the operator had no strategic plan. In relation to the operator's performance in defraying O&M costs for its rural water schemes, among those who described the operator's performance as GOOD (94), up to 93 (98.9%) affirmed that the organisation had a strategic plan; among those who rated performance as POOR (116), the majority, 112 (96.6%) acknowledged availability of a strategic plan. However, the analysis revealed lack of a significant association between awareness of the operator's strategic plan and its performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 1.472$ ,  $df = 2$  &  $p\text{-value} = 0.479$ ).

**Table 4.3: Cross-tabulation of strategic planning aspects and the operator's performance**

Strategic planning	Operator's performance in defraying O&M costs						Chi square results		
	GOOD		POOR		TOTAL				
	Count	%	Count	%	Count	%	$\chi^2$	df	$\rho$ -value
<i>Operator has a strategic plan?</i>									
Yes	93	98.9	112	96.6	205	97.6	1.472	2	0.479
No	0	0.0	1	0.9	1	0.5			
Don't know	1	1.1	3	2.6	4	1.9			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Operator's strategic plan captures all priority areas</i>									
Agree strongly	17	18.3	11	9.8	28	13.7	10.648	3	0.020**
Agree	69	74.2	100	89.3	169	82.4			
Undecided	1	1.1	0	0.0	1	0.5			
Disagree	6	6.5	1	0.9	7	3.4			
Disagree strongly	0	0.0	0	0.0	0	0.0			
<b>Total</b>	<b>93</b>	<b>100.0</b>	<b>112</b>	<b>100.0</b>	<b>205</b>	<b>100.0</b>			
<i>All our water supply activities are based on the operator's strategic plan</i>									
Agree strongly	12	12.9	7	6.3	19	9.3	12.909	3	0.014**
Agree	75	80.6	105	93.8	180	87.8			
Undecided	1	1.1	0	0.0	1	0.5			
Disagree	5	5.4	0	0.0	5	2.4			
Disagree strongly	0	0.0	0	0.0	0	0.0			
<b>Total</b>	<b>93</b>	<b>100.0</b>	<b>112</b>	<b>100.0</b>	<b>205</b>	<b>100.0</b>			
<i>Utility is on track in implementing its strategic plan</i>									
Agree strongly	12	12.9	6	5.4	18	8.8	13.416	3	0.011**
Agree	75	80.6	105	93.8	180	87.8			
Undecided	5	5.4	0	0.0	5	2.4			
Disagree	1	1.1	1	0.9	2	1.0			
Disagree strongly	0	0.0	0	0.0	0	0.0			
<b>Total</b>	<b>93</b>	<b>100.0</b>	<b>112</b>	<b>100.0</b>	<b>205</b>	<b>100.0</b>			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

#### 4.5.1.2 Staff involvement in the strategic planning process

Inclusivity in the strategic planning process is an important factor that promotes ownership and facilitates implementation of strategic plans. Based on this premise, participants were requested to indicate whether they were involved in developing the operator's strategic plan. The results show that of the 205 participants who indicated awareness of the operator's strategic plan, 90 (43.9%) affirmed that they were involved in the strategic planning process; particularly in activities such as identification of departmental needs, challenges, achievement targets, as well



as formulation of strategies. Besides, senior departmental managers were involved in consultative forums that came up with the operator's strategic plan. Notably though, more than one-half of participants, 115 (56.1%), said they were not involved in the strategic planning process, which according to Krill (2010), contradicts standard principles of organisational planning. In this regard, key informants observed that the planning processes could have been improved by involving more staff members.

#### *4.5.1.3 Coverage of priority areas by the operator's strategic plan*

A strategic plan is as good as the extent to which it covers interventions that matter to effective delivery of services. Based on this premise, participants were requested to indicate the degree to which they agreed or disagreed with the assertion, stating that *the operator's strategic plan captures all priority areas necessary for effective delivery of water services in rural areas*. The results presented in Table 4.3 show that of the 205 participants, 169 (82.4%) agreed with the assertion, while 28 (13.7%) agreed strongly. Only 7 (3.4%) participants disagreed with the assertion, while none disagreed strongly. Cumulatively, up to 197 (96.1%) participants indicated agreement with the assertion, which suggests that the operator's strategic plan covered most aspects that are necessary for effective delivery of water services.

In relation to the operator's performance in defraying O&M costs for its rural water schemes, the results show that among those who felt that the operator's performance was GOOD (93), up to 69 (74.2%) agreed with the assertion, while 17 (18.3%) agreed strongly. Among those who described the operator's performance as POOR (112), the majority, 100 (89.3%), agreed with the assertion, while 11 (9.8%) agreed strongly. Based on this, the analysis obtained a computed  $\chi^2$  value of 10.648, with 3 degrees of freedom and a p-value of 0.020, which suggests

up to 95% chance that scope of the operator's strategic plan significantly associated with its performance in defraying O&M costs over the reference period.

#### *4.5.1.4 Consistency of water supply activities and the operator's strategic plan*

Having a strategic plan and ensuring fidelity to its implementation are two different sides of a coin. Based on this premise, participants were required to indicate the degree of agreement or disagreement with the assertion stating that, *all our water supply activities are based on the operator's strategic plan*. The results in Table 4.3 show that 180 (87.8%) participants agreed with the assertion, 19 (9.3%) agreed strongly, while 5 (2.4%) disagreed. Cumulatively, up to 199 (97.1%) participants affirmed that all their water supply activities in rural areas were based on the operator's strategic plan, which suggests that the strategic plan was being implemented. Among those who rated the operator's performance in defraying O&M costs as GOOD (93), 75 (80.6%) agreed with the assertion, while 12 (12.9%) agreed strongly. The pattern was similar among those who described the operator's performance as POOR (112), with 105 (93.8%) agreeing with the assertion and 7 (6.3%) agreeing strongly. Based on this, the analysis obtained a computed  $\chi^2$  value of 12.909, with 3 degrees of freedom and a p-value of 0.014, which suggests up to 95% chance that consistent implementation of the operator's strategic plan significantly associated with its performance in defraying O&M costs for its rural water schemes.

#### *4.5.1.5 Strategic plan implementation status*

Still on implementation of the strategic plan, participants were asked to indicate the degree of agreement or disagreement with the assertion holding that *the operator is on track in implementing its strategic plan*. In this regard, the results presented in Table 4.3 show that of the 205 participants, 180 (87.8%) agreed with the assertion, while 18 (8.8%) agreed strongly.

Cumulatively, up to 198 (96.6%) participants indicated agreement with the assertion, which further confirms that the operator was on track with implementation of its strategic plan. Among those who felt that the operator's performance in defraying O&M costs was GOOD (93), the majority, 75 (80.6%), agreed with the assertion, while 12 (12.9%) agreed strongly. Among the 112 participants who rated the operator's performance as POOR, again the majority, 105 (93.8%), agreed with the assertion, while 6 (5.4%) agreed strongly. Based on the cross-tabulations, the analysis obtained a computed  $\chi^2$  value of 13.416, with 3 degrees of freedom and a p-value of 0.011. This suggests up to 95% chance that consistent implementation of the operator's strategic plan significantly associated with its performance in defraying O&M costs for its rural water schemes.

Key informant interviews also revealed that the operator embraced the concept of strategic planning right from the time of its inception. In this regard, the operator formulated and implemented two, three-year rolling strategic plans up to April 2010. The third strategic plan covered five years, viz. 2010/11 to 2014/15. However, implementation of the third strategic plan was interrupted by the onset of devolution in 2013, which led to its revision for the operator to align with the devolved governance system. Thus, the fourth strategic plan, which covers the period between 2014/15 and 2018/19, was developed to guide delivery of water services in Homa Bay County in line with Vision 2030, SDGs and Medium Term Plans.

#### *4.5.1.6 Availability of a financial plan*

The results presented in Table 4.4 show that most participants, 206 (98.1%), affirmed that the operator had a financial plan, which guided revenue generation and management of expenditure; 2 (1.0%) did not know whether the operator had a financial plan or not, while

another 2 (1.0%) participants stated that the operator did not have a financial plan. In relation to the operator's performance in defraying O&M costs for its rural water schemes, the results show that among the 94 participants who described the operator's performance as GOOD, up to 90 (95.7%) affirmed that the operator had a financial plan, and so did 166 (100.0%) participants who described the operator's performance as POOR. The analysis obtained a computed  $\chi^2$  value of 5.032, with 2 degrees of freedom and a p-value of 0.081, which suggests up to 90% chance that availability of a financial plan significantly associated with the operator's performance in defrayal of O&M costs for its rural water schemes.

**Table 4.4: Cross-tabulation of financial planning aspects and the operator's performance**

Financial planning	Operator's performance in defraying O&M costs						Chi square results		
	GOOD		POOR		TOTAL				
	Count	%	Count	%	Count	%	$\chi^2$	df	p-value
<i>Operator has a financial plan?</i>									
Yes	90	95.7	116	100.0	206	98.1	5.032	2	0.081*
No	2	2.1	0	0.0	2	1.0			
Don't know	2	2.1	0	0.0	2	1.0			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Financial planning has improved revenue generation over the past one year</i>									
Agree strongly	6	6.7	6	5.2	12	5.8	5.433	2	0.066*
Agree	70	77.8	103	88.8	173	84.0			
Undecided	0	0.0	0	0.0	0	0.0			
Disagree	14	15.6	7	6.0	21	10.2			
Disagree strongly	0	0.0	0	0.0	0	0.0			
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>206</b>	<b>100.0</b>			
<i>Financial planning has improved management of expenditure over the past one year</i>									
Agree strongly	3	3.3	13	11.2	16	7.8	7.095	3	0.047**
Agree	83	92.2	100	86.2	183	88.8			
Undecided	0	0.0	1	0.9	1	0.5			
Disagree	4	4.4	2	1.7	6	2.9			
Disagree strongly	0	0.0	0	0.0	0	0.0			
<b>Total</b>	<b>90</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>206</b>	<b>100.0</b>			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

#### 4.5.1.7 Contribution of financial planning to revenue generation

An overarching objective of financial planning is to improve revenues, which operators can use to defray O&M costs. In view of this thought, participants were requested to indicate the degree to which they agreed or disagreed with the assertion stating that *financial planning has improved revenue generation over the past one year*. The results in Table 4.4 show that of the 206 participants, 173 (84.0%) agreed with the assertion, 12 (5.8%) agreed strongly, while 21 (10.2%) disagreed. Cumulatively, up to 185 (89.8%) participants expressed agreement that the operator's financial planning had contributed to improvement of revenue generation over the preceding one year period. Among those who described the operator's performance as GOOD (90), up to 70 (77.8%) agreed with the assertion, while 14 (15.6%) disagreed. Among the 116 participants who said the operator performed POORLY, up to 103 (88.8%) agreed with the assertion, while 7 (6.0%) disagreed. Based on this, the analysis revealed that financial plan's contribution to revenue generation significantly associated with the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 5.433$ ,  $df = 2$  &  $p\text{-value} = 0.066$ ). This implies that financial plans may have influenced the financial sustainability of rural water schemes operated by HOMAWASCO by improving revenue generation.

#### 4.5.1.8 Contribution of the financial planning to expenditure management

The study also examined the relationship between financial plans and improvement in expenditure management. In this regard, participants were requested to indicate the extent to which they agreed or disagreed with the assertion stating that *financial planning has contributed to improved management of expenditure over the past one year*'. In this regard, the results presented in Table 4.4 show that of the 206 participants, 183 (88.8%) agreed with the assertion, while 16 (7.8%) agreed strongly. Cumulatively, up to 199 (96.6%) participants affirmed that

financial planning had improved management of the operator's expenditure over the reference period. Among those who described the operator's performance in defraying O&M costs as GOOD (90), 83 (92.2%) agreed with the assertion, while 4 (4.4%) disagreed. In the group that said the operator had performed POORLY (116), up to 100 (86.2%) participants agreed with the assertion, while 13 (11.2%) agreed strongly. Based on this, the analysis yielded a computed  $\chi^2$  of 7.095, with 3 degrees of freedom and a p-value of 0.047, which suggests up to 95% chance that financial plans' improvement of the financial sustainability of rural water schemes significantly associated with the operator's performance in defraying O&M costs for its rural water schemes. Improved management of expenditure is a key element of financial sustainability.

#### *4.5.1.9 Availability of the monitoring and evaluation system*

Monitoring and evaluation (M&E) systems provide information that supports effective organisational decisions. Consequently, availability of a functional M&E system is an essential aspect for organisational planning. The results show that of the 210 participants, 118 (56.2%) affirmed that the operator had an M&E system, while up to 74 (35.2%) indicated lack of knowledge regarding availability of an M&E system in the utility. Besides, 18 (8.6%) participants stated out-rightly that the operator did not have an M&E framework. Among the 94 participants who described the operator's performance in defraying O&M costs as GOOD, about one-half, 48 (51.1%), affirmed availability of an M&E system, while 34 (36.2%) did not know whether the operator had an M&E system or not. Among the 116 participants who rated the operator's performance as POOR, 70 (60.3%) stated that the operator had an M&E system, while 40 (34.5%) indicated lack of knowledge regarding availability of such a system. However, the analysis revealed lack of a significant association between availability of an M&E system and

the operator's performance in defraying O&M costs for its rural water schemes over the reference period ( $\chi^2 = 4.343$ ,  $df = 2$  &  $p\text{-value} = 0.114$ ).

#### *4.5.1.10 Contribution of the M&E system to implementation of the strategic and financial plans*

Participants were further requested to indicate the extent to which they agreed or disagreed with the assertion stating that *M&E system has improved implementation of the strategic and financial plans*. The results show that 96 (81.4%) participants agreed with the assertion, 15 (12.7%) agreed strongly, while 6 (5.1%) disagreed. Cumulatively, the results show that up to 111 (94.1%) participants expressed agreement that M&E system had improved implementation of the strategic and financial plans. Regarding the operator's performance in defraying O&M costs for its rural water schemes, the results show that among those who described performance as GOOD (48), 34 (70.8%) agreed with the assertion, 11 (22.9%) agreed strongly, while 3 (6.3%) participants disagreed. Among those who felt that the operator had performed POORLY in defraying O&M costs for its rural water schemes (70), 62 (88.6%) agreed with the assertion, 4 (5.7%) agreed strongly, while 3 (4.3%) participants disagreed. Based on the cross-tabulations, the analysis obtained a computed  $\chi^2$  value of 8.944, with 3 degrees of freedom and a  $p\text{-value}$  of 0.030, which suggests up to 95% chance that contribution of the M&E system to implementation of the strategic and financial plans significantly associated with the operator's performance in defraying O&M costs for its rural water schemes. Key informants revealed that the M&E system captured information on inputs such as financial, human, material, physical and technical resources; as well as outputs and outcomes such as revenues and expenditures, which supported planning decisions towards financial sustainability.

#### 4.5.2 Relative importance analysis of organisational planning aspects

Results presented in the foregoing sub-section show that the operator's performance in defraying O&M costs for its rural water schemes significantly associated with various aspects of organisational planning, including coverage of priority areas by the operator's strategic plan, which for the purpose of further analysis using the Relative Importance Index (RII) technique, was coded as  $OP_{A1}$ ; consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ); strategic plan's implementation status ( $OP_{A3}$ ); contribution of financial plans to revenue generation ( $OP_{A4}$ ); contribution of financial plans to expenditure management ( $OP_{A5}$ ); as well as contribution of M&E system to implementation of strategic and financial plans ( $OP_{A6}$ ). Table 4.5 presents results of the RII analysis, which include an inter-item correlation matrix, correlation co-efficients ( $\beta$ ), general dominance weights and relative weights. The latter indicates the importance of each organisational planning aspect in relation to the operator's performance in defraying O&M costs for its rural water schemes.

**Table 4.5: Relative importance of organisation planning aspects**

INTER-ITEM CORRELATION MATRIX							RELATIVE IMPORTANCE		
Organisational planning aspects (OPAs)	$OP_{A1}$	$OP_{A2}$	$OP_{A3}$	$OP_{A4}$	$OP_{A5}$	$OP_{A6}$	$\beta$	General dominance weights	Relative weights
$OP_{A1}$	1.000	0.356	0.173	0.500	0.387	0.534	0.424	0.638	0.634
$OP_{A2}$	0.356	1.000	0.330	0.209	0.382	0.243	0.451	0.665	0.661
$OP_{A3}$	0.173	0.330	1.000	0.131	0.263	0.165	0.409	0.649	0.635
$OP_{A4}$	0.500	0.209	0.131	1.000	0.407	0.289	0.301	0.581	0.572
$OP_{A5}$	0.387	0.382	0.263	0.407	1.000	0.441	0.423	0.656	0.648
$OP_{A6}$	0.534	0.243	0.165	0.289	0.441	1.000	0.283	0.563	0.549

The results show that consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ) was the most important aspect of organisational planning, in relation to the operator's performance in defraying O&M costs for its rural water schemes, with a relative



weight of 0.661. This resonates with bivariate results in the previous sub-section, where 199 (97.1%) participants affirmed that water supply activities in rural areas were based on the operator's strategic plan. The results suggest that consistency of water supply activities with the operator's strategic plan was the most important aspect of organisational planning influencing its performance in defraying O&M costs for its rural water schemes, as well as ability to achieve financial sustainability for its rural water schemes.

The second most important aspect of organisational planning was the contribution of financial plans to expenditure management ( $OP_{A5}$ ), which scored a relative weight of 0.648. This is consistent with the results presented in the previous sub-section, which indicated that out of 206 participants, 199 (96.6%) affirmed that financial planning had contributed to improvement of the financial sustainability of rural water schemes over the preceding one year period. Key informants confirmed that financial planning was critical for ensuring that water revenues were expended on priority activities; thereby, preventing wastage and loss of resources. However, this was propped by sound financial management system, which enabled timely detection and prevention of financial misappropriation.

The third aspect in the order of relative importance was strategic plan's implementation status ( $OP_{A3}$ ), which scored a relative weight of 0.635. Bivariate results presented in the previous sub-section indicated that out of 205 participants, 198 (96.6%) affirmed that the organisation was on track in implementing its strategic plan. The purpose of strategic plans is to enable organisations to achieve their purpose, which in the case of HOMAWASCO, is to improve access to quality water services and to achieve financial sustainability for its rural water schemes. The aspect that came fourth in the order of relative importance was coverage of priority

areas by the operator's strategic plan ( $OP_{A1}$ ), with a relative weight of 0.634. Bivariate analysis showed that up to 197 (96.1%) participants acknowledged that the operator's strategic plan captures priority areas that are necessary for effective delivery of water services within the context of commercialisation.

The fifth aspect in the order of relative importance was contribution of the organisation's financial plans to revenue generation ( $OP_{A4}$ ), which scored a relative weight of 0.572. This resonates with bivariate results presented in the previous section, which indicated that of the 206 participants, 185 (89.8%) affirmed that the organisation's financial plans had improved revenue generation over the preceding one year period. Lastly, contribution of M&E system to implementation of the strategic and financial plans ( $OP_{A6}$ ) came out sixth in the order of relative importance, with a relative weight of 0.549. In the previous sub-section, the analysis revealed that out of 118 participants, 111 (94.1%) acknowledged that the operator's M&E system had improved implementation of its strategic and financial plans, which in turn, improved the operator's performance in defraying O&M costs for its rural water schemes.

#### ***4.5.3 Concordance of participants' views regarding organisational planning aspects***

The analysis involved determining the extent to which views expressed by the five categories of staff members (managerial, operations, technical, commercial and finance) regarding the relative importance of organisational planning aspects converged. In this regard, the analysis generated mean ranks for each aspect of organisational planning, based on extent of the operator's performance in defraying O&M costs for its rural water schemes. In this regard, the results presented in Table 4.6 show that convergence of participants' views was strongest for consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ), which scored a

mean rank of 3.585; followed by contribution of financial plans to expenditure management( $OP_{A5}$ ), which scored a mean rank of 3.533. Ranking third was strategic plan's implementation status ( $OP_{A3}$ ), with a mean rank of 3.392; followed by coverage of priority areas by the operator's strategic plan ( $OP_{A1}$ ), with a mean rank of 3.213;contribution of the organisation's financial plans to revenue generation ( $OP_{A4}$ ), with a mean rank of 2.919; as well as contribution of M&E system to implementation of the strategic and financial plans ( $OP_{A6}$ ), with a mean rank of 2.778.

**Table 4.6: Concordance of views regarding organisational planning aspects**

Ranks		Test Statistics	
Organisational planning aspects (OPAs)	Mean Rank	N	118
$OP_{A1}$	3.213	Kendall's W <sup>a</sup>	0.741
$OP_{A2}$	3.585	Chi-Square ( $\chi^2$ )	52.739
$OP_{A3}$	3.392		
$OP_{A4}$	2.919	df	5
$OP_{A5}$	3.533	p-value	0.000
$OP_{A6}$	2.778	a. Kendall's Coefficient of Concordance	

In addition, the analysis obtained a Coefficient of Concordance (Kendall's W) of 0.741, which suggests a strong level of concordance of participants' views regarding organisational planning aspects, based on the operator's performance in defraying O&M costs for its rural water schemes. The analysis also obtained a computed  $\chi^2$  of 52.739, with 5 degrees of freedom (df) and a p-value of 0.000, which suggest up to 99% chance that the concordance of participants' views regarding organisational planning aspects was statistically significant.

#### ***4.5.4 Correlation between organisational planning & financial sustainability of water schemes***

The analysis further involved aggregation of organisational planning aspects into one variable, which was then correlated with the operator's performance in defraying O&M costs for

its rural water schemes. The results presented in Table 4.7 show that the analysis obtained Spearman's rank correlation co-efficient of 0.430, with a p-value of 0.000, which suggests up to 99% chance of a strong positive correlation between organisational planning and the operator's performance in defraying O&M costs for its rural water schemes. The results suggest that a unit improvement in organisational planning was likely to influence a proportionate improvement in the operator's performance in defraying O&M costs for its rural water schemes; as well as ability to achieve financial sustainability for its rural water schemes.

**Table 4.7: Correlation between organisational planning aspects &the operator's performance**

		<b>Organisational planning</b>	<b>Performance in defraying O&amp;M costs</b>
<b>Organisational planning</b>	Correlation Coefficient	1	0.430***
	Sig. (2-tailed)		0.000
	N	210	210
<b>Performance in defraying O&amp;M costs</b>	Correlation Coefficient	0.430***	1
	Sig. (2-tailed)	0.000	
	N	210	210

\*\*\*. Correlation is significant at the 0.01 level (2-tailed).

Based on the results, the first null hypothesis ( $H_01$ ) stating that *there is no significant correlation between organisational planning and financial sustainability of rural water schemes in Homa Bay County* was rejected for being inconsistent with empirical data. This implies that improving organisational planning was crucial for improving the operator's performance in defraying O&M costs for its rural water schemes, as well as achieving financial sustainability for rural water schemes.

#### **4.5.5 Regression of organisational planning & financial sustainability of water schemes**

The purpose of regression analysis was to determine the effect of independent variables on the financial sustainability of rural water schemes (dependent variable), which was measured

in terms of the operator's performance in defraying O&M costs over the preceding one year period. Under this objective, the independent variables that significantly associated with the operator's performance in defraying O&M costs were as indicated in Table 4.6. The analysis generated two regression models. The first model incorporated independent variables only, which means it partialled out the effect of intervening variables. The second model incorporated both independent and intervening variables, with the latter including, sub-county of work station, gender, job category and highest professional qualification. The results of regression analysis are presented and discussed under the following sub-sections, while detailed outputs are appended to this Thesis (Appendix VIII).

#### *4.5.5.1 Standardised regression coefficients (Beta weights)*

The results in Table 4.8 show that consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ), generated a standardised *Beta* weight of -0.358, which suggests that the variable caused a negative effect on the operator's performance in defraying O&M costs for its rural water schemes; which was statistically significant at 99% confidence level (t-statistic = -2.704 &  $p$ -value = 0.008) in Model 1. When intervening variables were added into the model, the standardised *Beta* weight reduced to -0.339, which again shows a negative effect that was significant at 95% confidence level (t-statistic = -2.595 &  $p$ -value = 0.011), as indicated in Model 2. In both Models, the analysis shows that consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ) caused a significant reduction in the operator's performance, which means a negative effect on the financial sustainability of the rural water schemes.

