THE ROLE OF COMMUNITY-BASED WATER SUPPLY ORGANISATIONS IN ENHANCING THE ECONOMIC SUSTAINABILITY OF RUWASA PROJECTS IN KYERWA DISTRICT

SHUKRANI MARTINE

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PROJECT MANAGEMENT

DEPARTMENT OF MARKETING, ENTREPRENEURSHIP AND MANAGEMENT

THE OPEN UNIVERSITY OF TANZANIA

2023

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Open University of Tanzania a dissertation entitled: **"Role Played by Community-Based Water Supply Organisations in Enhancing Economic Sustainability of Projects Managed by Ruwasa in Kyerwa District".** In partial fulfilment of the requirement for the degree of Master of Project Management of the Open University of Tanzania.

.....

Dr. Janeth Isanzu

(Supervisor)

.....

Date

.....

Dr. France Shayo

(Supervisor)

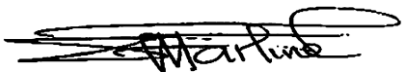
……..

Date

COPYRIGHT

DECLARATION

I, **Shukrani Martine,** declare that the work presented in this dissertation is original. It has never been presented to any other university or institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as original mine. It is hereby presented in partial fulfilment of the requirement for the Degree of Masters of Project Management (MPM) of The Open University of Tanzania.



…….

Signature

…….

Date

ACKNOWLEDGEMENTS

I want to begin by expressing my profound gratitude to the Almighty God for enabling me to achieve this significant milestone. His unwavering support has been evident in every step of my journey, and I am eternally thankful for His guidance and blessings. Next, I extend heartfelt thanks to my parents, Mr. Malima Tungaraza and Ms. Miriam Chausiku Maingu. Their unwavering encouragement and constant prayers have been a source of strength, providing solace during challenging moments.

I must also acknowledge and appreciate my supervisors, Janeth Isanzu (PhD) and Dr. France Shayo (PhD), for their consistent support, invaluable mentorship, and encouraging words. Their guidance has been instrumental in my academic journey, and I am grateful for their willingness to assist, even during weekends.

Furthermore, I want to express my sincere gratitude to my classmates, instructors, and the entire OUT community for their camaraderie and support throughout my studies. The collaborative spirit within this community has been an inspiration and a driving force behind my academic accomplishments. In addition to this, special thanks go to the board members and team of the Community-Based Organization (CBWSOs) in Kyerwa district, as well as all their dedicated employees. Their cooperation during the crucial stage of data collection for this research has been instrumental in its success.

Lastly, I extend my appreciation to the Open University of Tanzania for providing

me with the opportunity to conduct this research and for imparting valuable knowledge and guidance. To all my friends, relatives, and supporters who have contributed to my journey, even if not explicitly mentioned, your support is genuinely appreciated.

DEDICATION

I dedicate this work to my entire lovely family as follows. My Father Mr. Malima Musiba Tungaraza and Mother Ms. Mirriam Chausiku Maingu. Brothers; Robert Malima Tungaraza, Stanislaus Malima Tungaraza, Antanas Malima Tungaraza, Tumaini Malima Tungaraza and my sisters Frazia Malima Tungaraza and Debora Malima Tungaraza

ABSTRACT

The study examined the role played by community-based water supply organisations in enhancing the economic sustainability of projects managed by RUWASA in the Kyerwa district. Survey research design with quantitative and qualitative approaches was used. A sample size of 74 respondents that involved the water board and CBWSO members was collected using a questionnaire and interview guide. Quantitative data was analysed descriptively while qualitative data was analysed using content analysis. The findings revealed that CBWSOs influenced paid labour through community knowledge provision and involvement of monetary, material equipment and labour to the extent of enhancing community involvement and sustainability of the water projects. CBWSOs influenced the payment of water bills in time despite the economic hardship experienced by water users; reliance on government subsidy and external support due to poor community and household economy resulted in people making choices and committing resources in support of bill payments in time. CBWSOs ensured water project infrastructure operations and maintenance in the Kyerwa district by enhancing the idea and attitude of 'do it with people' to facilitate infrastructure operations; choosing leaders who facilitated transparency and honesty on water development projects, laying down strategies and operations by harmonizing policy, planning and practices to enable the attainment of sustainable water projects. It is recommended that to enable the sustainability of water projects; the choice of leaders, improving household economy and community involvement are important to enable water points operating in good condition.

Key words: *Projects; Community-based water supply organisations; Economic sustainability; Rural water supply and sanitation agency.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ATAWAS	Association of Tanzania Water Suppliers
CART	United Republic of Tanzania
CBWSOs	Community-Based Water Supply Organisations
LGAs	Local Government Authorities
NAWAPO	National Water Policy
NRW	Non-Revenues Water
RSS	Regional Secretariats
RUWASA	Rural Water Supply and Sanitation Agency
RWSN	Rural Water Supply Network
SPSS	Statistical Package for Social Sciences
UWASSAs	Urban Water Supply and Sanitation Authorities
WHO	World Health Organisation
WUAs	Water Users Associations

CHAPTER ONE

INTRODUCTION

1.1 Chapter Overview

This chapter provides background information regarding the involvement of Community-Based Water Supply Organizations (CBWSOs) in improving the economic sustainability of projects overseen by the Rural Water Supply and Sanitation Agency (RUWASA) in the Kyerwa district. It encompasses the background and articulation of the problem, the research objectives and questions, as well as the scope and structure of the study.

1.2 Background of the Study

Water, a fundamental element of life, is indispensable, with its significance extending to factors such as availability, quality, and economic viability (Water Aid, 2014). It is projected that by 2025 more than 3 billion people will be living in water-stressed countries and 14 countries will slip from water stress to water scarcity where the vastly uneven distribution of freshwater resources, combined with changes due to climate change, is already deepening water-related problems (WHO, 2012). Rural Water Supply Network (RWSN, 2010) indicates that regardless of various efforts and investments towards ensuring access to safe drinking water, many water projects in developing countries have failed to operate sustainably. For example, it has been estimated that the hand pump, which provides nearly half of the protected water supplies for Africa's rural population, has an estimated functionality rate of approximately 66% (World Bank, 2018). Across rural Sub-Saharan Africa, an

average of 36% of hand pumps are non-operational at any given time and in some countries, it is estimated that more than 60% of hand pumps are non-operational; the reason may be poor community ownership andparticipation (WHO, 2011).

Community ownership and participation play an important role in sustaining an improved water supply (Chumbula, 2015). Over the past 30 years, the community-based management model sought to empower communities to own the operation and maintenance of their water points. The goal was to leverage the expertise of local mechanics for more frequent repairs and avoid delays in government-initiated maintenance services (World Bank, 2018). By engaging communities in the planning and development of projects, the expectation was that they would have more incentive to keep their water points operating in good condition, and the consistent supply would encourage regular user payments supporting continued functionality and service improvements. However, while studies found community involvement in planning and management-related decision-making contributes to positive economic sustainability outcomes, taking on more complex technical roles does not lead greatly to sustainability (Marks et al., 2014). Further, water committees such as community-based water supply organisations (CBWSOs) are often unable to collect enough funds to pay for maintenance and repairs fully. The cited reasons include a lack of trust in water committees due to misuse of money and a lack of payment enforcement by committees (Chowns, 2015).

Mayo and Nkiwane (2013) reported that the government of Tanzania reformed its 1991 National Water Policy (NAWAPO) by encouraging private sectors and

institutions to participate in the provision of water supply and basic sanitation services. Through the decentralization approach, water resource is not only managed at a national level but also local levels by insisting on participatory approaches in water projects that inculcate a sense of community ownership of the projects and therefore improve projects' achievements and economic sustainability (World Bank, 2018).

Chowns (2015) investigated the factors necessary to provide reliable operation and maintenance services for rural water systems and found that access to spare parts was essential for maintenance, but a lack of consistent spare parts supply has left communities with few options when a breakdown occurs. He suggested the use of professionalized maintenance services to alleviate the responsibility placed on communities from the community-based management model and improve the reliability of water services.

Stigler (2013) employed mixed methods techniques to examine the health, cultural outcomes and economic sustainability of new water infrastructure projects in two indigenous communities in Baja, Mexico. The results from the study revealed that after receiving new water infrastructure in both communities, neither saw a reduction in rates of gastrointestinal illness. Household point-of-use water quality was still poor despite the introduction of the new infrastructure. Besides, beneficiaries failed to accept the new infrastructure and the reason cited for doing so was the cultural significance of the previous water source from the community's point of view. The recommendation made by the study was that it is important to incorporate community

participation approaches into the planning and implementation of water improvements for the economic sustainability of the projects.

