ASSESMENT OF FACTORS INFLUECING PERFOMANCE OF WATERPROJECTS IN BUNDA DISTRICT, TANZANIA

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

DEPARTMENT OF MARKETING AND ENTERPRENEURSHIP

THE OPEN UNIVERSITY OF TANZANIA

2021

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled: "***Assesment of Factors InfluecingPerfomance of Water Projects in Bunda District,Tanzania***" in partial fulfilment of the requirements for the degree of Master of Project Management (MPM) of the Open University of Tanzania.

……

Dr France A. Shayo

(Supervisor)

…….

Date

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DECLARATION

I, **Julieth Michael Ntuku**, 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 originally mine. It is hereby presented in partial fulfillment of the requirement for the Degree of Master of Project Management (MPM).

……..

Signature

……

Date

DEDICATION

This work is dedicated to my Father and Mother Mr & Mrs Michael ANtuku and my beloved children Brian and Harriet Urasa

ACKNOWLEDGEMENT

First of all I give thanks to God for giving me healthy and protection, that has enable me to accomplish my desirewhich I ought much.. Partly, this dissertation is a finding of joint efforts of many individuals. Since it is not easy to list all of them, I only mention a few.

The success of this dissertation was a great effort of my Supervisor, Dr.France Shayo, who supported me, gave me confidence during my studying time and dissertation writing, may the Alimight God help him to accomplish his plans.

I wish to express sincere gratitude to my employer Mr Jeremieh Amos Kusaja, Bunda District Exucutive Director for his permission and encouragement throughout the study period.

Special thanks go to all my family members and friends, in particular, Mr. Mululi Zacharia of Bunda Town Council, Mr.Joseph Makurura from Bunda RUWASA and my fellow workers from Bunda Distrct Council for their support. Finally, I would like to state that I am solely responsible for any errors or omissions of facts, which may be found in this report. All such errors are a reflection of my human limitations.

ABSTRACT

This study aimed at assessing factors influencing performance of water projects in Bunda district, Mara region in Tanzania. The study used mixed design in collecting, processing and analyzing data. Data were collected from among 273 respondents using questionnaires, interviews, and documentary reviews. The study found that water production in the district was generally below the consumption requirements while beneficiaries contributions were inadequate for efficiently running of the project. Walking distance to reach domestic water points has reduced, with access points increased than before project implementation. Some of the reported challenges facing the projects include: unaffordable electricity costs for pumping water, water loss due to leakages and breakages of pipes, lack of fund for maintenance, lack of technical skills and invasion of water sources. It is recommended that in order to improve the water project performance, the water association should be strengthened, annual fees increased, human activities restricted in order to avoid silting of the sources and water price made affordable. The research finally posed important implications to policy makers, planners and development partners towards increasing knowledge and skills on the performance of water projects. Generally, it can be concluded that water projects have improved water supply in Bunda district.

Keywords: Community participation, domestic water points, rural water supply water access and affordability.

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LIST OF ABBREVIATION

BDC	Bunda District Council
CBWSOs	Community Based Water Supply Organizations
COWSO	Community Owner Water Supply Organizations
DCDO	District Community Development Officer
EWURA	Energy and Water Utilities Regulatory Authority
FGD	Focus Group Discussion
HIV	Human Immune-deficiency Virus
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
IWRM	Integrated Water Resources Management
MDGs	Millennium Development Goals
MOW	Ministry of Water
NAWAPO	National Water Policy
NBS	National Bureau of Statistics, Tanzania
NGO	Non-Governmental Organization
NRWSS	National Rural Water Sustainability Strategy
NSGRP	National Strategy for Growth and Reduction of Poverty
RUWASA	Rural Water Supply and Sanitation Agency
SADC	Southern African Development Co-operation
SPSS	Statistical Package for Social Sciences
TASAF	Tanzania Social Action Fund
TAWASANET	Tanzania Water and Sanitation Network

TZS	Tanzanian Shillings
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
URT	United Republic of Tanzania
USAID	United States Aid for International Development
VEOs	Village Executive Officers
WAEO	Ward Agricultural Extension Officer
WEO	Ward Executive Officer
WFP	World Food Program
WHO	World Health Organization
WUA	Water User Association

CHAPTER ONE

INTRODUCTION

1.1 Chapter Overview

This chapter includes background to the resarch problem, statement of the research problem, research objectives,statement of the research problemand significance of the Study. The chapter also involvesscope of the study and organisation of the dissertation.

1.2 Background to the Research Problem

Over 2.1 billion people worldwide lack safe drinking water at home, while 844 million do not have even a basic drinking water service (WHO, 2017). This includes 263 million people who have to spend over 30 minutes per trip collecting water from sources outside their homes, and 159 million who still drink untreated water from surface water sources, such as streams or lakes (WHO, 2017). UNICEF and WHO (2017) report found that 3 in 10 people worldwide, or 2.1 billion lack access to safe readily available water at home, and 6 in 10 or 4.5 billion lack safely managed sanitation.

As reported by WHO (2011), factors that hinder water supply have been widely experienced in many parts of the world. High cost of water and poor quality mainly, create a greater risk to health and indeed, many poor people are dying each year from diarrhea and chistosomiasis as a result of drinking unsafe water (2017). UNICEF (2015) pointed out that almost half of global population without access to improved water is in Sub Saharan Africa. The information found that between 1990 to 2015

there is increase of 20 percent in the use of improved source of drinking water, though did not meet the Millenium Development Goal target (WHO-UNICEF-2015). The effect of lack of clean and safe water resulted in the spread of water borne diseases including Bilhazia and diarrhoea which in turn caused deaths to children due to hydration and malaria.

In Africa and particularly Sub-Saharan Africa, studies in Ghana have reported that such factors as interlinked political, administrative, economic, social and legislative factors have caused inefficiency of performance of water projects. Specifically, high cost of water production, water losses during distribution, increasing populations, unpaid water bills by consumers, rural and urban poverty, proximity , quantity and quality of water are linked with water project performance constraints (Osumanu, 2008; Osuman, 2015; and Kosoe and Osuman, 2015).

In Tanzania only 40 percent (about 21 million) people use safe drinking water from improved source, and 30 percent (43 million) have access to improved sanitation (Word Bank, 2018). The target of the Water Sector Development Programme (WSDP II) is 85% coverage by 2021 (Water Aid Tanzania, 2018). Rural areas have the worst improved water coverage about 48 percent compared to 87 percent in urban areas. Furthermore, just 48 percent of the population has access to an improved water source that has a collection time of 30 minutes or less, and only about 25 percent have access to a water source on their household premises (Water Aid, 2018).

According to 2016 estimates improved water coverage stands at 59 percent, having increased a mere 2 percentage points since 1990. The proportion of people who have

access to improved sanitation has risen by 20% in 2018 compared to 13 % in 1990 (World Bank, 2018). Budgetary constraints due to low fund allocated, lack of awareness and negative perceptions towards establishment of COWSOS have implications to the sustainability of many water many projects in Tanzania (Cairncross, 2000; Cairncross, 2000; Mwendamseke, 2019). For instance, a studies by Rostapshova Alwang, and Pendley, 2015) in Dodoma region found that institutional management were among determining factors towards raising up revenue collections from water services, where private sectors were found to be better than other management entities; and were less bureaucratic (Chumbula, 2016).

In another case, quality of water in different part surveyed was unacceptable (much salty, smelling and bad colour); and were a source of many diseases (TAWASANET, 2019). Rostapshova Alwang, and Pendley (2015) in their Impact Evaluation Baseline Report among Municipal Council in Tanzania including Iringa and Morogoro also pointed out that the sustainability of water projects was constrained with objectionable taste of drinking water as well as insufficiency in budgetary allocations to water projects.

The burden of water in Tanzania faces majority of women, who travel long distances daily to fetch water for drinking and other domestic needs. On average they spend more than 36 minutes per trip to collect water. DHS (2016) noted that household on average devotes more than eight hours per week in collecting water.

Water coverage in Bunda District is found to be 58%; significantly below the national average of 85%. Around 4300 households receive water from water supply system.

Community members travel long distances (up to 5 km) across this sprawling, hilly village to fetch water. Collecting water could take up to three hours, leaving little time for people to carry out their responsibilities in farming or at home (RUWASA, 2019).

The National Water Policy (NAWAPO) launched in 2002 established community participation, as one of the main principles for the management of rural water supply. The Water Supply and Sanitation ACT (WSSA) No. 12 of 2009 presents Community Owner Water Supply Organizations (COWSOs) as the only legal management entity entitled to implement. Despite large-scale investments in expansion of rural water services, coverage rates have not shown corresponding increases.

During 2014 water survey census about 83,000 rural water points equivalent to 40 percent were found to be non-functional, and 20 percent water points failed to function in their first year of operation (URT,2014). A more in-depth analysis of this water point data has shown that technology choice, hydrology management, and location-based factors are to varying degrees responsible for the failures. In order to go forward, the country need to learn from these experiences to ensure that future investment provides more sustainable results (Word Bank, 2018). It is in this context, the study intends to determine factors influencing performance of water projects in Bunda district. Key factors involved in the performance of water projects includes project management, community participation and water accessibility were the focus of this study.

1.3 Statement of the Research Problem

Bunda district is one of the water stressed areas in Mara region, one of the factors contributing to poverty (UNDP, 2015). Out of the total population of 335,061 people

at present, only 194,670 are supplied with water; which count to about 58% of the population within the water system supply (RUWASA, 2019). Whereas water demand currently stands at about 6,500 m^3 per day, total production at the moment is only less than 1,000 m^3 per day (*ibid*). Lack of proper water facilities has caused waterborne disease including bilhazia, tiphoid and diarhoea emerge (*ibid*).

The Melenium Development Goals (MDGs) assessment found that water landscape in Tanzania is unjust, inequitable and uneven with the population in low income areas relying on informal providers offerings water of uncertain quality at unregulated high price (Nganyanyuka *et a.l,* 2017). Concurrently, several reports have found that a negative impact on performances of water projects especially after the withdrawal of donors' support (Jimenez and Perez, 2005, Sanders and Jennifer.2011). WHO and UNICEF (2015) found that access to safe and clean water source does not guarantee adequate and affordable provision of water supply. Furthermore, functioning ruler infrastructures, inadequate financial and technical support for operation and maintenances were highly hindering water supply (Word Bank, 2018; Pelez-Foguet, 2011. URT, 2018).

The government of Tanzania on its side, launched the National Rural Water Supply and Sanitation program in 2002 with the main goal of the program to achieve a universal access to clean and safe water through the construction of water points often supported by the local communities.

Despite all the efforts by the government and donors, the situation of water supply from existing water projects in Bunda district is getting worse. About 53% of the

water facilities are not well functioning properly, while the performance of water projects is highly affected by unavailability of spare parts, outdated technologies and inadequate availability of trained local technicians (BDC, 2019; RUWASA, 2019).However, these literature reviews do not provide evidence of all the determinants on the performances water project in rural water project in Tanzania.

In-depth analysis is needed to meet the sustainable development demand of universality on affordability and equity.Currently, no studies have been conducted in Bunda district to determine factors influencing performance of water projects as well as an assessment on the success or failure to meet targets of water projects implemented in Bunda distict. The above situation therefore necessitates the need for undertaking this study.

1.4 Research Objectives

1.3.1 General Objective

The main objective of the study was to assess factors influencing performance of water projects in Bunda District.

1.3.2 Specific Objectives

(i) To explore approaches used in engaging community during implementation of water projects in the study area.

(ii) To determine practices employed in the management of water project in the study area.

(iii) To examine factors contributing to improved access to household water supply in in the study area.

1.4 Research Question

(i) What are the approaches used in engaging community during implementation of water projects in the study area?

(ii) What are the practices employed in the management water project in the study area?

(iii) What are the factors contributing to the improvement and access to Household water supply in in the project areas?

1.5 Significance of the Study

The contribution of the findingsin water sector is very important and is in line with Tanzania government goal in in water supply, sanitation and hygiene (WASH) in achieving Sustainable Development Goals (SDGs), which emphasize improving human development outcomes and accelaratespovert reduction(Word Bank, 2018).

Moreor less,the study willinform policy makers on the status of the goals of the Water Policy (2002) and the National Irrigation Policy (2010)inincreasing agricultural production and improvinghouseholds earnings. The identified strengths and weaknesses of water projects as water strategy will enable the modification of strategy to get highest results.