**Table 4.8: Effect of organisational planning on the financial sustainability of water schemes**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.546	0.716		3.555	0.001***
	Coverage of priority areas by the operator's strategic plan ( $OP_{A1}$ )	-0.194	0.279	-0.108	-0.696	0.488
	Consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ )	-0.447	0.165	-0.358	-2.704	0.008***
	Strategic plan implementation status ( $OP_{A3}$ )	-0.203	0.128	-0.157	-1.581	0.017**
	Contribution of the financial plan to revenue generation ( $OP_{A4}$ )	-0.121	0.129	-0.118	-0.938	0.351
	Contribution of the financial plan to expenditure management ( $OP_{A5}$ )	0.550	0.343	0.289	1.602	0.012**
	Contribution of M&E to implementation of the operator's plans ( $OP_{A6}$ )	0.056	0.134	0.044	0.421	0.675
2	(Constant)	3.016	0.825		3.655	0.000***
	Coverage of priority areas by the operator's strategic plan ( $OP_{A1}$ )	-0.199	0.274	-0.110	-0.726	0.469
	Consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ )	-0.423	0.163	-0.339	-2.595	0.011**
	Strategic plan implementation status ( $OP_{A3}$ )	-0.269	0.130	-0.208	-2.069	0.041**
	Contribution of the financial plan to revenue generation ( $OP_{A4}$ )	-0.098	0.128	-0.095	-0.762	0.448
	Contribution of the financial plan to expenditure management ( $OP_{A5}$ )	0.577	0.336	0.303	1.718	0.089*
	Contribution of M&E to implementation of the operator's plans ( $OP_{A6}$ )	0.049	0.133	0.038	0.372	0.710
	Sub-County	-0.102	0.088	-0.108	-1.154	0.251
	Gender	-0.149	0.177	-0.077	-0.841	0.402
	Job category	0.095	0.052	0.170	1.828	0.070*
	Highest professional credit	-0.201	0.109	-0.178	-1.840	0.069*

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

The results in Table 4.8 further show that in Model 1, contribution of the financial plan to expenditure management ( $OP_{A5}$ ) generated a *Beta* weight of 0.289, which shows that the variable caused a positive effect on the operator's performance was in defraying O&M costs; and the effect was significant at 95% confidence level (t statistic = -1.602 & a p-value = 0.012). The addition of intervening variables caused a marginal increment in the magnitude of the *Beta* weight to 0.303, which is also statistically significant at 90% confidence level (t statistic = 1.718 & a p-value = 0.089). The results imply that having financial plans added value to the operator by improving the management of expenditure, which in turn, improved performance in defraying O&M costs.

Model 1 further shows that the strategic plan's implementation status ( $OP_{A3}$ ) generated a *Beta* weight of -0.157, which means that the variable negatively affected the operator's performance in defraying O&M costs for its rural water schemes; and that the effect was statistically significant at 95% confidence level (t statistic = -1.581 & a p-value = 0.017). The result suggests that implementation of the operator's strategic plan had issues, which undermined its performance in defraying O&M costs. When intervening variables were added into the model, the *Beta* weight increased to -0.130, which was also statistically significant at 95% confidence level (t statistic = -2.069 & p-value = 0.041), as indicated in Model 2. The results suggest that implementation status of the organisation's strategic plan significantly reduced the operator's performance. Consequently, ensuring consistency in the implementation of the organisation's strategic plan would be crucial for improving the operator's performance and achievement of financial sustainability of rural water schemes.

#### 4.5.5.2 Model's goodness-of-fit

The results in Table 4.9 show the strength with which organisational planning aspects influenced the operator's performance in defraying O&M costs, as well as the statistical significance of the effect. In this regard, Model 1 generated an adjusted  $R^2$  of 0.103, which suggests that organisational planning aspects that were selected for this study accounted for up to 10.3% of variation in the operator's performance in defraying O&M costs. This suggests that the model had a weak strength in estimating the effect of organisational planning on the operator's performance in defraying O&M costs; which however, was statistically significant ( $F = 2.287$ ; p-value = 0.041); thus, suggesting up to 95% chance that the effect of the selected organisational planning aspects on the operator's performance in defraying O&M costs for its rural water schemes was significant.

**Table 4.9: Strength and significance of the model**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.334	0.112	0.103	0.697		
2	0.430	0.185	0.167	0.680		
		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.665	6	1.111	2.287	0.041**
	Residual	52.947	109	0.486		
	Total	59.612	115			
2	Regression	11.014	10	1.101	2.380	0.014**
	Residual	48.598	105	0.463		
	Total	59.612	115			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

Furthermore, the addition of intervening variables into the analysis caused the adjusted  $R^2$  to increase to 0.167, which suggest that Model 2 accounted for 16.7% of variation in the operator's performance in defraying O&M costs, meaning that up to 83.3% of variation in the operator's performance could not be explained by the organisational planning aspects selected for this study. Even though Model 2 was weak in estimating variation in the operator's performance in defraying O&M costs, its effect was statistically significant at 95% confidence level ( $F = 2.380$ ;  $p\text{-value} = 0.014$ ).

#### 4.6 Income Diversification and Financial Sustainability of Rural Water Schemes

Income diversification is a strategy used by market-oriented organisations to spread the risk of financial constraints that may be triggered by unprecedented macro-economic dynamics, such as economic recessions. The basic logic behind income diversification is that in the event of severe disruption in one or two streams of income, an organisation can still derive revenue from alternative streams in order to remain afloat. Thus, income diversification provides a safety net against failure of one or two sources, which according to León (2001), makes it a critical pillar for achieving financial sustainability. It's important to note that financial sustainability within the



context of the private operator model does not mean being profitable. Rather, it means being able to sustainably defray O&M costs for its rural water schemes and expand infrastructural systems to reach more people with quality, safe and affordable services. This section examines the statistical relationship between various aspects of income diversification and financial sustainability of rural water schemes operated by HOMAWASCO.

#### ***4.6.1 Analysis of income diversification and the operator's performance***

Income diversification was operationalised in terms of four aspects, including main sources of income, reliability of income, effect of income on the operator's financial stability; as well as extent of diversification. The aspects applied for both internally generated income and funding from external sources. Details are presented in the following sub-sections.

##### ***4.6.1.1 Main sources of internal income and external funding***

The results presented in Table 4.10 show that of the 210 participants, 199 (94.8%) cited water revenues as the main source of internally generated income. This was confirmed by key informants, who noted that water sales formed the operator's primary source of internal income. In this regard, water users were billed monthly, bimonthly or quarterly, depending on type of use and contractual agreements. Typically, water bills included fixed charges, and variable charges, which were determined by the volume of water consumed. Besides, 11 (5.2%) participants indicated that internally generated income was also generated through other services, such as metre connection and reconnection fees.

**Table 4.10: Main sources of internally generated income and external funding**

<b>Main sources of internal income</b>	<b>Responses</b>		<b>Main sources of external funding*</b>	<b>Responses</b>		<i>Percent of cases (n=205)</i>
	<i>Frequency</i>	<i>Percent</i>		<i>Frequency</i>	<i>Percent</i>	
Water revenue	199	94.8	Subsidies	165	41.0	78.6
			Grants	132	32.8	62.9
Other services	11	5.2	Loans	100	24.9	47.6
			No external funding received	5	1.2	2.4
<b>Total</b>	<b>210</b>	<b>100.0</b>	<b>Total</b>	<b>402</b>	<b>100.0</b>	<b>191.4</b>

\* Multiple response variable

Furthermore, 205 (97.6%) participants affirmed that the operator derives funding from external sources, including subsidies, as cited by 165 (78.6%) participants; grants, 132 (62.9%) and loans, 100 (47.6%). Key informants affirmed that the operator is funded by the County Government of Homa Bay, and such funding is mainly directed towards capital development. Notably though, government funding is often affected by late disbursement of county funds by the National Government. Participants noted that such delays often disrupt service delivery and ability of the operator to defray O&M costs for its rural water schemes. Donor grant was also cited as an important source of external income, which enable the operator to meet recurrent expenditures, such as electricity and chemical bills; thereby, subsidise the cost of service delivery. Even though the operator's primary source of income is water revenues, external funding from the County Government remain crucial for capital investment, particularly when water revenues fail to recover capital cost.

#### 4.6.1.2 Reliability of internally generated income

Reliability of income sources was operationalised by transforming it into a perception assertion, against which participants were requested to indicate views on a five-point Likert scale, calibrated as 'agree strongly', 'agree', 'undecided', 'disagree' and 'disagree strongly'. In

this regard, participants were requested to indicate the extent to which they either agreed or disagreed with the assertion stating that *the operator's internally generated income has been reliable over the past one year*. The results show that of the 210 participants, 126 (60.0%) disagreed with the assertion, while 76 (36.2%) agreed. Cumulatively, more than two-thirds of participants, 132 (62.8%), expressed disagreement with the assertion, which suggests that the operator's internally generated income was unreliable over the reference period.

Among those who rated the operator's performance in defraying O&M costs as GOOD (94), 55 (58.5%) disagreed with the assertion, while 37 (39.4%) agreed. Among those who described the operator's performance as POOR (116), 71 (61.2%) disagreed with the assertion, while 39 (33.6%) agreed. Based on the cross-tabulations, the analysis obtained a computed  $\chi^2$  value of 8.473, with 3 degrees of freedom and a p-value of 0.084, which suggests up to 90% chance that reliability of internally generated income significantly associated with the operator's performance in defraying O&M costs.

#### *4.6.1.3 Reliability of external funding sources*

Participants were further asked to indicate the degree of agreement or disagreement with the assertion stating that *the operator's external funding has been reliable over the past one year*. The results further show that of the 205 participants, 142 (69.2%) disagreed with the assertion, while 43 (21.0%) agreed. Cumulatively, 151 (73.6%) participants denied that the operator's external funding had been reliable over the reference period, which implies, that external funding sources were unreliable.

Among the 91 participants who described it as GOOD, 57 (62.6%) disagreed with the assertion, while 26 (28.6%) agreed. A similar pattern is observable among those who rated the operator's performance as POOR (114). In this regard, 85 (74.6%) participants disagreed with the assertion, while 17 (14.9%) agreed. Based on this, the analysis yielded a computed  $\chi^2$  value of 10.139, with 4 degrees of freedom and a p-value of 0.038, which suggests up to 95% chance that reliability of external funding sources significantly associated with the operator's performance in defraying O&M costs for its rural water schemes. In view of this, unreliability of external funding sources was likely to influence the operator's performance in defraying O&M costs for its rural water schemes, as well as achieving financial sustainability.

#### *4.6.1.4 Extent of diversification of internally generated income*

Again, the extent of diversification indicator was transformed into an assertion, and participants requested to indicate views on a five-point Likert scale, calibrated as 'agree strongly', 'agree', 'undecided', 'disagree' and 'disagree strongly'. In this regard, participants were asked to indicate the extent to which they agreed or disagreed with the assertion stating that *up to 60% of internally generated income is derived from a single source*. The results show that of the 210 participants, 182 (86.7%) agreed with the assertion, 25 (11.9%) disagreed, while 3 (1.4%) agreed strongly. Cumulatively, most participants, 185 (88.1%), expressed agreement with the assertion, which suggests that diversification of internal income sources was below the benchmark necessary for organisations to achieve financial sustainability for its rural water schemes.

In relation to the operator's performance in defraying O&M costs for its rural water schemes, among those who rated the performance as GOOD (94), 75 (79.8%) agreed with the

assertion, while 18 (19.1%) disagreed. Similarly, among those who described the operator's performance as POOR (116), 107 (92.2%) agreed with the assertion, while 7 (6.0%) disagreed. Based on the cross-tabulation, the analysis obtained a computed  $\chi^2$  value of 14.589, with 2 degrees of freedom and a p-value of 0.013, which suggests up to 95% chance that the extent to which internally generated income was diversified significantly associated with the operator's performance in defraying O&M costs for its rural water schemes.

#### *4.6.1.5 Extent of diversification of external funding sources*

Participants were requested to indicate the degree of agreement or disagreement with the assertion stating that *up to 60% of external funding come from a single source*. The results indicate that of the 205 participants, 140 (68.4%) disagreed with the assertion, while 13 (6.3%) disagreed strongly. On the other side of the Likert scale, 29 (14.1%) participants agreed, while 15 (7.3%) agreed strongly. Cumulatively, the majority of participants, 153 (74.7%), expressed disagreement with the assertion, which suggests that diversification of external funding sources met the minimum threshold required for the financial sustainability of rural water schemes operated by HOMAWASCO.

Regarding the operator's performance in defraying O&M costs for its rural water schemes, among the 91 participants who rated performance as GOOD, 52 (57.1%) disagreed with the assertion, while 18 (19.8%) agreed. Similarly, among those who described the operator's performance as POOR (114), up to 88 (77.2%) disagreed with the assertion, while 11 (9.6%) agreed. Based on the cross-tabulations, the analysis obtained a computed  $\chi^2$  value of 12.258, with 4 degrees of freedom and a p-value of 0.026, which suggests up to 95% chance that

the extent to which external funding sources were diversified significantly associated with the operator's performance in defraying O&M costs for its rural water schemes.

#### 4.6.2 Relative importance analysis of income diversification aspects

Bivariate results presented in the fore-going sub-section show that the operator's performance in defraying O&M costs for its rural water schemes significantly associated with reliability of internal income, which for the purpose of further analysis using the RII technique, was coded as  $ID_{A1}$ ; reliability of external funding ( $ID_{A2}$ ); extent of internally generated income diversification( $ID_{A3}$ ); as well as extent of external funding diversification ( $ID_{A4}$ ). Table 4.11 presents the results of RII analysis, which include an inter-item correlation matrix, correlation co-efficients ( $\beta$ ), general dominance weights and relative weights. The latter indicates the importance of each income diversification aspect in relation to the degree of variation in the operator's performance.

**Table 4.11: Relative importance of income diversification aspects**

INTER-ITEM CORRELATION MATRIX					RELATIVE IMPORTANCE		
Income diversification aspects (IDAs)	$ID_{A1}$	$ID_{A2}$	$ID_{A3}$	$ID_{A4}$	$\beta$	General dominance weights	Relative weights
$ID_{A1}$	1.000	0.589	0.406	0.733	0.262	0.552	0.543
$ID_{A2}$	0.589	1.000	0.563	0.442	0.385	0.599	0.590
$ID_{A3}$	0.406	0.563	1.000	0.364	0.412	0.626	0.619
$ID_{A4}$	0.733	0.442	0.364	1.000	0.370	0.610	0.596

The results in Table 4.11 show that extent of internally generated income diversification ( $ID_{A3}$ ) emerged the most important aspect influencing the operator's performance in defraying O&M costs for its rural water schemes, with a relative weight of 0.619. This resonates with bivariate results presented in the previous sub-section, where 185 (88.1%) participants affirmed that up to two-thirds of the operator's internally generated income was derived from a single

source. This implies that the operator's internal income sources were poorly diversified; thus, suggesting overreliance on a single source of internally generated income -water revenues. The primary challenge of poor diversification of internal income sources is that it limits the scope of resources over which an operator has full control and can spend freely without conditionalities. Secondly, an organisation relying on a single source of internally generated income is likely to experience financial constraints in the event of negative market shocks such as economic recessions, which may erode consumers' purchasing power, and ability to pay their water bills. This suggests that poor diversification of internally generated income was likely to influence the operator's achievement of financial sustainability.

The second aspect in the order of relative importance was the extent of external funding diversification ( $ID_{A4}$ ), which scored a relative weight of 0.596. This resonates with bivariate results presented in the previous sub-section, which show that 153 (74.7%) participants expressed disagreement with the assertion holding that up to two-thirds of external funding come from a single source; which suggests that the operator's external funding came from various sources, including government subsidies, as well as grants and loans from development partners. Diversification of external funding sources enabled the operator to cope with sudden changes in the flow of funding; thereby, setting a suitable basis for the operator to achieve financial sustainability for its rural water schemes.

Ranking third in the order of relative importance was the reliability of external funding sources ( $ID_{A2}$ ), with a relative weight of 0.590. Notably, bivariate results indicated that of the 205 participants, 151 (73.6%) expressed disagreement with the assertion that the operator's external funding had been reliable over the preceding one year period, which implies, that

external funding sources were unreliable. Key informants indicated that the operator was primarily funded by the County Government of Homa Bay, which in turn, relies on funding provided by the National Government. Participants cited frequent delay in the disbursement of county allocations by the National Treasury, as a key factor that contributed to the perception that external funding sources were unreliable.

Reliability of internal income sources ( $ID_{AI}$ ) ranked fourth in the order of relative importance, with a relative weight of 0.543. This resonates with bivariate results presented in the previous sub-section, which show that up to 132 (62.8%) participants, disagreed with the assertion stating that the operator's internally generated income had been reliable over the preceding one year period. Key informants noted that reliability of internal income sources was affected by various factors including ineffective billing and revenue collection systems, corruption among some billing and revenue collection officers, which manifested through deliberate exemption of some consumers from paying their water bills, among others. This situation implies that financial constraints were inevitable. Key informants noted that during periods of financial distress, the management adopted various austerity measures, including cutting down the use of office supplies such as papers.

#### ***4.6.3 Concordance of views on income diversification***

The analysis focused on determining the extent to which views expressed by various categories of staff regarding the relative importance of income diversification aspects converged. In this regard, the analysis generated mean ranks for each aspect of income diversification, based on the operator's performance in defraying O&M costs over the preceding one year period. The results presented in Table 4.12 show that participants' views converged most for the extent of



internally generated income diversification( $ID_{A3}$ ), which scored a mean rank of 2.864. This was followed by the extent of external funding diversification ( $ID_{A4}$ ), with a mean rank of 2.671.

**Table 4.12: Concordance of views regarding income diversification aspects**

<b>Ranks</b>		<b>Test Statistics</b>	
Income diversification aspects (IDAs)	Mean Rank	N	205
$ID_{A1}$	2.198	Kendall's W <sup>a</sup>	0.686
$ID_{A2}$	2.492	Chi-Square ( $\chi^2$ )	47.288
$ID_{A3}$	2.864	df	3
$ID_{A4}$	2.671	p-value	0.000
		a. Kendall's Coefficient of Concordance	

Ranking third in terms of convergence of participants' views was reliability of external funding sources ( $ID_{A2}$ ), with a mean rank of 2.492; followed by reliability of internal income sources ( $ID_{A1}$ ), with a mean rank of 2.198. Overall, the analysis obtained a Coefficient of Concordance (Kendall's W) of 0.686, which according to Legendre (2005), suggests a strong concordance of participants' views regarding the relative importance of income diversification aspects, based on the operator's performance in defraying O&M costs for its rural water schemes. The analysis also obtained a computed  $\chi^2$  of 47.288, with 3 degrees of freedom (df) and a significance (p-value) of 0.000, which suggest up to 99% chance that the concordance of participants' views regarding relative importance of income diversification aspects was statistically significant. In this regard, efforts to improve the operator's performance in defraying O&M costs for its rural water schemes, should prioritise diversification of internally generated income, followed by diversification of external funding sources, reliability of external funding sources and reliability of internally generated income.

#### 4.6.4 Correlation between income diversification and financial sustainability of water schemes

Income diversification aspects were aggregated and correlated with the operator's performance in defraying O&M costs over the preceding one year period. The results presented in Table 4.13 show that the analysis obtained Spearman's rank correlation co-efficient of 0.375, with a p-value of 0.014, which suggests a positive and significant correlation between income diversification and the operator's performance in defraying O&M costs for its rural water schemes; which in turn, suggests that income diversification was likely to have influenced the operator's ability to defray O&M costs during the reference period.

**Table 4.13: Correlation between income diversification aspects & the operator's performance**

		Income diversification	Performance in defraying O&M costs
<b>Income diversification</b>	Correlation Coefficient	1	0.375**
	Sig. (2-tailed)		0.014
	N	205	205
<b>Performance in defraying O&amp;M costs</b>	Correlation Coefficient	0.375**	1
	Sig. (2-tailed)	0.014	
	N	205	205

\*\* . Correlation is significant at the 0.05 level (2-tailed).

Based on the results, the investigator rejected the second null hypothesis ( $H_{02}$ ), which posited that *there is no significant correlation between income diversification and financial sustainability of rural water schemes in Homa Bay County*, because it was inconsistent with evidence obtained by the study. Consequently, income diversification was likely to have influenced the operator's performance in defraying O&M costs for its rural water schemes over the reference period; and was therefore, likely to have influenced its financial sustainability.

#### ***4.6.4 Regression analysis of income diversification & financial sustainability of water schemes***

Regression results presented in Table 4.14 show that most aspects of income diversification negatively effects the operator's performance in defraying O&M costs for its rural water schemes, as indicated by the standardised *Beta* weights. Detailed explanations are presented under the following sub-sections.

##### ***4.6.4.1 Standardised coefficients (Beta)***

The results presented in Table 4.14 show that in Model 1, extent of internal income diversification ( $ID_{A3}$ ) generated a *Beta* weight of -0.875, which suggests that the variable negatively affected the operator's performance in defraying O&M costs, and that the effect was significant at 99% confidence level (t statistic = -10.419 & a p-value = 0.000). This implies that the operator's internal income is poorly diversified, which in turn, affects its performance. This was affirmed by key informants who noted that the operator over rely on water revenues as the primary source of internal income. The addition of intervening variables into the analysis, caused a reduction in the magnitude of the *Beta* weight to -0.839, as indicated in Model 2. However, the variable's effect on the operator's performance in defraying O&M costs remain significant at 99% confidence level (t statistic = -10.103 & a p-value = 0.000). Based on this, establishing other sources of internally generated income would be a primary consideration towards enhancing the operator's performance and financial sustainability of the rural water schemes.

**Table4.14: Effect of income diversification on the financial sustainability of rural water schemes**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.110	0.262		-0.421	0.674
	Reliability of internal income ( $ID_{A1}$ )	-0.068	0.048	-0.072	-1.421	0.157
	Extent of internal income diversification ( $ID_{A3}$ )	-0.831	0.080	-0.875	-10.419	0.000***
	Reliability of external funding sources ( $ID_{A2}$ )	-0.169	0.071	-0.120	-2.372	0.019**
	Extent of external funding diversification ( $ID_{A4}$ )	0.259	0.075	0.287	3.459	0.001***
2	(Constant)	-0.493	0.392		-1.256	0.211
	Reliability of internal income ( $ID_{A1}$ )	-0.054	0.047	-0.057	-1.162	0.247
	Extent of internal income diversification ( $ID_{A3}$ )	-0.796	0.079	-0.839	-10.103	0.000***
	Reliability of external funding sources ( $ID_{A2}$ )	-0.123	0.070	-0.087	-1.748	0.082*
	Extent of external funding diversification ( $ID_{A4}$ )	0.260	0.073	0.289	3.554	0.000***
	Sub-County	0.143	0.116	0.060	1.237	0.218
	Gender	0.044	0.041	0.053	1.069	0.286
	Job category	-0.193	0.051	-0.200	-3.754	0.000***
	Highest professional credit	-0.125	0.079	-0.083	-1.583	0.115

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

The results in Model 1 show that the extent of external funding diversification generated a *Beta* weight of 0.287, which was significant at 99% confidence level (t statistic = 3.459 & a p-value = 0.001). This implies that diversification of external funding sources causes a significant positive effect on the operator's performance in defraying O&M costs. Besides, it conforms to earlier findings which suggest that the operator's external funding came from various sources, including government subsidies, as well as grants and loans from development partners. When the intervening variables were added into the model, the *Beta* weight improved marginally to 0.289, which was still significant (t statistic = 3.554 & a p-value = 0.000). The results show that diversification of the operator's external funding sources significantly improved its performance in defraying O&M costs for its rural water schemes.

Furthermore, Model 1 shows that reliability of external funding sources generated a *Beta* weight of -0.120, which means that it caused a negative effect on the operator's performance in defraying O&M costs and the effect was significant at 95% confidence level (t statistic = -2.372 & a p-value = 0.019). This implies that even though the operator's external funding sources

were diversified; there was an issue with reliability of the funding sources, which negatively affected the operator's performance in defraying O&M costs. When intervening variables were added into the model, the *Betaweight* reduced to -0.087, which was became significant at 90% confidence level (t statistic = -1.748& p-value = 0.082), as indicated in Model 2. The results suggest that reliability of external funding sources significantly reduced the operator's ability to performance and achieve of financial sustainability.

#### 4.6.4.2 Models' goodness-of-fit

As indicated in Table 4.15, Model 1 generated an adjusted  $R^2$  of 0.502, which suggest that the income diversification aspects that were selected for this study accounted for up to 50.2% of variation in the operator's performance in defraying O&M costs for its rural water schemes. This suggests that the model was moderate in estimating the effect of income diversification on the operator's performance in defraying O&M costs. The results further show that the strength of Model 1 was significant ( $F = 52.361$ ;  $p$ -value = 0.000); thus, suggesting up to 99% chance that the combined effect of the selected income diversification aspects on the operator's performance was significant.