The government of Tanzania has adhered to the community participation approach and decided to decentralize the rural water supply and management to the communities, as well as making CBWSOs responsible legal entities. This study utilizes the transparent water management theory that focuses on a descriptive approach to water use systems towards economic sustainability and equity for development, water users can pay for labour, and water bills in time and ensure water project infrastructure operations and maintenance towards efficient use of water resources. Instead of that, the district has been given a directive for implementing CBWSO strategies by registering organizations, and monitoring and supervising them (URT, 2015).

Despite all these improvements, the water sector continues to experience low levels of economic sustainability and stagnation in levels of access to water for domestic use in rural areas such as the Kyerwa district. It is against this backdrop that this study examined the role played by CBWSOs in enhancing the economic sustainability of projects managed by RUWASA in the Kyerwa district.

1.3 Statement of the Problem

The Tanzanian government and its donor partners have been investing substantial funds in ensuring the sustainability of clean water projects, particularly in rural areas (Kirenga et al., 2018). However, the current funding levels are deemed insufficient and not sustainable over the long term. Additionally, many countries, including Tanzania, face challenges in obtaining the necessary information for effective

financial planning in the water services sector. This includes inadequate data on users and their potential contributions to achieving economic sustainability (Kanda et al., 2018). The operational and maintenance costs of water infrastructure are frequently overlooked or not adequately considered in water mobilization projects (Stigler, 2013). Consequently, numerous water systems managed by Community-Based Water Supply Organizations (CBWSOs) suffer from inadequate maintenance, resulting in damages, losses, unreliability, and a decline in both the quality and quantity of services provided to users (World Bank, 2018).

Additionally, the implementation of changes by the Tanzanian government, particularly the adoption of a community management model known as community-owned water supply organizations, did not empower CBWSOs to economically, efficiently, and sustainably manage water supply projects (Kirenga et al., 2018). According to a study conducted by Kanda et al. (2018), challenges hindering CBWSOs from achieving economic sustainability include issues such as high non-revenue water, elevated operational and maintenance costs, limited metering of connections, insufficient revenue collections, governance issues, and low quality of services. Despite these efforts, nearly half of the Tanzanian population still lacks access to safe water (Water Aid, 2014). This scarcity is attributed to the limited lifespan of water projects in Tanzania. For instance, research conducted by Kaliba (2002) on the participatory evaluation of community-based water and sanitation programs in central Tanzania revealed that 109 out of 357 water projects in the Dodoma Region were non-functional. The prevalence of failed projects indicates a lack of sustainability in their implementation.

Despite the government's endeavours to enhance Rural Water Supply Management (RWSM) by implementing a community ownership and participation approach through the CBWSOs system, there remains uncertainty about the effectiveness of CBWSOs in fostering economic sustainability at the Kyerwa district level. It is against this backdrop that this study seeks to investigate the contribution of CBWSOs to the economic sustainability of projects overseen by RUWASA in the Kyerwa district.

1.4 The Objective of the Study

1.4.1 General Objective

To examine the role played by Community-Based Water Supply Organisations in enhancing the economic sustainability of projects managed by the Rural Water Supply and Sanitation Agency in the Kyerwa district.

1.4.2 Specific Objectives

i) To examine the extent to which CBWSOs influence the provision of paid labour to water projects in the Kyerwa district

ii) To determine how CBWSOs influence the payment of water bills on time among water users in the Kyerwa district

iii) To examine the extent to which CBWSOs ensure water project infrastructure operations and maintenance in the Kyerwa district

1.5 Research Questions

i) To what extent do CBWSOs influence the provision of paid labour to water projects in the Kyerwa district?

ii) How do CBWSOs influence the payment of water bills on time among water users in Kyerwa?

iii) To what extent do CBWSOs ensure water project infrastructure operations and maintenance in the Kyerwa district?

1.6 Scope of the Study

This study was conducted in the Kyerwa district, Kagera region. It focused on examining the extent to which CBWSOs influence the provision of paid labour to water projects in the Kyerwa district; determining how CBWSOs influence the payment of water bills in time among water users in the Kyerwa district and examining the extent to which CBWSOs ensure water project infrastructure operations and maintenance inKyerwa district.

1.7 Significance of the Study

This study is significant to water users with their roles in sustaining water projects economically in the Kyerwa district. It provides knowledge to water stakeholders to achieve a deep understanding of how water supply projects would be economically sustained through water user labour payment, bill payment by users and enabling infrastructure operations and maintenance. The recommendations might lead to possible solutions in terms of the policy to either improve or suggest more efficient policy management practices for water projects while addressing future economic improvements and sustainability. Additionally, the study is for the researcher's attainment of a master's degree in Project Management from the Open University of Tanzania.

1.8 Organisation of Study

This study is organized into five chapters. Chapter one presents the background information focusing on the background to the problem, statement of the problem, research objectives and questions, scope and organisation of the study. Chapter two presents the definitions of key terms, theoretical and empirical reviews on relevant works of literature related to the study, research gap and conceptual framework. Chapter three presents the research methodology used in the study. It focused on the study area, research approach and design, population, sample size and sampling procedures, data collection tools, reliability and validity of data, data analysis and ethical considerations. Chapter four presents the results and findings while chapter five presents the conclusion and recommendations arising from the study findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

In this chapter, a comprehensive review is explored, encompassing both theoretical underpinnings and empirical evidence, to establish a robust foundation for our research. The elucidation of these key components forms the groundwork for the subsequent development of the conceptual framework, which will guide the systematic exploration and analysis undertaken in this study.

2.2 Conceptual Definitions

2.2.1 Community-Based Water Supply Organisations

Community-based water supply organisations (CBWSOs) are organisations normally organised as Water Users Associations (WUAs) headed by a Board of Directors or need to report back to a General Assembly. These organisations exist on their own but may very well form larger collectives (e.g. Regional and National Water Users Associations) (URT, 2017). Strategic partnerships can also be built with other entities such as government agencies and non-governmental organisations (Kirenga et al., 2018).

2.2.2 Economic Sustainability

Kirenga et al., (2018) defined economic sustainability as the means used to safeguard and sustain resources (human and material) to create long-term sustainable values by optimal use, recovery and recycling. Also, economic sustainability is an integrated part of sustainability and means that we must use, safeguard and sustain resources

(human and material) to create long-term sustainable values by optimal use,recovery and recycling (Marks et al., 2014). On the other hand, economic sustainability entails evaluating the environmental impact of economic activity and devising sustainability goals to create a more livable future. The definition by Kirenga et al (2018) fits the study.

2.2.3 Project

A project is any undertaking, carried out individually or collaboratively and possibly involving research or design, that is carefully planned (usually by a project team) to achieve a particular aim (Odour, 2015). It is an individual or collaborative enterprise that is carefully planned to achieve a particular aim. Also, a project is a series of tasks that need to be completed to reach a specific outcome (Stigler, 2013). The definition by Odour (2015) fits the study.

2.2.4 Rural Water Supply and Sanitation Agency (RUWASA)

This is a newly established agency responsible for the development and sustainable management of water supply and sanitation projects and water service delivery in rural areas (Kirenga et al, 2018). The agency has been established by the new Water Supply and Sanitation Act No.5 of 2019, among other things, established The Rural Water Supply and Sanitation Agency (RUWASA) which took over mandates that were previously vested to PO-RALG, Regional Secretariats (RSs) and Local Government Authorities (LGAs). The transferred mandates involve ensuring the provision of water services to rural communities, small towns and district headquarters.

The Water Supply and Sanitation Act No.5 of 2019 has also transferred accountability of officers responsible for water service provisions from PO-RALG, RSs and LGAs to the Ministry of Water. The newly established Agency (RUWASA) has offices at the Headquarters, Regional and District levels as opposed to the previous structure which is composed of offices at the LGAs level and RSs. With its Headquarters in Dodoma, the Capital of Tanzania; and having assumed its functions on 1st July 2019 RUWASA operates in 25 regions in Tanzania mainland except for Dar Es Salaam (URT, 2019).

The establishment of a new rural water services regulatory agency, the Rural Water Supply and Sanitation Agency (RUWASA), aims to centralize and improve accountability for rural service delivery. It also aims to build capacity and professionalism for rural water supply operations and maintenance. Institutions such as the Water Institute at Ubungo and the umbrella association, the Association of Tanzanian Water Suppliers (ATAWAS), serve in capacitating Urban Water Supply and Sanitation Authorities (UWSSAs) to address pressing challenges such as high non-revenue water (NRW) and financial sustainability.

2.3 Theoretical Review

This study was underpinned by the Transparent Water Management Theory, providing a robust theoretical framework to examine the role played by Community-Based Water Supply Organizations (CWSOs) in enhancing the economic sustainability of projects managed by the Rural Water Supply and Sanitation Agency in the Kyerwa district.