To the government the recommendations will provide insights that can be incorporated in defining policy directions and resource allocation to water projects .The study is also important in informing district authorities about the impacts of the water projects for better planning. This goal is a priority for the Tanzanian government and for international organizations: availability of clean and safe water is

a human right and also a key element of United NationsSustainable Development Goals (UNESCO, 2018).

1.6 Scope of the Study

This study was carried out in Bunda District in the villages of Kibara, Bulamba, Karukekere, Kung'ombe, Nyamuswa and Kihumbu. The villages are scattered into four division of Bundadistict under RUWASA.

1.7 Organization of the Dissertation

This dissertation is organized into 5 chapters. Chapter one provides the introduction to the study, which covers the general introduction, statement of the research problem, objectives of the study, research questions, significance of the study, conceptual framework and scope of the study. Chapter two presents the literature review on the existing knowledge related to the performances factors influencing perfomance of water projects. The reviewed literature enabled the identification of the existing knowledge gap which this study has addressed. Chapter three presents the methodological approach covering sub- topics such as the rationale for selecting the study area, sample and sampling techniques, methods and instruments of data collection and data analysis. Chapter four presents and discusses the major findings of the study based on the research objectives and questions. Chapter five provides a brief summary of the key findings, conclusions and recommendations.

CHAPTER TWO

INTRODUCTION

2.1 Overview

This chapter presents comprehensive theoretical and empirical reviews regarding factors influencing performance of water projects. The aim is to seek for relevant studiesthat were found more helpful in accomplishing this study. It includes: methods and techniques used to analyze data, main findings from the study and major implications of the findings, major conclusions that were made and how related is the current study with the previous studies; and what is new in (knowledge gap) that the current study tries to accomplish.

Specifically, the studies reviewed include conceptual definition, water management policies and strategies, stakeholders participation, access to safe and affordable waterr and environmental constraints. The literature reviews also includes water quality, and indicators for tracking projects performance. The review involved also policies and strategies relative to water development in Tanzania, empirical studies and theories related to performances of water projects.

2.2 Conceptual Definitions

2.2.1 Participation

Participation is an approach through which people are able involved in identification, planning, implementation and monitoring phases; combining both indigenous and intellectual knowledges (Kasiaka, 2004; Guijt and Shah, 1998).

2.2.2 Customer

EWURA (2017) defined as a person who purchases or receives regulated services for own use or salemeans any person or body of personssupplied or applying to be supplied with orusing water from waterworks or receivingsanitation services or who is liable fo paymentof any fees or other charges for the supply oruse of water or sanitation services.

2.2.3 Community Based Water Supply Organizations

COWSOS were the entities entitled to legally own the water schemes. Additionally, manage directly the water systems, operating and maintaining the water scheme and the provision of safe water to the consumers. Community Water Supply Organizations (CBWSOS) replaced Community Water Supply Organazations (COWSOS). Water Supply and Sanitation Act of (2019.) describes the role of CBWSOS, which operates in single or a clusteres of villages.

2.2.4 Adequate Water Supply

It is important to consider that a household is only considered to have improved water if it has a sufficient daily amount of water for domestic use at an affordable price, safe chemical and bacteriological quality, and it is available without excessive physical efforts and time.

2.3 Water Management

The concept of water resources management according to Ince..(2011) is the ability of water sources and water resources to continue functioning and yielding water into the long-term future, without detriment to any water users including the environment. It is

a set of relationships designed to improve localised management of water resources, and so enhance resilience to threats such as increasing demand, environmental degradation and climate variability. It is involving water users in the day to day management of local water resources, (Damiba et al, 2013).

In Tanzania 43 million of population has access to improved sanitation (World Bank, 2018). The target of the Water Sector Development Programme (WSDP II) is 85% coverage by 2021(Water Aid Tanzania.2018). Rural areas have the worst improved water coverage about 48 percent compared to 87 percent in urban areas. Furthermore, just 48 percent of the population has access to an improved water source that has a collection time of 30 minutes or less, and only about 25 percent have access to a water source on their household premises (Water Aid, 2018).

World Bank (2018) pointted out that, about 60% of Tanzanians have access to improved water. Levels of access in urban areas were 87% and in rural areas were 48%. Better rural access is a big achievement compared to 61% coverage in 2000. Over 50% of the population experiencing over a 30 minute collection time that could be spent to work compared to more than one hour in 1990s.Only 60% of water points are functional against the 85% target of WSDP by 2020 (Word Bank, 2018).

Population in Tanzania has increased over 25 years increasing water demand, while Water resources droppingbelow 1700 cubic meters per capita, projected to decline further to 1400 cubic meters per capita by 2025 (World Bank, 2017): JMP (2017) pointed out in 2018 revenue collected dropped to an average of 33% due to leakage,

unauthorized connections and overflow. Other persistent problems includes water quality, reliability and affordability: (TAWASANET, 2019).

URT (2015) highlighted key challenges hindering water sector in Tanzania that were inadequate community participation in project, the limited capacity of the communities to operate and maintain the water supply systems; a poor supply chain for operational and maintenance spare parts at the community level and deterioration of the quantity and quality of water resources due to environmental degradation. To meet these challenges, the ministry has prepared the National Rural Water Sustainability Strategy (NRWSS) of five years with the primary goal to offer a framework for sustainable rural water supply development. The strategy to guide the sector towards fulfillment of various National goals, like the Vision 2025, National Strategy for Growth and Reduction of Poverty (NSGR PII), Five-Year Development Plan, Tanzania Long Term Perspective Plan (TLTPP) and Water Sector Development Programme Phase I and II (2006-2025), through sustainable rural water supply services (URT, 2015).

The WSDP II strategies focus on financial sustainability through effective tariff collection; establishment of COWSOS, technical capacity building and to improve the spare part supply chain (URT, 2015). Mwendamseke (2016) in Dodoma region found that the major problem facing COWSO being the lack of community awareness, inadequate human resources, and conflicts between stakeholders. In 2019 Tanzania has established Community Owned COWSOS to manage newly developed rural water schemes.(URT, 2019). More recently, the Water and Sanitation Act of 2019 changed the name of Community Owned Water Supply Organizations to Community Based

Water Supply Organizations (CBWSOS). The Act also transformed the responsibilities for rural water and sanitation service delivery with the establishment of the Rural Water and Sanitation Agency (RUWASA) that will be mandated to sustainably plan, design, construct and manage water supply and sanitation services in the rural parts of Tanzania (URT, 2019).

2.3.1 Policies and Strategies

The government of Tanzania and its development partners realizee the availability of clean and safe water as human right and also a key element of United Nations Sustainable Development Goals (UN, 2016). The policies and strategies include the National Water Policy (2002), Irrigation Policy (2010), National Agriculture Policy (2013), National Environmental Policy (1997), The Water Supply and Sanitation Act (WSSA). the Water Sector development plans (WSDP2006) and the Water Sector development plans II (WSDP II) and National Rural Water Sustainability Strategy (NRWSS).

The National Water Policy (NAWAPO) launched in 2002 established “community participation as one of the main principles for the management of rural water supply. The Water Supply and Sanitation Act (WSSA) No. 12 of 2009 presents Community Owner Water Supply Organizations (COWSO).The WSSA introduces COWSOS in order to improve local water management systems by ensuring communities participation and ownership. Through COWSOS, a community can effectively participate in owning, planning, maintaining and operating water supply projects and sanitation facilitiesd (URT, 2015). National Irrigation Policy of 2010 and National egriculture policy of 2013 considers water as vital input for agricultural production

and improving foodsecurity.Word wide Irrigated agriculturecontributes 20 percent of the total cultivated area and s 40 percent of the total food produced (World Bank, 2020).

The two other strategies WSDP (WSDP 2006) and the WSDP (WSDP II 2014) suggests the promotion and strengthening of independent management entities, including private agents. Tanzanian law Act no. 12 of 2009 regulates private sector participation in water supply, establishing under section 35 that a "service provider" may be hired by COWSOS for performing its functions and exercising its powers. The first National Water Sector Development Programme was published in July 2006 established Water User Groups (WUGs) and Water User Associations (WUAs),which might take the responsibility of managing the entire water scheme.).WSDP II more generally suggested the promotion and strengthening Water User Groups (WUG), and Private operator (WSDP II, 2014).

2.3.2 Word Bank Water Projects in Tanzania

The word Bank Projects in Tanzania is implemented under Water Sector Development Program (WSDP). WSDP prioritizes activities and budgets in a three-phased timelines of five years each. The first phase was between 2007 to 2014; while the second phase was between 2014 to 2019 and third phase will be between 2019 and 2025 (URT, 2014).

The World Bank Project Development objectives were to strengthen the capacity for integrated water resources planning and management in Tanzania, and improve access to water supply and sanitation services in an operationally efficient manner.

The project was implemented and monitored with United Republic of Tanzania under the Ministry of Water through Water Sector Support Project (2007-2015).

World Bank (2019). The project directly benefitted 14,461,715 people in both rural and urban areas of Tanzania. To achieve the National Strategy for Growth and Reduction of Poverty, and to reach the MDG targets, an additional 11.6 million people needed access by 2015. To meet the Development Vision of the Government of Tanzania (GoT) target of 90 percent coverage by 2025, a further 24.6 million people will need access to improved water supply (URT, 2020).

2.3.3 Integrated Water Resources Management

The Integrated Water Resources Management and Development (IWRMD) approach has been adopted as a potential tool for managing of water resources. Development of IWRMD Plans is a required to integrate sectoral plans. IWRM is a comprehensive, participatory planning and implementation tool for managing and developing water resources in a way that balances social and economic needs, and that ensures the protection of ecosystems for future generations. Water uses for agriculture , healthy ecosystems, for people and livelihoods. An IWRM approach is an open, flexible process, bringing together decision-makers across the various sectors that impact water resources, and bringing all stakeholders to the table to set policy and make sound, balanced decisions in response to specific water challenges faced. IWRMD Plans for all the Basins of Tanzania have been prepared, these basin are Tanganyika, Nyasa, Ruvuma Rukwa and Rufiji ,also Lake Victoria and Wami/Ruvu Basins. IWRM seeks to manage resources including water in a socially and economically equitable

manner. IWRM strove to include all stakeholders in the decision-making process and recognized the many uses of water (GWP, 2010).

2.3.4 Water Source for Home Use

Acccording to WHO (2017), drinking water comes from natural sources that are either groundwater or surface water. Wells or springs are used to harvest groundwater, while surface water comes from rain and snow. It is the water that feels the rivers, lakes, and streams. Water is pumped, both from groundwater or surface water sources, into pipes or tanks. The pipes eventually lead to homes, schools, businesses, and any place for various uses including drinking (EPA, 2017).Water schemes in Tanzania are technically composed borehole, a pumping system, a reservoir and the distribution network (Fierro etal., 2017). URT (2017) reported that The main sources of water between 2015 to 2017 were rivers (32.8%), springs (26.5%) and boreholes (24.6%). Others were lakes (9%) and dams (7.2%). During financial year 2016/17, the main sources contributed 83.8% of the total water abstracted, compared to 88.5% in financial year 2015/16 and 85.3% in 2014/15 (EWURA, 2017).

2.3.5 Community Participation

The concept of community participation is still an exception rather than the normal in several developing countries. Community participation being a democratic process of development (King and Hickey, 2016). Cole (2007) observed community participation and empowerment are necessary ingredients for communities to participate in the planning. LGC (2015) affirmed that programmes and projects that develop from an informed public guided by professionals, are likely to be more creative and locally

appropriate than the programmes where the public is excluded from the planning process. Nuttavuthisit, Jindahra, and Prasarnphanich (2015) supported this claim arguing that the detailed participatory mechanisms that may operate within certain contexts especially in developing countries remain under-researched.

2.3.6 Advantages of Participation

Active involvement of community have been more successful and often gain more acceptance by local communities (Mbuagbaw and Shrik, 2011; 2016). The approach ensures success of the projects, makes projects more effective, efficient and relaxant to the project goal and increase project quality (Mcgee, 2002; Brett, 2014), this comes from an increased international interest in community and public involvement (PPI) in research.

2.3.7 Level of Stakeholders Participation

The degree of community participation ranges from mere reception of programme information to welding power over priorities and resources (Tones and Green, 2004). At its lowest degree or level, people participation can take the form of being coerced. However, there is no people control at this lowest stage. Even if the state or the government practices the consultative approach to community development in a partnership programme by giving people the choice within the predetermined projects, people's participation is induced (Asnarulkhadi and Fariborz,2011).