**Table 4.15: Strength and significance of the income diversification model**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.715	0.512	0.502	0.669
2	0.744	0.553	0.535	0.646

		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.708	4	23.427	52.361	0.000***
	Residual	89.483	200	0.447		
	Total	183.190	204			
2	Regression	101.346	8	12.668	30.338	0.000***
	Residual	81.844	196	0.418		
	Total	183.190	204			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

The addition of intervening variables into the analysis caused the adjusted  $R^2$  increased to 0.535, which suggest that Model 2 accounted for 53.5% of variation in the operator's performance in defraying O&M costs. Again, the results suggest that Model 2 had a moderate strength in estimating the effect of income diversification aspects on the operator's performance in defraying O&M costs, which was also significant at 99% confidence level ( $F = 30.338$ ;  $p\text{-value} = 0.000$ ). This means about 46.5% of variation in the operator's performance was not accounted for by the income diversification aspects that were selected for this study. This may be explained by other factors not covered by this study.

#### **4.7 Management Practices and Financial Sustainability of Rural Water Schemes**

Effective leadership and management are crucial factors that determine the ability of an organisation to optimise revenue generation, expenditure management, defrayal of O&M costs, as well as expedite achievement of financial sustainability. This study examined various attributes of the operator's Board of Directors from the perspective of the five categories of staff. For starters, participants were requested to indicate whether their organisation had a Board of Directors or not. The purpose of this requirement was to determine the level of awareness and knowledge of the operator's governance structure among staff. In this regard, all the 210 (100.0%) participants indicated that their organisation had a Board of Directors.

Key informant interview sessions confirmed that the operator's activities are governed by a Board of Directors, whose primary mandate is to make decisions that influence delivery of water and sewerage services in Homa Bay County. The Board consists of members drawn from among County's residents, who were appointed by the County's Governor. Notable members of the Board include the County Executive Member for Finance, the County Executive Member for

Water, the Chairpersons of Water and Finance Committees in the County Assembly, as well as representatives of relevant professional bodies, public sector organisations such as Kenya National Chamber of Commerce and Industry, private sector organisations, as well as civil society organisations such as the Non-Governmental Organisation Council. The operator's Managing Director provides a vital linkage between the Board and the management team.

#### ***4.7.1 Analysis of management practices and financial sustainability of water schemes***

The study focused on capacity attributes of the Board of Directors and the management team before narrowing down to financial management practices, which demonstrate capacity of the two structures to steer the operator to financial sustainability. Details are presented and discussed in the following sub-sections.

##### ***4.7.1.1 Board's capacity attributes***

The study sought to establish whether skills possessed by Board members were up to task of the mandate given to them. Participants were requested to indicate their views regarding selected capacity attributes of the Board of Directors, including skill diversity, activeness, clarity of mandate, revenue generation policies and oversight of expenditure. For each attribute, participants were requested to indicate views on a five-point Likert scale, which was calibrated as 'very strong', 'strong', 'average', 'weak', and 'very weak'. The results presented in Table 4.16 show that of the 210 participants, 132 (62.9%) stated that the Board was strong in terms skill diversity, while 66 (31.4%) described the attribute as very strong. On the opposite side of the scale, only 10 (4.8%) participants felt that the Board's skill diversity was weak.

Cumulatively, 198 (94.2%) participants indicated that the Board was above average regarding skill diversity.

Among those who described the performance as GOOD (94), 60 (63.8%) felt that the Board was strong in skill diversity, while 27 (28.7%) stated that it was very strong. Among those who described the operator's performance as POOR (116), 72 (62.1%) stated that the Board's skill diversity was strong, while 39 (33.6%) felt that it was very strong. However, the analysis revealed lack of a significant association between the Board's strength in skill diversity and the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 1.383$ ,  $df = 3$  &  $p\text{-value} = 0.709$ ); which suggests that the Board's strength in skill diversity had no significant influence on the operator's performance.

**Table 4.16: Capacity attributes of the Board of Directors**

Capacity attributes	Operator's performance in defraying O&M costs					
	GOOD		POOR		TOTAL	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>Skill diversity</i>						
Very strong	27	28.7	39	33.6	66	31.3
Strong	60	63.8	72	62.1	132	62.9
Average	1	1.1	1	0.9	2	1.0
Weak	6	6.4	4	3.4	10	4.8
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Activeness</i>						
Very strong	33	35.1	57	49.1	90	42.8
Strong	59	62.8	59	50.9	118	56.2
Average	0	0.0	0	0.0	0	0.0
Weak	2	2.1	0	0.0	2	1.0
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Clarity of mandate</i>						
Very strong	24	25.5	37	31.9	61	29.0
Strong	56	59.6	68	58.6	124	59.0
Average	13	13.8	9	7.8	22	10.6
Weak	1	1.1	2	1.7	3	1.4
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Revenue policies</i>						
Very strong	9	9.6	15	12.9	24	11.5
Strong	69	73.4	89	76.7	158	75.2
Average	8	8.5	8	6.9	16	7.6
Weak	8	8.5	4	3.5	12	5.7
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Oversight of expenditure</i>						
Very strong	25	26.6	38	32.8	63	30.0
Strong	66	70.2	78	67.2	144	68.5
Average	2	2.1	0	0.0	2	1.0
Weak	1	1.1	0	0.0	1	0.5
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>



The results in Table 4.16 further show that of the 210 participants, 118 (56.2%) rated the Board's activeness as strong, while 90 (42.8%) described the Board's activeness as very strong. Cumulatively, 208 (99.0%) felt that the Board was above average in terms of activeness. Among those who described the operator's performance as GOOD (94), 59 (62.8%) said the Board was strong in terms of activeness, while 33 (35.1%) felt it was very strong. The pattern was similar among those who described the operator's performance as POOR (116), where 59 (50.9%) rated the Board's activeness as strong, and 57 (49.1%) described it as very strong. Based on this, the analysis obtained a computed  $\chi^2$  of 8.163, with 2 degrees of freedom (df) and a significance (p-value) of 0.046, suggesting up to 95% chance that the Board's activeness significantly associated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

The study sought to establish whether members of operator's Board were clear with their mandate. The results presented in Table 4.16 also show that 124 (59.0%) participants indicated that the Board was strong in terms of the degree to which it understood its mandate, hereafter stated as *clarity of mandate*; while 61 (29.0%) described the Board's clarity on its mandate as very strong. Cumulatively, up to 185 (88.0%) participants indicated that the Board's clarity on its mandate was above average.

Regarding the operator's performance in defraying O&M costs for its rural water schemes, among the 94 participants who described the operator's performance as GOOD, 56 (59.6%) rated the Board's clarity on its mandate as strong, while 24 (25.5%) rated it as very

strong. Among those who described the operator's performance as POOR (116), 68 (58.6%) rated the Board's clarity on its mandate as strong, while 37 (31.9%) said it was very strong. Based on the cross-tabulations, the analysis revealed lack of a significant association between the Board's clarity on its mandate and the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 2.717$ ,  $df = 3$  &  $p\text{-value} = 0.437$ ).

Participants were further requested to indicate views regarding the Board's capacity in formulating effective policies for revenue generation. In this regard, the results in Table 4.16 show that of the 210 participants, 158 (75.2%) described the Board's capacity in formulating effective policies for revenue generation as strong, while 24 (11.5%) rated it as very strong. Cumulatively, the results show that up to 182 (86.7%) participants felt that the Board's capacity in formulating effective revenue generation policies was above average. Among the 94 who described the operator's performance as GOOD, 69 (73.4%) said the Board was strong in formulating effective policies for revenue generation, while 9 (9.6%) rated the Board's capacity in that regard, as very strong. The pattern was similar among the 116 participants who described the operator's performance as POOR. More specifically, 89 (76.7%) participants rated the Board's capacity in formulating effective policies for revenue generation as strong, while 15 (12.9%) rated it as very strong. However, the analysis revealed lack of a significant association between the Board's capacity in formulating effective policies for revenue generation and the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 3.094$ ,  $df = 3$  &  $p\text{-value} = 0.377$ ).

The results presented in Table 4.16 further show that 144 (68.5%) participants rated the Board's capacity to oversee the operator's expenditure as strong, while 63 (30.0%) rated it as

very strong. Cumulatively, 207 (98.5%) participants said the Board's capacity to oversee expenditure was above average. Further analysis shows that among the 94 participants who described the operator's performance in defraying O&M costs as GOOD, 66 (70.2%) rated the Board's capacity to oversee expenditure as strong, while 25 (26.6%) said it was very strong. Among the 116 participants who described the operator's performance as POOR, 78 (67.2%) rated the Board's capacity as strong, while 38 (32.8%) rated it as very strong. Again, the analysis revealed lack of a significant association between the Board's capacity to oversee the organisation's expenditure and the operator's performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 4.426$ ,  $df = 3$  &  $p\text{-value} = 0.219$ ).

#### *4.7.1.2 Management team's capacity attributes*

All the 210 (100.0%) participants affirmed that the operator had a professional management team that was in charge of its daily operations. Key informants also confirmed the existence of a professional management team, consisting of senior managers drawn from the operator's five main departments, including technical, operations, human resource, commercial and financial. Participants were requested to indicate views on selected management practices and attributes, including professional qualifications, professional experience, revenue generation, revenue diversification as well as expenditure management. For each attribute, participants were requested to indicate views on a five-point Likert scale, which was calibrated as 'very strong', 'strong', 'average', 'weak', and 'very weak'. Results presented in Figure 4.15 show that of the 210 participants, 138 (65.7%) described the management team's professional qualifications as very strong, while 72 (34.3%) rated attribute as strong. Cumulatively, all the 210 (100.0%) participants indicated that the management team was above average as regards professional qualification.

In relation to the operator's performance in defraying O&M costs for its rural water schemes, among the 94 participants who described the performance as GOOD, 55 (58.5%) rated the management team's professional qualification as very strong, while 39 (41.5%) said it was strong. Similarly, among those who described the operator's performance as POOR (116), 83 (71.6%) participants indicated that the management team's professional qualification was very strong, and 33 (28.4%) rated it as strong. Based on the cross-tabulations, the analysis obtained a computed  $\chi^2$  of 3.362, with 1 degree of freedom (df) and a significance (p-value) of 0.067, which suggest up to 90% chance that the management team's professional qualifications significantly associated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

**Table 4.17: Capacity attributes of the management team**

Capacity attributes	Operator's performance in defraying O&M costs					
	GOOD		POOR		TOTAL	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>Professional qualifications</i>						
Very strong	55	58.5	83	71.6	138	65.7
Strong	39	41.5	33	28.4	72	34.3
Average	0	0.0	0	0.0	0	0.0
Weak	0	0.0	0	0.0	0	0.0
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Professional experience</i>						
Very strong	51	54.3	73	62.9	124	59.0
Strong	43	45.7	43	37.1	86	41.0
Average	0	0.0	0	0.0	0	0.0
Weak	0	0.0	0	0.0	0	0.0
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Revenue generation</i>						
Very strong	30	31.9	23	19.8	53	25.2
Strong	44	46.9	53	45.7	97	46.2
Average	10	10.6	8	6.9	18	8.6
Weak	10	10.6	32	27.6	42	20.0
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Revenue diversification</i>						
Very strong	15	16.0	6	5.2	21	10.0
Strong	57	60.6	65	56.0	122	58.1
Average	7	7.4	8	6.9	15	7.1
Weak	15	16.0	37	31.9	52	24.8
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>
<i>Expenditure management</i>						
Very strong	15	16.0	20	17.2	35	16.7
Strong	69	73.4	52	44.8	121	57.6
Average	6	6.4	13	11.2	19	9.0

Weak	4	4.2	31	26.8	35	16.7
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>

The results in Table 4.17 further show that of the 210 participants, 124 (59.0%) indicated that the management team's professional experience was very strong, while 86 (41.0%) rated it as strong. Cumulative results show that all the 210 participants felt that the management was above average in terms of professional experience. Among those who described the operator's performance in defraying O&M costs as GOOD (94), 51 (54.3%) stated that the management team's professional experience as very strong, while 43 (45.7%) rated it as strong. Among the 116 participants who felt that the operator had performed POORLY, 73 (62.9%) described the management team's professional experience as very strong, while 43 (37.1%) rated it as strong. However, the analysis revealed lack of a significant association between the management team's professional experience and the operator's performance in defraying O&M costs for its rural water schemes over the reference period ( $\chi^2 = 1.277$ ,  $df = 1$  &  $p\text{-value} = 0.258$ ). While it is valuable to have an adequate experience as a manager, too long experience may make one look down upon colleagues with less experience. Also too much experience may make a manager fall victim to what Mkongo (2013) calls intellectual bankruptcy of ideas. In this regard, Kimeu (2013) advocates for a fixed five-years term in order to ensure that Board members do not sleep on their job.

The results in Table 4.17 further show that of the 210 participants, 97 (46.2%) rated the management team's capacity in revenue generation as strong, while 53 (25.2%) felt that the management team was very strong in that aspect. Notably though, 42 (20.0%) participants indicated that the management was weak revenue generation. Cumulatively, 150 (71.4%) participants said that the management team's capacity in revenue generation was above average. In relation to the operator's performance in defraying O&M costs for its rural water

schemes, among the 94 participants who described the performance as GOOD, 44 (46.9%) rated the management team's capacity in revenue generation as strong, while 30 (31.9%) indicated it was very strong. Among those who described the operator's performance as POOR (116), 53 (45.7%) participants indicated that the management was strong in revenue generation, while 23 (19.8%) felt that it was very strong. Based on this, the analysis obtained a computed  $\chi^2$  of 11.796, with 3 degrees of freedom (df) and a significance (p-value) of 0.008, which suggest up to 99% chance that the management team's capacity in revenue generation significantly associated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

Regarding revenue diversification, results in Table 4.17 show that of the 210 participants, 122 (58.1%) rated the management team's capacity in revenue diversification as strong, while 21 (10.0%) indicated that it was very strong. On opposite side of the scale, about one-quarter, 52 (24.8%) participants felt that the management team was weak in revenue diversification. Cumulatively, up to 143 (68.1%) participants hinted that capacity of the management in revenue diversification was above average; however, about one-quarter of the participants believed that the management was weak in terms of revenue diversification. Of the 94 participants who described the operator's performance as GOOD, 57 (60.6%) stated that the management team's capacity in revenue diversification was strong, while 15 (16.0%) felt that it was weak. Of the 116 participants who described the operator's performance as POOR (116), 65 (56.0%) rated the management team's capacity as strong, while 37 (31.9%) indicated that the management was weak in terms of revenue diversification. Based on this, the analysis revealed a significant association between the management team's capacity in revenue diversification and the

operator's performance in defraying O&M costs for its rural water schemes over the reference period ( $\chi^2 = 11.875$ ,  $df = 3$  &  $p\text{-value} = 0.008$ ).

The results in Table 4.17 further show that of the 210 participants, 121 (57.6%) rated the management team's capacity in managing the operator's expenditure as strong, while 35 (16.7%) hinted that it was very strong. On the other side of the scale, results show that another 35 (16.7%) participants opined that the management team was weak in managing the operator's expenditure. Cumulatively, the analysis shows that even though 156 (74.3%) participants hinted that the management team was above average in managing the operator's expenditure, a significant 35 (16.7%) expressed contrary views. Among the 94 participants who described the operator's performance in defraying O&M costs as GOOD, 69 (73.4%) stated that the management team was strong in managing expenditure, while 4 (4.3%) were of the view that it was weak. Contrastingly, among the 116 participants who described the operator's performance in defraying O&M costs as POOR, 52 (44.8%) indicated that the management team was strong in managing expenditure, while up to 31 (26.7%) felt that the team was weak in that respect. Based on the cross-tabulations, the analysis yielded a computed  $\chi^2$  of 24.474, with 3 degrees of freedom ( $df$ ) and a significance ( $p\text{-value}$ ) of 0.000, suggesting up to 99% chance that the management team's capacity in the financial sustainability of rural water schemes significantly associated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

#### *4.7.1.3 Financial management practices*

By subjecting water services to market forces of demand and supply, water sector reforms entrenched the aspect of commercialisation, whose purpose was to orient operators towards cost recovery and financial sustainability. Sound financial management practices are

important antecedents to achieving the purpose of commercialisation. This study examined five financial management practices that were identified through a review of policy and empirical literature, including compliance of procurement activities to relevant legislations, effectiveness of internal audit in enforcing expenditure policies, effectiveness of external audit in improving financial management practices, relevance of activities on which water revenues are spent, as well as conformance of expenditure to approved budgets. The stated financial management practices were operationalised in terms of hypothetical assertions, against which participants were required to indicate views on a five-point Likert scale, calibrated as ‘strongly agree’, ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’.

Firstly, participants were requested to indicate views regarding the hypothetical assertion stating that ‘expenditures are always within approved budgets’. The results in Table 4.18 show that of the 210 participants, 88 (41.9%) disagreed with the assertion, while 18 (8.6%) disagreed strongly. On the other side of the scale, 65 (31.0%) participants agreed, while 23 (11.0%) agreed strongly. Cumulatively, 106 (50.5%) participants failed to endorse the statement, which suggests that the operator’s expenditures were not always within approved budgets; while 88 (41.9%) endorsed it.

The results show that of the 94 participants who rated the operator’s performance as GOOD, 43 (45.7%) agreed with assertion, while 20 (21.3) disagreed. Among the 116 participants who described the operator’s performance as POOR, up to 68 (58.6%) disagreed with the assertion, while 22 (19.0%) indicated agreement. Based on this, the analysis obtained a computed  $\chi^2$  value of 15.545, with 4 degrees of freedom and a  $p$ -value of 0.004, which suggests up to 99% chance that conformance of expenditure to approved budgets significantly associated



with the operator's performance in defraying O&M costs for its rural water schemes. The results imply that containing the operator's expenditures within approved budgets was a challenge, at least, according to one-half of the participants, which was likely to influence achievement of financial sustainability.

**Table 4.18: Management practices and financial sustainability of rural water schemes**

Financial management practices	Operator's performance in defraying O&M costs						Chi Square Results		
	GOOD		POOR		TOTAL				
	Count	%	Count	%	Count	%	$\chi^2$	df	p-value
<i>Expenditures are always within approved budgets</i>									
Agree strongly	16	17.0	7	6.0	23	11.0	15.545	4	0.004***
Agree	43	45.7	22	19.0	65	31.0			
Undecided	7	7.4	9	7.8	16	7.6			
Disagree	20	21.3	68	58.6	88	41.9			
Disagree strongly	8	8.5	10	8.6	18	8.6			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Procurement of goods, services and works is done in accordance with legislations</i>									
Agree strongly	27	28.7	12	10.3	39	18.6	35.040	4	0.000***
Agree	26	27.7	17	14.7	43	20.5			
Undecided	2	2.1	3	2.6	5	2.4			
Disagree	30	31.9	70	60.3	100	47.6			
Disagree strongly	9	9.6	14	12.1	23	11.0			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Internal audit is effective in enforcing expenditure policies</i>									
Agree strongly	12	12.8	7	6.0	19	9.0	28.024	4	0.000***
Agree	24	25.5	68	58.6	92	43.8			
Undecided	7	7.4	5	4.3	12	5.7			
Disagree	47	50.0	27	23.3	74	35.2			
Disagree strongly	4	4.3	9	7.8	13	6.2			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>External audit is effective in improving financial management practices</i>									
Agree strongly	16	17.0	6	5.2	22	10.5	16.301	4	0.003***
Agree	39	41.5	32	27.6	71	33.8			
Undecided	3	3.2	5	4.3	8	3.8			
Disagree	25	26.6	48	41.4	73	34.8			
Disagree strongly	11	11.7	25	21.6	36	17.1			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Revenues are always spent on activities relevant to sustainable delivery of quality water services</i>									
Agree strongly	13	13.8	6	5.2	19	9.0			
Agree	35	37.2	30	25.9	65	31.0			

Undecided	6	6.4	11	9.5	17	8.1	22.886	4	0.000***
Disagree	27	28.7	60	51.7	87	41.4			
Disagree strongly	13	13.8	9	7.8	22	10.5			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

Sound public procurement practices are essential elements of good governance. In this study, participants were also requested to indicate views regarding the assertion, stating that ‘procurement of goods, services and works is done in accordance with legislations, which included *Public Procurement and Disposal Act: Chapter 412C*, as well as *Public Procurement and Disposal Regulations, 2006*. The results in Table 4.18 show that of the 210 participants, 100 (47.6%) disagreed with the assertion, while 23 (11.0%) disagreed strongly. Those who agreed were 43 (20.5%), while those who agreed strongly were 39 (18.6%). Cumulative results show that up to 123 (58.6%) participants disagreed with the assertion, which suggests that procurement activities were not always done in accordance with necessary legislations. However, 82 (39.0%) affirmed the assertion.

In relation to the operator’s performance in defraying O&M costs for its rural water schemes, among those who described the operator’s performance as GOOD (94), 30 (31.9%) disagreed with the assertion, while 26 (27.7%) agreed. Contrastingly, among those who rated the operator’s performance as POOR (116), up to 70 (60.3%) disagreed with the assertion, while 17 (14.7%) agreed. The analysis revealed up to 99% chance that compliance of procurement activities to relevant legislations significantly associated with the operator’s performance in defraying O&M costs for its rural water schemes ( $\chi^2 = 35.040$ ,  $df = 4$  &  $p\text{-value} = 0.000$ ). The results imply that compliance of procurement activities to relevant legislations was likely to improve the financial sustainability of rural water schemes operated by HOMAWASCO.

The third aspect of financial management practices was about ‘effectiveness of internal audit in enforcing expenditure policies’. In this regard, participants were requested to indicate views about the assertion, stating that ‘internal audit is effective in enforcing expenditure policies’. As indicated in Table 4.18, up to 74 (35.2%) participants disagreed with the assertion, while 13 (6.2%) disagreed strongly. Those who agreed were 92 (43.8%), while those who agreed strongly were 19 (9.0%). Cumulative results show that 111 (52.9%) participants endorsed the assertion, which suggests that internal audit was effective in enforcing expenditure policies. Among those who felt that the operator’s performance in defraying O&M costs was GOOD (94), up to 47 (50.0%) disagreed with the assertion, while 24 (25.5%) indicated agreement. Among those who described the operator’s performance as POOR (116), 68 (58.6%) agreed with the assertion, while 27 (23.3%) disagreed. Following these results, the analysis obtained a computed  $\chi^2$  value of 28.024, with 4 degrees of freedom and a p-value of 0.000, which suggests up to 99% chance of significant association between effectiveness of internal audit in enforcing expenditure policies and the operator’s performance in defraying O&M costs for its rural water schemes. The results imply that the effectiveness of internal audit in enforcing expenditure policies was a crucial influencer of the financial sustainability of rural water schemes operated by HOMAWASCO.

The study also examined views regarding effectiveness of external audit in improving financial management practices in the utility. In this regard, participants were requested to indicate views about the assertion stating that ‘external audit is effective in improving the operator’s financial management practices’. The results which are presented in Table 4.18 show that of the 210 participants, 73 (34.8%) disagreed with the assertion, while 36 (17.1%) disagreed strongly. On the other side of the scale, 71 (33.8%) participants agreed with the assertion, while

22 (10.5%) agreed strongly. Cumulative results indicate that 109 (51.9%) participants disagreed with the assertion, which suggests that external audit was not effective in improving financial management practices; while 93 (44.3%) affirmed the assertion. Among those who rated the performance as GOOD (94), up to 39 (41.5%) agreed with the assertion, while 25 (26.6%) disagreed. Contrastingly, of the 116 participants who felt that the performance was POOR, 48 (41.4%) disagreed with the assertion, while 32 (27.6%) indicated agreement. The analysis revealed up to 99% chance that the relationship between the operator's performance in defraying O&M costs and effectiveness of external audit in improving financial management practices, was statistically significant ( $\chi^2 = 16.301$ ,  $df = 4$  &  $p\text{-value} = 0.003$ ). The results imply that external audit was a crucial factor influencing the operator's financial management practices.

Participants were requested to indicate views about the assertion, stating that 'revenues are always spent on activities relevant to sustainable delivery of quality water services'. The results in Table 4.18 show that of the 210 participants, 87 (41.4%) disagreed with the assertion, while 22 (10.5%) disagreed strongly. Those who agreed were 65 (31.0%), while 19 (9.0%) indicated strong agreement. Cumulatively, up to 109 (51.9%) participants disagreed with the assertion, thereby suggesting that the operator's revenues were not always spent on activities relevant to sustainable delivery of quality water services. Among those who felt that the operator's performance in defraying O&M costs was GOOD (94), up to 35 (37.2%) agreed with the assertion, while 27 (28.7%) disagreed; while among those who described the operator's performance as POOR (116), up to 60 (51.7%) disagreed with the assertion, while 30 (25.9%) agreed. Based on this, the analysis obtained a computed  $\chi^2$  value of 22.886, with 4 degrees of freedom and a  $p\text{-value}$  of 0.000, which suggests up to 99% chance that relevance of activities on which water revenues were spent significantly associated with the operator's performance in

defraying O&M costs for its rural water schemes. The results imply that water revenues should not be spent in activities that are outside the purview of the operator's purpose. Minimising expenditure in activities that have no direct connection with the operator's purpose is likely to prevent loss of resources that would be used to defray O&M costs for its rural water schemes and to enhance financial sustainability.