2.3.1 Transparent Water Management Theory

This theory was developed by Naim Haie in 2020 with its first publication in 2021. The theory is vital for water policy, planning, sustainability and practice due to the high complexity inherent in water use systems, which, in turn, demands a coherent and clearly defined terminology for transparent and accurate analysis in terms of economic, environmental and social sustainability. In this theory, Haie (2021) provided a system of ideas intended to explain general principles based on five foundational ideas using independent principles, and a basic law of nature to guide water management processes toward economic sustainability. Furthermore, his thoughts of developing a theory for water use systems emerged when the author was reading the book of the late eminent scholar John Rawls entitled "A Theory of Justice". In this famous book, the author advanced a theory based on three fundamental ideas; one of which (the Difference Principle) gave impetus to some of the important developments of the theory (Water Aid, 2014).

Haie (2021) states that the emergence of a universal aggregative indicator and an objective distributive approach for water use systems are significant outcomes of the theory, which served as the foundation towards economic sustainability. The author stated that there is a fundamental difference between descriptive and performance indicators of a water use system namely economic, social, technological and environmental. The former responds to the question "What is happening?", and the latter focuses on the questions, such as "Does it matter? Are targets reached?" To answer these questions, Haie (2021) used efficiency as a performance indicator, which helps to attain more of the things valued and develop systemic, comprehensive and

objective performance indicators based on a universal principle integrating the differentials of the three pillars of water management, namely water quantity, water quality and water economic benefit. These reveal trade-offs among the three pillars at three levels of management with climate and energy descriptors and stakeholder enablers (Chowns, 2015).

Haie (2021) coined the idea of equity that is related to development, which is a process of expanding the real freedoms that people enjoy. Furthermore, freedom can be distinguished both from the means that sustain it and from the achievements that it sustains. In this theory, the author focused on water as a means keeping in mind that economically sustainable water equity means a fair share considering the water needs and the ability to use the water efficiently. These two requirements, i.e., need and efficiency, have degrees (i.e., they are not binary) and correspond to two principles: distributive and aggregative, respectively. In progress in the two requirements, the author developed an approach to enable transparent and impartial communication, to focus attention on problematic situations through categorization, and to elaborate policy guidelines to coherently and consistently solve management issues (Burk, 2018).

The theory helps the users of water to appreciate the wide range of situations that the concepts and tools presented in theory should be employed to get a better insight into their economic functioning. The application examples are about urban water and wastewater cycle, urban water equity, economic sustainability, irrigation under water scarcity, water-energy-food entangled systems, and the combined impactof an urban

area and an irrigation zone on their common source of water, which is a river with a minimum water requirement. This theory might explain and solve the problems associated with the economic sustainability of water supply schemes concerning the Kyerwa district.

The strengths of the theory include; harmonizing the policy, planning, sustainability and practices of water-related management while expanding the freedom of people to enjoy and utilize water in a friendly manner. Its weakness is that it provides little insight into the economic functioning of water management.

2.4 Empirical Review

2.4.1 CBWSO Influence on the Provision of Paid Labour to Water Projects

The World Bank (2017) carried out a study and found that Governments and water sector stakeholders such as CBWSOs have worked hard to ensure improvement in institutional capacities through policies and guiding frameworks for sustainable service delivery through adopting technology-friendly for their use with labour provision. There was a need to move beyond infrastructure development to ensure water service providers receive capacity building with a focus on governance, technical capacity and equipping with information.

The findings further showed the challenge of financing rural water supply projects since these projects cannot recover costs, capital maintenance, cost of operations and maintenance yet they collect revenues from the sale of water. It was recommended that rural schemes may require cost recovery in this line of thought where the

government is usually called to fix broken parts or replace infrastructure without considering the Life Cost Cycle approach.

Cook (2017) carried out a study in Thailand on investments in the water sector that focused on the economic value of time and cost savings through improved water systems that would enable people to have the ability to pay for and use water for the saved time and costsin other productive activities which in turn boosts the chances of sustainably managing the systems. The survey research design with a questionnaire was used. The findings revealed the availability of an improved water supply defined as a system that provided water reliably, of potable quality and of sufficient quantity to meet basic household needs like drinking, bathing, cooking, and washing around the house managed by community organisations.

A study conducted by Toan et al (2023) in Vietnam aimed at meeting the target of investing in infrastructure and maintaining the sustainability of water systems was found to be crucial. This study took into account the role of the management model of rural water supply systems and its relationship with the sustainability of the water systems. A weighing procedure for a sustainability assessment of rural water systems for the current study was proposed, and then an ordered logit regression model was applied to examine the relationship between types of water system management models and the sustainability of the water systems in the context of Vietnam. The results from this study showed that the type of management model influenced the sustainability of rural water supply systems, and the private management model was considered the one that significantly contributed to the sustainability of the rural

water systems in the study area. The study provides some lessons learned for researchers in the field of rural water supply to select appropriate approaches to assess the sustainability of water systems and for policymakers to modify current policies toward more sustainable development of water infrastructure in the future, especially in developing countries.

2.4.2 CBWSO Influence on Payment of Water Bills in Time

Olela and Wanyonyi (2018) carried out a study on the factors for the sustainability of watersupply projects in paying water bills in Kenya. Regression analysis to find the relationship between variables was carried out. The findings revealed that there is a positive relationship between the sustainability of water supply projects and the choice of technology, water tariffs, socio-cultural factors, socio-economic factors and specialized training of service teams. The significance values for the relationship between sustainability of water supply projects and choice of technology, socio-economic factors, socio-cultural factors, water tariffs and specialized training on technical knowledge and skills. Training, availability of spare parts and water abstraction technology were prerequisites towards sustainability resulting in reliable access to water duration to minimize breakdowns. There was a lack of involvement and participation in the water supplydevelopment process including tariff setting with household consumption a major factor to consider in tariff setting.

A study was conducted by Kativhu et al (2017) in Zimbabwe to investigate the factors influencing the sustainability of rural water supply systems with a total of 399 water points studied in Nyanga, Chivi and Gwanda districts using a questionnaire,

observation checklist and key informant interview guide. Multi-criteria analysis was used to assess the sustainability of water points and inferential statistical analysis such as Chi-square tests and Analysis of Variance (ANOVA) were used to determine if there were significant differences in selected variables across districts and types of lifting devices used in the study area. The thematic approach was used to analyze qualitative data. Results show that most water points were not functional and only 17% across the districts were found to be sustainable. A fusion of social, technical, financial, environmental and institutional factors was found to be influencing sustainability. On technical factors, the ANOVA results show that the type of lifting device fitted at a water point significantly influences sustainability ($F = 37.4$, $p < 0.01$). The availability of spare parts at the community level was found to determine the downtime period of different lifting devices in the studied wards. The absence of user committees was found to be central in influencing sustainability as water points that did not have user committees were not sustainable and most of them were not functional during the time of the survey. Active participation by communities at the planning stage of water projects was also found to be critical for sustainability although field results showed passive participation by communities at this critical project stage. Financial factors of adequacy of financial contributions and establishment of operation and maintenance funds were also found to be of great importance in sustaining water supply systems. It is recommended that all factors should be considered when assessing sustainability since they are interrelated.

Mamburi (2014) in his study found that the sustainability rate of rural water supply systems increased as a result of communities' owning and managing their schemes

through user fees, the existence of management organizations at the village level, protection of the water point, communities cost recovery for operation and maintenance, technology type and availability of their spare parts. He recommended the need for users to be capacitated to pay for the services they get through the management of community organisations.

2.4.3 CBWSO Influence on Water Project Infrastructure Operations and Maintenance

Oduor (2015) carried out a study focusing on sub-Saharan African countries. A descriptive design was used along with a questionnaire. He found that countries mostly deviate resources meant for the poor due to selfishness and halt the project's development especially when they establish a relationship with the local elites creating room for exploitation of resources meant for the impoverished where the poor water users become unable to pay for the services rendered. It was further found that the federal government manages water resources; state governments supply water to the urban areas and local governments together with communities deal with water supply in rural areas which do not have the resources to do so. As most of the countries provide limited finance while most of the water projects are financed by donors, their economic and social sustainability have been questionable.

Kirenga et al (2018) conducted a study in Tanzania on the influence of the Water Fund on the sustainability of community-managed rural water supply projects. A survey research design with a questionnaire was used. It was found thatthe water fund collected was inadequate to cover the operations and maintenance costs due to low

levels of tariff and weak water consumption rates. It was recommended that the reliance on external funds could not predict the economic sustainability of projects when donor funding was no more.