The participation at ʻinducedʻ or ʻpartnershipʻ stage is not mainly concerned with the process of mobilizing the people, who should be regarded as the recipients or beneficiaries of the development introduced, but of upper most importance is ʻthe

participation of the organized community (White, 1982). It refers to working in partnership with other stakeholders on each aspect of the decision, developing alternatives and identifying solutions (Takyi and Yussif, 2013).

2.3.8 Access to Safe and Affordable Water

Analysis of Access to Water showed that about 84% of the global population has access to piped water supply through house connections to an improved water source through other means including stand pipes, protected springs and protected wells (Joint Monitoring, 2017). However, about 14% does not have access to an improved water source and have to use unprotected wells or springs, canals, lakes or rivers for their water needs.

Word bank 2017 pointed that National improved water coverage is only 60%, meaning that some 21 million people lack access to a water source that is built with technology and prevents contaminants from entering the system. Rural areas have the worst improved water coverage, about 48% compared to 87% in urban areas. Many rural Tanzanians instead rely on traditional open dug wells (24 percent) or surface water (18%).

The report further showed that bout 48% of the population has access to an improved water source that has a collection time of 30 minutes or less, and only about 25% have access to a water source on their household premises. On average, Tanzanian's spend 36 minutes per trip to collect water. Assuming that water collection is a daily activity, with at least two trips per day, a household on average devotes more than eight hours per week to collecting water. (Joint Monitoring and planning, 2017).

2.3.9 Pricing and Affordability of Water Services

Pricing of water services should accurately reflect the true costs of providing high-quality water and waste water services to consumers to maintain infrastructure and plan for upcoming repairs, rehabilitation, and replacement of that infrastructure (WHO, 2017). Haysom (2006) study shows that water costs were too high for the community to handle; thus this situation affected the project negatively as majority of the people decided to collect water from unprotected sources, and this does not have any cost implication. According to Water Supply and Sanitation Act (2009), requires EWURA to prepare annually comparative analysis report on the performance of the regulated water utilities (EWURA, 2017).

2.3.10 Pricing Structures

Prices signal value to consumers and help determine whether consumers use water efficiently. If prices are too low, consumers will use too much water. It is also essential that the pricing of water services covers the costs of providing service, for both operations and maintenance and capital expenses. factors all costs into prices, including past and future, operations, maintenance, and capital costs.

Meteringallows both consumers and suppliers to know exactly how much water is being consumed. When water is billed based on metered consumption, consumers see a direct financial reward for their conservation efforts. Suppliers use meters to gain insights on the amount of water being lost in a system through leaks. From both a consumer and a supplier point of view, metering is an invaluable aid to conservation efforts (EPA, 2017).

2.3.11 Water Rates

Water rates is measured by the annual cost of water bills as a percentage of median household income. Households paying an amount for water that exceeds an affordability threshold are considered to be paying a cost that is unaffordable and a "high burden (EWURA, 2017).

2.3.12 Water Availability

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes (UN, 2016). In 2017 about 5.3 billion people used safely managed drinking water services (Word Bank, 2017).

The remaining 2.2 billion people live without safely managed services, 1.4 billion people having basicand an improved water source located within a round trip of 30 minutes, while 206 million people with improved water source requiring more than 30 minutes to collect water and 435 million people taking water from unprotected wells and springs, however 144 million people collecting untreated surface water from lakes, ponds, rivers and streams (Word Bank, 2018).

2.3.13 Water Quality

WHO (2015) supports and produces a series of water quality guidelines, including on drinking-water, safe use of waste water, and safe recreational water environments. guidelines, including on drinking-water, safe use of wastewater, and safe recreational water environments. The Framework recommends establishment of health-based targets, the development and implementation of water safety plans by water suppliers

to most effectively identify and manage risks from catchment to consumer, and independent surveillance to ensure that Water Safety Plans are effective and health-based targets are being met.

2.3.14 Indicators for Tracking Projects Performance

According to water supply reliability theory outlined by Damelin et al. (1972), it is crucial to have indicators that will help to understand the reliability and level of service provided by tracking the trend of the scheme performance for proper allocation of resources and suitable operation and maintenance to meet the need of the consumers per unit time.

Indicators can be important tools for monitoring and allocating resources whenever needed. The indicators includes level of service provided, well-functioning water project, the revenue collected and savings from project earnings. proper function of the system, and absence of conflicts between stakeholders.

2.3.15 Environmental Water Related Constraints

WHO (2017)reported that about 829 000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water and sanitation.Diarrhoea is the most widely known disease linked to contaminated food and water but there are other hazards including schistosomiasis In many parts of the world, insects that live or breed in water carry and transmit diseases such as dengue fever. Some of these insects, known as vectors, breed in clean, rather than dirty water, and household drinking water containers can serve as breeding grounds.

2.4 Theoretical Literature Review

2.4.1 Participatory Theory

Participation is not a new concept. It represents a move from the global, spatial, top-down strategies that dominated early development initiatives to more locally sensitive methodologies (Storey, 1999). There are differing opinions as to the origins of participation theory. This study was premised on Participatory Theory founded by Buchy, Ross and Proctor (2000). The theory assumes that a better participation of local communities in the management of their own resource will lead to better environmental management.The local communities willingly and enthusiastic will engage on a voluntary basis in the management of their own affairs and transfer of ownership. Participation will also lead to empowerment and greater social justice.

Macnaghten and Jacobs (1997) identified that participation is one of the principals of the global action plan Agenda 21, suggesting the involvement of ordinary citizens in decisions and the implementations of social and economic changes. Holcombe (1995) acknowledged that everyone needs to be involved in development decisions, implementation and benefits. The top down approach focused on single disciplines and reductionist paradigms. Agrawal and Gibson (1999) identified the limitation of the state in top-down approach in inneffient of resource conservation practices and emphasis popular participation as the remedy of these shortcomings.

2.4.2 Functionalism Theory

The structural-functionalism approach can be used to support planners to practically assess the capacity of governance arrangements to support planning processes in complex planning systems. Functionalism theory (Talcot, 1975) study assumes that

perfomances of water projects depends on effective management of the system which considers aspects alike operations and maintenance as key instruments for project functionality. The theory shows that perfomance of water projects depend on both stakeholders participation and effective management of the system which includes operation and maintenance, setting of water charges and effective use of water funds.

Apart from the indicators of management, performances of water project also depends on the inter-linkage of indicators between economic, environmental and social dimensions (Juwana et al., 2012). Social factors like awareness of people towards environmental conservation affect the way they comply with the rules and regulations for environmental protection. Economic factors where people employ themselves by carrying out economic activities around water sources like farming activities, making bricks, grazing animals pollutes the sources hence affect the availability of water.

2.4.3 Stakeholder Theory

The stakeholder theory has been in the management agenda for about thirty years and reservations about its acceptance as a comprehensive theory still remains. It was introduced as a managerial issue by the Labour Party of United Kingdom in 1997 aiming to make public management more inclusive (Gomes, 2006). Stakeholders are group or individual who can affect or is affected by the achievement of the organization's objectives (Freeman, 1984). Bryson (1995) defined stakeholders as any person, group, or organization that can place a claim on an organization's attention, resources, or output or is affected by that output The problem with the theory is that, it does not explain thoroughly the complexity of the relationships between an organization and the people, groups and other organizations from its environment.

Stakeholder theory suggests that in order for any project at any organization to succeed and be sustainable, stakeholders should be involved in all stages of project life cycle (Bal et al., 2013). Failure to involve stakeholders in project development makes lack of ownership leading to poor performance of the projects. The theory was used in this study by looking at the way different levels of water management how stakeholders are involved in all stages of water projects development.

2.4.4 The Theory of Water Aid

In 1992, the International Conference on Water and the Environment took place in Dublin, Ireland. During the forum, the participating countries came up with four principles that have now become cornerstones when considering global water development [UN,1992)]. The first principle states that fresh water is a finite resource that is essential to sustain life, development and the environment. The second principle states that all water development and management should stem from a participatory approach. This principle involves community during implementation. The third principle recorgaanizes women role they play in the development and management of water. This principle, along with the second principle, is an essential lesson in the application of community water development. Finally, the fourth principle recognizes that water has economic value. The principle recorganize water as not only public good, but water play important for business and livelihoods (UN, 2017).

2.5 Empirical Literature Review

According to WHO (2011) drinking water guideline values, it is assumed that the daily per capita consumption of drinking-water is approximately 2 litres for adults,

although actual consumption varies according to climate, activity level and diet. Based on currently available data, a minimum volume of 7.5 litres per capita per day will provide sufficient water for hydration and incorporation into food for most people under most conditions. In addition, adequate domestic water is needed for food preparation, laundry and domestic hygiene. Water may also be important in income generation and amenity uses.

WHO (2011) Guidelines for Drinking-water Quality commented that, affordability of water has a significant influence on the use of water and selection of water sources. Households with the lowest levels of access to safe water supply frequently pay more for their water than do households connected to a piped water system. The high cost of water may force households to use alternative sources of water of poorer quality that represent a greater risk to health and high cost.

WHO (2017) assessment on progress of drinking water, sanitation and hygiene, noted that about 829,000 people worldwide are estimated to die each year from diarrhoe and 22 million found with schistosomiasis as a result of unsafe drinking water. Diarrhoe is largely preventable, and the death of 297,000 children aged under 5 years could be avoided each year if these risk factors were addressed.

Study conducted by Osumanu (2008) in Ghana on Private sector participation in urban water and sanitation, found that water sector has been constrained by interlinked political, administrative, economic, social and legislative factors that hinders water supply system in the country. Futhermore, Ahima (2012) evaluation of the quality of sachet water vended in the New Juaben Municipality of Ghana found high cost of

water treatment, plants and equipment, water losses during distribution, increasing population and non-payment of water bills by consumers account for the country's public water sector inability to supply adequate water to their clients.

Kosoe and Osumanu (2015) in Ghana found that water sources used by households in the Wa Municipality are boreholes both non-mechanized and mechanized, open wells and piped water. Majority of consumers depend on public taps supplied by mechanized boreholes for their water needs.

The study by Kosoe and Osuman (2015) analyzing access to household water supply in municipality in Ghana found that problem of poverty are inexplicably linked with those of water. Its availability, proximity , quantity and quality and improving access to water could also make major contribution towards achieving the eradication of poverty.

Mitlin and Walnycki (2016) evaluation study on why water still unaffordable for sub-Saharan Africa's urban poor, found household income have implication to water use. Curently, cost mentioned to be a factor of accessibility and influences water use patterns of households. Where the price of water is considered to be cheap, the usage rate is higher and where the cost is seen as expensive, the uses is low (Cairncross, 2000).

Mwendamseke (2019) empirical study on on COWSO strategy and private sector implementation in Dodoma region found that private sectors are better than other management entities especially in collecting revenues. They have less bureaucracy and decisions are taken faster.

Chumbula (2016) a case study done in Iringa region, Tanzania on sustainability of water projects found that litle women were involved in water committees compared to men, which affects performances of many water projects. Majority of respondents reported that there were not aware about women representations in the water committee.

Rostapshova Alwang, and Pendley, 2015 Impact Evaluation Baseline Report of the Municipal Council in Tanzania, found the quality of water at their main source in different part surveyed was unacceptable. In Morogoro water quality was a more consistent problem. The main complaints were about objectionable taste, salt, smell and colour and caused them ill-heath,deaths from the disease.

TAWASANET (2019) in Tanzania Sector Equity Report, Analysis on the sector to fit with industralisation shows that between financial years 2016/17 and 2018/19 low fund were allocated. The total budget available to the government has increased, but the total budgetallocated to the water sector has fallen by over a quarter fromTsh 242 billion to Tsh 687 billion in 2018/19 , this meant that water sector was receiving little funding.

Mwendamseke (2019) study in Dodoma, found COWSOS strategy is a new idea in rural communities and even though it was legally established in 2009, many districts started the implementation only in 2013. Villagers often do not understand why they should establish COWSOS. In some cases districts go and train villagers several times but the community does not agree with the idea. Cairncross, (2000) Global Water Supply and Sanitation Assessment found that Distance to a water facility and access to

the water have an inverse relationship. Thus people's water usage rate is influenced by the distance they cover to access the water. If people consider the distance to be far, the water they use daily is affected negatively. Apart from those with wells and home connections from GWCL, the average distance covered by households to access water was 125 meters.