#### 4.7.2 Relative importance analysis of financial management practices

Bivariate results presented in the foregoing sub-section revealed that the operator's performance in defraying O&M costs for its rural water schemes significantly associated with all the five financial management practices examined by the study, including conformance of expenditure to approved budgets, which for the purpose of further analysis using the RII technique, was coded as  $FM_{P1}$ ; compliance of procurement activities to relevant legislations ( $FM_{P2}$ ), effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ ), effectiveness of external audit in improving financial management practices ( $FM_{P4}$ ), as well as relevance of activities on which water revenues are spent ( $FM_{P5}$ ). Table 4.19 presents the results of RII analysis, which include an inter-item correlation matrix, correlation co-efficients ( $\beta$ ), general dominance weights and relative weights. The latter indicates the importance of each financial management practice in relation to degree of the operator's performance in defraying O&M costs.

**Table 4.19: Relative importance of management practices & operator's performance**

INTER-ITEM CORRELATION MATRIX						RELATIVE IMPORTANCE		
Financial management practices	$FM_{P1}$	$FM_{P2}$	$FM_{P3}$	$FM_{P4}$	$FM_{P5}$	$\beta$	General dominance weights	Relative weights
$FM_{P1}$	1.000	0.533	0.350	0.677	0.564	0.460	0.740	0.726
$FM_{P2}$	0.533	1.000	0.507	0.386	0.559	0.628	0.842	0.838
$FM_{P3}$	0.350	0.507	1.000	0.308	0.440	0.600	0.833	0.825

$FM_{P4}$	0.677	0.386	0.308	1.000	0.584	0.478	0.758	0.749
$FM_{P5}$	0.564	0.559	0.440	0.584	1.000	0.586	0.826	0.812

The results in Table 4.19 show that compliance of procurement activities to relevant legislations ( $FM_{P2}$ ) was the most important management practice in relation to the operator's performance, with a relative weight of 0.838. Bivariate results presented in the previous subsection indicated that up to 123 (58.6%) participants felt that procurement activities at the operator were not done in accordance with relevant legislations, which suggests that water sector reforms had not influenced adherence to procurement legislations at the operator. In this regard, key informants and FGD participants indicated that the operator's procurement activities were characterised by irregularities such as conflict of interest, which manifested through award of tenders to bidders associated with some officers and/or Board members; and inflation of quotations, which distended procurement expenditure, and in some occasions, caused budget overruns. Participants also cited a few occasions, when the management precipitated the need for emergency procurement of goods and services without going through necessary procurement procedures, by failing to develop procurement plans in time. Emergency procurements were also caused by delayed disbursement of funds by the national government, which affected implementation of procurement plans.

The effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ ) was second in the order of relative importance, with a relative weight of 0.825. Bivariate results showed that slightly more than one-half, 111 (52.9%), of the participants said the internal audit was effective in enforcing expenditure policies; however, up to 87 (41.4%) participants expressed contrary views, which suggests that internal audit experienced capacity challenges. Key informants confirmed this by identifying challenges such as inadequate staffing, which constrained detailed

attention to enforce expenditure policies. Participants also mentioned lack of opportunities for staff development, which limited their capacity in comprehending strategic direction, expectations of stakeholders, and financial risks facing the operator. As a result, internal audit staff lacked capacity to detect, question and mitigate irregular expenditures by the management. Some participants noted that lack of opportunities for professional development made internal audit staff easily compromised to overlook or cover-up irregular expenditures. Inadequate enforcement of expenditure policies contributed to loss of fiscal resources, which in turn, undermined achievement of financial sustainability.

The third aspect in the order of relative importance was the relevance of activities on which revenues are spent ( $FM_{P5}$ ), with a relative weight of 0.812. Bivariate results indicated that 109 (51.9%) participants believed that the operator's water revenues were not always spent on activities that are relevant to sustainable delivery of quality water services. In this regard, KII and FGD participants cited a few activities which they perceived to be irrelevant, but were financed using water revenues, including foreign trips by senior management officers, too many stakeholder workshops and frequent engagement of consultancy services for activities that could be undertaken by staff themselves. Participants noted that expenditure of water revenues in such activities demonstrated that the management lacked commitment to the operator's strategic focus; and that internal structures lacked capacity to control unnecessary expenditure. Participants further linked expenditure in such activities to political interference and ineffectiveness of external audit to improve financial management practices. Unnecessary expenditure of water revenues on irrelevant activities usurped resources meant for defraying O&M costs, which prevented the operator from achieving financial sustainability.

The effectiveness of external audit in improving financial management practices ( $FM_{P4}$ ) was fourth in the order of relative importance, with a relative weight of 0.749. About one-half of the participants, 109 (51.9%), hinted that external audit was not effective in improving financial management practices. Even though the operator was audited annually by the government's auditor general, the process was constrained by challenges such as inconsistency and delays, which provided opportunity for some officers to move to other institutions through transfers, without being held to account for loss of fiscal resources. Some KII and FGD participants perceived external audit as a mere formality, with no mechanism for implementation, monitoring and evaluation of audit recommendations. This was illustrated by certain recommendations which were often repeated in annual audit reports. Non-implementation of audit recommendations suggests that external audit failed to propagate a culture of fiscal discipline in the utility.

The fifth aspect in the order of relative importance was conformance of expenditure to approved budgets ( $FM_{P1}$ ), with a relative weight of 0.726. Notably, up to 106 (50.5%) participants indicated that expenditures were not always within approved budgets, implying that there were occasions when the operator experienced budget overruns. This was confirmed by KII and FGD participants who linked budget overruns to expenditure of water revenues on activities that were not directly relevant to delivery of water services. Budget overruns were also attributed to delayed disbursement of funds by the national government and unprecedentedly high inflation rates, which caused the prices of construction and infrastructural materials to overshoot budgetary estimates. Participants further linked budget overruns to procurement irregularities such as splitting tenders into smaller units for unilateral approval, induced emergency procurements, where goods and services were procured without following due



process; as well as inflation of quotations. Budget overruns affected the operator by precipitating financial constraints, which undermined the operator's performance in defraying O&M costs for its rural water schemes. The results amplify the need for appropriate measures to prevent unnecessary expenditures and procurement irregularities, in order to contain expenditures within approved budgets.

#### ***4.7.3 Concordance of views regarding financial management practices***

The analysis determined the extent to which views expressed by various categories of staff regarding the relative importance of management practices, based on the operator's performance in defraying O&M costs for its rural water schemes, converged. In this regard, the analysis generated mean ranks for each financial management practice, based on the degree of variation in the operator's performance in defraying O&M costs for its rural water schemes. The results resented in Table 4.20 show that convergence of participants' views was strongest for compliance of procurement activities to relevant legislations ( $FM_{P2}$ ), with a mean rank of 3.713. Ranking second was the effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ ), with a mean rank of 3.520. This was followed by relevance of activities on which water revenues were spent ( $FM_{P5}$ ) with a mean rank of 3.341; effectiveness of external audit in improving financial management practices ( $FM_{P4}$ ) with a mean rank of 3.047, as well as conformance of expenditure to approved budgets ( $FM_{P1}$ ) with a mean rank of 2.906.

**Table 4.20: Concordance of views regarding financial management practices**

<b>Ranks</b>		<b>Test Statistics</b>	
Financial management practices	Mean Rank	N	210
$FM_{P1}$	2.906	Kendall's W <sup>a</sup>	0.862
$FM_{P2}$	3.713	Chi-Square ( $\chi^2$ )	64.491
$FM_{P3}$	3.520	df	4

$FM_{P4}$	3.047	$\rho$ -value	0.000
$FM_{P5}$	3.341	a. Kendall's Coefficient of Concordance	

The analysis obtained a Coefficient of Concordance (Kendall's W) of 0.862, which suggests a very strong level of convergence of participants' views regarding financial management practices, based on the operator's performance in defraying O&M costs for its rural water schemes (Legendre, 2005). The results in Table 4.20 further show that the analysis obtained a computed  $\chi^2$  of 64.491, with 4 degrees of freedom (df) and a  $\rho$ -value of 0.000, which suggest up to 99% chance that participants' views regarding relative importance of management practices in relation to the operator's performance in defraying O&M costs for its rural water schemes, were concordant. In view of this, appropriate response interventions aimed at improving compliance of procurement activities to relevant legislations, capacity of the internal audit department, expenditure of water revenues, effectiveness of external audit, as well as conformity of expenditures to approved budgets should make significant contributions to the financial sustainability of rural water schemes operated by HOMAWASCO.

#### ***4.7.4 Correlation of management practices & financial sustainability of water schemes***

Management practices, including capacity attributes of the Board of Directors, management practices attributes and financial management practices were aggregated and correlated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period. The results presented in Table 4.21 show that the analysis obtained Spearman's rank correlation co-efficient of 0.430, with a  $\rho$ -value of 0.000, which suggests a positive and significant correlation between management practices and the operator's performance in defraying O&M costs for its rural water schemes.



**Table 4.21: Correlation between management practices and the operator's performance**

		Management practices	Performance in defraying O&M costs
Management practices	Correlation Coefficient	1	0.430***
	Sig. (2-tailed)		0.000
	N	210	210
Performance in defraying O&M costs	Correlation Coefficient	0.430***	1
	Sig. (2-tailed)	0.000	
	N	210	210

\*\*\*. Correlation is significant at the 0.01 level (2-tailed).

Based on the results, the third null hypothesis ( $H_03$ ), stating that *there is no significant correlation between management practices and financial sustainability of rural water schemes in Homa Bay County*, was rejected for being inconsistent with primary data obtained by the study. The results imply that management practices were likely to have influenced the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

#### **4.7.5 Regression of management practices and financial sustainability of water schemes**

Table 4.22 presents regression results, which show that most independent variables under this objective caused negative effects on the operator's performance in defraying O&M costs, based on the magnitude of *Beta* weights. Details are explained under the following sub-sections.

##### **4.7.5.1 Standardised regression coefficients (Beta weights)**

Compliance of procurement activities to relevant procurement legislations ( $FM_{P2}$ ) scored a *Beta* weight of -0.435, as indicated in Model 1. The results suggest that non-compliance of procurement activities to relevant procurement legislations was a challenge that negatively affected the operator's performance in defraying O&M costs; and that its effect was significant at 99% confidence level (t statistic = -6.993 & a p-value = 0.000). This means that not all procurement activities were undertaken as per the public procurement laws, which resulted to

inefficient use of the operator's funds; thereby affecting its performance in defraying O&M costs. Model 2, which incorporated intervening variables shows that compliance of procurement activities to relevant procurement legislations( $FM_{P2}$ )generated a *Beta* weight of -0.411, which again shows that the variable negatively affected the operator's performance in defraying O&M costs, and its effect was significant at 99% confidence level (t statistic = -6.957 & a  $\rho$ -value = 0.000). In view of this, ensuring compliance of procurement activities to relevant procurement legislations would be a critical move towards achievement of financial sustainability of the rural water schemes.

Relevance of activities on which water revenues were spend over the preceding one year ( $FM_{P5}$ ) generated a *Beta* weight of -0.283, which was significant at 99% confidence level (t statistic = -4.727 & a  $\rho$ -value = 0.001), as indicated by Model 1. When the intervening variables were added into the model, the *Beta* weight increased to -0.287, which was also statistically significant at 99% confidence level (t statistic = -5.060 & a  $\rho$ -value = 0.000). The results imply that the operator's revenues were not spent on activities relevant to the delivery of water services; thereby, affecting its performance in defraying O&M costs for its rural water schemes.

Furthermore, Model 1 shows that effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ )generated a *Beta* weight of -0.222, which implies that the variable negatively affected the operator's performance in defraying O&M costs and the effect was statistically significant at 99% confidence level (t statistic = -3.611 & a  $\rho$ -value = 0.000). The addition of intervening variables into the model, caused a slight drop in the *Beta* weight to -0.192, but which was still significant at 99% confidence level (t statistic = -3.300 &  $\rho$ -value = 0.001), as indicated in Model 2. The results suggest that effectiveness of internal audit in enforcing expenditure

policies significantly reduced the operator's performance on defraying O&M costs and achievement of financial sustainability. Thus, improving the capacity of the internal audit unit would be valuable in enhancing contribution of the internal audit towards financial sustainability of rural water schemes.

**Table 4.22: Effect of management practices on the financial sustainability of water schemes**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.729	0.282		-2.587	0.010**
	Conformance of expenditure to approved budgets ( $FM_{P1}$ )	0.130	0.047	0.165	2.769	0.006***
	Compliance of procurement activities to relevant legislations ( $FM_{P2}$ )	-0.314	0.045	-0.435	-6.993	0.000***
	Effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ )	-0.181	0.050	-0.222	-3.611	0.000***
	Effectiveness of external audit in improving financial management practices ( $FM_{P4}$ )	-0.052	0.043	-0.074	-1.226	0.032**
	Relevance of activities on which water revenues are spent ( $FM_{P5}$ )	-0.222	0.047	-0.283	-4.727	0.000***
2	(Constant)	-1.323	0.418		-3.163	0.002***
	Conformance of expenditure to approved budgets ( $FM_{P1}$ )	0.097	0.046	0.123	2.119	0.035**
	Compliance of procurement activities to relevant legislations ( $FM_{P2}$ )	-0.297	0.043	-0.411	-6.957	0.000***
	Effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ )	-0.157	0.048	-0.192	-3.300	0.001***
	Effectiveness of external audit in improving financial management practices ( $FM_{P4}$ )	-0.020	0.041	-0.028	-0.481	0.631
	Relevance of activities on which water revenues are spent ( $FM_{P5}$ )	-0.225	0.044	-0.287	-5.060	0.000***
	Sub-County	-0.280	0.059	-0.284	-4.726	0.000***
	Gender	0.150	0.134	0.062	1.124	0.262
	Job category	0.081	0.046	0.098	1.743	0.083*
	Highest professional credit	-0.128	0.091	-0.084	-1.408	0.161

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

#### 4.7.5.2 Models' goodness-of-fit

As indicated in Table 4.23, Model 1 generated an adjusted  $R^2$  of 0.305, which suggest that the aspects of management practices that were selected for this study accounted for up to 30.5% of variation in the operator's performance in defraying O&M costs. The result further suggests that the model had a weak strength in estimating the effect of management practices on

the operator's performance; but which was significant at 99% confidence level ( $F = 19.348$ ;  $p$ -value = 0.000).

**Table 4.23: Strength and significance of the model**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.567	0.322	0.305	0.803
2	0.639	0.408	0.381	0.758

		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.379	5	12.476	19.348	0.000***
	Residual	131.544	204	0.645		
	Total	193.924	209			
2	Regression	79.122	9	8.791	15.316	0.000***
	Residual	114.802	200	0.574		
	Total	193.924	209			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

The addition of intervening variables into the model caused the adjusted  $R^2$  to increase to 0.381, which suggest that Model 2 accounted for 38.1% of variation in the operator's performance in defraying O&M costs. Again, the results suggest that Model 2 was a weak but significant estimation of the effect of management practices on the operator's performance ( $F = 15.316$ ;  $p$ -value = 0.000). The results imply that up to 61.9% of variation in the operator's performance was not accounted for by the management practices that were selected for this study. This proportion of variation may be explained by other aspects of management practices or by increasing the sample size. Consequently, similar studies, that will be conducted in the future, should examine additional aspects of management practices in order to generate more robust regression models, explaining the effect of management practices on the operator's performance in defraying O&M costs for its rural water schemes.

## **4.8 Revenue Generation and Financial Sustainability of Rural Water Schemes**

Water sector reforms brought in the aspect of commercialisation of water services, which was intended to orient operators towards cost recovery and financial sustainability. Revenue generation is the principal avenue through which operators can generate resources for defraying O&M costs, towards achievement of financial sustainability. This study examined the relationship between various aspects of revenue generation and the operator's performance in defraying O&M costs for its rural water schemes. Details are presented in the following sub-sections.

### ***4.8.1 Analysis of revenue generation aspects and financial sustainability of water schemes***

This study examined various aspects of revenue generation, which were identified through a review of policy and empirical literature, including type of billing system used by the utility, efficiency of the billing system, efficiency of revenue collection, appropriateness of water tariff in relation to cost recovery, non-revenue water, as well as unaccounted for water. The stated aspects were used to formulate hypothetical perception assertions, against which participants were requested to indicate views on a five-point Likert scale, which was calibrated as 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'.

#### ***4.8.1.1 Efficiency of the operator's billing system***

The first hypothetical assertion stated that 'the operator's billing system is efficient'. As indicated in Table 4.24, of the 210 participants, 141 (67.1%) disagreed with the assertion, while 22 (10.5%) disagreed strongly. On the other side of the scale, 33 (15.7%) participants agreed with the assertion, while 8 (3.8%) agreed strongly. Cumulative results show that 163 (77.6%) participants expressed disagreement with the assertion, which suggests that the operator's billing



system was inefficient, according to majority of the participants. In this regard, up to 165 (78.6%) participants indicated that the operator's billing system was largely manual, 41 (19.5%) stated that the system was partially automated, while 4 (1.9%) indicated that the system was fully automated. The results suggest that the operator's billing system was manual, which may have contributed to its inefficiency. On their part, key informants and focus group discussants, revealed that the billing systems' efficiency was clouded by inadequacies such as lack of consumer records, inadequate updating of customer accounts, outdated systems used for monitoring, non-categorisation of receivables by customer type and age; fragmented information management as well as administrative problems.

Furthermore, of the 94 participants who described the operator's performance in defraying O&M costs as GOOD, 56 (59.6%) disagreed with the assertion, while 22 (23.4%) agreed. Among those who rated the operator's performance as POOR (116), 85 (73.3%) disagreed with the assertion, while 15 (12.9%) disagreed strongly. Based on the cross-tabulation results, the analysis revealed up to 99% chance that association between the operator's performance in defraying O&M costs and efficiency of the billing system was statistically significant ( $\chi^2 = 27.854$ ,  $df = 4$  &  $p\text{-value} = 0.000$ ). The results suggest that efficiency of the billing system strongly associated with the operator's potential to achieve financial sustainability, particularly by influencing the amount of revenue generated over a given period of time.

**Table 4.16: Cross-tabulation of revenue generation & financial sustainability of water schemes**

Revenue generation aspects	Operator's performance in defraying O&M costs						Chi Square Results		
	GOOD		POOR		TOTAL		$\chi^2$	df	p-value
	Count	Percent	Count	Percent	Count	Percent			
<i>Operator's billing system is efficient</i>									
Agree strongly	7	7.4	1	0.9	8	3.8	27.854	4	0.000***
Agree	22	23.4	11	9.5	33	15.7			
Undecided	2	2.1	4	3.4	6	2.9			
Disagree	56	59.6	85	73.3	141	67.1			
Disagree strongly	7	7.4	15	12.9	22	10.5			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Revenue collection has reached sector benchmark of &gt;90%</i>									
Agree strongly	0	0.0	0	0.0	0	0.0	15.573	4	0.004***
Agree	42	44.7	11	9.5	53	25.2			
Undecided	4	4.3	3	2.6	7	3.3			
Disagree	41	43.6	90	77.6	131	62.4			
Disagree strongly	7	7.4	12	10.3	19	9.0			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Water tariff is optimal for cost recovery</i>									
Agree strongly	9	9.6	6	5.2	15	7.1	9.108	4	0.058*
Agree	53	56.4	44	37.9	97	46.2			
Undecided	3	3.2	4	3.4	7	3.3			
Disagree	28	29.8	60	51.7	88	41.9			
Disagree strongly	1	1.1	2	1.7	3	1.4			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Non-revenue water is within acceptable sector benchmark</i>									
Agree strongly	3	3.2	1	0.9	4	1.9	36.009	3	0.000***
Agree	10	10.6	29	25.0	39	18.6			
Undecided	1	1.1	3	2.6	4	1.9			
Disagree	79	84.0	82	70.7	161	76.7			
Disagree strongly	1	1.1	1	0.9	2	1.0			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			
<i>Unaccounted for water is within acceptable limits</i>									
Agree strongly	6	6.4	4	3.4	10	4.8	11.368	4	0.023**
Agree	52	55.3	27	23.3	79	37.6			
Undecided	0	0.0	2	1.7	2	1.0			
Disagree	33	35.1	70	60.3	103	49.0			
Disagree strongly	3	3.2	13	11.2	16	7.6			
<b>Total</b>	<b>94</b>	<b>100.0</b>	<b>116</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

#### 4.8.1.2 Revenue collection efficiency

Revenue collection efficiency measures the amount of cash collections over billings. In this study, the aspect was operationalised in terms of the following hypothetical assertion, which

stated that ‘revenue collection has reached sector benchmark of >90%’. In this regard, Table 4.24 shows that of the 210 participants, 131 (62.4%) disagreed with the assertion, while 19 (9.0%) disagreed strongly. Contrastingly, 53 (25.2%) participants agreed with the assertion. Cumulatively, 150 (71.4%) participants expressed disagreement with the assertion, which suggests that revenue collection had not reached the sector’s benchmark of more than 90%, at least according to most participants.

Furthermore, among the 94 participants who rated the operator’s performance as GOOD, 42 (44.7%) agreed with the assertion, while 41 (43.6%) disagreed. Contrastingly, of the 116 participants who felt that the operator’s performance was POOR, 90 (77.6%) disagreed with the assertion, while 11 (9.5%) expressed agreement. The analysis revealed up to 99% chance that the operator’s performance in defraying O&M costs for its rural water schemes significantly associated with efficiency of revenue collection ( $\chi^2 = 15.573$ ,  $df = 4$  &  $p\text{-value} = 0.004$ ). The results suggest that there was a strong statistical association between efficiency of revenue collection and the operator’s potential to achieve financial sustainability for its rural water schemes.

On the same note, key informants and focus group discussants observed that revenue collection efficiency was constrained by factors such as poor records management, logistical constraints, which impedes regular follow-up of defaulters, interference by some political leaders who often undermine actions such as disconnection of defaulters, faulty metres, as well as collusion between some officers and consumers to alter metre readings. Even though the operator has legal powers to disconnect consumers who fail to pay for services, participants noted that

rampant disconnection automatically impacted on revenue collection efficiency, which in turn, prevented the operator from realising the sector's benchmark of >90%.

Nonetheless, the management initiated various measures to raise the operator's revenue. One such measure is diversification of payment methods. In this regard, the analysis revealed that the most popular payment method was mobile phone transfers, as cited by 188 (89.5%) participants. This is followed by payment through bank, which was stated by 178 (84.8%), as well as cash payment, 143 (68.1%). Besides, 2 (1.0%) participants mentioned other methods of payment, including the use of special credit cards and door-to-door collection from defaulters. Note that this was a multiple response variable and the percentages are based on the sample size (210).

#### *4.8.1.3 Level of water tariff*

The level of water tariff is critical for determining the potential of an operator to achieve financial sustainability, without over-burdening consumers. Water tariff is optimal when it enables an operator to generate sufficient revenue for defraying O&M costs, while considering the purchasing power of communities served. In this study, participants were required to indicate views regarding the level of water tariff in relation to cost recovery. In this regard, the variable was operationalised through the hypothetical assertion stating that 'water tariff is optimal for cost recovery'. The results presented in Table 4.24 show that 97 (46.2%) participants agreed with the assertion, 15 (7.1%) agreed strongly; while 88 (41.9%) disagreed. Cumulatively, 112 (53.3%) participants affirmed the assertion, which suggests that water tariff was optimal for cost recovery, at least according to more than half of the participants. On the other side of the scale, up to 91 (43.3%) participants expressed disagreement with the assertion.

In relation to the operator's performance in defraying O&M costs for its rural water schemes, the results show that of the 94 participants who rated the operator's performance as GOOD, 53 (56.4%) agreed with the assertion, while 28 (29.8%) disagreed. Among those who described the operator's performance as POOR (116), 60 (51.7%) disagreed with the assertion, while 44 (37.9%) agreed. Based on the cross-tabulation results, the analysis obtained a computed  $\chi^2$  value of 9.108, with 4 degrees of freedom and a p-value of 0.058, which suggests up to 90% chance that the operator's performance significantly associated with the appropriateness of water tariff for cost recovery.

The results further suggest that the statistical association between water tariff and the operator's potential to achieve financial sustainability was fairly weak. From the perspective of consumers, water tariff is considered optimal when it fits within the purchasing power of most households. In this regard, most consumers would be willing to pay for water services when they perceive that the level of tariff is fair and more affordable, compared to alternative sources of water in the community. Based on these premises, the study found that all the 210 (100.0%) participants affirmed that communities served by rural water schemes were willing to pay for services, which is another pointer suggesting that the level of water tariff charged by HOMAWASCO was optimal. Participants noted that this set a favourable precedence for the operator to achieve financial sustainability by generating sufficient revenue for defraying O&M costs.