A study conducted by Daniel et al (2022) in Indonesia used multinomial logistic regression and Bayesian belief networks (BBN) to analyze factors influencing the functionality of the community-based rural drinking water supply and sanitation program (PAMSIMAS). 28,936 PAMSIMAS projects in 33 provinces in Indonesia were analyzed. The data indicates that 85.4% of the water supply systems were fully functioning, 9.1% were partially functioning, and 5.5% were not functioning. In the regression analysis, good management is positively associated with functionality and a high investment per capita is negatively associated with the functionality. The latter suggests the need for comprehensive economic analysis in the feasibility study in scattered housing sites and remote-undeveloped areas. It was further found that high community participation at the beginning of the project was associated with the not functioning system, while women's participation was positively associated with the functionality. Furthermore, the household connection is more likely to be functioning than the communal connection. BBN analysis shows if the beneficiaries do not pay for water, the probability of not functioning systems is 20 times higher than systems with fee collection. Moreover, the combination of strong management, strong financial status, and household connection rather than communal connection increases the probability of fully functioning to 98%. Improvement of data collection is also necessary to monitor the current conditions of all PAMSIMAS systems in Indonesia. This study offers a country-level perspective for better implementation of

the community-based rural water supply and sanitation program in developing countries.

2.5 Research Gap

The studies reviewed could not sufficiently examine the role played by CBWSOs in enhancing the sustainability of projects from theoretical and contextual perspectives. For example; Cook (2017) focused on investing in the water sector towards the economic value of time and cost serving through improved water systems. Olela and Wanyonyi (2018) focused on factors for the sustainability of water supply projects while Oduor (2015) reflected on the inability of water users to pay for the services rendered. Likewise, Kirenga et al (2018) aimed to examine the influence of water funds on the sustainability of community-managed rural water supply without reflecting on methodological issues. This is the gap to be filled by the study.

2.6 Conceptual Framework

This is defined as an abstract idea or a theory used to develop new concepts or to reinterpret existing ones (Creswell, 2018). Figure 2.1 provides the conceptual framework. It gives the relationship between the dependent and independent variables as hereunder.

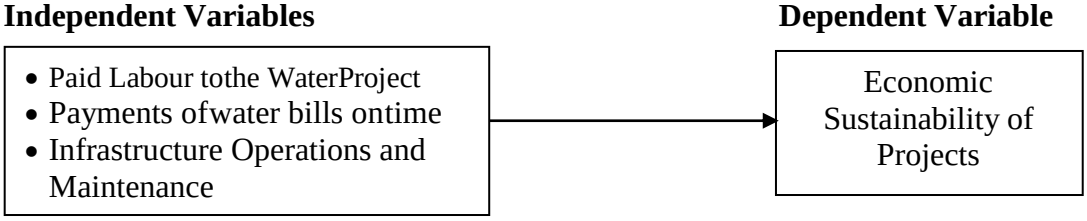


Figure 2.1: Conceptual framework

Source: Synthesized from Literature Review (2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Chapter Overview

This chapter presents the systematic approach through which this research was conducted. It consists of the research paradigm, study area, research approach and design, population and sample size, sampling procedures, data collection tools, reliability and validity, data analysis, and ethical considerations.

3.2 Research Paradigm

A research paradigm is a belief about how data about a phenomenon should be gathered, analyzed and used (Creswell, 2018). Four main trends of research paradigms are distinguished in the works by many authors: the positivist research paradigm which claims that the social world can be understood objectively; the interpretivism research paradigm where a researcher states that based on the principles it is not easy to understand the social world; pragmatist research paradigm that deals with the facts and the practical results are considered important where researchers have freedom of choice, and realistic research paradigm that is based on the principles of positivist and interpretive research paradigms (Creswell, 2018). Therefore, in this study, a pragmatic paradigm was used as it focuses on mixed or multiple approaches. It also utilizes triangulation that involves quantitative and qualitative approaches. Moreover, this study used both quantitative and qualitative approaches.

3.3 Study Area

This study was conducted in the Kyerwa district council, Kagera region. The reason for conducting the study is that despite the efforts of the government to improve rural water supply management (RWSM) through community ownership and participation approach using the CBWSO system, the role played by CBWSOs in Kyerwa district level towards economic sustainability is still doubtable from the fact that there are little efforts to sustain the projects through paid labour, paying water bills and infrastructure operations and maintenance among water users. It is from that backdrop that this study aimed to examine the role played by CBWSOs in enhancing the economic sustainability of projects managed by RUWASA in the Kyerwa district.

3.4 Research Approach

This study utilized a mixed approach focusing on qualitative and quantitative approaches. The qualitative approach aims to explore and discover issues about the problem on hand because very little is known about the problem. It uses soft data and gets rich data (Creswell, 2018). Further, the quantitative approach makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterised by the use of statistical analysis (Zegwaard et al., 2017).

3.5 Research Design

This study adopted a survey research design whereby a questionnaire and interview guide were used to solicit information. According to Zheng (2015), the cross-

sectional research design is a research design in which the researcher investigates the state of affairs in a population at a certain point in time. According to Lankshear (2011), a research design is needed because it facilitates the smooth sailing of the various research operations.

3.6 Target Population

Population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate. Population forms a basis from which the sample or subjects for the study are drawn. In this aspect, a population is the universe of units from which the sample is to be selected (Bryman, 2008). Creswell (2018) asserts that a target population is generally a large collection of individuals or objects that is the main focus of a scientific inquiry and it is for the benefit of the population that research is done. Moreover, Cameron (2018) reportedthat the target population refers to the total number of items about which the information is desired. In this study, the target population included (240) water boardand CBWSO members.

3.7 Sample Size and Sampling Procedures

3.7.1 Sample Size

A sample size is a segment of the population that is selected for investigation (Emmel, 2013). Saunders et al (2017) assert that a sample is a part of the population from which it wasdrawn. Similarly, other scholars such as Tabachnick & Fidell (2007) provide a formulaas $N \geq 50 + 8\ M$ (where M= the number of variables, while N = the number of participants).

Therefore the sample size was calculated as, N= 50 + 8*3

N = 50 +24

N = 74

The sample size was 74 participants.

Table 3.1: Sample distribution

No	Category	Population	Sample
1	CBWSOs members	216	62
2	Water board members	24	12
	Total	**240**	**74**

3.7.2 Sampling Procedures

Sampling is a part of research which deals with the vexing question of sampling and focuses on how the researcher selects those who will participate in the study (Fisher, 2010). Sampling techniques entail methods used in drawing samples from a population in such a manner that a sample will facilitate the determination of a hypothesis concerning the population. Sampling techniques may involve the use of probability and non-probability sampling (Taherdoost, 2016). In this study, purposive and simple random sampling was applied. Purposive sampling entails the elements of the population to have no equal and known chance of being selected for thesample (Saunders et al., 2017). Moreover, purposive sampling is a non-probability form of sampling in which the researcher does not seek to sample research participants on a random basis. The goal of purposive sampling is to sample participants strategically so that those sampled are relevant to the research questions that are being posed (Bryman, 2008). It was used by the board members as these respondents possess key information regarding the matter to attain the study objectives.

Besides, simple random sampling was used to select CBWSO members where each member had a chance of being chosen. In this study, a complete list of members was provided and a rotary system was used to select the needed respondents (Saunders et al., 2017). Pieces of paper with Yes or No identifications were used and those who chose the Yes papers were called to answer questionsregarding the matter.

3.8 Data Collection Tools

Primary data was collected through self-made questionnaires and interview guides. Creswell (2018) defines a questionnaire as a data collection instrument consisting of a series of questions and other prompts to gather information from respondents and is often designed for statistical analysis of the response. In this study, the researcher applied a questionnaire to collect data from CBWSO members. These questionnaires were self-administered and managed through the drop-and-pick method.

An in-depth interview was administered to the board members. In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. This is considered appropriate for this study as it enables one to obtain and elaborate answers to open-ended questions from the respondents. Interviews are methods of gathering information through oral quizzes using a set of preplanned core questions (Zheng, 2015).

3.9 Data Analysis

The researcher embarked on a data analysis process after data collection from the field

which involved identifying common views from the respondents' description of their experiences. The responses to the close-ended items were assigned codes and labels. Quantitative data were analyzed descriptively using frequencies and percentages through Statistical Packages for Social Science (SPSS Version 20). Moreover, qualitative data from in-depth interviews were coded and analysed through a content analysis where themes and emerging patterns were coded from the interview transcripts (Saunders et al., 2017). Also, qualitative data from interviews were analysed using content analysis focusing on the observer's impression where themes involved transcribing all information from verbal discussions with informants followed by breaking the recorded information into meaningful smallest units of thematic information, subjects and tendencies and presented as a text.