2.5.1 Research Gap

The literature has provided different opinion on factors influencing performance of water projects, it has assessd opinion of those who argued negatively performances of rural water projects are major challenge in Tanzania (Water Aid, 2015). Water point Mapping (WPM) surveys conducted in 51 districts in Tanzania mainland found that only 54% of all public improved water points are functional. Even very new water points (WPs) have a problem: The same surveys found that just two years after project completion already a quarter are no longer functioning (JMP, 2015). Inspite of the Governments and international organizations (NGOs) investing every year in implementation of rural water supply projects (Gabrielino, 2006, Hukka& Katko, 2004). However, some projects failed in short time after construction due to poor planning and management of water supply systems (Gebrehiwot, 2006).

The literature assessed different studies on the performance of water projects of those, who found positive improvement in water sector in the country (World Bank, 2017; WHO, 2017, UN, 2016).The general objective of the Tanzanian Government is to improve access to sustainable water service in the rural areas of the country. This general goal has implemented correctly by all stakeholders and achievement has been made so far.

There increasing water supply coverage with new water schemes and rehabilitations of old ones. The existence schemes management has improved tremendously monitoring and supervision of existed scheme. The number of functioning water points increased by 90% (NRWSS, 2015). The information above necessitates the creation of more information on this study.

2.6 Conceptual Framework

The conceptual framework for this study as presented in Figure 1.1 has been adapted and modified from Gitua (2015) on the factors influencing performance of community water projects. The conceptual framework has five key dimensions of how the performance of water projects depend on project support,water management, participation of community and improved access to household water supply.

Participation (Box 1) is the most important approach towards enabling communities to help themselves and sustain efforts in the project. The involvement of key stakeholders in community water projects has led to empowerment of community members in terms of problem solving skills, knowledge and technical skills for managing projects.

This finding is consistent with the study of Nkongo (2009), who found that participation of beneficiaries in the planning and execution of the project increased chances of project success by increasing beneficiaries' sense of ownership in the project. The involvement of communities in water projects promotes continuity by ensuring that community members are equipped with skills and knowledge that enable them to run the projects even after the professional contractors exit the project.

Water management is very important in any water project (BOX 2). The study consider success of water sector rely on rehabilitation of infrastructures and capacity building. Availability and distribution of water are important factors for project performance. The aim of water distribution is to distribute water through system from the source to the community intended. Water is distributed through a network to supply a community with the appropriate quantity and quality of water. According to ICE (2011) water management is the ability of water system to continue functioning and yielding water into the long-term future, without detriment to consumers and its surroundings.

UN 2016 insist that access to safe water (BOX 3) is human right. The SDGs call for universal access to safely managed water and sanitation by 2030. Beyond providing technologically improved water and sanitation facilities, the country will also need to meet rigorous standards on service quality. Access to water in this study involves three variablesnamely availability of water,affordable price and safe water quality.

Households paying an amount for water that exceeds an affordability threshold are considered to be paying a cost that is unaffordable. Haysom (2006) study shows that when water costs is too high for the community to handle; majority of the people decided to collect water from unprotected sources Prices signal value to consumers and help determine whether consumers use water efficiently. If prices are too low, consumers will use too much water. It is also essential that the pricing of water services covers the costs of providing service, for both operations and maintenance and capital expenses.

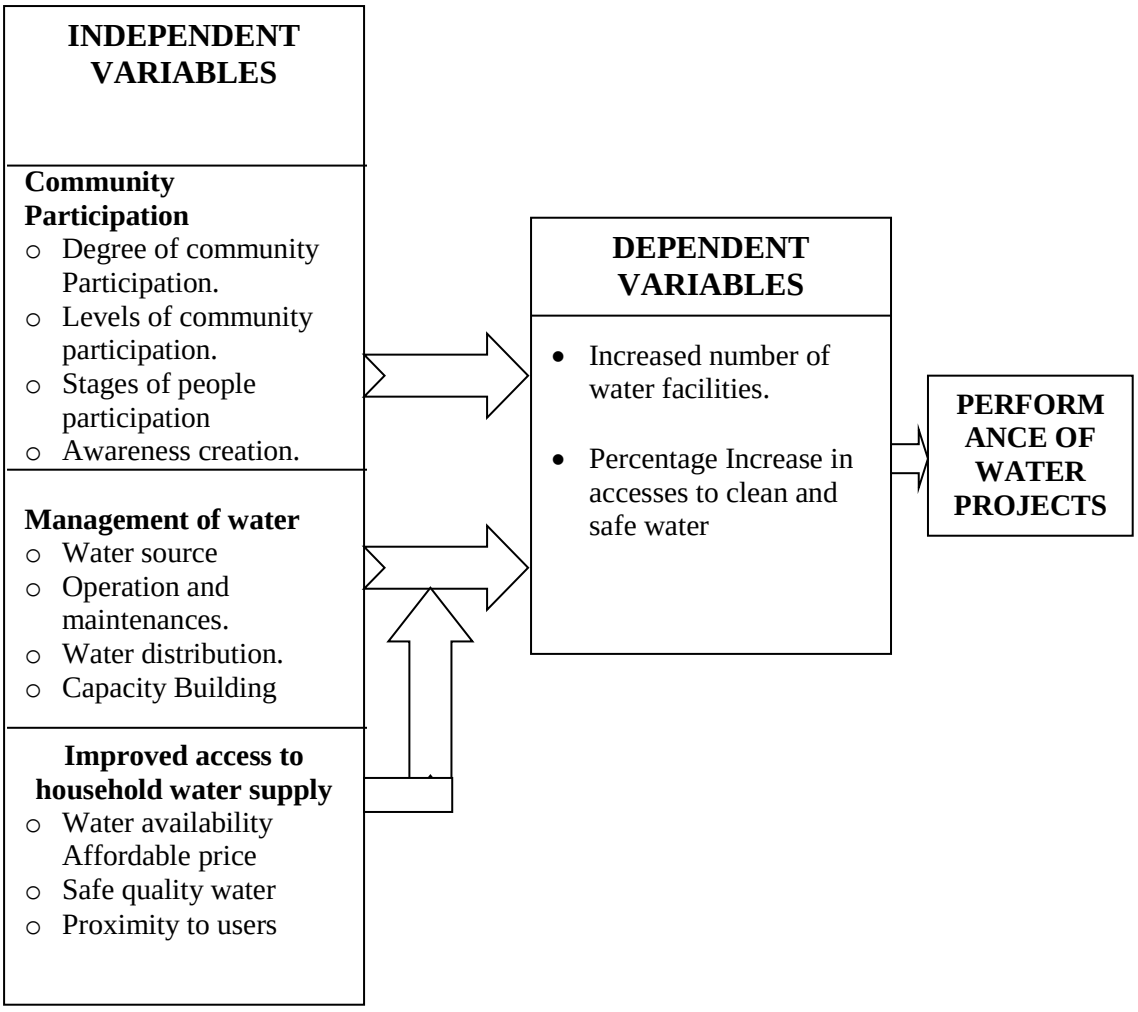


Figure 2.1: Conceptual Frame Work on Factors Influencing Performances of Water Projects

Source: Adapted from Gitua, (2015) and Modified by Reseacher

Project support is very important for success of water projects. The support includes water sector policy and governance, including legislation, regulation, planning and management; institutional capacity development and all activities supporting the Integrated Water Resource Management are necessary for the performance of any water project/program. The world Bank support varies project in developed countries to support improved access to potable water ndsanitation (Dinar, 1998). Integration of water and sanitation policies with other sector policies are interliked with the performances of water projects.Techinial issue can not be ignored technical issue can

be seen as part of managerial issue. Technical support is reguired in complicated issues that communities can not handle (Batchelor, 2010).

It is essential to build the capacity of sector professionals, civil society and communities to understand, commit to and promote the new policies.Successful policy and reform implementation requires political will and facilitation, but technical support, economic, environmental and social considerations are also important (Ghosh, 1999).

2.7 Summary of the Chapter

This chapter has reviewed related literature on factors influencing performance of water projects and its constraints. The studies reviewed include conceptual definition, water management, policies and strategies, stakeholders participation, acess to safe and affordable water and environmental constraints. It has thoroughly discussed the literature review water accessibility includes water guality and theories related to performances of water projects. Generally, the reviewed literature has helped to identify the research gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter discussed the methodology as applied in the study. The chapter is arranged as follows: Section 3.1 discusses research philosophy, 3.2 illustrates selection of study areas, section 3.2.1 depicts source of data, section 3.2.2 explain research design. Then is followed by section 3.2.3 which presents source of data, section. 3.2.4 discuses sample size and sampling technique, while section 3.2.5 involves sample frame and , section 3.2.6 presents data collection techniques.Section 3.3 describe presentation and analyses of data processing and analysis, section 3.3.3 desribes data reliability and validity and section 3.3.4 dwells on limitation of the study,Lastly section 3.3.5 provides summary of the chapter.

3.2 Research Philosophy

Scientific research philosophy is a system of the researcher's thought, following which new, reliable knowledge about the research object is obtained. In other words, it is the basis of the research, which involves the choice of research strategy, formulation of the problem, data collection, processing, and analysis. (Žukauskas, Vveinhardt and Andriukaitienė, 2017).

There are four main trends of research philosophy that are distinguished and discussed in the works by many authors: the positivist research philosophy, interpretivist research philosophy, pragmatist research philosophy, and realistic research philosophy.

The research adopted pragmatic mixed method approach. It was considered most suitable for this study since the subject area cuts through social and technical line of inquiry. According to Cohen et al. (2007), the scientific research paradigm can be defined as a wide structure encompassing perception, beliefs, and awareness of different theories and practices used to carry out scientific research. The scientific research paradigm, creates a relationship between research aims and questions The approach provided the opportunity to use methods, techniques and procedures typically associated with quantitative or qualitative research. Mackenzie and Knipe (2006) state that in most common definitions, it is claimed that methodology is a general approach to research related to the paradigm or theoretical foundation, and the method includes the systematic ways, procedures, or tools used for data.

The mixed methods research is adopted because takes advantage of using multiple ways to explore a research problem. This is with a view to overcome the limitations of a single design. Hence, the design is characterized by an initial collection and analysis of quantitative data followed by a collection and analysis of qualitative data. The purpose is to use qualitative results to assist in explaining and interpreting the findings of a quantitative study (Creswell, 2013).

3.3 The Study Area

The research wascarried in Bunda district, Mara region, to the projects under World Bank.The project is supported with RUWASA projects. RUWASA works with 33 registered CBWSOS within 30 villages. The population in these villages were 115,654. The numbers of existing water supply facilities are 261 (RUWASA,2019).

3.3.1 Description of the Study Area

Bunda district is one among five District of Mara Region with nine Local Authority Councils (ESRF, 2015). BundaDistrict borders to the Northby Musoma rural district, to the South by lake Victoria and Ukerewe, District Mwanza region. Serengeti district in the East, Magu district (Mwanza region) in the west by Lake Victoria. Bunda district is located at an elevation of 1225 meters above sea level.itsrdinates is 2^{0}0' 0'S and 0'and 33^{0} and 49"60' East (ESRF,2015). The District has a total area of 3088 Km² out of which 200 Km² is covered by Lake Victoria water).About 2888 Km² is dry land of which 2408 Km² is arable land suitable for crop production and livestock keeping. The remaining 480 Km² occupies by Serengeti national Park (URT, 2010).

According to National Population cencus of 2012, Bunda District has a total population of 335,061 people, with a growth rate of 1.8 % (ESR, 2015).Bunda District accounts for 19.5% of the region's population and secondTarimedistrict (URT, 2010). Main ethnic group in Bunda District are Jita, Kurya, Kizu, Sukuma and Kerewe. Bunda District is among the Districts in Tanzania which has low coverage in terms of access to improved water sources. It is estimatedthat only 58 % of population have acess to water, which is below the National average of 85% (RUWASA,2019).

The daily water demand in the Bunda District Council is estimated to be 14,500 cubic meters; however the current daily water supply is about 6,960 cubic meters. The major causes of water deficient includes old infrastructures, non functional facilities, breakdown of pumps, theft, drought and poor operation and maintenances from the community (RUWASA, 2019).The District target is to increase water coverage from the current 56% to 75% by the year 2020 (RUWASA, 2018).

3.3.3 Source of Data

Both primary and secondary data sources were used to collect information. Primary data were obtained directly from water users.Walliman (2011) reported that primary data are obtained from the field by observation . In this study, primary data were obtained using questionnaire and interview whereas relevant literatures such as reports, censuses, newspapers and internet were used to gadhered secondary data. Walliman (2011) indicates that secondary data are written sources that interpret or record primary data These documents obtained from libraries, different governmental and non-governmental institutions and offices including District Water Engineer's office, Villages office and COWASO leaders office.