#### *4.8.1.4 Level of non-revenue water*

The study also examined views regarding the level of non-revenue water in the schemes managed by HOMAWASCO. As indicated under section 1.14, non-revenue water is the

difference between the volume of water put into a water distribution system and the volume that is billed to customers. The variable was operationalised through the hypothetical assertion, which stated that ‘non-revenue water is within acceptable sector benchmark’. In this regard, the results presented in Table 4.24 show that of the 210 participants, 161 (76.7%) disagreed with the assertion, while 39 (18.6%) agreed. Cumulatively, 163 (77.7%) participants expressed disagreement with the assertion, which suggests that non-revenue water was not within acceptable sector benchmark, according to majority of the participants.

In relation to the operator’s performance in defraying O&M costs for its rural water schemes, of the 94 participants who said the operator’s performance was GOOD, 79 (84.0%) disagreed with the assertion, while 10 (10.6%) indicated agreement. Among those who described the operator’s performance as POOR (116), 82 (70.7%) disagreed with the assertion, while 29 (25.0%) agreed. Based on this, the analysis revealed up to 99% chance that the operator’s performance in defraying O&M costs for its rural water schemes significantly associated with non-revenue water ( $\chi^2 = 36.009$ ,  $df = 3$  &  $p\text{-value} = 0.000$ ). The results suggest a strong statistical association between non-revenue water and the operator’s potential to achieve financial sustainability for its rural water schemes.

Similarly, key informants affirmed that the level of non-revenue water was higher than the acceptable sector benchmark, primarily due to leakages along the distribution network and illegal connections; as well as lack of effective monitoring systems at various points, including production, distribution and consumer levels. Participants observed that high non-revenue water is one of the factors that continue to undermine the operator’s potential to achieve financial sustainability for its rural water schemes. Addressing the high level of non-revenue water requires

the operator to put in place an effective monitoring system at the production, distribution and consumer levels.

#### *4.8.1.5 Level of unaccounted for water*

The study also examined views regarding the level of unaccounted for water in the rural water schemes managed by HOMAWASCO, which is the difference between the volume of water delivered into a network and the volume of water that can be accounted for by legitimate consumption, due to leakage or theft. In view of this, participants were requested to indicate views regarding the hypothetical assertion, which stated that ‘unaccounted for water is within acceptable limits’. The results in Table 4.24 show that of the 210 participants, 103 (49.0%) disagreed with the assertion, while 16 (7.6%) disagreed strongly. However, 79 (37.6%) participants indicated agreement with the assertion, while 10 (4.8%) agreed strongly. Cumulatively, the results show that 119 (56.7%) participants expressed disagreement with the assertion, which suggests that unaccounted for water was not within acceptable limits, according to more than one-half of the participants.

In relation to the operator’s performance in defraying O&M costs for its rural water schemes, the results in Table 4.24 further show that of the 94 participants who rated the operator’s performance as GOOD, 52 (55.3%) agreed with statement, while 33 (35.1%) disagreed. Among the 116 participants who described the operator’s performance as POOR, 70 (60.3%) expressed disagreement with the assertion, while 27 (23.3%) indicated agreement. Based on this, the analysis obtained a computed  $\chi^2$  value of 11.368, with 4 degrees of freedom and a p-value of 0.023, which suggests up to 95% chance that the level of unaccounted for water significantly associated with the operator’s performance in defraying O&M costs for its rural

water schemes. The results suggest a moderate statistical association between unaccounted for water and the operator's potential to achieve financial sustainability for its rural water schemes. Key informants also noted that the level of unaccounted for water was higher than the recommended sector maximum limits; and participants linked the problem to limited knowledge on how to calculate unaccounted for water, as well as lack of equipment for determining the same.

#### 4.8.2 Relative importance analysis of revenue generation aspects

Bivariate analysis performed in the foregoing sub-section revealed that the operator's potential to achieve financial sustainability significantly associated with all revenue generation aspects examined by the study, including efficiency of the billing system, which for the purpose of further analysis using the RII technique, was coded as  $RG_{A1}$ . Other aspects included efficiency of revenue collection ( $RG_{A2}$ ), appropriateness of water tariff in relation to cost recovery ( $RG_{A3}$ ), non-revenue water ( $RG_{A4}$ ), as well as unaccounted for water ( $RG_{A5}$ ). Table 4.25 presents the results of RII analysis, which include an inter-item correlation matrix, correlation co-efficients ( $\beta$ ), general dominance weights, as well as relative weights, which indicate the importance of each aspect of revenue generation in relation to the operator's performance in defraying O&M costs.

**Table 4.25: Relative importance analysis of revenue generation & operator's performance**

INTER-ITEM CORRELATION MATRIX						RELATIVE IMPORTANCE		
Revenue generation aspects	$RG_{A1}$	$RG_{A2}$	$RG_{A3}$	$RG_{A4}$	$RG_{A5}$	$\beta$	General dominance weights	Relative weights
$RG_{A1}$	1.000	0.594	0.411	0.738	0.625	0.649	0.882	0.866
$RG_{A2}$	0.594	1.000	0.568	0.447	0.620	0.635	0.875	0.853
$RG_{A3}$	0.411	0.568	1.000	0.369	0.501	0.509	0.789	0.767
$RG_{A4}$	0.738	0.447	0.369	1.000	0.645	0.677	0.891	0.879
$RG_{A5}$	0.625	0.620	0.501	0.645	1.000	0.527	0.807	0.790



The results presented in Table 4.25 show that non-revenue water ( $RG_{A4}$ ) emerged the most important aspect of revenue generation, based on the operator's performance in defraying O&M costs for its rural water schemes, with a relative weight of 0.879. This relates to bivariate results presented in the previous sub-section, where up to 165 (78.6%) participants hinted that non-revenue water was not within the acceptable sector benchmark. On this note, key informants estimated that non-revenue water averaged at 35%, which notably was higher than the acceptable average of 20%. The informants affirmed that the operator experienced a high level of non-revenue primarily due to losses in the distribution systems through leakages, faulty water metres, inaccurate metre readings, and inefficient billing system. Participants noted that due to the high level of non-revenue water, meeting revenue targets was a big challenge for the operator. In this regard, the operator lost about 40% of its annual revenue targets, which significantly undermined its potential to achieve financial sustainability for its rural water schemes. Participants described the resulting imbalance between revenues and financial obligations, as a perennial challenge that precipitated financial constraints, and affected maintenance of the distribution system.

The results in Table 4.25 further show that efficiency of the billing system ( $RG_{A1}$ ) was second in the order of relative importance; based on the operator's performance in defraying O&M costs for its rural water schemes (relative weight = 0.866). This reflects bivariate results, which show that of the 210 participants, 163 (77.6%) hinted that the operator's billing system was inefficient. Similarly, key informants indicated that the billing process, which was predominantly manual, was constrained by challenges such as delayed uptake of metre readings, delayed compilation of metre data, erroneous computation of bills, which manifested through

under-costing, and in a few instances, over-costing of water services; as well as delayed distribution of water bills due to logistical challenges.

Participants further noted that under-costing of water services directly reduced revenues, while over-costing triggered complaints among customers, which in turn, led to refusal to pay, disconnections and bad debts. Non-payment was particularly a critical challenge with government institutions, whose disconnection from the supply system was constrained by tedious bureaucratic procedures. Even though the operator was in the process of computerising its billing system, informants noted that the process was painstakingly slow and was constrained by inadequacy of appropriate ICT facilities and technical skills among billing officers.

Efficiency of revenue collection ( $RG_{A2}$ ) was third in the order of relative importance, with a relative weight of 0.853. These results concur with bivariate results in the previous subsection, which show that up to 150 (71.4%) participants indicated that collected revenue had not reached the sector's benchmark of more than 90%. Key informants and FGD participants observed that revenue collection efficiency was largely determined by payment methods adopted by the utility. In this regard, three methods of payment including bank, mobile phone transfer and cash, were cited. Of these, payment through banks was identified as the most dominant method, albeit with issues such as long distance to bank facilities and long queuing time, especially around end month. The challenges resulted to delayed payments, high default rates and disconnections.

Participants further indicated that payment through mobile phone was an upcoming initiative, which was intended to address the challenges inherent in payment through banks. In

this regard, participants noted that the method was gradually picking up and improving revenue collection efficiency, particularly due to its flexibility and convenience, as consumers were able to pay bills from the comfort of their homes. Nonetheless, its impact was yet to be felt as far as default rates, delayed payments and disconnections are concerned.

The results in Table 4.25 further show that unaccounted for water ( $RG_{A5}$ ) was fourth in the order of relative importance (relative weight = 0.790). Again this concurs with bivariate results presented in the previous sub-section, where up to 119 (56.7%) participants felt that unaccounted for water was not within acceptable limits of 20%. Key informants estimated the level of unaccounted for water to be in the range of 30 to 35%, and attributed it to illegal connections and physical leakage from the distribution system before reaching metered consumers. The high level of unaccounted for water was primarily attributed to inadequacy of resources for regular monitoring of the distribution network to facilitate timely detection of leakages and pilferage. Resource constraint also delayed the launch of preventive, corrective and rehabilitative maintenances. These challenges affected the amount of revenue generated, which in turn, undermined the operator's potential to achieve financial sustainability for its rural water schemes.

The appropriateness of water tariff for cost recovery ( $RG_{A3}$ ), emerged fifth in the order of relative importance (relative weight = 0.767). Again, this resonates with bivariate results, which indicate that slightly more than one-half of the participants, 112 (53.3%), affirmed that water tariff was optimal for cost recovery. However, a significant proportion, 91 (43.3%), felt that water tariff was not optimal for cost recovery. Among key informants and FGD participants, the

analysis revealed three different perspectives regarding the appropriateness of water tariff for cost recovery.

Proponents of the first perspective asserted that the level of water tariff had nothing to do with the operator's financial constraints. Instead, they pointed fingers at the billing system, revenue collection, non-revenue water and unaccounted for water, among other aspects, as key factors that contributed to the operator's financial constraints. Proponents of the second perspective indicated that the level of water tariff contributed to the operator's financial constraints by primarily being sub-optimal for cost recovery; while proponents of the third perspective argued that it was difficult to tell whether water tariff was optimal or sub-optimal for cost recovery due to lack of accurate data on the actual cost of producing and delivering water services, as well as maintaining distribution systems.

#### ***4.8.3 Concordance of views on revenue generation aspects***

The results presented in the foregoing sub-section show the relative importance of revenue generation aspects, based on the operator's performance in defraying O&M costs for its rural water schemes. The analysis relied on participants' subjective views, whose validity depends on the extent to which such views expressed by different participants concur or converge. In this sub-section, the analysis focused on determining the extent to which views expressed by the five categories of staff regarding the relative importance of revenue generation aspects vis-à-vis the financial sustainability of rural water schemes operated by HOMAWASCO converged. In this regard, Table 4.26 shows that the analysis yielded mean ranks for each aspect of revenue generation, Kendall's Coefficient of Concordance (W) and Chi square ( $\chi^2$ ) statistic

with related  $\rho$ -value, which indicates statistical significance of convergence among views expressed by different participants.

The results in Table 4.26 further show that convergence of views was strongest for level of non-revenue water ( $RG_{A4}$ ), with a mean rank of 3.826. Coming second was efficiency of the billing system ( $RG_{A1}$ ) with a mean rank of 3.633, followed by efficiency of revenue collection ( $RG_{A2}$ ), level of unaccounted for water ( $RG_{A5}$ ) and appropriateness of water tariff in relation to cost recovery ( $RG_{A3}$ ).

**Table 4.26: Concordance of views regarding revenue generation aspects**

<b>Ranks</b>		<b>Test Statistics</b>	
Revenue generation aspects	Mean Rank	N	210
$RG_{A1}$	3.633	Kendall's W <sup>a</sup>	0.893
$RG_{A2}$	3.481	Chi-Square ( $\chi^2$ )	71.222
$RG_{A3}$	3.019	df	4
$RG_{A4}$	3.826	$\rho$ -value	0.000
$RG_{A5}$	3.187	a. Kendall's Coefficient of Concordance	

In view of the above, the analysis obtained a Coefficient of Concordance (Kendall's W) of 0.893, which according to Legendre (2005) suggests a strong level of convergence of the views expressed by the five categories of staff, regarding the relative importance of revenue generation aspects in relation to the operator's performance in defraying O&M costs for its rural water schemes. The analysis also obtained a computed  $\chi^2$  of 71.222, with 4 degrees of freedom (df) and a  $\rho$ -value of 0.000, which suggest up to 99% chance that participants' views were concordant. The results suggest that all the five categories of staff concurred that revenue

generation aspects examined by the study, significantly influenced the operator's potential to achieve financial sustainability for its rural water schemes.

#### ***4.8.4 Correlation analysis of revenue generation and financial sustainability of water schemes***

Revenue generation aspects were aggregated and correlated with the operator's performance in defraying O&M costs for its rural water schemes over the reference period. As indicated in Table 4.27, the analysis obtained Spearman's rank correlation co-efficient of 0.568, with a p-value of 0.000, which suggests a positive and significant correlation between revenue generation and the operator's performance in defraying O&M costs for its rural water schemes; which in turn, suggests that revenue generation was likely to have influenced the organisation's ability to defray O&M costs. This further implies that revenue generation was crucial for improving the financial sustainability of rural water schemes operated by HOMAWASCO.

**Table 4.27: Correlation between revenue generation and the operator's performance**

		Revenue generation	Performance in defraying O&M costs
<b>Revenue generation</b>	Correlation Coefficient	1	0.568***
	Sig. (2-tailed)		0.000
	N	210	210
<b>Performance in defraying O&amp;M costs</b>	Correlation Coefficient	0.568***	1
	Sig. (2-tailed)	0.000	
	N	210	210

\*\*\*. Correlation is significant at the 0.01 level (2-tailed).

Based on the results, the fourth null hypothesis ( $H_{04}$ ), stating that *there is no significant correlation between revenue generation and financial sustainability of rural water schemes in Homa Bay County*, was rejected because it was inconsistent with empirical evidence obtained by the study. Consequently, revenue generation was likely to have influenced the operator's

performance in defraying O&M costs for its rural water schemes over the reference period; and was therefore, likely to have influenced its financial sustainability.

#### ***4.8.5 Regression analysis of revenue generation & financial sustainability of water schemes***

The results presented in Table 4.28 show most aspect of revenue generation negatively affected the operator's performance in defraying O&M costs, as indicated by the standardised *Beta* weights. Based on the magnitude of *Beta* weights, the results in Model 2 shows that non-revenue water caused the largest negative effect on the operator's performance (*Beta* = -0.374); followed by efficiency of revenue collection (*Beta* = -0.195), efficiency of the operator's billing system (*Beta* = -0.186). Detailed interpretation is provided in the following sub-section.

##### ***4.8.5.1 Standardised coefficients (Beta)***

Model 1 shows that non-revenue water ( $RG_{A4}$ ) generated a *Beta* weight of -0.416, which suggests that the variable negatively affected the operator's performance in defraying O&M costs for its rural water schemes, and the effect was statistically significant at 99% confidence level (t statistic = -7.156 & a p-value = 0.000). This means that the operator's non-revenue water had not reached the sector's benchmark; thereby, causing losses, which affected the operator's revenue generation. When intervening variables were added into the analysis, Model 2 shows that non-revenue water generated a *Beta* weight of -0.374, which again shows that the variable caused a negative effect on the operator's performance in defraying O&M costs for its rural water schemes, and its effect was at 99% confidence level (t statistic = -6.498 & a p-value = 0.000). In view of this, reducing the amount of non-revenue water is a primary intervention that should be prioritised in order to enhance the operator's performance towards financial sustainability of the rural water schemes.

**Table 4.28: Effect of revenue generation on the financial sustainability of rural water schemes**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.845	0.300		-2.812	0.005***
	Efficiency of the operator's billing system ( $RG_{A1}$ )	-0.270	0.062	-0.236	-4.351	0.000***
	Efficiency of revenue collection ( $RG_{A2}$ )	-0.174	0.050	-0.198	-3.464	0.001***
	Appropriateness of water tariffs in relation to cost recovery ( $RG_{A3}$ )	0.062	0.055	0.064	1.129	0.260
	Non-revenue water within acceptable limits ( $RG_{A4}$ )	-0.414	0.058	-0.416	-7.156	0.000***
	Unaccounted for water within acceptable limits ( $RG_{A5}$ )	-0.143	0.046	-0.172	-3.121	0.002***
2	(Constant)	-0.181	0.434		-0.418	0.676
	Efficiency of the operator's billing system ( $RG_{A1}$ )	-0.212	0.063	-0.186	-3.394	0.001***
	Efficiency of revenue collection ( $RG_{A2}$ )	-0.171	0.049	-0.195	-3.495	0.001***
	Appropriateness of water tariffs in relation to cost recovery ( $RG_{A3}$ )	0.072	0.054	0.074	1.332	0.184
	Non-revenue water within acceptable limits ( $RG_{A4}$ )	-0.372	0.057	-0.374	-6.498	0.000***
	Unaccounted for water within acceptable limits ( $RG_{A5}$ )	-0.127	0.046	-0.152	-2.768	0.006***
	Sub-County	-0.106	0.057	-0.109	-2.598	0.000***
	Gender	0.125	0.128	0.052	0.979	0.329
	Job category	0.058	0.046	0.071	1.280	0.202
	Highest professional credit	-0.134	0.086	-0.088	-1.547	0.123

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

More still, Model 1 shows that efficiency of revenue collection( $RG_{A2}$ )generated a *Beta* weight of -0.198, which was significant at 99% confidence level (t statistic = -3.464 & a p-value = 0.001). When intervening variables were added into the model, the *Beta* weight dropped marginally to -0.195, but which was still significant at the same confidence level (t statistic = -3.495 & a p-value = 0.001). This corroborates earlier findings which show that revenue collection efficiency was constrained by factors such as poor records management, logistical constraints, which impedes regular follow-up of defaulters, interference by some political leaders who often undermine actions such as disconnection of defaulters, faulty metres, as well as collusion between some officers and consumers to alter metre readings. Improving efficiency of revenue collection system is key towards enhancing the operator's performance towards financial sustainability of rural water schemes.

Model 1 further shows that efficiency of the operator's billing system( $RG_{A1}$ ) generated a *Beta* weight of -0.236, which implies a negative effect on the operator's performance in



defraying O&M costs and the effect was statistically significant at 99% confidence level ( $t$  statistic = -4.351 & a  $p$ -value = 0.000). When intervening variables were added into the analysis, the *Betaweight* reduced to -0.186, but which was still significant at 99% confidence level ( $t$  statistic = -3.394 &  $p$ -value = 0.001), as indicated in Model 2. The results suggest that efficiency of the billing system significantly reduced the operator's performance and achievement of financial sustainability. This confirms observations by key informants and focus group discussants who noted that the operator's billing systems was undermined by lack of consumer records, inadequate updating of customer accounts, outdated systems used for monitoring, non-categorisation of receivables by customer type and age; fragmented information management as well as administrative problems. Consequently, initiating interventions aimed at improving the billing system's efficiency would be a valuable intervention that may contribute towards financial sustainability of rural water schemes.

#### *4.8.5.2 Models' goodness-of-fit*

The results summarised in Table 4.29 show that Model 1 generated an adjusted  $R^2$  of 0.398, which suggests that the revenue generation aspects that were selected for this study accounted for up to 39.8% of variation in the operator's performance. This suggests that the model was a fair estimation the effect of revenue generation on the operator's performance in defraying O&M costs for its rural water schemes. The analysis obtained a computed  $F$  statistic of 28.588 and  $p$ -value of 0.000; thus, suggesting up to 99% chance that the combined effect of the selected revenue generation aspects on the operator's performance in defraying O&M costs for its rural water schemes was significant.

**Table 4.29: Strength and significance of the revenue generation model**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	0.642	0.412	0.398	0.748
2	0.677	0.458	0.434	0.725

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	79.896	5	15.979	28.588	0.000***
	Residual	114.027	204	0.559		
	Total	193.924	209			
2	Regression	88.864	9	9.874	18.796	0.000***
	Residual	105.060	200	0.525		
	Total	193.924	209			

\*, \*\*, \*\*\* show significance at  $p < 0.1$ ,  $p < 0.05$  and  $p < 0.01$  error margins, respectively

When intervening variables were added into the model, the adjusted  $R^2$  increased to 0.434, which suggest that Model 2 accounted for 43.4% of variation in the operator's performance; which is even a fairer estimation of the effect of revenue generation aspects on the operator's performance in defraying O&M costs for its rural water schemes, whose strength was also significant at 99% confidence level ( $F = 18.796$ ;  $p\text{-value} = 0.000$ ). Nevertheless, the results suggest that up to 56.6% of variation in the operator's performance was not accounted for by the revenue generation aspects that were selected for this study. Similar studies, that will be conducted in the future, should examine additional aspects of revenue generation in order to come up with better regression models, explaining the effect of revenue generation on the operator's performance in defraying O&M costs for its rural water schemes.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents a summary of findings and draws conclusions from such, in line with objectives of the study. The chapter also presents recommendations for programmatic and/or policy interventions, which should enable the private operator improve planning, income diversification, management, revenue generation aspects towards financial sustainability of associated rural water supply schemes. The last two sections of this chapter focus on contributions of the study and recommendations for further research.

#### **5.2 Summary of Findings**

The study aimed at determining how the private operator model, as a key aspect of water sector reforms in Kenya, has contributed to financial sustainability of rural water schemes in Homa Bay County. More specifically, the study delved on establishing the statistical relationship between various organisational attributes of HOMAWASCO (the private operator) and financial sustainability of its rural water schemes, which was measured in terms of its performance in defraying O&M costs for its rural water schemes over the preceding one year period. The purpose was to inform stakeholders, contribute to policy discourses and programming decisions, as well as stimulate relevant research to aid sector development in Kenya and in other developing countries. The study fulfilled the purpose by examining views of the operator's staff holding various positions, which were broadly categorised as managerial, operations, technical, commercial and finance. The study also examined views of water users and scheme management committee members. The analysis involved determining four statistical measures, including *bivariate association* between the operator's attributes and financial sustainability of rural water

schemes; *relative importance* of the operator's attributes; *concordance* of participants' views regarding relative importance of operator's attributes; as well as *spearman's rank correlation* between the operator's attributes and financial sustainability of its rural water schemes.

### ***5.2.1 Organisational planning and financial sustainability of rural water schemes***

Consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ) was the most important aspect of organisational planning, in relation to the operator's performance in defraying O&M costs for its rural water schemes, with a relative weight of 0.661. The second most important aspect of organisational planning was the contribution of financial plans to expenditure management( $OP_{A5}$ ), which scored a relative weight of 0.648; followed by strategic plan's implementation status ( $OP_{A3}$ ), which scored a relative weight of 0.635. The aspect that came fourth in the order of relative importance was the coverage of priority areas by the operator's strategic plan ( $OP_{A1}$ ), with a relative weight of 0.634; followed by contribution of the organisation's financial plans to revenue generation ( $OP_{A4}$ ), which scored a relative weight of 0.572. Lastly, contribution of M&E system to implementation of the strategic and financial plans ( $OP_{A6}$ ) came out sixth in the order of relative importance, with a relative weight of 0.549.

Convergence of participants' views was strongest for consistency of water supply activities with the operator's strategic plan ( $OP_{A2}$ ), which scored a mean rank of 3.585; followed by contribution of financial plans to expenditure management( $OP_{A5}$ ), which scored a mean rank of 3.533. Ranking third was strategic plan's implementation status ( $OP_{A3}$ ), with a mean rank of 3.392; followed by coverage of priority areas by the operator's strategic plan ( $OP_{A1}$ ), with a mean rank of 3.213; contribution of the organisation's financial plans to revenue generation ( $OP_{A4}$ ), with a mean rank of 2.919; as well as contribution of M&E system to implementation of

the strategic and financial plans ( $OP_{A6}$ ), with a mean rank of 2.778. Based on this, a Coefficient of Concordance (Kendall's W) of 0.741 was obtained, which suggests a strong level of concordance of participants' views regarding organisational planning aspects, based on the operator's performance in defraying O&M costs for its rural water schemes. Besides, a computed  $\chi^2$  of 52.739, with 5 degrees of freedom (df) and a p-value of 0.000 were obtained, which suggest up to 99% chance that the concordance of participants' views regarding organisational planning aspects was statistically significant.