3.10 Reliability and Validity of Data

3.10.1 Reliability

Reliability refers to the consistency of a research study or measuring test or the repeatability of findings (Creswell, 2018). To test the reliability, the researcher carried out a Cronbach's Alpha test on questionnaires where a value of 0.75 was obtained. According to Kothari (2019), a Cronbach's Alpha above 0.7 is preferable. Since the reliability of data goes with the accuracy or precision of a measuring instrument, in this research study, reliability was concerned with the questions' consistency of responses in repeated measurements (Carmines and Zeller, 2006).

Table 3.2: Cronbach's Alpha Test

Cronbach's Alpha	No of Items
.75	26

3.10.2 Validity

Validity is defined as the instrument's ability to measure exactly what concept it is supposed to measure (Creswell, 2018). To validate the data and instruments (questionnaires) used in the research, the researcher asked the experts to recommend their representativeness andsuitability. Besides, the researcher allowed suggestions to be made to the structure of the questions as argued by Cooper and Schindler (2008). In this study validity of data was ensured by pre-testing and pilot testing of research instruments and proper recording of data (Mohajan, 2017).

3.11 Ethical Considerations

All necessary procedures were followed to conform to the ethical standards of research. The researcher sought permission from the relevant authorities before carrying out the research. All information obtained in this research was strictly usedfor academic purposes and respondents were assured of the confidentiality ofinformation given. Moreover, anonymity together with accessibility to research information was observed (Creswell, 2018). Treatment was done according to the organizational protocol for the management of data collection.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Chapter Overview

This chapter offers the results and discussions from the examination of the role played by Community-Based Water Supply Organisations in enhancing the economic sustainability of projects managed by RUWASA in the Kyerwa district. It starts with the response rate and demographic information and then the objectives follow.

4.2 Response Rate

The response rate included (60) questionnaires distributed to CBWSO members that were managed through the drop-and-pick method. The questionnaires were all filled and collected with 100% response. More so, the water board members (14) were served with interviews as scheduled.

4.3 Demographic Information

The demographic information included; gender, age, length of service and employment status. Table 4.1 below summarises the information, the results reveal that gender distribution between males and females was 64.8% and 35.2% respectively. Besides, age distribution showed that those who were 18 to 20 years were 2.7%, those between 21 to 30 years were 24.3%, those between 31 to 40 years were 54.1%, those between 41 to 50 years were 10.8% and those above 50 years were 8.1%. Moreover, those who worked for less than 3 years were 29.7%, those

who worked between 3 to 6 years were 51.4% and those who worked more than 6 years were 18.9%. Finally, respondents who were permanently employed were 86.5% and those who worked as temporary employees were 13.5%.

Table 4.1: Demographic information

Category	Frequency	Percentage %
Gender		
Male	48	64.8
Female	26	35.2
Age (in years)		
18-20	02	02.7
21-30	18	24.3
31-40	40	54.1
41-50	08	10.8
Above 50	06	08.1
Length in service (in years)		
Less than 3	22	29.7
3 to 6	38	51.4
Above 6	14	18.9
Employment status		
Permanent	64	86.5
Temporally	10	13.5

4.4 Extent toWwhich CBWSOs Influence the Provision of Paid Labour to Water Projects

The first objective of the study examined the extent to which CBWSOs influence the provision of paid labour to water projects in the Kyerwa district. Questionnaires were administered to CBWSOs members therefore; the results are summarized in Table 4.2 as hereunder.

Table 4.2: CBWSO influence on paid labour

Statements	Strongly agree %	Agree %	Not sure %	Disagree %	Strongly disagree %
Paid labour has influenced community knowledge that the project belongs to them and the survival or collapse depends on community involvement in terms of human, physical and financial capital	85	0	15	0	0
Paid labour has influenced community involvement in monetary, material equipment and labour	75	25	0	0	0
Paid labour among community members has been done in terms of cash towards implementing the project	80	0	0	20	0
Paid labour among community members has been done in terms of cash and labour towards implementing the project	90	0	10	0	0

The results in Table 4.2 show that 85% of respondents strongly agreed that CBWSOs have influenced paid labour by enhancing community knowledge of the fact that the project belongs to them and the survival or collapse depends on community involvement in terms of human, physical and financial capital. This implies that users of water should pay for the necessary dues that may be paid through human participation in decision-making, physical presence and participation in project implementation as well as financial provision in terms of cash. Moreover, 15% of respondents were not sure about the matter from the fact that what was done was not part and parcel of their inclusion something that raises a need to engage all people. The statement above concurs with Cook (2017) who reported that with people who are encountering difficulties in paying for water services, the alternative ways may be the use of physical participation and presence in implementing projects as well as encouraging the provision of cash if time to participate becomes a challenge.

The interviewees were of the following view;

> *To our knowledge, paid labour has been translated as the participation of people in the project through the provision of labour charges that can be converted into cash and those who cannot dare to do so may provide their cash as agreed in a community meeting. This has enabled a good number of people to choose the mechanism that suits their way towards attaining project sustainability.*

Similarly, the results in Table 4.2 show that 75% of respondents strongly agreed while 25% of respondents agreed that CBWSOs have influenced community involvement in monetary, material equipment and labour towards the economic sustainability of water projects in Kyerwa district. This implies that in most cases, projects that are handled by the community need to be sustained in terms of money, equipment and labour support. In this case, the CBWSOs proved to enhance the services by employing people to own the water projects by providing equipment or labour or paying the user fees that enhanced the availability and sustainability of projects. It was found that most of the people in the study area can fulfil their obligations to enable sustainable water use. The statements above support the affirmation by Chumbula (2015) that community ownership and participation in sustaining water projects have played an important role not only in sustaining the project but also in improving the water supply.

The interviewees were of the following view;

> *With 5 years of operating the projects handled by us; CBWSO leaders have been able to encourage every member to team up to attain the goal of accessing water all the time with every beneficiary to contribute adequately.*

Furthermore, the results in Table 4.2 show that 80% of respondents strongly agreed

that CBWSOs influenced paid labour among community members through cash provision in implementing the projects. This implies that with the project handled by the community; those able to connect water have been encouraged to do thereby paying connection fees that facilitate water projects' implementation. This has been so due to a great number of people needing the services in their households, yet those who are unable are accommodated by the community water stations that charge little amount for the water fetched. The statement above is in agreement with Kanda et al (2018) who reported that when people can connect water for their household use, leaders need to encourage them to expand the services to all those who need to be connected. By so doing, accessibility of water becomes extended to a greater part of the community. However, 20% of respondents disagreed that although paid labour would be done in terms of cash the implementers of projects could not consider the economic status of the people, something that renders a few people to fail in accessing water although the operations may be accompanied by downfalls. This is in contrast with Chumbula (2015) who reported that factors contributing to the sustainability of water schemes include the functionality, design flow; water fetching time; ability to meet additional demand; use by population; equity; participation in decision-making on operation and maintenance where existence of fund for operation and maintenance need to emanate from the users themselves or the other part.

The interviewees were of the following view;

> *Paid labour in terms of cash is fruitful among people who can pay. Yet, those who are unable may not be stacked and utilize their manpower influence. This has been of help although with challenges when it comes to estimating the labour to be rendered in terms of days.*

Similarly, the results in Table 4.2 show that 90% of respondents strongly agreed that paid labour among community members has been done in terms of cash and labour towards implementing the project. This implies that in some instances both means were used to enable the implementation of the projects due to the need to access water in time or to go hand in hand with the time for the completion of the project. Yet, 10% of respondents were not sure as to how both means are integrated. The statement above concurs with Kirenga et al (2018) who reported that when people utilize various mechanisms to enable the facilitation of a project, the outcome becomes fruitful to the community at large.

The interviewees were of the following view;

> *We welcomed the mechanisms used by CBWSO leaders to utilize either labour or cash in implementing the water projects. That has served people to choose what they can afford or manage to attain their goals. Also, it has been a norm among water users to manage the projects through various means that enable the sustainability of water projects.*

Generally, the results show that CBWSOs influenced paid labour through community knowledge provision to the extent of entrusting projects to the hands of users for either survival or collapse something that involved their human, physical and financial capital. Besides, paid labour was influenced by CBWSOs that involved monetary, material equipment and labour to the extent of enhancing community involvement and sustainability of the water projects. Moreover, CBWSOs influenced paid labour in terms of cash something that led to project implementation for those people who were able to render their cash. Similarly, CBWSOs influenced paid labour among the users of water projects in terms of both cash and labour to enable the sustainability of water projects. The initiatives are in line with the World Bank

(2018) that asserted that by engaging communities in the planning and development of water projects the outcomes are associated with more incentive to keep water points operating in good condition, and the consistent supply would encourage regular user payments supporting continued functionality and service improvements.

4.5 CBWSOs Influence on Payment of Water Bills on Time among Water Users

The second objective of the study determine how CBWSOs influence the payment of water bills on time among water users in the Kyerwa district. Questionnaires were administered to CBWSOs members therefore; the results are summarized in Table 4.3 as hereunder.