3.3.2 Research Design

Sharma (2003) highlighted that research design is the preparation of a strategy of conducting research these are the important points to be considered in formulating any research.

This research employs mixed design. According to Creswell (2009), mixed design comprises of studies that use both qualitative and quantitative methods sequentially and simultaneously; such that the first one approach is used and then the next; with the second part of the study perhaps expanding on the results of the first or in a multilevel design approach.

In this research, quantitative study involved the use of sample surveys. A survey is a research technique used to scan a wide range of field issues (Cohen et.al, 2004), and can generate numerical data, provide descriptive, inferential and explanatory

information through the use of instruments and question for all participants hence gather standardized information. Under qualitative methods, it involves key informant interviews, informal discussion, direct observation on the field which serve to obtain information which were used to contribute towards the development of user perception surveys using likert scale, the results of which was analyzed statistically.

3.3.3 Sample Size, Sample Frame and Sampling Techniques

According to Cohen (2004), the knowledge gained from sample is representative of the total population under study. A sample is defined as small group of respondents drawn from a population in which the study is interested in gaining information and drawing conclusion (Kothari, 2004). A sample frame is list of all units in the population from which study sample will be selected (Creswe, 2003). According to Hair (2003), sampling is the process of selecting segment of the population for investigation.

Practically, it is not possible to include every member of the population of interest in a research study that covers a broad area. For this reason, a sample is mostly preferable. The main sampling frame comprised of a list of water user customers as well as COWBSO project leaders from the six (6) studied villages. The following types of sampling techniques were used to select the sample sizes at various stages of data collection in the study area.

3.3.3.1 Simple Random Sampling Technique

To select a sample of CBWSOS leaders, simple random- probability sampling technique was applied with the purpose obtaining equally chanced selected

respondents. To apply this technique, the sample size calculator provided by the Survey System (SS) was used to select relevant respondents from the sampling unit in the six villages. SS is an online software that has reputation for survey creation, analysis and administration methods, making it one of the best survey software available to researchers which can be used to precisely determine sample size of population, ensuring that the result reflects the target population (http/ww,survey system.com/s scalc.htm visited on 12/08/2020).

According to Mugenda and Mugenda (2003), thirty percent (30%) of the total target population as a sample size for it may be accepted as a good representative sample. With this regards, a sample size for the population of the 180 respondents in the sampling unit using a confidence level of 95% and confidence interval of 5 % yielded a sample size of 123 CBWSOS leaders.

3.3.3.2 Convenience Sampling Technique

Selection of water user customers was done by using convenience sampling. Convenience sampling defines a process of data collection from population that is close at hand and easily accessible to researcher (Crossman, 2020). This technique was applied to water user customers based on their discernment on performances of water projects in the study area, and enables to obtain response in low cost and allows easy reachability (Rahi, 2017). From this, a sample size of 150 participants was selected, twenty five (25) from each of the six (6) villages as according to Mugenda and Mugenda (2003), this number is accepted as an adequate representative sample. The 150 respondents were obtained from the water points or visited to their home

under the assistance of resident enumerators who were employed, that enable collection of data on time.

3.3.3.3 Purposive Sampling Technique

Purposive sampling is a non-probability sampling technique in which the selection is based on characteristics of a population and the objective of the study; also known as judgmental, selective, or subjective sampling (Crossman, 2020). Using this technique, 15 key informant interviewees who are the officials including: RUWASA board members, Village Executive Officers, CBWSO Chairpersons, RUWASA Manager, Water Technician and District Community Development Officer (DCDO). The selected officials were involved in the study due to their relevant position, knowledge and skills about water management and the utilization; and that were found very important in giving supplementary information based on the functioning and performance of water projects.

Purposeful sampling method was also used to obtain the six (6) villages for this study. The method was used to avoid having villages with more or less characteristics. Two reasons underline the selection of the six (6) villages. Firstly, three of them use water from the National Lake Victoria Water Project as their source; but secondly there was a need to include the other three villages in midlands that mainly uses water from other source. These villages are expecting to provide a case for understanding other source of water used, out of Lake Victoria Project.

Therefore, besides the 273 main samples comprising of COWBSO leaders as well as water users, the studied involved 15 key informants so altogether making a total of

288 studied respondents.Tables 2(a) and 2(b) below give a summary of sampling distributionthat shows the different categories and characteristics of the respondents.

Table 3.1(a): Sampling Table for the Main Respondents

S/n	Sampling group	Sample size	Sampling technique used
1.	COWBSO Leaders	123	Online calculator
2.	Water user Customers	150	Convenience sampling
	Total	**273**	

Tables 2(b): Sampling Table for Key Informant Interviewees

S/n	Sampling group	Sample size	Sampling technique used
1.	RUWASA VEOs	6	Purposive sampling
2.	CBWSO Chairpersons	6	Purposive sampling
3.	RUWASA Manager	1	Purposive sampling
4.	Water Technician	1	Purposive sampling
5.	DCDO	1	Purposive sampling
	Total	**15**	

3.3.4 Data Collection Techniques

The data for the study was collected through triangulation method, which imployed more than one data collection methods. Triangulation means using more than one method to collect data on the. same topic.This is a way of assuring the validity of research through the use of a variety of methods to collect data on the same topic, which. involves different types of samples as well as methods of data collection (https://www.researchgate.net/post visited on 12/08/2020). The data for the study was administered through questionnaire and interviews. To achieve the objective of the research data was collected by the researcher and supported by research assistants in the administration of surveys, questionnaires and field observation.

3.3.4.1 Questionnaire

With this tool, a total of 273 questioners were administered to water users including both men and women. The questionnaire involved both closed and open-ended questions.Closed question enable to collect standardized information that is tabulated and frequencies drawn. Open –ended questions were included to enable respondents to give out their own opinions. The advantage of using questionnaires is based on the fact that it covers a large sample at a low cost, and gives respondents adequate time to give well thought out answers. There was also chance to help respondents unable to read or write.

3.3.4.2 Interview

Kothari (2008) noted that, interview involves oralcommunication two individuals. The interview method is flexible, and enable to rephresethe questions or giving elaboration. . Semi- structured interviews was used to collect data from District officials, Village Executive Officers, Village Extension Workers and Village leaders. The open-endedquestion enabled the researcher to elaborate the points of interests.

3.4 Data Processing and Analysis

3.4.1 Data Processing

According to Kothari (2008), data processing implies editing, cording, classification and tabulation of collected data so that they are amenable to analysis. The raw data collected were edited and some errors omitted to ensure that data are accurate and consistent to enabled coding and tabulation. The collected data was processed manually where codes established and templates formed.Questionnaires were coded

and edited before further processing. Afterrefining ,data were entered into the computer.

3.4.2 Data Analysis

Shepard (2002 informed that important stage of data integrity is the proper analysis of research findings. Improper statistical analyses distort scientific findings, mislead casual readers.

Data Analysis is the process of systematically applying statistical techniques to describe and illustrate, condense and recap, and evaluate data. According to Shamoo and Resnik (2003) various analytic procedures “give a way of drawing inductive inferences from data and differentiated the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data”

Qualitative research include statistical procedures, several times analysis is an iterative process where data is continuously collected and analyzed almost simultaneously. Data analyzed for patterns in observations and data gathering during field study (Savenye, Robinson, 2004) in thescase, the qualitative data gathered through open ended questions and interview were subjected to content analysis.. accordingly, findings were presented in text of narration and quotations.

in the case of the quantitative analysis data gathered through closed-ended questions like age, level of education, sex were assigned to numerical value, then were subjected to Statistical Package for Social Science Vesion 23 (SPSS) and MS Excel were used to analyze data,where derived descriptive statistics (frequencies and percentages)

which were presented in tables and figures. This was important to obtain the relationship and h variations between variables.

3.4.2.1 Measuring of Participation

The frequency of participation can be easily measured with an attendance sheet/register or Creating the grid and establishing indicators of accomplishment. In creating the grid, it can also be done on for example, the number of shifts/meetings an individual signed up for and actually turned up for and remained for the entire shift. The respodens can be either asked to indicte "Yes" or "No" on qualitative question.

3.4.2.2 Affodability Determination

In order to calculate the basic consumption per household, the per capita reference was multiplied by the number of people of the representative household in the authority. Next, the amount of money that households would have to pay for the average water consumption and the basic water consumption was calculated, dividing both quantities by the average household income gives both traditional (AI) and alternative affordability indices (AI*).The amount of 100 litres per capita was be chosen in order to establish comparisons, because this amount covers basic hygiene and consumption needs (Howard & Bartram, 2003).

Some frequently uses affordability Indexes In order to measure the affordability of water services, two indicators have been used in international comparisons (OECD, 2003). First, a macro or aggregate affordability index considers affordability at the country level. It is measured as the ratio of average household water charges (WB) to average household income. The formula given below:

AI =WB/Y…….(1)

Secondly, an alternative index of affordability is proposed to measure the affordability and equity aspects of residential water .tarrifs. Instead of considering the total bill that a household (or representative household) is paying for water, it is suggested that only the amount paid for basic water consumption is taken into account, excluding luxury uses. Thus, the new affordability index will be the following;

AI* ¼ MWB=…….(2)

Y denotes individual/regional/national income. However, MWB refers to the amount of money.

3.4.3 Data Reliability and Validity

Kothari (2008) elaborated that, validity refers to organization of the underlying relationship where by the outcome in theresearch are linked to each other therefore there is a need to ensure that inferences made, exactly to reflect the stated factors. To enhance reliability and validity, this study used qualitative approaches. Firstly, pre-testing of questionnaires were done before whole exercise. The aim was to omit errors before data collection. Also, validity of overall objectives attainment was attained through consulting some experts' opinions in the subject area related to this research. Suggestions given by them was incorporated in reviewing and improving the work.

3.5 Ethical Considerations

Neuman (2006) elaborated that ethics in research involves of principles that inform what is or is not justifiable to do in research carrying out . The research was carried based on the ethical procdures. The respondents were asked their consent to participate in this studyvoluntary before obtaining any information from them.The

respondents assured that data of this study will be kept confendetial and the study was for academic purposeaddingto that, the information from different sources was accredited to the equitable source and accordingly acknowledged.

3.5.1 Summary of the Chapter

This chapter has portrayed the research methodology applied in the factors influencing performances of water projects. Purposive and convenience sampling were used during sampling CBWSOS water management committees and their customers also data gathering. The chapter has also reversed the research design, population used, sampling method, sample size, data collection methods and instruments, data quality control, ethical issues, data presentation and analysis. The next chapter presents, analyses and explained the result.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

This chapter presents and explains the results of assesment of factors influecingperfomance of water projects in Bunda District,Tanzania.The findings presented here are from surveys and interviews administered, and it is divided into 4 sub-sections; namely 4.1 which presents detailed analysis and discussion of socio-economic profile of the surveyed respondents; 4.2 which explains the findings on the the approaches used in engaging community during implementation of water projects in the study area; 4.3 which reveals the findings on the practices on managing projects; and 4.4 that presents the factors contributing to the improvement and access to Household water supply in in the study area.

4.2 Socio-economic Profile of the Surveyed Respondents

The respondents were requested to give information on their age, gender, and marital status, level of education, household size, place of birth and main occupations. These attributes are explained in details in the subsequent subsections.

4.2.1 Human Population and Number of Households in the Study Areas

Table 4.1 below shows that population is not the same in villages. Nyamuswaand Kibara villages population is high compared to other villages in the study areas. The two villages are growing so fast, serving 437 consumers per Domestic water Point (D.P). Kibara village is second with 9,931 popolation serving an avarage of 343 consumers per DP. While, Nyamatoke CBWSO had low number of population (3,645) and serving 304 consumers per DP.

Table 4.1:Population and Number ofDomestic Water points

Name of CBWSOs	Village Serving	Number of Domestic water Point (DP)	Population	Number of population per Domesict water Point
Kibara	4	29	9,931	342.45
Bulamba	1	21	4,173	198.71
Karukekere	1	75	6,530	87.07
Kihumbu	1	5	4,082	816.40
Kung'ombe	2	12	3,645	303.75
Nyamuswa	4	32	14,000	437.50
Total	**9**	**145**	**32,430**	**223.66**

Source: Field study (2020)

The information show that Karukerere village havingthe largest number of DP (75) and serving fewconsumers (88) only. Thenumber of domestic points vary in different area items of population, Thewater policy of 2002 recommendations are 250 users per facility (URT,2002). The data shows that there is need of more water points per village. The concept is criticed by Masanyiwa et al., (2017) study on household access and affordability to pay for domesticwater supply services in small towns in Tanzania, who found that number and distance to water point sometimes is not critical derterminingacess to water, waiting time is very important factor. Amount of water discharged from domestic point decide on consumers staying time to the water points,other factors mentioned includes household size, type of water source, waiting time at the sourceand household monthly expenditure on water services.