The analysis obtained a Spearman's rank correlation co-efficient of 0.430, with a p-value of 0.000, which suggests up to 99% chance of a strong positive correlation between organisational planning and the operator's performance in defraying O&M costs for its rural water schemes. The results suggest that a unit improvement in organisational planning was likely to influence a proportionate improvement in the operator's performance in defraying O&M costs for its rural water schemes; as well as ability to achieve financial sustainability for its rural water schemes. This led to rejection of the first null hypothesis ( $H_0I$ ) stating that *there is no significant correlation between organisational planning and financial sustainability of rural water schemes in Homa Bay County* for being inconsistent with empirical data. This implies that improving organisational planning was crucial for improving the operator's performance in defraying O&M costs for its rural water schemes, as well as achieving financial sustainability for the same utilities.

### ***5.2.2 Income diversification and financial sustainability of rural water schemes***

The extent of internally generated income diversification ( $ID_{A3}$ ) emerged the most important aspect influencing the operator's performance in defraying O&M costs for its rural

water schemes, with a relative weight of 0.619. The second aspect in the order of relative importance was the extent of external funding diversification ( $ID_{A4}$ ), which scored a relative weight of 0.596; followed by reliability of external funding sources ( $ID_{A2}$ ), with a relative weight of 0.590. Reliability of internal income sources ( $ID_{A1}$ ) ranked fourth in the order of relative importance, with a relative weight of 0.543.

Participants' views converged most for the extent of internally generated income diversification ( $ID_{A3}$ ), which scored a mean rank of 2.864; followed by the extent of external funding diversification ( $ID_{A4}$ ), with a mean rank of 2.671. Ranking third in terms of convergence of participants' views was reliability of external funding sources ( $ID_{A2}$ ), with a mean rank of 2.492; followed by reliability of internal income sources ( $ID_{A1}$ ), with a mean rank of 2.198. Overall, a Coefficient of Concordance (Kendall's W) of 0.686 was obtained, which according to Legendre (2005), suggests a strong concordance of participants' views regarding the relative importance of income diversification aspects. The results further suggest up to 99% chance that the concordance of participants' views regarding relative importance of income diversification aspects was statistically significant ( $\chi^2 = 47.288$ ,  $df = 3$  &  $p\text{-value} = 0.000$ ).

More still, a Spearman's rank correlation co-efficient of 0.375, with a  $p\text{-value}$  of 0.014 were obtained, which suggests a positive and significant correlation between income diversification and the operator's performance in defraying O&M costs for its rural water schemes. Based on this, the investigator rejected the null hypothesis, which posited that *there is no significant correlation between income diversification and financial sustainability of rural water schemes in Homa Bay County*, because it was inconsistent with evidence obtained by the

study. This suggests that income diversification was likely to have influenced the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

### ***5.2.3 Management practices and financial sustainability of rural water schemes***

Compliance of procurement activities to relevant legislations ( $FM_{P2}$ ) emerged the most important management practice, with a relative weight of 0.838; followed by effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ ), with a relative weight of 0.825. The third aspect in the order of relative importance was the relevance of activities on which revenues are spent ( $FM_{P5}$ ), with a relative weight of 0.812. This was followed by effectiveness of external audit in improving financial management practices ( $FM_{P4}$ ), which emerged fourth in the order of relative importance, with a relative weight of 0.749; while conformance of expenditure to approved budgets ( $FM_{P1}$ ), came out fifth with a relative weight of 0.726.

Notably, convergence of participants' views was strongest for compliance of procurement activities to relevant legislations ( $FM_{P2}$ ), with a mean rank of 3.713; followed by effectiveness of internal audit in enforcing expenditure policies ( $FM_{P3}$ ), with a mean rank of 3.520. Ranking third was relevance of activities on which water revenues were spent ( $FM_{P5}$ ) with a mean rank of 3.341; followed by effectiveness of external audit in improving financial management practices ( $FM_{P4}$ ) with a mean rank of 3.047, as well as conformance of expenditure to approved budgets ( $FM_{P1}$ ) with a mean rank of 2.906.

A Coefficient of Concordance (Kendall's W) of 0.862 was obtained, which suggests a very strong level of convergence of participants' views regarding financial management practices, based on the operator's performance in defraying O&M costs for its rural water

schemes (Legendre, 2005). Based on this, a computed  $\chi^2$  of 64.491, with 4 degrees of freedom (df) and a p-value of 0.000 were obtained, which suggest up to 99% chance that participants' views regarding relative importance of management practices, were concordant. In view of this, appropriate response interventions aimed at improving compliance of procurement activities to relevant legislations, capacity of the internal audit department, expenditure of water revenues, effectiveness of external audit, as well as conformity of expenditures to approved budgets should make significant contributions to the financial sustainability of rural water schemes operated by HOMAWASCO.

Based on this, a Spearman's rank correlation co-efficient of 0.430, with a p-value of 0.000 were obtained, which suggests a positive and significant correlation between management practices and the operator's performance in defraying O&M costs for its rural water schemes. This led to rejection of the null hypothesis, stating that *there is no significant correlation between management practices and financial sustainability of rural water schemes in Homa Bay County*, for being inconsistent with primary data obtained by the study. The results imply that management practices were likely to have influenced the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

#### ***5.2.4 Revenue generation and financial sustainability of rural water schemes***

Non-revenue water ( $RG_{A4}$ ) emerged the most important aspect of revenue generation, with a relative weight of 0.879; followed by efficiency of the billing system ( $RG_{A1}$ ), which came out second in the order of relative importance; based on the operator's performance in defraying O&M costs for its rural water schemes (relative weight = 0.866). Efficiency of revenue collection ( $RG_{A2}$ ) was third, with a relative weight of 0.853; followed by unaccounted for water



( $RG_{A5}$ ) with a relative weight of 0.790. The appropriateness of water tariff for cost recovery ( $RG_{A3}$ ), emerged fifth in the order of relative importance (relative weight = 0.767).

Convergence of views was strongest for level of non-revenue water ( $RG_{A4}$ ), with a mean rank of 3.826. Coming second was efficiency of the billing system ( $RG_{A1}$ ) with a mean rank of 3.633; followed by efficiency of revenue collection ( $RG_{A2}$ ), level of unaccounted for water ( $RG_{A5}$ ) and appropriateness of water tariff in relation to cost recovery ( $RG_{A3}$ ). In view of the above, the analysis obtained a Coefficient of Concordance (Kendall's W) of 0.893, which according to Legendre (2005) suggests a strong level of convergence of the views expressed by the five categories of staff. The analysis also obtained a computed  $\chi^2$  of 71.222, with 4 degrees of freedom (df) and a p-value of 0.000, which suggest up to 99% chance that participants' views were concordant.

Furthermore, a Spearman's rank correlation co-efficient of 0.568, with a p-value of 0.000 were obtained, which suggests a positive and significant correlation between revenue generation and the operator's performance in defraying O&M costs for its rural water schemes. Based on this, the null hypothesis, stating that *there is no significant correlation between revenue generation and financial sustainability of rural water schemes in Homa Bay County*, was rejected because it was inconsistent with empirical evidence obtained by the study. Consequently, revenue generation was likely to have influenced the operator's performance in defraying O&M costs for its rural water schemes over the reference period.

### 5.3 Conclusions

Conclusions presented under this sub-section are drawn from the findings and have been organised under the following themes, in line with objectives of the study.

#### *5.3.1 Organisational planning and financial sustainability of rural water schemes*

Organisational planning is a culture whose origin is traceable to scientific management principles that were developed during the industrial revolution, which took place between the 18<sup>th</sup> and 19<sup>th</sup> Centuries. Organisational planning entails practices that enable organisations to predict future challenges and opportunities; thus, initiate appropriate measures to enhance their survival, performance and success. More specifically, through financial planning, organisations can predict revenue and expenditure trends; thus, take appropriate measures for optimisation. On the other hand, through strategic planning, organisations can assess prevailing situations; develop incremental objectives, as well as design plans and strategies, for achieving strategic goals that are mission-focused and vision-driven. Organisational planning is at the hub of financial sustainability (León, 2001), which in the context of water sector reforms, involves a continuous delivery of quality and affordable water services to an increasing population, in accordance with social development priorities and universal human rights provisions.

The findings of this study suggest up to 99% chance of a strong positive correlation between organisational planning and the operator's performance in defraying O&M costs for its rural water schemes; which in turn, amplify the need for consistent implementation of the operator's strategic and financial plans, as a precursor to achievement of financial sustainability. It's worth noting that having such plans is one thing, implementing them fully is another. Implementation of the operator's strategic plan is likely to facilitate achievement of financial

sustainability in two important ways: by ensuring optimal utilisation of internally generated revenues, as well as improving ability of the operator to mobilise additional revenues from external sources in the form of loans and grants. Most development partners are keen on supporting organisations that have a clear vision for the future regarding where they would like to be after a given period of time, and a clear plan on how to get there. Ability of the operator to account for internally generated resources is important for influencing financing decisions among development partners.

In view of this, having strategic and financial plans, and ensuring consistent implementation of such is crucial for improving the operator's performance in defraying O&M costs for its rural water schemes. Equally important is the need for regular review of the strategic and financial plans to make them more responsive to changes within the operator's internal and external environments.

Monitoring and Evaluation (M&E) are vital for continuous sourcing and analysis of information regarding implementation of the operator's strategic and financial plans, as well as performance in defraying O&M costs for its rural water schemes. Such information will enable the operator's management to make appropriate decisions regarding the right strategies for avoiding or overcoming possible obstacles; thereby, expedite achievement of financial sustainability. Without effective M&E systems, it might be impossible for the operator to judge whether implementation of the strategic and financial plans are on the right course or not; whether achievements are linkable to interventions or not; as well as how organisational strategies can be fine-tuned to improve similar interventions in the future. Strengthening the operator's M&E system is an important intervention that should be prioritised in order to

improve effectiveness of organisational planning, as well as achievement of financial sustainability.

### ***5.3.2 Income diversification and financial sustainability of rural water schemes***

Diversification of internally generated income and external funding sources is a strategy that is indispensable in a commercialised water market. Organisations operating in such markets are strategically obligated to diversify income and funding sources in order to cushion themselves against failure of one or two streams, as well as improve fiscal performance and sustainability. In this regard, diversification of income and funding sources enables organisations to minimise the risk of financial constraints that may be triggered by failure of primary income sources; thus, making it a critical pillar for achieving financial sustainability (León, 2001). In this study, the findings suggest up to 95% chance that income diversification significantly correlated with the operator's performance in defraying O&M costs for its rural water schemes. Notably, 185 (88.1%) participants affirmed that *up to 60% of internally generated income is derived from a single source*, which suggests that diversification of internal income sources was below the benchmark necessary for organisations to achieve financial sustainability for its rural water schemes. This situation has a few, but critical implications on the operator's ability to defray O&M costs for its rural water schemes, as well as achieve its purpose in society.

Firstly, it implies that the operator was at risk of experiencing financial constraints in the event that water revenues were disrupted by prevailing micro- and macro-economic dynamics; which in turn, would affect its ability to defray O&M costs for its rural water schemes. Secondly, poor diversification of internal income sources implies that the operator was less likely to generate surplus fiscal resources for investment in the expansion of infrastructural facilities;

which is necessary for universalising access to safe drinking water in line with requirements of development blue prints, such as Kenya's Vision 2030. With little or no resources to invest in the development of infrastructural facilities, the operator is left with no choice but to depend on the County Government for capitation funding, albeit with a few critical challenges. For instance, government funding is often affected by late disbursement of county funds by the National Government, which in turn, disrupts investment plans, sometimes leading to diversion of capitation funds to pressing operational issues. Consequently, poor diversification of internal income sources makes the operator less competitive to operate in a commercialised water market. Going forward, it's imperative that the operator explores how to diversify internally generated income; thereby, improve its competitiveness, financial performance and defrayal of O&M costs for its rural water schemes. Notably though, diversification of income requires a strategic orientation, which means it should be planted in the operator's strategic plans to enable financing prioritisation.

### ***5.3.3 Management practices and financial sustainability of rural water schemes***

Effective management practices are crucial for private operators to develop capacity in cost recovery in the context of commercialised water markets. Such management practices enable operators to optimise revenue generation, expenditure management, defrayal of O&M costs, as well as expedite achievement of financial sustainability. The findings of this study suggest up to 99% chance that of a positive and significant correlation between management practices and the operator's performance in defraying O&M costs for its rural water schemes. The management practices in question included compliance of procurement activities to relevant legislations, effectiveness of internal audit in enforcing expenditure policies, effectiveness of

external audit in improving financial management practices, relevance of activities on which water revenues are spent, as well as conformance of expenditure to approved budgets.

Organisations procure goods, services and works to facilitate their operations and fulfil their purpose in society. Well managed procurement activities are not only valuable to procuring organisations but also to sectoral and national development. Through procurement activities, organisations inject fiscal resources into the economy, which in turn, creates business opportunities for the private sector. However, poorly managed procurement systems and activities provide avenues through which organisations lose their fiscal resources. Scaling down to the context of this study, procurement can either improve or undermine operator's financial sustainability, depending on the extent to which procurement legislations are embraced. In Kenya, public procurement is governed by the Public Procurement and Disposal Act of 2005, Public Procurement and Disposal Regulations, 2006, as well as a number of sector and sub-sector specific manuals and guidelines. Nonetheless, having necessary legislative and policy frameworks is one thing; compliance to the provisions of such is another.

In this study, participants cited irregularities such as inflation of quotations, which distended expenditure and caused budget overruns; conflict of interest, which manifested through awarding tenders to bidders associated and/or related to certain senior management officers and Board members; splitting tenders into two or more sub-tenders in order to sidestep threshold provisions and necessary procurement procedures; inducing emergency situations where procurement of goods and services would be approved without going through the due process. Ensuring that procurement activities are strictly guided by procurement laws and policies is important for preventing irregularities, minimising loss of fiscal resources and enabling the

operator to achieve financial sustainability for its rural water schemes. This calls for attention of the Public Procurement Oversight Authority (PPOA) and the Ethics and Anti-Corruption Commission (EACC) to sensitise the operator's staff and Board members on procurement laws and policies; strengthen the operator's tender committee; improve monitoring and evaluation of procurement activities; and enforce adherence by prosecuting officers who fail to follow due process.

Internal audit enables organisations to manage their resources by detecting and preventing fraud, testing internal control policies and procedures, as well as monitoring and enforcing compliance with organisational expenditure policies, and government regulation. In this regard, internal audit provides organisational management with information on the effectiveness of risk management, control and governance processes, to support expenditure control decisions. However, effectiveness of internal audit department to fulfil its purpose depends on the prevalence of capacity challenges. In this study, participants noted that effectiveness of the operator's internal audit to enforce expenditure policies and prevent loss of fiscal resources was constrained by under-staffing, lack of training opportunities and lack of independence. In this regard, strengthening capacity of the internal audit department and enhancing its independence, are crucial antecedents for the operator to improve its performance in defraying O&M costs for its rural water schemes; thereby, achieve financial sustainability for its rural water schemes. This may be realised by improving staffing levels and establishing/or strengthening staff development programmes in the internal audit department. The latter should focus on improving skills, knowledge and understanding of organisational risks, stakeholder expectations, cost optimisation, credible service culture, as well as application of appropriate internal audit ICT tools.

By subjecting water services to market forces, the reforms amplified the importance of water revenues to the operators' survival, efficiency and sustainability. In this regard, water revenues form the backbone of such operators in a commercialised market. However, water revenues may not necessarily lead to financial sustainability in environments characterised by expenditure indiscipline. In other words, revenues only add value to financial sustainability where expenditure is streamlined, prioritised and focused on activities that are relevant to an organisation's core mission. Such activities are ideally identified and defined in expenditure policies, which form part of financial budgets. Notably though, prioritising expenditure and ensuring that revenues are spent on correct activities are two different sides of a coin, as factors such as personal interests and political interference often influence expenditure decisions. The risk of expenditure indiscipline is particularly high in organisations where internal control structures are weak and external audit is conducted as a formality.

In the water sector, expenditure of revenues on irrelevant activities usurps resources that would be used to defray O&M costs, which in turn, impedes achievement of financial sustainability. In this study, participants identified a number of activities that they considered irrelevant to the operator's mission, including foreign trips, consultancy services and stakeholder workshops. While recognising that such activities are important to the operator, moderating their frequency is likely to yield greater value by preventing unnecessary expenditures. This calls for the water authorities, which in Kenya includes WRMAs and WSBs, to focus on strengthening internal expenditure control structures of the operator, through appropriate training to improve fiscal discipline, commitment to organisational strategic focus and implementation of external audit recommendations.



Regular audit of financial statements by external and independent agencies is vital for an organisation's reputation, performance and sustainability. By examining the accuracy of financial statements, financial position and compliance with international accounting principles, external audit provides assurance to stakeholders that an organisation's resources are managed properly and that, financial records are accurate and complete. External audit is particularly important when its able to identify inappropriate financial management practices that require corrective measures to enable organisations improve performance towards financial sustainability. In this regard, external audit processes are expected to recommend appropriate measures that should be taken by organisations to minimise wastage of resources or promote efficiency by tightening accounting practices.

In Kenya, external audit of public institutions, organisations, programmes and projects is done by the Auditor General, as primarily mandated by the Public Audit Act, No. 34 of 2015 and Article 253 of the Constitution. Notably, the effectiveness of external audit optimises when it's performed consistently, timely, objectively and inclusively; as well as when it delivers opinions that are acceptable to stakeholders and recommendations that are implementable. However, in this study, participants noted that effectiveness of external audit was constrained by delays; inconsistency and lack of mechanisms for ensuring recommendations are implemented. Improving external audit process by ensuring timeliness and consistency, as well as regular monitoring of how recommendations are implemented are crucial for the operator's financial sustainability. This requires a collaborative intervention by water authorities and the public audit office.

Organisations prepare budgets to basically balance revenues and expenditures; and more specifically, to estimate revenues, predict revenue trends, prioritise allocation of resources as well as institute mechanisms for controlling expenditures. Such mechanisms are particularly important for preventing budget overruns, which often deplete contingency resources and heighten the risk of financial crunches. Even though budgeting is central to effective management of fiscal resources, budget overrun is a common challenge that prevents many operators from achieving financial sustainability. In this study, participants cited budget overrun as one of the factors precipitating financial constraints, poor performance in defraying O&M costs rural water schemes managed by the operator and inconsistent delivery of water services. Participants further linked budget overruns to over-expenditure of water revenues in activities that are not directly relevant to delivery of water services, procurement irregularities, weak internal control systems, as well as lack of a mechanism for monitoring and ensuring implementation of external audit recommendations.

Addressing such underlying factors is likely to create a supportive environment for the operator to align its expenditures with approved budgets; thereby, avoid budget overruns and expedite financial sustainability. This may be achieved through sensitisation and refresher training to the operator's management, internal audit department and Board members in order to enhance fiscal discipline, and skills in budgeting, budget implementation and expenditure control. This requires the intervention of water authorities. Equally important is the need to strengthen the procurement function through training and linkage with procurement and anti-corruption authorities, which in Kenya includes PPOA and EACC, in order to curb irregularities that increase the risk of budget overruns.

#### ***5.3.4 Revenue generation and financial sustainability of rural water schemes***

Water sector reforms, through commercialisation of services, precipitated the need for all WSPs to enhance internal capacity for successful functioning in a competitive water market. The Four Pillars Model of Financial Sustainability identifies key components that WSPs need to enhance in order to set themselves on the right path to financial sustainability, including income/revenue generation (León, 2001). The findings of this study suggest up to 99% chance of a positive and significant correlation between revenue generation and the operator's performance in defraying O&M costs for its rural water schemes. More specifically, the findings create an impression that the operator's revenue generation pillar was inadequately prepared for financial sustainability, as indicated by most participants. High proportions of non-revenue and unaccounted for water signals loss of revenue. However, reducing non-revenue and unaccounted for water is a daunting challenge, particularly in contexts where operators lack appropriate technology and technical skills for early detection of leakages, pilferage, defective metres, as well as budgetary resources for timely launch of preventive, corrective and rehabilitative maintenance.

In Kenya, the water sector is constrained by perennial budgetary deficits, which makes it difficult for the operators to acquire necessary technology and expertise for addressing non-revenue and unaccounted for water. Consequently, there is no doubt that the twin challenges will continue militating against the operator's performance in defraying O&M costs, as well as potential to achieve financial sustainability for its rural water schemes. Nonetheless, the operator's management and Board should focus on continuous engagement with development partners, with a view to mobilising supplementary resources for necessary equipment and technical support. Equally important is the need for active partnership with community

administrative structures and groups for early detection and reporting of physical leakages, spillage, illegal connections and defective metering equipment.

Efficiency of billing systems is primarily, a function of the type of systems adopted by operators, alongside operational efficiency and administrative effectiveness. Whereas manual systems are prone to inaccuracy and inefficiency, computerised systems are likely to generate more accurate bills at less cost and time. Regardless of the type of billing systems adopted by an operator, the accuracy of bills and efficiency of the billing process are crucial antecedents for achieving revenue targets. Consequently, transition from manual billing systems to computerised systems is an inevitable necessity for operators to function in a commercialised water market. Notably though, the transition process is a capital-intensive undertaking, which requires appropriate ICT hardware facilities and software programmes, as well as technical support in building workers' capacity. Even though the operator had initiated computerisation of the billing system, the process was yet to be completed. This study amplifies the need for water authorities and the county government to upgrade billing systems through their investment plans.

Efficient revenue collection systems employ payment methods that motivate customers to pay their bills early by reducing costs of forgone opportunities, accessing payment points and effecting transactions. Early payment of water bills is crucial for operators to obtain revenues for defraying O&M costs for their water schemes. It also prevents disconnections and bad debts, which deny operators revenues. In view of this, any attempt to enhance operator's financial sustainability should not overlook the need to improve payment methods, particularly in terms of versatility, convenience and cost implications. In Kenya, the advent of mobile phone payment methods provides an important option, which enables consumers to overcome challenges

inherent in payment through banks and cash. Promoting the mobile phone payment method is an option that the operator should consider in order to improve revenues and achieve financial sustainability for its rural water schemes.

Appropriateness of water tariff for cost recovery is also crucial for operators to improve revenues and achieve financial sustainability for its rural water schemes. An optimal water tariff enables operators to generate sufficient revenue for O&M costs, while incentivising customers to pay for services rendered. Notably though, setting water tariff is a critical process which should ensure that low revenue-earners are not over-charged and operators are not under-paid for their services. The challenge is greater in developing countries, where most domestic consumers live below the poverty line and access to water services often used by some leaders to advance political interests. Even though optimal tariff is an indispensable antecedent for operators to achieve financial sustainability, setting an optimal water tariff requires accurate and complete data on production, distribution and maintenance costs, which however, were lacking in the operator covered by the study. Thus, initiating appropriate monitoring and data capture systems is a crucial intervention, which should be prioritised by stakeholders to enable the operator set and manage optimal water tariffs from time to time, in order to improve revenues.

## **5.4 Recommendations**

### *5.4.1 Organisational planning and financial sustainability of rural water schemes*

1. Ensure consistent implementation of the strategic and financial plans to guide water supply activities. This will require the involvement of all staff, Board members and community members.

2. Ensure regular review of the strategic and financial plans to make them more responsive to changes within the operator's internal and external environments.
3. Strengthen the operator's M&E system by allocating more resources and building capacity of staff, as well as involving communities in the M&E of water service provision. This is likely to improve effectiveness of organisational planning, as well as achievement of financial sustainability.

#### *5.4.2 Income diversification and financial sustainability of rural water schemes*

1. Diversify internal income sources in order to improve the operator's competitiveness, financial performance and defrayal of O&M costs for its rural water schemes. The operator needs innovative financing initiatives in order to minimise the risk of experiencing financial constraints, in the event that water revenues are disrupted by market forces.
2. Revise the strategic plan to institutionalise diversification of income as a strategic intervention towards financial sustainability of rural water schemes. This is important for financing considerations.
3. Ensure timely disbursement of capitation funding by the national and county governments. This should enable the operator to finance the development of infrastructural facilities before they are overtaken by competing operational issues.

4. Increase budget allocation to water and sanitation at national and county level. This should be backed by legal and legislative framework that will allow resource mobilisation at the local level.

#### *5.4.3 Management practices and financial sustainability of rural water schemes*

1. Improve procurement practices through the following actions: sensitising the operator's staff, Board members and tender committee on procurement laws and policies; improving monitoring and evaluation of procurement activities; and enforcing adherence by prosecuting officers who fail to follow due process.
2. Improve the effectiveness of the audit department through better staffing, introduction of appropriate internal audit ICT tools; as well as establishing or strengthening staff development programmes, with a view to improving skills, knowledge and understanding of organisational risks, stakeholder expectations, cost optimisation and credible service culture.
3. Strengthen internal expenditure control structures of the operator, through appropriate training to improve fiscal discipline, commitment to organisational strategic focus and implementation of external audit recommendations.
4. Improve external audit process by ensuring timeliness and consistency, as well as regular monitoring of how recommendations are implemented. This requires a collaborative intervention by water authorities and the public audit office.