Table 4.3: CBWSO influence on payment of water bills

Statements	Strongly agree %	Agree %	Not sure %	Disagree %	Strongly disagree %
The economic hardship experienced by water users results in the inability to pay for the services	80	0	0	20	0
Reliance on government subsidy and externalsupport has resulted in the non-economic sustainability of water schemes	70	0	30	0	0
The poor community economy has facilitated the inability to pay for the services	90	10	0	0	0
The poor household economy has facilitated the inability to pay for services	85	0	15	0	0
Paid labour influenced people in making choices and committing resources in support of bill payments on time	70	0	30	0	0

The results in Table 4.3 show that 80% of respondents strongly agreed that CBWSOs influenced payment of water bills on time although the economic hardship

experienced by water users resulted in an inability to pay for the services rendered in some instances. This implies that the leaders were able to play their part towards enhancing the services to all who are in need despite the economic hardship they face. This resulted in many people in the Kyerwa district to access water while utilizing little time to fetch water as before. The statement above is in support of Kanda et al (2018) who reported that CBWSOs may often be unable to collect enough funds from water users to pay for maintenance and repairs fully due to economic hardship faced by the community members. Therefore, the use of various means to help the needy is paramount. Yet, 20% of respondents disagreed that the economic hardship was a hindrance towards paying water bills on time. This was due to the little income earned by most of the people in the Kyerwa district.

The interviewees were of the following view;

> *Although, it has been difficult to pay water bills in time due to our little income; what is being done through CBWSO members is to make sure that water is becoming an affordable commodity to many members of the community to get rid of waterborne diseases as well as saving time in fetching time as it was used before the implementation of water projects.*

Furthermore, the results in Table 4.3 show that 70% of respondents strongly agreed that CBWSOs influenced the payment of water bills in time from the fact that reliance on government subsidy and external support resulted in non-economic sustainability of water schemes. This implies that CBWSO leaders played a great role in making sure that after water projects are handled, reliance on external support is reduced to enable people to own and manage the projects. This was obvious in Kyerwa district where people can pay for the services rendered after seeing the benefits thereof. The statement above is in support of Cook (2017) who reported that

although there has been external support to run and service the water projects, CBWSOs have played a great role in filling the gap to enable users to pay their bills on time thereby sustaining the water projects handled to them. Yet, 30% of respondents were not sure of the matter the fact that in some cases there has been a lack of trust in water committees due to misuse of money and a lack of payment enforcement by committees as asserted by Chowns (2015).

The interviewees were of the following view;

> *There has been an emphasis to pay for water bills on time among water users from CBWSO leaders something that enhanced service provision. However, such achievement has been due to cooperation between water users and CBWSO leaders towards sustainable water projects in the Kyerwa district.*

Nonetheless, the results in Table 4.3 show that 90% of respondents strongly agreed while 10% of respondents agreed that CBWSOs influenced payment of water bills in time although such a strategy could be hindered by the poor community economy that is facilitated by the inability to pay for the services among Kyerwa members. The community in Kyerwa district was found to live below 1$ per day but the CBWSOs were able to restructure ways of enabling it to access the service at a minimum cost to be affordable.

The interviewees were of the following view;

> *Although a great number of people in the Kyerwa district live below 1$ per day, leaders have been able to facilitate them with services that they can afford. Some have been served through community stations that charge TZS 50 per 20 litres something affordable to many.*

Similarly, the results in Table 4.3 shows that 85% of respondents strongly agreed that CBWSOs influenced payment of water bills in time from the fact that although the

household economy is poor in Kyerwa district to enable the payment of water services. It was found that strategies were initiated to enable those with the inability to access water services without challenges. Moreover, 15% of respondents were not sure about the matter as they were able to access water from the neighbouring families while sharing the costs as needed. The statement above is in support of Mamburi (2014) who reported that in many African countries where water services are not connected to many people, users end up sharing the costs after using something that adds accessibility of services to a great amount of people.

Finally, the results in Table 4.3 show that 70% of respondents strongly agreed that CBWSOs influenced the payment of water bills in time from the fact that by using paid labour, people were able to make choices and commit resources in support of bill payment on time. Yet, 30% of respondents were not sure. The statement above is in line with Cook (2017) who argued that the water sector that focuses on the economic value of time and cost savings results in improved water systems that enable people become able to pay for and use water while saving time and costs on other productive activities which in turn boosts the chances of sustainably managing the systems.

The interviewees were of the following views;

> *Through affordably accessing water; people in the Kyerwa district have been able to save time and costs to enhance other productive activities than before.*

Generally, the results show that CBWSOs influenced the payment of water bills in time despite the economic hardship experienced by water users; reliance on

government subsidy and external support; poor community economy; poor household economy and paid labour that influenced people to make choices and commit resources in support of bills payment in time.

4.6 Extent to which CBWSOs Ensure Water Project Infrastructure Operations and Maintenance

The third objective of the study examined the extent to which CBWSOs ensure water project infrastructure operations and maintenance in the Kyerwa district. Questionnaires were administered to CBWSOs members therefore; the results are summarized in Table 4.4 as hereunder.

Table 4.4: Ensuring water project infrastructure operations and maintenance

Statements	Strongly agree %	Agree %	Not sure %	Disagree %	Strongly disagree %
CBWSOs have enhanced the idea and attitude of doing it with people to facilitate infrastructure operations	80	0	20	0	0
CBWSOs enabled choosing leaders who facilitate transparency and honesty on water development projects towards infrastructure operations	90	0	0	10	0
CBWSOs enabled laying down strategies towards infrastructure development and operations	75	25	0	0	0
CBWSOs have enabled the harmonization of policy, planning and practices to enable the sustainability of projects	85	0	0	15	0

The results in Table 4.4 show that 80% of respondents strongly agreed that CBWSOs ensured water project infrastructure operations and maintenance by enhancing the idea and attitude of doing it with people to facilitate infrastructure operations. The

idea and attitude of doing it with people were facilitated by people's participation in planning and decision making which resulted in ownership of the project after being handled by the community. Yet, 20% of respondents were not sure as they could not participate fully in decision-making. The statement above of 'do it with people' concurs with Kirenga et al (2018) who reported that to do with people means, to make people have a full mandate regarding planning, control and implementation of the project that results in ownership and sustainability.

The interviewees were of the following view;

> *The 'do it with people' tactic that was used by our CBWSO leaders managed to gather people together to ensure participation in various stages something that resulted in proper infrastructure operation and maintenance.*

Nonetheless, the results in Table 4.4 show that 90% of respondents strongly agreed that CBWSOs ensured water project infrastructure operations and maintenance from the fact that CBWSO leaders were able to choose leaders who would facilitate transparency and honesty on water development projects towards infrastructure operations. Such choices were enabled due to trust among leaders to the extent of coordinating the project operations resulting in sustainable water projects. The statement above concurs with Chowns (2015) who affirmed that when water projects are left with leaders who are trustful and transparent; their sustainability may be maintained. However, 10% of respondents disagreed on the matter of the fact that in some instances, leaders would misuse their positions to undermine the project implementations.

The interviewees were of the following view;

> *In the Kyerwa district plans and strategies have been put forward to enable leaders who assist in managing CBWSOs to be capacitated with management skills that enable them to perform their duties with transparency and honesty. Such attainments have led to sustainable water use and affordability for many people.*

Similarly, the results in Table 4.4 show that 75% of respondents strongly agreed while 25% of respondents agreed that CBWSOs ensured water project operations and maintenance from the fact that CBWSOs laid down strategies towards infrastructure development and operations that resulted in sustainable water development schemes. This implies that strategies put not only facilitated operations and maintenance but also, sustainable water use among users through paying user fees as needed. The statement above concurs with the World Bank (2018) which reported that strategies to manage water projects that are handled by CBWSOs are essential towards facilitating operations and maintenance that enable community ownership of projects.

Finally, the results in Table 4.4 show that 85% of respondents strongly agreed that CBWSOs ensured water project infrastructure operations and maintenance from the fact that they enabled the harmonization of policy, planning and practices to enable the sustainability of projects. This implies that CBWSOs were able to coordinate all the project implementation issues something that rendered the services to be in line with the goals. This is in line with Mamburi (2014) who stated that the sustainability rate of rural water supply systems increases as a result of communities' owning and managing schemes in a harmonized way by making sure that user fees and the

existence of management at the village to district level are optimized towards the protection of the water points while making sure that cost recovery for operation and maintenance are sustained. However, 15% of respondents were in disagreement with the matter fact that in some instances the plans and practices could not tally rendering inefficiencies.