During the interview RUWASA manager insisted that in many villages water is discharged for 24 hours. In Nyamuswa village 800litres is discharged per hour and is enough for population with waiting time less that 30 minutes as shown at plate 4,3 below. Hence, the Water requirement in these villages is able to meet the domestic requirement, and surplus water for other economic activities including vegatables

growing and bricks making, which is common means of well being in these areas..RUWASA (2019) added that water coverage in Bunda District is 58% which is significantly below the national average of 85%.

The information ressemble that of Word Bank (2017) that population in Tanzania has increased over 25 years increasing water demand, while Water resources droppingbelow 1700 cubic meters per capita. Water Aid (2018) in Tanzania added that Rural areas have the worst improved water coverage of 48 percent, compared to urban areas of 87 percent and only about 25 percent have access to a water source on their household premises.

4.2.2 Ages of the Respondents

Age is very important in both social and economic activities. Different age categories performs different activities in their societies (Chumbula,2016). The findings shows that majority (72%) of respondents their ages were between 18-45 year, followed by those between 46-60 (17%), the last with small number were above 60 years (11%)The result described underneath.

Table 4.2: Ages of the Respondents

Age Group	Frequency	%
18-45	197	72
46-60	46	17
60+	30	11
Total	**273**	**100**

Source: Field data (2020)

Respondents said that age was very important in every decision making and division of labour in their families and upbringing of the family, like other parts in Mara region

were old people are respected and influencies community descions, and able to contribute their views, financialy and physicaly for the development of water projects.Young people contributeslabour in physical activities like construction and cultivation. Likewise, Overholt et al. (1991) highlighted that age are considered in measurement of person maturity, experience and knowledge know how of various things.

4.2.3 Respondents' Gender

The findings discloses that 68% of respondents werefemale (68%) and only 32% were male. This indicates that the largest part of the respondents were women and women are affected with water related challenges in the study area like fetching water and other family matters.

Table 4.3: Sex of the Respondents

Sex	Frequency	Percentage
Male	88	32
Female	185	68
Total	**273**	**100**

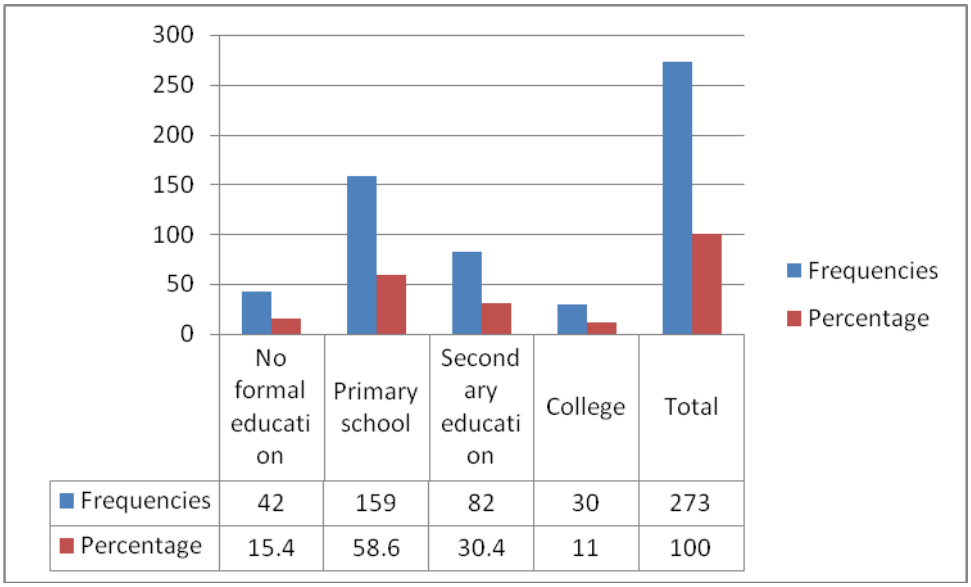
Source: Field data (2020)

The result concur that of Chumbula (2016) a case study done in Iringa region, Tanzania on sustainability of water projects who found that few women were involved in water commitees compared to men, which affects perfomances of many water project. Additionaly, DHS (2016) indicates that the burden of water in Tanzania faces majority of women, who travel long distances daily to fetch water for drinking and other domestic needs. On average they spends more than 36 minutes per trip to collect

water, household on average devotes more than eight hours per week in collecting water. Concurrently, Miruka (2016) in Kenya found little women were involved in rural water-projects even though were affected with water issues compared to men.

4.2.4 Education Attainment

Educational archievements of respondents is an important variable for evaluating different aspects about water projects (Chumbula, 2016). The findings in Figure 4.1 show that vast (58.6%) were those with primary education, while more than 30.4 % completed secondary education, corresponding 15.4% had no formal education and only 11% had college education.



	No formal education	Primary school	Secondary education	College	Total
Frequencies	42	159	82	30	273
Percentage	15.4	58.6	30.4	11	100

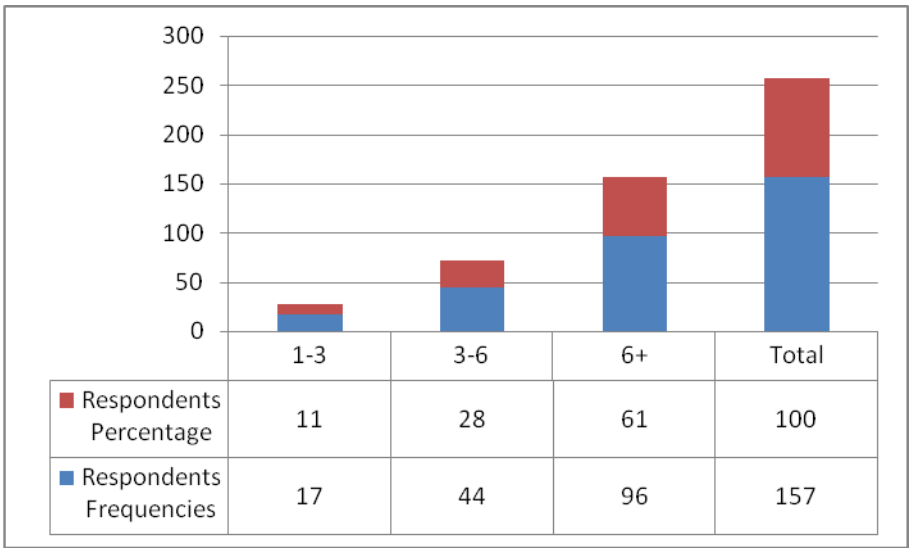
Figure 4.1: Education Levels of Respondent
Source: Field data (2020)

The study noted reason for increased primary school leavers in the areas is due to Primary Education Development Programme which was implemented in 2000s (URT, 2009). This shows that they can read themselves water related issues with little assistance. RUWASA officials pointed that training was done on water, business and

finance management. The result corresponds to that of Miruka (2016) in Kenya that level of education has the highest influence on community participation in water supply projects. The results also concur with Mwenda (2010) who links education to the publics ability to express their interest in self-determining governance of the people by the people and further argues that lack of sufficient education hampers access to information hence lower the quality of community participation in community projects. Mboga (2009) argues that education expands the ability of citizens to appropriate their desires and interests and have their voices heard in a logical manner.

4.2.5 Household Size

The findings in the Figure 4.2 indicate that the majority of the households had above 6 people, while minority of the households had 1-3 people. Findings reveal that the majority of the household with large household involved not only their own children but also dependents from their relatives.



	1-3	3-6	6+	Total
Respondents Percentage	11	28	61	100
Respondents Frequencies	17	44	96	157

Figure 4.2: Respondents Household Size

Source: Field Data (2020)

The results show that 61% of households has more than 6 family members. This entails that there is a chance for a household to spend more on basic needs due to increase in population. Roudi, (2002) reported that household requirement for water is affected by a diverse factors, such as household size, households' distance from the source of water, how often water is easily reached, and people's utilization patterns**.** Conccurently,Kosoe and Osumanu(2015) analyzing access to household water supply in municipality in Ghana found that problem of poverty is inexplicably linked with those of water.

4.2.6 Occupation of Respondents

The result as explained in Table 4.4revealed that farming is mainlydone around water sources followed by livestock keeping and brick making. Other economic activities include charcoal making.

Table 4.4: Occupation of the Household Heads

Occujpation	Frequency	Percentage
Farming activities	91	33.3
Keeping animals	50	25.4
Making bricks	33	12
Charcoal making	30	11
Both three activities	69	18.3
Total	**273**	**100**

Source: Field data (2020)

Respondents informed that,their main activities iscrop productionand livestock rearing earning for livelihoods. Other potential economic activities in the study areas include brick making. During the study majority reported that activities is undertaken within 60 meters from the water source. These findings coincide with Miruka (2016) who

reported that such human activities pollute the water source, hence resulting into poor water guality and drying of the sources. On this regards, Mbwambo (2007), commented that about 80% of Tanzanians are residing in the rural areas and their main income generation depend on both farm and off farm.

4.3 Approaches used in Engaging Community During Implementation of Water Projects

The firsts pecific objective of this study was to explore approaches used in engaging community during implementation of water projects. Findings based on tthis objective are found below.

4.3.1 Community Participation in Different Levels of Project Development

Customers were asked to indicate their perception on participation in different levels during project establishment; if it was low, medium or high interms of reponses. The findings shows that 115 (76.6%) consumers their participation level during project indetification was very high.

Table 4.5: Community Participation in Different Levels of Project

Perception on participation (n = 150)	Low level participation	Medium level participation	Higher level participation
Participation level at indetificationof the project	21(14%)	14(7%)	115(76.6%)
Participation level at establishment of CBWSOs	14(9.6%)	18(12%)	118(78.4%)
Participation level at contributing for the project (cash, in-kind)	12(8%)	18 (12%)	120(80%)
Participation Level at setting up of tariff guidelines and system	15(10%)	118(79%)	17(11%)

Source: Field data (2020)

Accordingly, 118 (78.4%) perceived that participation level at establishment of CBWSOS was very high, while 120 (80%) thier participation in project contribution (cash, in-kind) was medium. Apart from that, 119 (79%) customers agreed that participation level at setting up tariff guidelines and system was medium. Table 4.5 summarizes the results.

4.3.1.1 Participation Level During Indetification of the Project

On the Participation level at indetification of the project, the findings in Table 4.5 suggest that there was highlevel of participation by the majority of the customers whoparticipated in the present study. Majority (76.6%) of customers were involved during projectindetification.The respondents revealed that were involved to select source of water during thepublic meeting. In his words, one of the respondents said that,

> *"The project is among the highly prefferedby communities,during the meetingWe indentify the project andpriotising the projects. as we did in several projects established in 1990s,projects of today is not the same with that of 1990s. I mean that projects of today is implemented with high quality due to political influencies".*

Another respondents added that,

> *"The project is very important to us and will solve water problem facing our area, we are involved and provide information required by council and RUWASA Officers,we agree and highly support the project".*

These quotations entail that development of water projects in the study areas put the aspect of community involvement as a foremost agenda. Dungumaro et al. (2003) asserts that, communities authority in involvement in participation processes was outmost essens. Communities participation, information, skills and ideas help to solve

community problem. The result concur with that of Chumbula (2016) that involved communitiesin their own development has more benefits than drawback.

4.3.1.2 Participation Level During Establishment of CBWSOS

The findings in Table 4.5 reveals that there customers were involvement during establishment of CBWSOs in the surveyed villages. The respondents (78.4%) involved in this study cited that there was high level of involvement,and attended village general assembly during establishmentand selection of committees while the other significant percent (9.6% perceived that low level participation because there is favoritism in selection of committee members . Really, these testify there is involvement during establishment of CBWSOs in the sudy areas.

This is clearly supported by one of the respondents that,

> *"TheVillageCouncilincollaboration with thelocal government authority and RUWASA convenyed Village GeneralAssembly on purpose ofestablishment ofcommunity organisation and inform us on the new act which provoke the old act under COWSO and establishment of CBWSOS effectively from the day of formation of CBWSO".*

Another respodent from Kibara Village added that,

> *"We are involved and there is fairselection of management committees to unite with other 3 villages, and we have the trust with those selection because are respected by all members of our communities".*

These resuls resssemble that of Buchy, Ross and Proctor (2000) founders of participation theory that a better participation of local communities in the management of their own resource will lead to transfer of ownership and empowerment and greater social justice,concurrently, URT (2019) noted that Pursuant to the water supply and sanitation act, No.5 of 2019 section 32 of the Act,states that there shall be established

a community Based Water Supply Organisation for the purpose ofeffective management and operation of water supply and sanitation services in its area of jurisdiction. The act provoke the Water Supply and Sanitation Act Number 12 (2009) which clearly explain COWSO as the legal-management unit granted responsibility for implementation of NAWAPO principles.