5. Sensitise and/or provide refresher training to the operator's management, internal audit department and Board members in order to enhance fiscal discipline, and skills in budgeting, budget implementation and expenditure control.

#### *5.4.4 Revenue generation and financial sustainability of rural water schemes*

1. Engage with development partners continuously, with the aim of mobilising external funds for financing acquisition of necessary equipment, infrastructural facilities and accessing technical support. Build capacity of stakeholders / Board directors in resource mobilisation.
2. Initiate active partnership forums with community administrative structures and groups to facilitate early detection and reporting of physical leakages, spillage, illegal connections and defective metering equipment.
3. Prioritise upgrading of the operator's billing systems. Water authorities and the county governments should prioritise this through their investment plans.
4. Promote the mobile phone payment method in order to improve revenues and achieve financial sustainability for rural water schemes.
5. Initiate appropriate monitoring and data capture systems to enable the operator set and manage optimal water tariffs from time to time, in order to improve revenues.



#### *5.4.5 General recommendations for sector development*

1. Increase the participation of communities in WASH financing.
2. Enhance private operator sector involvement in WASH financing.
3. Provide a legal framework for private sector involvement in WASH financing.
4. Align water sectoral plans to vision 2030 and SDG Goals.
5. Develop water sector information management system and build capacity of stakeholders on information access.

### **5.5 Contribution of the Study**

The relationship between the private operator model and financial sustainability of water schemes is a subject that has repeatedly featured in policy discourses and empirical studies in various geographical contexts. For instance, studies conducted by Adank and Tuffuor (2013), Mimrose and Gunawardena (2011), Rauendorfer and Liemberger (2010), as well as Whittington *et al.* (2009), among others, show evidence of a positive correlation between the private operator model and financial sustainability of water schemes. Some of the successes associated with the model include reduction of water rationing and water loss through leakages; improvement of billing and revenue collection, as well as achievement of financial stability.

In Kenya, relationship between the private operator model and financial sustainability of rural water schemes has featured in a few water sector review reports (WASRB, 2013) and studies (World Bank, 2012; Wambua, 2004). Notably though, no systematic study has ever focused on the financial sustainability of rural water schemes operated by HOMAWASCO. Therefore, this study is the first of its kind in Homa Bay County. Consequently, it's not only informative to stakeholders, but also and more importantly, a catalyst for policy deliberations

and programmatic decisions, aimed at strengthening the private operator, improving financial sustainability of its rural water schemes and sustaining the quality of water services. In this regard, the study provides an important benchmark against which similar studies will be conceptualised and conducted in future. It also enriches existing academic literature on water sector reforms, not only in Kenya but also in developing countries.

## **5.6 Recommendations for Further Research**

Water sector reforms entrenched the aspect of commercialisation, which involved reducing government participation in direct service delivery, and increasing the role of private operators in the same. The purpose of commercialisation was to enhance efficiency and sustainability of water services across the country. What is not clear is the extent to which water sector reforms prepared private operators to effectively function in the commercialised water market towards cost recovery and financial sustainability. This study focused on HOMA WASCO, which is just one entity among the 47 private operators managing water services across the country on behalf of the government. The information generated by this study is most relevant for strengthening the operator in Homa Bay County. In future, there will be need for the study to be replicated in other counties, as well as scaled up to regional and national levels. This is likely to generate information that would effectively support national-level policy, legislative and programmatic interventions for strengthening the private operator model towards financial sustainability of rural water schemes.

The analysis performed in this study, mainly involved determining bivariate relationship between various attributes of the private operator and financial sustainability of its rural water schemes. However, bivariate analyses can only tell how two variables are either associated or

correlated. It cannot determine causality between variables, for instance, whether variable A causes a positive or negative effect on variable B. Besides, bivariate analysis cannot tell the net effect of a particular independent variable on a dependent variable, while taking into account the effect of other variables. This gap justifies the need for future studies to apply multivariate techniques of analysis in order to generate models with robust estimations of the causal relationship between the private operator and financial sustainability of rural water schemes.

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## **APPENDICES**

### **Appendix I: Letter of Transmittal**

AgwaMarylineAkinyi  
P.O. Box 30197 – 00100,  
NAIROBI.  
Email: [marylineagwa@gmail.com](mailto:marylineagwa@gmail.com)  
Tel: +254721835156

31<sup>st</sup> March 2017.

Dear Sir/Madam,

#### **RE: ACADEMIC RESEARCH**

I am a Masters student at the University of Nairobi. As part of the requirements of the Master of Arts degree in Project Planning and Management, I am conducting a research as a prerequisite for the course in project planning and management. The study is intended to determine how well the HOMAWASCO is prepared to sustainably deliver quality water services in the commercialised water market. Based on the results, the study shall make recommendations, which should inform stakeholders as well as influence policy, programming and funding decisions.

To enable me collect data for the research, you have been selected as one of the participants of the study. Kindly complete the questionnaire attached or arrange for a date of appointment for and interview as per the schedule attached.

The research is for academic purposes only and thus your responses shall be treated with utmost confidence and privacy. You are requested to provide your responses with as much honesty as possible. Thank you in advance for participating in the exercise.

Yours sincerely,

AgwaMarylineAkinyi

#### **MA Student**

School of Continuing and Distance Education  
Department of Extra Mural Studies  
UNIVERSITY OF NAIROBI

## Appendix II: Authorisation Letter from University of Nairobi



UNIVERSITY OF NAIROBI  
COLLEGE OF EDUCATION AND EXTERNAL STUDIES  
DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY

Telephone: 020-2500759, 020-2500760  
020-2500762, 020-2460056

P.O. Box 30197, 00100 NAIROBI  
P.O. BOX 92.00902 KIKUYU

17<sup>th</sup> March, 2017


### TO WHOM IT MAY CONCERN

**SUBJECT: AGWA MARYLINE AKINYI – REG. NO. L50/68839/2013**

This is to certify that **Agwa Maryline Akinyi** has defended her Masters proposal successfully at the Department and School levels towards achieving the Master of Arts in Project Planning and Management of the University of Nairobi.

She is currently undertaking her research on *Water Sector Reforms in Kenya: Influence of the Private Operator Model on Financial Sustainability of Rural Water Schemes in Homa Bay County, Kenya*. **Any assistance accorded to her during data collection will be highly appreciated.**

Yours sincerely,

  
**PROF. PAUL A. ODUNDO**  
**CHAIRMAN,**

**DEPARTMENT OF EDUCATION COMMUNICATION AND TECHNOLOGY**

### Appendix III: Authorisation Letter from NACOSTI



## NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 310571, 2219420  
Fax: +254-20-318245, 318249  
Email: [secretary@nacosti.go.ke](mailto:secretary@nacosti.go.ke)  
Website: [www.nacosti.go.ke](http://www.nacosti.go.ke)  
When replying please quote

9<sup>th</sup> Floor, Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref No.

Date:  
**20<sup>th</sup> October, 2016**

**NACOSTI/P/16/5238/5861**

Maryline Akinyi Agwa  
University of Nairobi  
P.O. Box 30197-00100  
**NAIROBI.**

### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on “*Water Sector Reforms in Kenya: Influence of the Private Operator Model on Financial Sustainability of Rural Water Schemes in Homa Bay County, Kenya*”, I am pleased to inform you that you have been authorized to undertake research in **Homa Bay County** for a period ending **30<sup>th</sup> October, 2017**.

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

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

**SAID HUSSEIN**  
**FOR: DIRECTOR-GENERAL/CEO**

Copy to

The County Commissioner  
Homa Bay County.

The County Director of Education  
Homa Bay County.

*National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified*

## Appendix IV: Survey Questionnaire

	<p style="text-align: center;"><b>WATER SECTOR REFORMS IN KENYA: INFLUENCE OF THE PRIVATE OPERATOR MODEL ON FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMS IN HOMA BAY COUNTY</b></p> <p style="text-align: center;"><b>T101: SURVEY QUESTIONNAIRE</b></p>
	<p><b>INTRODUCTION AND CONSENT</b></p> <p>Hello. My name is <b>MarylineAkinyi</b>. I am a student at the University of Nairobi. I'm conducting a research, as part of requirements for the Masters degree in Project Planning and Management. The purpose of the study is to generate information that shall be shared with stakeholders to influence interventions aimed at informing stakeholders as well as influencing policy, programming and funding decisions in order to improve the quality and sustainability of water services provided by HOMA WASCO in the commercialised water market.</p> <p>I humbly request for your support by responding to this questionnaire. The study has no direct benefits to participants and there are no risks to your participation. Your decision to participate is highly appreciated. You may withdraw from the study at any time during your participation before submitting the questionnaire. After that it will be difficult to identify the information you have provided.</p> <p>The information you provide will be kept strictly confidential and used for the purpose of this study only. The data may be accessed by my supervisor only, as part of Thesis examination. You should not indicate your name on the questionnaire. No information identifying you shall be reported in the Thesis or publications. By responding to the questionnaire, you provide consent for me to use data for the stated purposes – Thesis and publications.</p> <p>Thank you for your time.</p> <p>Yours sincerely,</p> <p>AgwaMarylineAkinyi</p> <p><b><u>MA Student</u></b></p> <p>School of Continuing and Distance Education Department of Extra Mural Studies UNIVERSITY OF NAIROBI</p> <p>P.O. Box 30197 – 00100, NAIROBI. Email: <a href="mailto:marylineagwa@gmail.com">marylineagwa@gmail.com</a> Tel: +254721835156</p>

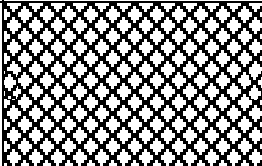

	QUESTIONS	RESPONSES	INSTRUCTIONS
1.0	INTRODUCTION		
1.1	DATE OF INTERVIEW	_____/_____/16	DD/MM/YY
1.2	WATER SCHEME	HOMA BAY ..... 1 MBITA ..... 2 KENDU BAY ..... 3 OYUGIS ..... 4 WEST KARACHUONYO ..... 5 KANYADHIANG' ..... 6 HEAD OFFICE ..... 7	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
1.3	SUB-COUNTY	HOMA BAY ..... 1 RACHUONYO NORTH ..... 2 RACHUONYO SOUTH ..... 3 MBITA ..... 4	
1.4	CADRE CATEGORY	MANAGERIAL ..... 1 OPERATIONS ..... 2 TECHNICAL ..... 3 COMMERCIAL ..... 4 FINANCE ..... 5	
1.5	SPECIFIC JOB TITLE	_____ _____ _____	
1.6	GENDER	MALE ..... 1 FEMALE ..... 2	
1.7	HIGHEST LEVEL OF EDUCATION	PRIMARY ..... 1 SECONDARY ..... 2 COLLEGE ..... 3 UNIVERSITY ..... 4	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
1.8	HIGHEST PROFESSIONAL CREDIT	CERTIFICATE ..... 1 DIPLOMA ..... 2 BACHELORS DEGREE ..... 3 MASTERS DEGREE ..... 4 OTHERS ..... 5 _____ _____ _____	
2.0	ORGANISATIONAL PLANNING AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES		
2.1	Does your organisation have a strategic plan?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	IF 'NO' OR 'DON'T KNOW', <b><u>SKIP</u></b> TO 2.6
2.2			CONTINUE TO 2.3



	<b>IF YES:</b> Did you participate in the strategic planning process?	YES ..... 1 NO ..... 2	
2.3	The operator's strategic plan captures all the priority areas necessary for effective water service delivery in rural areas.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	<b>CIRCLE THE <u>MOST</u> APPROPRIATE RESPONSE</b>
2.4	All our water supply activities in rural areas are based on the operator's strategic plan.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
2.5	The organisation is on track in implementing its strategic plan.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
2.6	Does your organisation have a financial plan?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	<b>IF 'NO' OR 'DON'T KNOW', <u>SKIP</u> TO 2.9</b>
2.7	The organisation's financial planning has improved revenue collection over the past two years.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	<b>CIRCLE THE <u>MOST</u> APPROPRIATE RESPONSE</b>
2.8	The organisation's financial planning has improved the financial sustainability of rural water schemes of water revenues over the past two years.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
2.9	Does the organisation have a monitoring and evaluation (M&E) system?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	<b>IF 'NO' OR 'DON'T KNOW', <u>SKIP</u> TO 3.1</b>
2.10	The existing M&E systems have improved the implementation of the operator's strategic and financial plans.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	<b>CIRCLE THE <u>MOST</u> APPROPRIATE RESPONSE</b>
<b>3.0</b>	<b>INCOME DIVERSIFICATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>		
3.1	What are the main sources of internally generated income for the organisation?	WATER REVENUE ..... 1 OTHERS ..... 2  _____	<b>SPECIFY 'OTHERS'</b>



		<hr/> <hr/> <hr/> <hr/>	
3.2	The operator's internally generated income has been reliable over the past one year.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	<b><u>CIRCLE THE MOST APPROPRIATE RESPONSE</u></b>
3.3	Internally generated income has improved the organisation's financial stability over the past one year.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
3.4	Up to 60% of internal income is derived from a single source.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
3.5	What are the main sources of external funding for the organisation?	SUBSIDIES ..... 1 GRANTS ..... 2 LOANS..... 3 OTHERS ..... 4 <hr/> <hr/> <hr/> <hr/>	<b><u>CIRCLE THE ALL THE RESPONSES THAT APPLY</u></b>  SPECIFY 'OTHERS'
3.6	The operator's external funding has been reliable over the past one year.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	<b><u>CIRCLE THE MOST APPROPRIATE RESPONSE</u></b>
3.7	Up to 60% of external funding come from a single source.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
<b>4.0</b>	<b>MANAGEMENT PRACTICES AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>		
4.1	Does your organisation have a Board of directors?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	IF 'NO' OR 'DON'T KNOW', <b><u>SKIP TO 4.5</u></b>
4.2			

	What is your view about the Board of directors in terms of the following attributes?					
		<b>V. GOOD</b>	<b>GOOD</b>	<b>UNDECIDED</b>	<b>POOR</b>	<b>V. POOR</b>
	a) Skill diversity	1	2	3	4	5
	b) Activeness	1	2	3	4	5
	c) Clarity of mandate	1	2	3	4	5
	d) Revenues policies	1	2	3	4	5
	e) Oversight of expenditure	1	2	3	4	5
	f) Work relations with management	1	2	3	4	5
4.3	All Board members are actively involved in decision making processes regarding revenues and expenditures.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE..... 4 DISAGREE STRONGLY ..... 5				CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
4.4	The Board of directors, through their decisions, has improved financial status of the organisation over the past two years.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE..... 4 DISAGREE STRONGLY ..... 5				
4.5	Does the organisation have a professional management team?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3				IF 'NO' OR 'DON'T KNOW', <b><u>SKIP</u></b> TO 4.7
4.6	What is your view about the management team in terms of the following attributes?					
		<b>V. GOOD</b>	<b>GOOD</b>	<b>UNDECIDED</b>	<b>POOR</b>	<b>V. POOR</b>
	a) Professional qualifications	1	2	3	4	5
	b) Professional experience	1	2	3	4	5
	c) Revenue generation	1	2	3	4	5
	d) Revenue diversification	1	2	3	4	5
	e) Expenditure management	1	2	3	4	5
	f) Work relations with Board	1	2	3	4	5
	g) Performance management	1	2	3	4	5
4.7	Type of accounting system in your organisation/water scheme.	FULLY AUTOMATED ..... 1 PARTIALLY AUTOMATED ..... 2 MANUAL ..... 3 DON'T KNOW ..... 4				CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
4.8	The organisation's accounting system is efficient.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE..... 4 DISAGREE STRONGLY ..... 5				
4.9	All management staff are given opportunity to participate in budget preparation processes.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE..... 4 DISAGREE STRONGLY ..... 5				
4.10						CIRCLE THE <b><u>MOST</u></b>

	All expenditures are managed within pre-planned budgets.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	APPROPRIATE RESPONSE
4.11	What is the budgeting period in your organisation?	MONTHLY ..... 1 QUARTERLY ..... 2 BIENNIAL ..... 3 ANNUAL ..... 4 DON'T KNOW ..... 5	
4.12	Availability of budgets has improved the organisation's financial status over the past one year.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
4.13	Cash flow problem is a common challenge in the organisation.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
4.14	Procurement of goods, services and works are done in accordance with legal provisions and regulations.	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
4.15	Does your organisation have an internal auditing department/unit?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	IF 'NO' OR 'DON'T KNOW', <b><u>SKIP</u></b> TO 4.18
4.16	What is your view about the internal auditing department/unit in terms of the following attributes?		
		<b>V. GOOD</b> <b>GOOD</b> <b>UNDECIDED</b> <b>POOR</b> <b>V. POOR</b>	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
	a) Staffing level	1   2   3   4   5	
	b) Skill adequacy	1   2   3   4   5	
	c) Competence/efficiency	1   2   3   4   5	
	d) Identification of irregularities	1   2   3   4   5	
	e) Management of irregularities	1   2   3   4   5	
			
4.17	The internal audit department/unit has improved the organisation's financial performance over the past two years?	AGREE STRONGLY..... 1 AGREE..... 2 UNDECIDED..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
4.18			IF 'NO' OR 'DON'T

	Has your organisation/water scheme been audited by external auditors over the past two years?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 3	KNOW', <u>SKIP TO 5.1</u>				
4.19	What is your view about the external auditing in terms of the following attributes?						
		<b>V. GOOD</b>	<b>GOOD</b>	<b>UNDECIDED</b>	<b>POOR</b>	<b>V. POOR</b>	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
	a) Timeliness	1	2	3	4	5	
	b) Consistency	1	2	3	4	5	
	c) Management of irregularities	1	2	3	4	5	
4.20	External auditing has improved the financial performance of the organisation.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5					CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
<b>5.0</b>	<b>REVENUE GENERATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>						
5.1	What is the type of billing system in your organisation/scheme?	FULLY AUTOMATED ..... 1 PARTIALLY AUTOMATED ..... 2 MANUAL ..... 3 DON'T KNOW ..... 4					CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
5.2	The organisation's/scheme's billing system is efficient.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5					
5.3	Revenue collection has reached the sector benchmark of >90% / is satisfactory.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5					
5.4	What payment methods have your organisation/scheme adopted?	CASH ..... 1 BANK ..... 2 MOBILE PHONE PAYMENT ..... 3 OTHERS ..... 4 _____ _____ _____ _____					CIRCLE THE <b><u>ALL THE RESPONSES</u></b> THAT APPLY
5.5	What payment method is <b>most</b> convenient to your customers?	CASH ..... 1 BANK ..... 2 MOBILE PHONE PAYMENT ..... 3 OTHERS ..... 4 _____ _____ _____ _____					SPECIFY 'OTHERS'
5.6		VERY HIGH ..... 1					CIRCLE THE <b><u>MOST</u></b>

	What is your view regarding the current level of water tariff, considering the purchasing power of the communities served?	HIGH ..... 2 UNDECIDED ..... 3 LOW ..... 4 VERY LOW ..... 5	APPROPRIATE RESPONSE
5.7	The level of water tariff is optimal for full cost recovery	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
5.8	The total water connection in the communities served by the organisation/scheme has reached the sector benchmark of >90%.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
5.9	The level of non-revenue water in the organisation/scheme is within the acceptable sector bench mark.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
5.10	The level of unaccounted for water in the organisation/scheme is within the acceptable limits.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
5.11	What is your view about the overall level of operational efficiency in your organisation/scheme?	VERY HIGH ..... 1 HIGH ..... 2 UNDECIDED ..... 3 LOW ..... 4 VERY LOW ..... 5	
5.12	Metering ratio in the communities served by the organisation/scheme has reached the sector benchmark/is satisfactory.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	
5.13	What are the main economic activities of the communities served by your organisation/scheme?	_____ _____ _____ _____	STATE ANY <b><u>FOUR</u></b> <b><u>IMPORTANT</u></b> ECONOMIC ACTIVITIES
5.14	Communities served by the organisation/scheme have sufficient economic power to pay water bills and user charges	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
5.15	Communities served by the organisation/scheme are willing to pay for services.	AGREE STRONGLY ..... 1 AGREE ..... 2 UNDECIDED ..... 3 DISAGREE ..... 4 DISAGREE STRONGLY ..... 5	CIRCLE THE <b><u>MOST</u></b> APPROPRIATE RESPONSE
<b>6.0</b>	<b>PERFROMANCE IN DEFRAYING O&amp;M COSTS</b>		
6.1		VERY GOOD ..... 1	CIRCLE THE <b><u>MOST</u></b>

	How would you rate the performance of your organisation in defraying operations and maintenance costs for its water schemes over the past one year?	GOOD ..... 2 POOR ..... 3 VERY POOR..... 4	<i>APPROPRIATE RESPONSE</i>
	<b>THANK YOU</b>		

## Appendix V: Key Informant Interview Guide

### WATER SECTOR REFORMS IN KENYA: INFLUENCE OF THE PRIVATE OPERATOR MODEL ON FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMS IN HOMA BAY COUNTY

#### T102: KEY INFORMANT INTERVIEW GUIDE

##### INTRODUCTION AND CONSENT

Hello. My name is **MarylineAkinyi**. I am a student at the University of Nairobi. I'm conducting a research, as part of requirements for the Masters degree in Project Planning and Management. The purpose of the study is to generate information that shall be shared with stakeholders to influence interventions aimed at informing stakeholders as well as influencing policy, programming and funding decisions in order to improve the quality and sustainability of water services provided by HOMA WASCO in the commercialised water market.

I humbly request for your support by participating in the interview. The study has no direct benefits to participants and there are no risks to your participation. Your decision to participate is highly appreciated. You may withdraw from the study at any time during your participation or within two days after the interview. After that it will be difficult to identify the information you have provided.

The information you provide will be kept strictly confidential and used for the purpose of this study only. The data may be accessed by my supervisor only, as part of Thesis examination. You should not indicate your name on the questionnaire. No information identifying you shall be reported in the Thesis or publications. By responding to the questionnaire, you provide consent for me to use data for the stated purposes – Thesis and publications.

Thank you for your time.

Yours sincerely,

AgwaMarylineAkinyi

##### MA Student

School of Continuing and Distance Education  
Department of Extra Mural Studies  
UNIVERSITY OF NAIROBI

P.O. Box 30197 – 00100,  
NAIROBI.

Email: [marylineagwa@gmail.com](mailto:marylineagwa@gmail.com)

Tel: +254721835156

1.1 DATE OF INTERVIEW	_____/_____/16
1.2 TYPE OF ORGANISATION	COMMERCIAL ..... 1 GOVERNMENT..... 2
1.3 SUB-COUNTY	HOMA BAY ..... 1 RACHUONYO NORTH ..... 2 RACHUONYO SOUTH ..... 3 MBITA ..... 4



1.5 What is your official designation?	<hr/> <hr/> <hr/>
1.6 GENDER	MALE ..... 1 FEMALE ..... 2
<b>2.0 INCOME GENERATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>	
<p>1. What are the main sources of water used by your organisation/institution? From which water scheme does your organisation/institution draw water? Who is the service provider? What would you say about adequacy of water accessed from the stated service provider in relation to the needs of your organisation/institution?</p> <p>2. Based on your experience with the service provider, what would you comment about water connection (<b>TIMELINESS AND COST</b>); billing (<b>ACCURACY AND TIMELINESS</b>); payment methods; and fairness of tariffs charged? <b>PROBE:</b> Do you have any concerns regarding these aspects that should be addressed to improve the quality of services?</p> <p>3. What are your views regarding reliability of water services provided by the stated service provider over the past two years? <b>IF NOT CLEAR, PROBE:</b> Have the services been accessible continuously? <b>IF NOT:</b> When are the services available and when are they not?</p> <p>4. What is the longest period you have stayed without accessing the services over the past two years? What were the reasons? How did this challenge affect your activities/business? How did your institution/organisation cope with the challenge?</p> <p>5. How often are the water systems maintained by the service provider? What are your views about regular maintenance of the water distribution system to avoid breakdowns? Do you think the service provider is doing enough? Why?</p> <p>6. What is the frequency of system breakdown? What types of system failures have you experienced over the past two years? How long did it take the service provider to correct such system problems after reporting? What are your views regarding the service provider's response to system breakdowns?</p> <p>7. Overall, how would you rate your satisfaction with the quality of services provided by HOMAWASCO over the past two years? What would advice the organisation to prioritize in order to improve the quality of services? What are your reasons?</p> <p style="text-align: center;"><b>THANK YOU</b></p>	

## Appendix VI: Focus Group Discussion Guide I

### WATER SECTOR REFORMS IN KENYA: INFLUENCE OF THE PRIVATE OPERATOR MODEL ON FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMS IN HOMA BAY COUNTY

#### T103: FOCUS GROUP DISCUSSION GUIDE I

#### INTRODUCTION AND CONSENT

Hello. My name is **MarylineAkinyi**. I am a student at the University of Nairobi. I'm conducting a research, as part of requirements for the Masters degree in Project Planning and Management. The purpose of the study is to generate information that shall be shared with stakeholders to influence interventions aimed at informing stakeholders as well as influencing policy, programming and funding decisions in order to improve the quality and sustainability of water services provided by HOMAWASCO in the commercialised water market.