Generally, the results show that CBWSOs ensured water project infrastructure operations and maintenance in the Kyerwa district by enhancing the idea and attitude of ‘do it with people’ to facilitate infrastructure operations; choosing leaders who facilitate transparency and honesty on water development projects, laying down strategies towards infrastructure development and operations and harmonizing policy, planning and practices to enable the attainment of sustainable water projects.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Chapter Overview

This chapter presents the conclusion and recommendations arising from the study findings. It commences with the conclusion; then recommendations and finally further studies follow.

5.2 Conclusion

This study explored the influence of Community-Based Water Supply Organizations (CBWSOs) on various facets of water projects in the Kyerwa district, focusing on the extent to which they impact paid labour provision, the timely payment of water bills, and the infrastructure's operations and maintenance. The findings presented a comprehensive overview of the roles played by CBWSOs in enhancing the economic sustainability of water projects.

The investigation into the extent to which CBWSOs influence paid labour revealed a substantial impact on community knowledge and involvement. The majority of respondents strongly agreed that CBWSOs enhanced community understanding that water projects belonged to them, emphasizing the interdependence of survival or collapse with community involvement in terms of human, physical, and financial capital. This aligns with the assertion that, in situations of economic difficulty, physical participation and cash contributions become alternative means of supporting water projects.

Moreover, CBWSOs were found to significantly influence community involvement in terms of monetary, material equipment, and labour, further emphasizing their role in enhancing economic sustainability. The study highlighted that CBWSOs facilitated the provision of paid labour among community members through cash contributions, thereby contributing to the implementation of water projects. However, challenges were noted, such as the consideration of the economic status of individuals and the need for careful estimation of labour rendered in terms of days.

In terms of the payment of water bills, CBWSOs were found to play a crucial role despite the economic hardships faced by water users. The majority of respondents strongly agreed that CBWSOs influenced timely bill payments, even in the face of economic challenges. This was attributed to the emphasis on affordability and the implementation of strategies by CBWSOs to make water services accessible to many community members. However, some respondents expressed doubts, citing economic difficulties and low incomes as hindrances to timely bill payments.

Regarding the infrastructure's operations and maintenance, CBWSOs were reported to have a positive impact. The "do it with people" approach was highlighted, emphasizing the importance of community participation in planning and decision-making to ensure ownership and sustainability. Additionally, the study revealed that CBWSOs facilitated the selection of leaders who promoted transparency and honesty in water development projects, laid down strategies for infrastructure development and operations, and harmonized policy, planning, and practices for the overall sustainability of water projects.

The findings underscore the significant contributions of CBWSOs to the economic sustainability of water projects in the Kyerwa district. The study provides valuable insights for policymakers, water management authorities, and community leaders to enhance the effectiveness of community-based initiatives in the water sector. The collaborative efforts of CBWSOs in fostering community participation, transparency, and strategic planning contribute not only to the economic viability of water projects but also to their long-term sustainability and positive impact on the community.

5.3 Recommendations

The study's findings shed light on the crucial role played by Community-Based Water Supply Organizations (CBWSOs) in enhancing the economic sustainability of water projects in the Kyerwa district. The insights gleaned from the examination of paid labour provision, timely payment of water bills, and infrastructure operations and maintenance point to valuable recommendations for optimizing the impact of CBWSOs in community-based water management.

One prominent recommendation is the imperative for CBWSOs to continuously engage and educate the community on the significance of water projects. The study underscores the need for CBWSOs to emphasize the communal ownership of these projects, thereby fostering a sense of responsibility and commitment among community members. Efforts to enhance community knowledge should encompass human, physical, and financial capital, reinforcing the notion that the survival or collapse of water projects is intricately tied to community involvement.

Addressing economic challenges faced by water users emerges as a pressing consideration. CBWSOs should explore creative strategies to make water services affordable, particularly for those confronting financial difficulties. This may involve implementing flexible payment plans, subsidies, or alternative contribution methods to ensure that economic constraints do not hinder timely bill payments and sustained project operations.

Leadership within CBWSOs is identified as a critical factor influencing the success of water projects. The selection and training of leaders should be strengthened to ensure transparency, honesty, and effective project management. Capacity-building programs for CBWSO leaders are recommended to enhance their skills in financial management, community engagement, and overall project oversight.

Strategic planning and implementation are highlighted as instrumental in ensuring the longevity of water projects. CBWSOs should document and refine strategies for infrastructure development, operations, and maintenance. Additionally, fostering collaboration and information-sharing among CBWSOs can contribute to the collective wisdom and success of community-based water management initiatives.

Community participation in decision-making processes is underscored as a cornerstone for success. CBWSOs should actively involve all community members in planning and implementation, ensuring inclusivity and a shared sense of ownership. The study suggests that a "do it with people" approach, emphasizing communal participation in various stages of project development, contributes to infrastructure sustainability.

A robust monitoring and evaluation framework is recommended to assess the impact of CBWSOs on economic sustainability, paid labour provision, and timely payment of water bills. Regular reviews and adjustments to strategies based on monitoring outcomes will enable CBWSOs to adapt to evolving community needs and challenges. Collaboration with external partners is encouraged to leverage additional support, expertise, and resources. Strengthening ties with government agencies, non-governmental organizations, and other stakeholders will enhance the overall effectiveness of CBWSOs in achieving sustainable water projects.

Lastly, fostering a culture of continuous research and learning within CBWSOs is vital. Collaboration with academic institutions can provide insights into emerging trends, challenges, and opportunities in community-based water management, ensuring that CBWSOs remain adaptive and informed.

In essence, these recommendations aim to empower CBWSOs in the Kyerwa district to navigate challenges, capitalize on opportunities, and foster sustainable water projects that positively impact the community.

5.4 Recommendation for Further Studies

The study examined the role played by community-based water supply organisations in enhancing the economic sustainability of projects managed by Ruwasa in the Kyerwa district. It is advised that further studies be done on the following issue. Assessing the contribution of CBWSOs in enhancing the environmental sustainability of projects managed by Ruwasa in various districts in Tanzania.

REFERENCES

Bryman, A. (2008). *Social Research Methods, 4th Ed*. Oxford: Oxford University Press

Cameron, C. (2018). The evolution of a mixed methods study in work-integrated learning [special issue]. *International Journal of Work-Integrated Learning*, *19*(3), 237-247

Chowns, E., (2015). Is community management an efficient and effective model of public service delivery? Lessons from the rural water supply sector in Malawi. *Public Adm .Dev. 35*, 263–276.

Chumbula, J, J (2016). Sustainability of Water Projects. A Case of Selected Projects in Iringa District, Tanzania. Unpublished Masters Dissertation. Sokoine University of Agriculture. Morogoro, Tanzania.

Cook, J., Kimuyu, P. K., & Whittington, D. (2017). The costs of coping with poor water supply in rural Kenya. *Water Resources Research, 52, 841 - 859.*

Cooper, J., and Schindler, M. (2014). *Perfect Sample Size in Research*. New Jersey: Macmillan.

Creswell, J. W. (2018). *Research design: qualitative, quantitative and mixed methods approach*. Thousand Oaks, California: Sage Publications

Daniel, D, AlDjono, P & Iswarani, W (2022). Factors related to the functionality of community-based rural water supply and sanitation programmes in Indonesia. *Geography and Sustainability*, *4*(1), 29-38.

Emmel, N. (2013). *Sampling and Choosing Cases in Qualitative Research: A Realist Approach*. London: Sage.

Fisher, C. (2010). *Researching and Writing a Dissertation: An Essential Guide for*

Business Students. 3rd Ed. Gosport: Ashford Colour Press Ltd.

Haie N. (2021) *Introduction. In: Transparent Water Management Theory*. *Water Resources Development and Management.* Singapore: Springer.

Kaliba, M.R.K.A. (2002). Participatory evaluation of community-based water and sanitation programs: the case of central Tanzania. A Doctoral dissertation, Kansas State University, Manhattan, Kansas, USA. ttps://www.academia.edu/29298284/Participatory_evaluation_of_community_based_water_and_sanitation_programs_the_case_of_central_Tanzania.

Kanda, E, Odiero, J,Lutta, V & Ong'or, B (2018). Challenges facing small and medium water services providers in Kenya. a case study of Amatsi water service company, Vihiga County. *Journal of Civil Engineering Forum*, *4*(1), 19-20.

Kativhi, T, Mazvimavi, D, Tevera, D and Nhapi, R (2017). Factors influencing sustainability of normally managed water facilities in rural areas of Zimbabwe. *Physics and Chemistry of the Earth*; *100* (1), 247-257

Kirenga, K, Mujungu, C & Mbwette, T (2018). Influence of water funding to the sustainability of community-managed rural water supply projects. Moshi District Council, Northern Tanzania. *Huria Journal*, *25* (2), 1-21

Kothari, C. R. (2019). *Research Methodology, 5th edition*, New Delhi. New International (P) Limited.