4.3.1.3 Cash/in-Kind Stakeholders Contributions in Water Projects

The study in Table 4.5 found that majority of respondents (80%) reported that participation level was high, were involved in setting amount of contribution. The district offial informed them during indetificationand selection of water source, they required to contribute 2% of the investment cost as pre condition of water projects, those few (8%) who said there is low participation commented that were told during the meeting and the amount was vey high. The village Secretay of Karukekere arquired the contribution is very important to enable registration CBWSOs and iniatalpayementof employees including seceratay and technician.

4.3.1.4 Participation Level at Setting up of Tariff Guidelines and System

The findings in Table 4.5established that most (79%) coustomers perceived that there is medium participation in setting of tariff guidelines and system, due to the fact that several factos were not involved including views of customers and were informed in the last stage of genea lasssemblies,contraly, the few (17%) customes agreed that were involved and prices set was low compared to the running cost.

Additionaly, the result revealed that 15% of CBWSOS disagreed that there is low level participation in setting tarrifs as procedure did not consider economic factors

facing the study areas. The study noted that the CBWSOS of Karukerere Village during the meetings increased the amount of tarrif from TZS 0.50 to 100 TZS to overcome management expenses.

The result critices URT (2019) conventional principles andguildine of CBWSOs in setting tariff. The guideline insist to Review of economic, social and political tariff aspects of legal framework with respect to the need for communities to pay for water services. Other aspects includes review of relevant principles for water tariff setting including principle of consumer pays, principle of equity and equality, principle of affordability, principle of conservation of natural resources, principle of full recovery of costs and principle of economic efficiency.

4.3.2 Water Management Commitees Participation in Different Levels of Project Development

The Water management commitees of CBWSOs were asked to provide their opinions and perceptions on theirparticipation in different levels of project development. The data indicated that 78(63.46) of the Water managementcommittes agreed that participation level is very high during formation of community water committee, 88(71.56%) were in agreement that the participation level at capacity building was high, 74(60%) perceived that were highly involved in preparation and implementation of action plan, including preparation of strategic plan and monitoring and evaluation plan. Accordingly, 87(71%) of the members of CBWSOS perceived that the participation level at Operation and Maintainances (O & M)was very high. Table 4. 6shows the results.

Table 4.6: CBWSOS Participation in Different Levels of Project Development

Participation Statement(N=123)	Low level participation	Medium level participation	Higher level participation
Participation level in formation of Community water committee	18(14.60)	27(21.94)	78(63.46)
Participation level at capacity building	12(9.75%)	23(18.69%)	88(71.56%)
Participation level in preparation and implementationof action plan	33(27%)	74(60%)	16(13%)
lowParticipation level at operation and Maintainances	11(8.60)	25(20.32)	87(71)

Source: Field data (2020)

4.3.2.1 Participation Level in Formation Of Community Water Committee

The Boardmembers of CBWSOs were also asked to provide their opinions and perceptions on theirparticipation level in formation of management committee. The data indicated that 78(63.46) agreed that their participation level in formation of community water committee was very high because were selected during village assembly with majorities, 27(21.94%) were in agreement that level of participation was mediumbeceuse were not informed about selection of committee few days before the general assembly, 18(14.60) perceived that the participation level in formation of management committee was very low some individual selected lack skill of management. Table 4.5 presents the results:

One of the board of members during the interview commented that,

> "*It is neither possible nor practical for every villager to participate inevery decision that has to be taken. Yet it is still possible for the village as a whole,through community water committees to participate in decision making on their behalf".*

During the interview District RUWASA manager informed that community organisation shall form its community water committee and Community water

management team in accordance with ActNo.5 of 2019 of the water supply and sanitation and its constitution or memorandum of agreement if involves more than one village. The result go contrary to that of Chumbula (2016) in Iringa region, Tanzania which report that communities were not considered as essential stakeholders in project development, a factor that led to failure of many projects in the district.

4.3.2.2 Participation Level at Capacity Building

The respondents were asked to state their patricipationduring capacity building if was low, medium or high. Table 4.6shows the result. Majority, 88(71.56%) of respondents indicated their particaipation level was high, because training done was accoding to their needs mentioned during need assessment. Significant 23(18.69%) said participation level was medium because training took short time and they did not understand well the knowledge given to them,while few 12 (9.75%) respodentsarqued their participation was low because trainers from RUWASA was rushing and did not give them ample time to ask question.The District community officer during the interview commented that training was conducted during the implementation phase to prepare Community WaterCommittees and Community Water Management Teamto carry out the duties effectively. The traininginvolved technical, financial andmanagement aspects which were important for the perfomance of water projects.

URT (2019) insists participation of CBWSOs in project performance werecapacitated to take the role of ensuring effective operations and management of the corresponding rural water supply schemes including sustainable planning and financing of all necessary subsequent operations and maintenance.

4.3.2.3 Participation Level in Preparation and Implementation of Action Plan

Participatory and community-driven approaches are claimed to give improved equity, sustainability and effectiveness in development activities (Toner et al., 2005). Table 4.6 indicates the results. During the interview 74 (60%)of the respondents reported an increase in participation during preparation and implementation of action plan.

The findings shows that about 27% of the respondents mentioned that there is medium level participation in preparation and implementation of action plan, while 13% said that paticpation level was lowduring preparation and implementation of action plan.It was observed through the study that their participation was high because it is mandatory of project donor World Bank and TASAF to use participatory approaches in all levels of project implementation. The importance being given to community participation asone of the criteria by which programmes will be evaluated for further support.

The result was verified byDistrict RUWASA Manager during interview that Participatory Rapid Apparaisalapproache is used in all levels of project implementation which include participatory planning during establishment to implementation of action plans. Both customers and board members needs are incoparated in plans. The findings concur that of participation theory which ssumes that the higher community participation in planning and decision making, the lower likehoods of interefernces of external organsation on the desion, hence good performances of project output (Munguti, 2014. LikewiseCohen et al., (1980), added that participation includes people's involvement in decision making process,

implementation, evaluation, and sharing of the benefits of developmental programmes.

4.3.2.4 Participation Level During Operation and Maintainances

Community involvement in planning, operation, and maintenance has been key to the successful provision of water and sanitation services for more people living in remote and poor regions (ADB, 2016).

The findings in Table 4.6 indicate that the majority (71%) of the Management Commitees commented that participation level during operation and maintainances was high, while minority of the respondents (11%) revealed that their participation level was low. Findings found that the majority of the respondents were involved in operation and maintanances. The findings indicate that the majority (61%) of respondents were involved in operation and maintainances of infrastructure. The report found that currently, water supply infrastructure construction and rehabilitation were under way and at different stages across different project sites atKibara, Bulamba, Karukekere, Kung'ombe, Nyamuswaand Kihumbu. According to URT (2019) insists that participation of water management team is important as illustrated by theNational Water Supply and Sanitation Act No 5 of 2019 that management, operation and maintenance of each of the scheme being constructed or rehabilitated fall under the key roles of CBWSOs.

4.3.3 Community Participation in Project Development

Findings reveal 4 stages that govern participation in project implement and development (Table 4.7).

The results indicate that 251 (92%) of the rspondentss agreed that need assessement was done accordingly. Accordingly, 218 (80%) perceived that Initial Meeting was done to discuss the project, while 240 (88) of the respondents agreed that they participated during approval of the project proposal. Apart from that, 251 (76%) of the repodents agreed that were involved in deciding amount of contribution both cash and in kind to implement projectTable 4.7 summarizes the results.

4.3.3.1 Community Participation During Need Assessement

During the field study (Table 4.7) majority (92%) of respondents agreed they had participated in need assessment which took place in their villages.The village chairman under directives of district facilitators who facilitated three days community meeting and gave chance to community member discuss opportunities and obstacles of development facing the village strategies were to utilize the available opportunities and resource. Few (8%) respodents who disagree said that participation was done only for government official to justify the use of fund because past need assessement was done and did not come up with new project.

Table 4.7: Stage of People Participation During Project Development (n= 273)

Perception on participation (n = 273)	Agree	Do not agree	Mean	Std dev.
Need assessement done accordingly	251 (92%)	22 (8%)	1.08	0.277
Initial Meeting to discuss the project	218 (80%)	55 (20%)	1.2	0.408
Approval of the project document	240 (88%)	33 (12%)	1.2	0.408
In contribution of cash and in kind to implement project	207 (76%)	66 (24%)	1.24	0.436
All four stag above	251 (92%)	22(8%)	1.24	0.436

Source: Field data (2020)

The respondents informed that were asked on their priority water source they prefer. Kibara andKarukerere respondents mentioned Lake source and the rest mentioned boareholes. Water dams was not mentioned as preferable water source.

One respodents asserted that,

> *"The process is too long and invole many steps, groups were formed and assigned different task before presentataion to meetings"* .

Another respondents commented that,

> *"During the meeting we indetify opportunies and obstacles available ,proitise project, stakeholders of the project were also ranked and set stratregies for implementation of the project was set".*

The findings shows that in the study areas participation started during need assessment which indentifyand priotises projects using numbers of participatory methodologies. During the interview,Bunda district community officerrelevead that Opportunities and Obstacles to Development (O and OD) was used, according to directive from government that allLocal Government AuthorityinTanzania to use the methodology during need assessement, though TASAF uses PRA methodologys during need assessment. URT (2020)highletd that O and OD approach strengthens LGA's capacity in identifying and encouraging community initiatives as well as empowering communities to implement and complete community initiatives as a road map towards meeting targrts of the Tanzania Development Vision (2025) and SDGs.

4.3.3.2 Initial Meeting of the Project

During the survey's, it was intended to asses responden'ts levels of participation during project development stage. Results revealed that that considerablly, 80%

participated in iniatial meetingnd were involved and ample time was given, since the issue was to form CBWSOS instead of COWSOs which formerly was only entity implementing water management functions in their villages. On the other hand, 20% of the respondents did not agree that were involved during the iniatial meeting because time for discussion was too short, and more clarification was not given why COWSOS were no longer operating.

During the interview, majority of respondents commented that water is the major problem in their study areas and COWSOS did not perform well causing many facilities not functioning and mis usedfund for operations and maintainances.

One consumerlamented that:,

> *"I don't believe that CBWSOs will perfom differently to COWSOs because to manage all facilities within the village or clustered villages is difficult job, while COWSOwas operatingonly one facility but fails, let us wait and see".*

The result ressemble that of Ephraim Mwendamseke (2019) study in Dodoma, found COWSOS strategy was a new idea in rural communities and even though it was legally established. Communities often did not understand why they should establish COWSOS. In some cases districts officials go and train communities several times but the community does not agree with the idea.

4.3.3.3 Approval of the Project Document

Project Documents include projectcharter, statement of work, contracts, requirements documentation, stakeholder register, change control register, activity list, quality metrics, risk register, issue log, and other similardocuments The sponsor will see and approve the project management plan (PMP, 2020).

Respodents were asked in Table 4.7 on their participation on the approval of project documents. Majority of respondents commented that they wereinvolved during approval of documents because the signings of project documents were done during village general assembly between Village officials, RUWASA Manager and District Executives Director. Few respodents said that they were partially involved and RUWASA manger clarify what were in the documents and was difficult for them to understand.

During the meeting, District RUWASA district manager clarify the purpose of the approval meeting wasformally to announce the start of the project and to ensure everyone is familiar with its details, resourcesto be incured, the scope and people working on it. The clarification aims to ensure everyone's understand the expectations of the project's deliverables. This gets a close support by Juwana *et al*. (2012) and stakeholder theory which emphasizes on community involvement (Bal et al.2013.

4.3.3.4 Contribution of Cash and in-Kind to Implement Project

The respondents were asked in Table 4.7if they were involved during setting amount of contribution before project implementation. About 76% of respondents agree that they participated in meeting to set amount of contribution and allowed to ask question for further clarification, while 24% mentioned that they were not involved,but were only told the amount required, they also said that there is no transparency on amount contributed and the report of expenditure was not realeased.