I humbly request for your support by participating in the focus group discussion. The study has no direct benefits to participants and there are no risks to your participation. Your decision to participate is highly appreciated. You may withdraw from the study at any time during your participation or within two days after the interview. After that it will be difficult to identify the information you have provided.

The information you provide will be kept strictly confidential and used for the purpose of this study only. The data may be accessed by my supervisor only, as part of Thesis examination. You should not indicate your name on the questionnaire. No information identifying you shall be reported in the Thesis or publications. By responding to the questionnaire, you provide consent for me to use data for the stated purposes – Thesis and publications.

Thank you for your time.

Yours sincerely,

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P.O. Box 30197 – 00100,  
NAIROBI.

Email: [marylineagwa@gmail.com](mailto:marylineagwa@gmail.com)

Tel: +254721835156

1.1 DATE OF FGD	_____/_____/16		
1.2 SUB-COUNTY	HOMA BAY..... 1 RACHUONYO NORTH ..... 2 RACHUONYO SOUTH..... 3 MBITA ..... 4		
1.3 WATER SCHEME	HOMA BAY..... 1 MBITA ..... 2 KENDU BAY..... 3 OYUGIS ..... 4 WEST KARACHUONYO ..... 5 KANYADHIANG' ..... 6		
1.4 NO. OF PARTICIPANTS	MEN	WOMEN	TOTAL

1.5 FACILITATOR			
1.6 NOTE TAKER			
<b>2.0 INCOME GENERATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>			
<ol style="list-style-type: none"> <li>What are the main sources of water used by your family, for drinking, domestic requirements and livestock? <b>[PROBE FOR EACH TYPE OF USE]</b> What would you say about adequacy of water accessed from the stated sources, in relation to the needs of your family?</li> <li>Based on your experience with the stated water scheme (water service provider), what would you comment about water connection (<b>TIMELINESS</b> and <b>COST</b>); billing (<b>ACCURACY</b> and <b>TIMELINESS</b>); payment methods (<b>MERITS and DEMERITS</b>); and tariffs charged (<b>FAIRNESS</b> and <b>QUALITY OF SERVICES</b>)? <b>PROBE:</b> Do you have any concerns regarding these aspects? What are they and how should they be addressed?</li> <li>What are your views regarding reliability of water services provided by the stated service provider over the past two years? <b>IF NOT CLEAR, PROBE:</b> Have the services been accessible continuously? <b>IF NOT:</b> When are the services available and when are they not?</li> <li>What is the longest period you have stayed without accessing the services over the past two years? What were the reasons? How did this challenge affect you and your family? How did you cope with the challenge?</li> <li>How often are the water systems maintained by the service provider? What are your views about regular maintenance of the water distribution system to avoid breakdowns? Do you think the service provider is doing enough? Why?</li> <li>What is the frequency of system breakdown? What types of system problems have you experienced over the past two years? How long did it take the service provider to correct such system problems after reporting? <b>[PROBE FOR THE LONGEST AND SHORTEST DURATION]</b> What are your views regarding the service provider's response to system problems?</li> <li>Overall, how would you rate your satisfaction with the quality of water services over the past two years? What would advice the organisation to prioritize in order to improve the quality of services? What are your reasons?</li> </ol>			
<b>THANK YOU</b>			

## Appendix VII: Focus Group Discussion Guide II

### WATER SECTOR REFORMS IN KENYA: INFLUENCE OF THE PRIVATE OPERATOR MODEL ON FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMS IN HOMA BAY COUNTY

#### T104: FOCUS GROUP DISCUSSION GUIDE II

##### INTRODUCTION AND CONSENT

Hello. My name is **MarylineAkinyi**. I am a student at the University of Nairobi. I'm conducting a research, as part of requirements for the Masters degree in Project Planning and Management. The purpose of the study is to generate information that shall be shared with stakeholders to influence interventions aimed at informing stakeholders as well as influencing policy, programming and funding decisions in order to improve the quality and sustainability of water services provided by HOMAWASCO in the commercialised water market.

I humbly request for your support by participating in the focus group discussion. The study has no direct benefits to participants and there are no risks to your participation. Your decision to participate is highly appreciated. You may withdraw from the study at any time during your participation or within two days after the interview. After that it will be difficult to identify the information you have provided.

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Thank you for your time.

Yours sincerely,

AgwaMarylineAkinyi

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Email: [marylineagwa@gmail.com](mailto:marylineagwa@gmail.com)

Tel: +254721835156

1.1 DATE OF FGD	_____/_____/16
1.2 SUB-COUNTY	HOMA BAY..... 1 RACHUONYO NORTH ..... 2 RACHUONYO SOUTH..... 3 MBITA ..... 4
1.3 WATER SCHEME	HOMA BAY..... 1 MBITA ..... 2 KENDU BAY..... 3 OYUGIS ..... 4 WEST KARACHUONYO ..... 5 KANYADHIANG' ..... 6
	_____

1.4 TITLE OF THE COMMITTEE			
1.4 NO. OF FGD PARTICIPANTS	MEN	WOMEN	TOTAL
1.5 FACILITATOR	_____		
1.6 NOTE TAKER	_____		
1.7 VENUE	_____		
<b>2.0 ORGANISATIONAL PLANNING AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>			
1. What are your roles and responsibilities as a committee? Are these roles and responsibilities reflected in the current strategic plan? Please explain. 2. To what extent are the activities of the committee linked with the current strategic plan? What successes may be attributed to your water committee? [PROBE FOR CHANGES IN INCOME AND EXPENDITURE OVER THE PAST TWO YEARS] 3. Does the water scheme have financial plans? How often are such plans developed and revised? Is the committee involved in the financial planning process? 4. What is your view about the strengths and weaknesses of financial planning in your water scheme? [PROBE FOR INCOME GENERATION, THE FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES AND FINANCIAL SUSTAINABILITY OF THE SCHEME]			
<b>3.0 INCOME DIVERSIFICATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>			
1. What are the main sources of internally generated income for your water scheme? What are the main sources of external income or funding for scheme? 2. Looking at the internal and external income, which one is more important for your water scheme and why? Which one has contributed more to financial sustainability of your water scheme over the past two years? 3. What challenges are associated with internal and external sources of income? How do these challenges affect financial sustainability of the water scheme?			
<b>4.0 MANAGEMENT CAPACITY AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>			
1. What are your views regarding the capacity of your committee to undertake its functions? What are the challenges or skill gaps, if any? How do such affect financial sustainability of the scheme? 2. How would you describe the capacity of the water scheme's management team to deliver water services? [PROBE FOR CAPACITY IN REVENUE COLLECTION, REVENUE DIVERSIFICATION, MANAGEMENT OF EXPENDITURE] What are the challenges or capacity gaps? How do such challenges or capacity gaps undermine financial sustainability of the water scheme? [PROBE FOR THE FREQUENCY OF CASH FLOW PROBLEMS IN THE WATER SCHEME OVER THE PAST TWO YEARS] 3. What are your thoughts about the accounting system used by the water scheme, particularly focusing on strengths and weaknesses? To what extent has the internal financial control system contributed to the financial sustainability of the water scheme? Please explain. 4. What are your perspectives regarding external auditing of the water scheme, in terms of timeliness, consistency and prevention of irregularities? Has the external auditing of the scheme contributed to the financial sustainability of the water scheme? What are your reasons?			
<b>5.0 INCOME GENERATION AND FINANCIAL SUSTAINABILITY OF RURAL WATER SCHEMES</b>			

- a. What are your thoughts regarding water connectivity (**TIMELINESS, COST** and **COVERAGE**); billing (**ACCURACY** and **TIMELINESS**); payment methods (**MERITS** and **DEMERITS**); and tariffs charged (**FAIRNESS** and **QUALITY OF SERVICES**)? **PROBE:** Do you have any concerns regarding these aspects? **IF SO:** What are they and how should they be addressed?
- b. How reliable are the water services provided by the scheme? [**PROBE WHETHER SERVICES HAVE BEEN ACCESSIBLE TO USERS CONTINUOUSLY OVER THE PAST TWO YEARS**] **PROBE:** When are the services available and when are they not?
- c. What was the longest period of service discontinuation over the past two years? What were the reasons? How did this challenge affect the water scheme? What measures were taken by the management to cope with the situation?
- d. How often are the water systems maintained? What are your views about regular maintenance of the water distribution system? Do you think your committee and the management are doing enough to maintain water systems? Please explain.
- e. What is the frequency of system breakdown? What types of system problems have you experienced over the past two years? How long did it take to correct such system problems after reporting? [**PROBE FOR THE LONGEST AND SHORTEST DURATION**] What were the reasons for delay?
- f. How would you describe the level of **unaccounted for water** and **non-revenue water** over the past two years? how does the situation of the two aspects influence financial sustainability of the water scheme? What are your suggestions for improvement?

**THANK YOU**

## Appendix VIII: Regression Analysis Results

### Objective 1: Organisational planning & financial sustainability of rural water schemes

```
REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT v009
/METHOD=ENTER OPa1 OPa2 OPa3 OPa4 OPa5 OPa6
/METHOD=ENTER OPa1 OPa2 OPa3 OPa4 OPa5 OPa6 v001 v002 v003 v004.
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#### Regression

[DataSet1] C:\Users\user\Documents\Agwa\Agwa\Regression data.sav

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	Contribution of M&E to implementation of the operator's plans (OPa6), Contribution of the financial plan to expenditure management (OPa5), Consistency of water supply activities with the operator's strategic plan (OPa2), Contribution of the financial plan to revenue generation (OPa4), Coverage of priority areas by the operator's strategic plan (OPa1), Strategic plan implementation status (OPa3) <sup>b</sup>	.	Enter
2	Gender, Sub-County, Job category, Highest professional credit <sup>b</sup>	.	Enter

a. Dependent Variable: Performance in defraying o&m costs

b. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.334 <sup>a</sup>	.112	.103	.697
2	.430 <sup>b</sup>	.185	.167	.680

a. Predictors: (Constant), Contribution of M&E to implementation of the operator's plans (OPa6), Contribution of the financial plan to expenditure management (OPa5), Consistency of water supply activities with the operator's strategic plan (OPa2), Contribution of the financial plan to revenue generation (OPa4), Coverage of priority areas by the operator's strategic plan (OPa1), Strategic plan implementation status (OPa3)

b. Predictors: (Constant), Contribution of M&E to implementation of the operator's plans (OPa6), Contribution of the financial plan to expenditure management (OPa5), Consistency of water supply activities with the operator's strategic plan (OPa2), Contribution of the financial plan to revenue generation (OPa4), Coverage of priority areas by the operator's strategic plan (OPa1), Strategic plan implementation status (OPa3), Gender, Sub-County, Job category, Highest professional credit

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.665	6	1.111	2.287	.041 <sup>b</sup>
	Residual	52.947	109	.486		
	Total	59.612	115			
2	Regression	11.014	10	1.101	2.380	.014 <sup>c</sup>
	Residual	48.598	105	.463		
	Total	59.612	115			

a. Dependent Variable: Performance in defraying o&m costs

b. Predictors: (Constant), Contribution of M&E to implementation of the operator's plans (OPa6), Contribution of the financial plan to expenditure management (OPa5), Consistency of water supply activities with the operator's strategic plan (OPa2), Contribution of the financial plan to revenue generation (OPa4), Coverage of priority areas by the operator's strategic plan (OPa1), Strategic plan implementation status (OPa3)

c. Predictors: (Constant), Contribution of M&E to implementation of the operator's plans (OPa6), Contribution of the financial plan to expenditure management (OPa5), Consistency of water supply activities with the operator's strategic plan (OPa2), Contribution of the financial plan to revenue generation (OPa4), Coverage of priority areas by the operator's strategic plan (OPa1), Strategic plan implementation status (OPa3), Gender, Sub-County, Job category, Highest professional credit

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.546	.716		3.555	.001
	Coverage of priority areas by the operator's strategic plan (OPa1)	-.194	.279	-.108	-.696	.488
	Consistency of water supply activities with the operator's strategic plan (OPa2)	-.447	.165	-.358	-2.704	.008
	Strategic plan implementation status (OPa3)	-.203	.128	-.157	-1.581	.017
	Contribution of the financial plan to revenue generation (OPa4)	-.121	.129	-.118	-.938	.351
	Contribution of the financial plan to expenditure management (OPa5)	.550	.343	.289	1.602	.012
	Contribution of M&E to implementation of the operator's plans (OPa6)	.056	.134	.044	.421	.675
2	(Constant)	3.016	.825		3.655	.000
	Coverage of priority areas by the operator's strategic plan (OPa1)	-.199	.274	-.110	-.726	.469
	Consistency of water supply activities with the operator's strategic plan (OPa2)	-.423	.163	-.339	-2.595	.011
	Strategic plan implementation status (OPa3)	-.269	.130	-.208	-2.069	.041
	Contribution of the financial plan to revenue generation (OPa4)	-.098	.128	-.095	-.762	.448
	Contribution of the financial plan to expenditure management (OPa5)	.577	.336	.303	1.718	.089
	Contribution of M&E to implementation of the operator's plans (OPa6)	.049	.133	.038	.372	.710
	Sub-County	-.102	.088	-.108	-1.154	.251
	Gender	-.149	.177	-.077	-.841	.402
	Job category	.095	.052	.170	1.828	.070
	Highest professional credit	-.201	.109	-.178	-1.840	.069

a. Dependent Variable: Performance in defraying o&m costs



## Objective 2: Income diversification & financial sustainability of rural water schemes

```

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT v009
  /METHOD=ENTER IDa1 IDa3 IDa2 IDa4
  /METHOD=ENTER IDa1 IDa3 IDa2 IDa4 v001 v002 v003 v004.

```

### Regression

[DataSet1] C:\Users\user\Documents\Agwa\Agwa\Regression data.sav

Variables Entered/Removed <sup>a</sup>			
Model	Variables Entered	Variables Removed	Method
1	Extent of external funding diversification (IDa4), Extent of internal income diversification (IDa3), Reliability of internal income (IDa1), Reliability of external funding sources (IDa2) <sup>b</sup>	.	Enter
2	Gender, Highest professional credit, Job category, Sub-County <sup>b</sup>	.	Enter

a. Dependent Variable: Performance in defraying o&m costs

b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.715 <sup>a</sup>	.512	.502	.669
2	.744 <sup>b</sup>	.553	.535	.646

a. Predictors: (Constant), Extent of external funding diversification (IDa4), Extent of internal income diversification (IDa3), Reliability of internal income (IDa1), Reliability of external funding sources (IDa2)

b. Predictors: (Constant), Extent of external funding diversification (IDa4), Extent of internal income diversification (IDa3), Reliability of internal income (IDa1), Reliability of external funding sources (IDa2), Gender, Highest professional credit, Job category, Sub-County

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.708	4	23.427	52.361	.000 <sup>b</sup>
	Residual	89.483	200	.447		
	Total	183.190	204			
2	Regression	101.346	8	12.668	30.338	.000 <sup>c</sup>
	Residual	81.844	196	.418		
	Total	183.190	204			

a. Dependent Variable: Performance in defraying o&m costs

b. Predictors: (Constant), Extent of external funding diversification (IDa4), Extent of internal income diversification (IDa3), Reliability of internal income (IDa1), Reliability of external funding sources (IDa2)

c. Predictors: (Constant), Extent of external funding diversification (IDa4), Extent of internal income diversification (IDa3), Reliability of internal income (IDa1), Reliability of external funding sources (IDa2), Gender, Highest professional credit, Job category, Sub-County

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.110	.262		-.421	.674
Reliability of internal income (IDa1)	-.068	.048	-.072	-1.421	.157
1 Extent of internal income diversification (IDa3)	-.831	.080	-.875	-10.419	.000
Reliability of external funding sources (IDa2)	-.169	.071	-.120	-2.372	.019
Extent of external funding diversification (IDa4)	.259	.075	.287	3.459	.001
(Constant)	-.493	.392		-1.256	.211
Reliability of internal income (IDa1)	-.054	.047	-.057	-1.162	.247
Extent of internal income diversification (IDa3)	-.796	.079	-.839	-10.103	.000
Reliability of external funding sources (IDa2)	-.123	.070	-.087	-1.748	.082
2 Extent of external funding diversification (IDa4)	.260	.073	.289	3.554	.000
Sub-County	.143	.116	.060	1.237	.218
Gender	.044	.041	.053	1.069	.286
Job category	-.193	.051	-.200	-3.754	.000
Highest professional credit	-.125	.079	-.083	-1.583	.115

a. Dependent Variable: Performance in defraying o&m costs

### Objective 3: Management practices & financial sustainability of rural water schemes

```

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/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
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/NOORIGIN
/DEPENDENT v009
/METHOD=ENTER FMp1 FMp2 FMp3 FMp4 FMp5
/METHOD=ENTER FMp1 FMp2 FMp3 FMp4 FMp5 v001 v002 v003 v004.

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#### Regression

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**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	Relevance of activities on which water revenues are spent (FMp5), Effectiveness of internal audit in enforcing expenditure policies (FMp3), Conformance of expenditure to approved budgets (FMp1), Complainece of procurement activities to relevant legislations (FMp2), Effectiveness of external audit in improving financial management practices (FMp4) <sup>b</sup>	.	Enter
2	Job category, Gender, Highest professional credit, Sub-County <sup>b</sup>	.	Enter

a. Dependent Variable: Performance in defraying o&m costs

b. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.567 <sup>a</sup>	.322	.305	.803
2	.639 <sup>b</sup>	.408	.381	.758

a. Predictors: (Constant), Relevance of activities on which water revenues are spent (FMp5), Effectiveness of internal audit in enforcing expenditure policies (FMp3), Conformance of expenditure to approved budgets (FMp1), Complainece of procurement activities to relevant legislations (FMp2), Effectiveness of external audit in improving financial management practices (FMp4)

b. Predictors: (Constant), Relevance of activities on which water revenues are spent (FMp5), Effectiveness of internal audit in enforcing expenditure policies (FMp3), Conformance of expenditure to approved budgets (FMp1), Complainece of procurement activities to relevant legislations (FMp2), Effectiveness of external audit in improving financial management practices (FMp4), Job category, Gender, Highest professional credit, Sub-County

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.379	5	12.476	19.348	.000 <sup>b</sup>
	Residual	131.544	204	.645		
	Total	193.924	209			
2	Regression	79.122	9	8.791	15.316	.000 <sup>c</sup>
	Residual	114.802	200	.574		
	Total	193.924	209			

a. Dependent Variable: Performance in defraying o&m costs

b. Predictors: (Constant), Relevance of activities on which water revenues are spent (FMp5), Effectiveness of internal audit in enforcing expenditure policies (FMp3), Conformance of expenditure to approved budgets (FMp1), Compliance of procurement activities to relevant legislations (FMp2), Effectiveness of external audit in improving financial management practices (FMp4)

c. Predictors: (Constant), Relevance of activities on which water revenues are spent (FMp5), Effectiveness of internal audit in enforcing expenditure policies (FMp3), Conformance of expenditure to approved budgets (FMp1), Compliance of procurement activities to relevant legislations (FMp2), Effectiveness of external audit in improving financial management practices (FMp4), Job category, Gender, Highest professional credit, Sub-County

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.729	.282		-2.587	.010
	Conformance of expenditure to approved budgets (FMp1)	-.130	.047	-.165	-2.769	.006
	Compliance of procurement activities to relevant legislations (FMp2)	-.314	.045	-.435	-6.993	.000
	Effectiveness of internal audit in enforcing expenditure policies (FMp3)	-.181	.050	-.222	-3.611	.000
	Effectiveness of external audit in improving financial management practices (FMp4)	-.052	.043	-.074	-1.226	.032
	Relevance of activities on which water revenues are spent (FMp5)	-.222	.047	-.283	-4.727	.000
	(Constant)	-1.323	.418		-3.163	.002
2	Conformance of expenditure to approved budgets (FMp1)	-.097	.046	-.123	-2.119	.035
	Compliance of procurement activities to relevant legislations (FMp2)	-.297	.043	-.411	-6.957	.000
	Effectiveness of internal audit in enforcing expenditure policies (FMp3)	-.157	.048	-.192	-3.300	.001
	Effectiveness of external audit in improving financial management practices (FMp4)	-.020	.041	-.028	-.481	.631
	Relevance of activities on which water revenues are spent (FMp5)	-.225	.044	-.287	-5.060	.000
	Sub-County	-.280	.059	-.284	-4.726	.000
	Gender	.150	.134	.062	1.124	.262
	Job category	.081	.046	.098	1.743	.083
	Highest professional credit	-.128	.091	-.084	-1.408	.161

a. Dependent Variable: Performance in defraying o&m costs

## Objective 4: Revenue generation & financial sustainability of rural water schemes

```

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT v009
  /METHOD=ENTER RGa1 RGa2 RGa3 RGa4 RGa5
  /METHOD=ENTER RGa1 RGa2 RGa3 RGa4 RGa5 v001 v002 v003 v004.

```

### Regression

[DataSet1] C:\Users\user\Documents\Agwa\Agwa\Regression data.sav

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	Unaccounted for water within acceptable limits (RGa5), Efficiency of revenue collection (RGa2), Appropriateness of water tariffs in relation to cost recovery (RGa3), Efficiency of the operator's billing system (RGa1), Non-revenue water within acceptable limits (RGa4) <sup>b</sup>	.	Enter
2	Gender, Highest professional credit, Job category, Sub-County <sup>b</sup>	.	Enter

a. Dependent Variable: Performance in defraying o&m costs

b. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642 <sup>a</sup>	.412	.398	.748
2	.677 <sup>b</sup>	.458	.434	.725

a. Predictors: (Constant), Unaccounted for water within acceptable limits (RGa5), Efficiency of revenue collection (RGa2), Appropriateness of water tariffs in relation to cost recovery (RGa3), Efficiency of the operator's billing system (RGa1), Non-revenue water within acceptable limits (RGa4)

b. Predictors: (Constant), Unaccounted for water within acceptable limits (RGa5), Efficiency of revenue collection (RGa2), Appropriateness of water tariffs in relation to cost recovery (RGa3), Efficiency of the operator's billing system (RGa1), Non-revenue water within acceptable limits (RGa4), Gender, Highest professional credit, Job category, Sub-County

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.896	5	15.979	28.588	.000 <sup>b</sup>
	Residual	114.027	204	.559		
	Total	193.924	209			
2	Regression	88.864	9	9.874	18.796	.000 <sup>c</sup>
	Residual	105.060	200	.525		
	Total	193.924	209			

a. Dependent Variable: Performance in defraying o&m costs

b. Predictors: (Constant), Unaccounted for water within acceptable limits (RGa5), Efficiency of revenue collection (RGa2), Appropriateness of water tariffs in relation to cost recovery (RGa3), Efficiency of the operator's billing system (RGa1), Non-revenue water within acceptable limits (RGa4)

c. Predictors: (Constant), Unaccounted for water within acceptable limits (RGa5), Efficiency of revenue collection (RGa2), Appropriateness of water tariffs in relation to cost recovery (RGa3), Efficiency of the operator's billing system (RGa1), Non-revenue water within acceptable limits (RGa4), Gender, Highest professional credit, Job category, Sub-County

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.845	.300		-2.812	.005
	Efficiency of the operator's billing system (RGa1)	-.270	.062	-.236	-4.351	.000
	Efficiency of revenue collection (RGa2)	-.174	.050	-.198	-3.464	.001
	Appropriateness of water tariffs in relation to cost recovery (RGa3)	.062	.055	.064	1.129	.260
	Non-revenue water within acceptable limits (RGa4)	-.414	.058	-.416	-7.156	.000
	Unaccounted for water within acceptable limits (RGa5)	-.143	.046	-.172	-3.121	.002
	(Constant)	-.181	.434		-.418	.676
	Efficiency of the operator's billing system (RGa1)	-.212	.063	-.186	-3.394	.001
	Efficiency of revenue collection (RGa2)	-.171	.049	-.195	-3.495	.001
	Appropriateness of water tariffs in relation to cost recovery (RGa3)	.072	.054	.074	1.332	.184
2	Non-revenue water within acceptable limits (RGa4)	-.372	.057	-.374	-6.498	.000
	Unaccounted for water within acceptable limits (RGa5)	-.127	.046	-.152	-2.768	.006
	Sub-County	-.106	.057	-.109	-2.598	.000
	Gender	.125	.128	.052	.979	.329
	Job category	.058	.046	.071	1.280	.202
	Highest professional credit	-.134	.086	-.088	-1.547	.123

a. Dependent Variable: Performance in defraying o&m costs