Lankshear, C. (2011). *Some Notes on the Nature and Importance of Research Design within Educational Research.* Faculty of Education, Monash University. https://www.scribd.com/doc/37112570/Some-Notes-on-the-Nature-and-Importance-of-Research-Design-Within-Educational-Research

Mamburi, P. N. (2014). Factors influencing community ownership of water projects in Kenya. A case of Kinna Division Isiolo County. A Master's reseach project. University of Nairobi, Kenya. http://erepository.uonbi.ac.ke/handle/11295/74022.

Marks, S.J., Komives, K., Davis, J., (2014). Community participation and water supply sustainability: Evidence from hand pump projects in Rural Ghana. *Journal of Planning and Educational Research, 34*, 276–286

Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. Annals of Spiru Haret University. *Economic Series, 17*(4), 59–82.

Oduor, R, E (2015). Increasing functional sustainability of water and sanitation supplies in Rural Sub-Saharan Africa. *Environmental Engineering Science*, 26 (5), 1017-1023.

Olela, E. S. & Wanyonyi, L. (2018). Factors influencing sustainability of water supply projects for rural communities in arid and semi-arid lands: A case of Garbatula Sub County in Isiolo County, Kenya. *International Academic Journal of Information Sciences and Project Management, 3*(2), 516-537

RWSN, (2010). *Sustainable Rural Water Supplies*. Rural Water Supply Network, St.Gallen. https://www.rural-water-supply.net/en/resources/226

Saunders, M, Lewis, P, & Thornhill, A. (2017). *Research Methods for Business Students, 5th ed.* (5ed). Harlow: Pearson Education.

Stigler, P. E. (2013). Water, culture and environmental health: Understanding community-based planning to improve health outcomes in vulnerable populations (Order No. 3609393).

Taherdoost, H. (2016).Sampling methods in research methodology; how to choose a

sampling technique for research. *International Journal of Academic Research in Management (IJARM),* 5(2), 18-27.

Toan, D., Hanh, D. & Thu, T. (2023). Management models and the sustainability of rural water supply systems: An analytical investigation in the Ha Nam Province, Vietnam. *Sustainability*, *5*(12), 1-27

Water Aid Tanzania, (2014). Where We Work Tanzania. http://www.wateraid.org/where-we-work/page/Tanzania.

WHO, (2011).*Guidelines for Drinking-Water Quality*, 4th ed., WHO Press

WHO, (2012). UN-Water Global annual assessment of Sanitation and drinking water (GLAAS) 2012 Report: The Challenge of Extending and sustaining services. https://www.un.org/waterforlifedecade/pdf/glaas_report_2012_eng.pdf.

World Bank, (2018). Tanzania: Sustainable Rural Water Supply and Sanitation Program-for-Results. https://www.worldbank.org/en/news/loans-credits/2018/06/26/tanzania-sustainable-rural-water-supply-and-sanitation-program-for-results.

Yin, R. K. (2003). *Case Study Research: Design and Method: Applied Social Research Methods, Vol 5*. London: Sage Publications Ltd.

Zegwaard, K. E., Campbell, M., & Pretti, T. J. (2017). Professional identities and ethics: The role of work-integrated learning in developing agentic professionals. In T. Bowen & M. T. B. Drysdale (Eds.), *Work-integrated learning in the 21st century: Global perspectives on the future* (145-160). Bingley, UK: Emerald Publishing Limited.

APPENDICES

Appendix 1 Questionnaires

Dear Prospective Respondent;

This questionnaire is designed to solicit information from you. The purpose of this research is for the academic award of a Master's degree in project management from the Open University of Tanzania. Kindly fill in the required information as per the researcher's requirement.

Gender: Male ( ), Female ( )

Age: 18 to 20 ( ), 21 to 30 ( ), 31 to 40 ( ), 41 to 50 ( ), over 50 ( )

Length of services with the organization (In years),

Employment status: Permanent ( ), Temporally ( )

For each of the following aspects shown below rate your level of agreement using the following Likert-type scale provided:

Agreement: 1= strongly agree, 2= Agree, 3= Not sure, 4= Disagree, 5= strongly disagree

Na.	Paid labour for water projects	Level of agreement
1.	Community knowledge that the project belongs to them and the survival or collapse depends on community involvement in terms of human, physical and financial capital	1 2 3 4 5
2.	Community involvement in monetary, material equipment and labour	1 2 3 4 5
3.	Paid labour among community members has been done in terms of cash towards implementing the project	1 2 3 4 5
.4	Paid labour among community members has been done in terms of cash and labour towards implementing the project	1 2 3 4 5
5	The economic hardship experienced by water users result in the inability to pay for the services	1 2 3 4 5
6	Reliance on government subsidy and externalsupport has resulted in non-economic sustainability of water schemes	1 2 3 4 5

Na.	Paid labour for water projects	Level of agreement
7	The poor community economy has facilitated the inability to pay for the services	1 2 3 4 5
8	The poor household economy has facilitated the inability to pay for the services	1 2 3 4 5
9	Making choices and committing resources in support of bill payments on time	1 2 3 4 5
	Ensuring water project infrastructure operations	**Level of agreement**
10	Enhancing the idea and attitude of "do it with people" to facilitate infrastructure operations	1 2 3 4 5
11	Choosing leaders who facilitate transparency and honesty on water development projects towards infrastructure operations	1 2 3 4 5
12	Laying down strategies towards infrastructure development and operations	1 2 3 4 5
13	Harmonizing policy, planning and practices in order to enable the sustainability of projects	1 2 3 4 5

THANK YOU

Appendix 2: In-depth interview

i) To what extent do CBWSOs influence the provision of paid labour to water projects in the Kyerwa district?

ii) How do CBWSOs influence the payment of water bills on time among water users in Kyerwa?

iii) To what extent do CBWSOs ensure water project infrastructure operations and maintenance in the Kyerwa district?

THANK YOU

Appendix 3: Work Plan

The study will be completed in 2023 as the Schedule of Activities shown hereunder.

No	Activity	Duration										
		The years 2022 to 2023										
		A	S	O	N	D	J	F	M	A	M	J
1	Completion of preparation of Research Proposal, Questionnaire and Submission of ResearchProposal											
2	A pilot study and questionnaire e testing											
3	Fieldwork And Datacollection											
4	Data Processing and Analysis											
5	Dissertationwriting, correction and Submission											

Appendix 3: Ethical Documents

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/ PG202087511 **27th July, 2023**

Director General,

Rural Water Supply and Sanitation Agency (RUWASA),

P.O. Box 1126,

KAGERA.

Dear Director,

RE: RESEARCH CLEARANCE FOR MR. SHUKRANI MARTINE, REG NO: PG202087511

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Shukrani Martine,**

Reg. No: PG202087511) pursuing **Masters of Project Management** (**MPM**). We here by grant this clearance to conduct a research titled "**Role Played by Community-based Water Supply Organizations in Enhancing Economics Sustainability of Projects Managed by Rural Water and Sanitation Agency in Kyerwa District"**. He will collect his data at your office from 28th July to 30th August 2023.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha

For: VICE CHANCELLOR

JAMHURI YA MUUNGANO WA TANZANIA

WIZARA YA MAJI

WAKALA WA MAJI NA USAFI WA MAZINGIRA VIJIJINI

RUWASA
Rural Water Supply and Sanitation Agency

Simu: +255 (028) 2221412
Tovuti :
Baruapepe:kagerarm@ruwasa.go.tz

Ofisi ya Meneja Mkoa
Mtaa wa Katekele
S. L. P 1905
BUKOBA

Kumb .Na.RUW/KGR/WPF/59/15 23 Julai, 2023

Meneja RUWASA (W),
S.L.P 626,
KYERWA.

YAH: **KIBALI CHA KUFANYA UTAFITI**

Tafadhali husika na mada tajwa hapo juu,

Nimepokea barua ya Katibu Tawala wa Mkoa wa Kagera Kumb. Na.DA.194/228/01/'0'/247 ya tarehe 20/10/2022 ikihusu somo tajwa hapo juu.

Barua husika inamtambulisha **Bw. Shukrani Tungaraza** ambaye ni Mwanachuo wa Chuo Kikuu Huria Tanzania, kwa sasa anafanya kazi ya utafiti ***"Factors Influencing Economic Sustainability of Water Supply Scheme in Rural Areas in Tanzania***" katika Wilaya ya Kyerwa.

Utafiti unaanza tarehe **28/07/2023 hadi 30 Agosti, 2023** tafadhali apokelewe na kupewa ushirikiano ili akamilishe kazi yake.

Natanguliza shukrani.

Inj. Warioba Sanya
MENEJA RUWASA (M)
KAGERA