District Community officer pointed out that communities contributed both cash and labour,for operationand maintainaces of pumps and infrastructures. Community was

required to contribute atleast 2% of project expenses in form of cash or inkind to all villages where CBWSOs reigistred and operates. USDA (2013) insits that a key motivation for engaging the community in water and sanitation programmes is to improve accountability amongst the different actors involved. Tools and approaches to community engagement that improve accountability can be transpareny of fund contributed, compliance, and respossiveness of community which ensure response of consumer voices.

4.3.4 Community Awareness During Project Implementation

Sensitizing and raising the levels of awareness of the community helps to promote local level participation. Raising the levels of awareness can contribute to community involvement in that it helps people formulate their interests, knowledge and understanding as being a precondition for real participation of the community in the project management cycle (Mosse, 2001).

On the awarnesss of the water project undergoing in their study areas,the findings foundthat 68% were aware about of water projects available in the village, and were engaged during all stages of establiment and formation of COWSOS and rencetlyCBWSOS, while 24% of the respondents said were not informed during establishment of the project and 8% of the respondent said they do did not know. Respondents were also asked also asked to state the iniciator of the water projects benefiting them where nearly 78% said it was government inpmementation. This was also supported CBWSOS management team of all villages, the village chairman of Kibara village admitted that the water project at their village was established by public and was under public control till 1990s were where the community was engaged in

management through COWSOS. The respondents from Nyamuswa informed that Nyamuswa water project which supply water in 5 villges was also established by public. About 21% claimed the source to be esablished by donors. The respondents from Kihumbu highlighted that all 5 facilities was donated by donors, four donated with SingitaGrumeti Reserve and one facility donated with UNDP. Ocassionaly, signifacantly 11 % of participants responded that local communities initiated their projects.

According to these findings, it is can be revealed that community awareness is very important in all stages of project development, increase beneficiries voice and respoveness from the grassroots of the development, they will have ownership hence sustainable development.The finding concur that of USAID (2013) in Nepal that engagement' includes a range of activities and approaches that are undertaken to varying degrees by different actors,ranging from public consultation to active participation in the design and delivery of projects. In addition, such activities tend to offer some form of empowerment for members of the community.

4.4 Practices Employed Towards Managing Projects

4.4.1 Main Sources of Water in the Study Areas

Water facilities in the study areas are under community based.During the field study the respondents wereasked about their source of water for domestic use. Majority of respondents (52%) revealed that main source of water is from the Lake Victoria, significant 30% mentioned that their source of water is boreholes, while 12% mentioned they obatain water from Shallow well, about 6% reported the source of water to improved traditioan well.

During the interview District Water Engineer noted that water in the study areas obtained from different sources and storedto the tanks of different size.The villages of Kibara, Bulamba Karukekere and Kung'ombe their source of water is from lake Victoria, while Nyamuswa and Kihumbu is from bore holes. Capacity of storage tanks differs in study areas. Kibarawater is stored in two overhead tanks (capacities 150,000 litres and 75,000 litres **(**Plate 4.1**)**, while Bulamba, Karukerere, Kun'gombe and Kihumbu villages water is stored in overhead tank with 75,000 litres. Nyamuswa village water is stored in three overhead tanks one with capacity 150,000 litres and another two with 75,000 litres. The stored water was planned to supply water to domestic points. In addition, the respondents narrated that previously were relying on shallow wells and natural wells but due to erratic and drought prevailin in their area. that the district authority remain with responsibilities of operation and management.

Plate 4.1:Pump House at Bulamba Village Derives Water from the Lake
Source: Field Study (2020)

The findings ressemble that ofUSAID (2013) in Nepal thatbefore introcduction of water development project, 30% of Nepals population of 23.2 million had no access to basic water and sanitation services. People relied on shallow wells, ponds, and streams, which were often both biologically and chemically, contaminated and dry during drought season. Coccurently, RUWASA, 2019 noted that the main source of water for the rural population in Bunda district is lake followed by borehole and shallow wells.

Plate 4.2:Water Tanks of 150,000 Litres Storage Capacities at Kibara Village
Source Field Study (2020)

4.4.2 Operations and Maintenance Cost

National Water Supply and Sanitation Act No 5 of 2019, elaborated that management, operation and maintenance of water scheme being constructed or rehabilitated fall

under the key roles of CBWSOs. On the other hand, lessons from previous rural water schemes in Tanzania have shown that such schemes face challenges of sustainability due to governance issues because often the CBWSOs lack the necessary experience and capacities to perform their key functions. (URT,2019)

The respondents in the study area were asked if they have paid operation and maintainances cost. 88 % of respondents responded that there no operation and maintainances paid to the project, they paid only 2% cost of project as community contribution.while 10% of respondents revealed that they paid operation and maintainances to support the project as they agreed during the village meeting bacause the infrasuctures need a lot of money to purchase spare parts; manpower ; transportation and administrative costs.

CBWSOs management team clarified that, proper operations and maintenance of the diff erent parts of the water supply system is done reguraly and timely to ensure the system operate throughout its useful design life. The intake is cleaned regularly and broken pipe screens are replaced. Pipe bursts are often ‘repaired by tying rubber or plastic around it to stop the leaking. These ensure that the whole system functions properly.

Majority of respondents during the interview inargued that they did not sawsignificance of cost of operations and maintainances, sincethey had contributed labour during the project establishment as prequiste and was agreed during iniatial meetings They also commented that operation and maintainances is function of CBWSO as they collect tarrifs.

One CBWSOs board members from Nyamuswa lamented that operation and Maintainces cost is obtained from water tarrif charges which is 0.50TZ S per 20litres bucket of water. This is the directives of RUWASA in order to achieve water for all by the year 2025.

The findings contradicts that of URT, 2002 that in order the water projects to achieve sustainabilitythe communities were required topay fully the operational and maintenance costs. The plans to cover operation and maintenance should be discussed during the projectformulation stage, to enables communities to choose appropriate technologythat corresponds to their ability to operate, maintain and manage the waterprojects effectively.

Plate 4.3: Rehabilitation of Shallow Wells at Bulamba Village

Source: Field Study (2020)

Plate 4.4: Domestic Points a close to the Householdsat Kibara Village
Source: Field Study (2020

4.4.3 Community Based Water Supply Organizations Contributions

Tanzania has established Community Owned Water Supply Organizations (COWSOS) to manage newly developed rural water schemes (URT, 2019). More recently, the Water and Sanitation Act of 2019 changed the name of Community Owned Water Supply Organizations to Community Based Water Supply Organizations (CBWSOS).

Community organisation have formed Water management Committee and Water Management Team inaccordance with the Act andits Constitution rmemorandum of agreement.Kibara and Nyamuswa formed clustered CBOWSOS because theyoperates in more than two villages. Kibara operates in two villages of Kibara and Kitengule,

while Nyamuswa operates within five villages of Nyamuswa“A” and “B”as well as Makongoro“A” and “B”. Nyamuswa CWBOS operate also in Bukama Village. According to URT (2019) in the case of clustred village, water management committee comprises two members selected during his/her village general assembly.

CBWSOS in the study areas are registered. Community water committee and Management teams are responsible for water management. Water management committee is selected by village general assembly. Comprises of 10 members including women. Water management team composed of chairman, secretary and treasury and two members from Management committee. In the study areas secretary, treasury and technician are employed.

The respondents were requested on the occupation and usefulnessof Water management commitee. The study realised thatconsiderably63% of committees were efficient and 22% noted that the committees were not efficient. The significant 15% reported nothing. Likwise, vaarious causeshighlitedon the function of committees which involved not repairing pipes immedieately to stop water leaking, hence minimizing water loss and poor monitoring of water related ectivities.

The findings found some beneficiaries were not paying operation and maintainances cost because water management comitees does not organize consumers to do so. One of the respondents during the interview ascertained that they are able to pay operation and maintainances cost to ensure water is available and project operates effectively and efficiently, because the contribution and tarrifs were not enough to run the project.

In this context, the community was required tocontribute 2% of investment cost.Contribution was required for opening of accounts, operation and maintainance and adminisratation expenses. The contribution was either cash or labour during project development contributions were required for the initial opening of bank accounts, operation and maintainances and administration expenses.The repodents in the study areas also reported that were involved in project activities ilike preparation of ditches for laying pipes, fetching water for construction, carrying building blocks and stones. Construction of slabs, and cleaning areas for drilling boreholes.

Generally, the study noted that in the six (6) CBWSOS by by-laws were passed and. During the interview one of the village leaders pointed out thatprevention or human activities, mainly farming on riparian lands in the river catchments feeding the lake, to avoid increased sedimentation and siltation. Deforestation remains a critical problem as subsistence farmers cutting trees, grazing and bush fires around the watern catchments, all fowarded to police for further action. Animals restricted tograze and damage catchment area and damage the infrastructure in anyway. Those who went so penalized TZS 50,000.

4.4.4 Water Distribution Practices

Aim of water distribution is to distribute water through system to the community intended. Water in the study area is distributed through a network tosupplya community with the appropriate quantity and quality ofwater. The components of the distribution system are water pumps,storage tanks, pipeslines,valves, and hydrants. Kibara and Nyamuswa villages have 3 and 4 storage tanks.The pumping machine deriver water to the storage tanks. The storage tanksin the study area is placed in high

elevation to allow high pressure, hence agravity flow system efficiently pipes recive full of water with no air locks. Gravity are used to move water, over hills and undulations. The distribution network also uses gravity to move water to the taps through thinner pipes to the domestic water points. In the study area water treated in the storage tank. In case of Kungombe village, water is derived from Guta pumping station to Bunda town, then to the village more than 20 kilometers. The distribution system is large, with more than one transmission main, each serving a different area within the overall system. This flow is then distributed from mains by small pipes called service lines or connections to.

During the research majority reported that water available was not a big barrier compared to the past days.. The respondents were requested on water availability at home. The finding indicated that note worthy 68% agreed that amount distributed was sufficient for domestic requirement. whereas, 25% commented that water they got, concurrently 7% of respondents did not concur with the statement

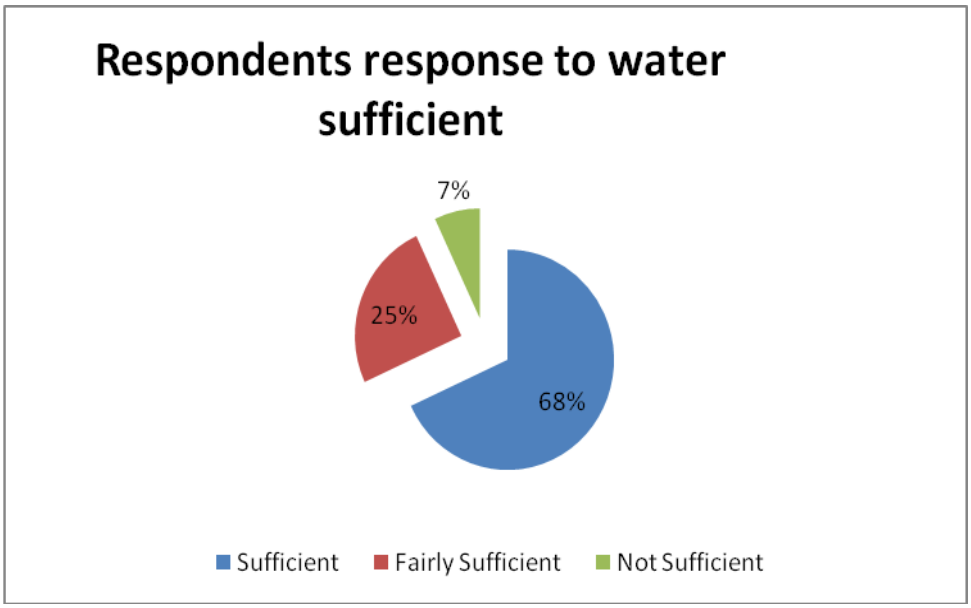


Figure 4.3: Repondents Response to Water Availability
Source: Field Study (2020)

They also informed factors causing to insufficient water, 32% mentioned unavailability of electricy for pumping water due inadequate fund to buy electricity, moreless 35% highlighted amount of water lost during distribution caused by old pipes busting and holes. The remaining 33% mentioned storage tanks were not enough especially during drought. Community at Kihumbu village asked TANAPA and UNDP to contribute for drilling of another bore horeand they agreed to contribute TZS 7,000 per household for another water tank. Respondents said that unfuction of 4 shallow wells due to hand pump problem contributed to insufficient of water.

One member of water committee from Kibara village commented,

> "*Water distribution is done daily, but due to electicty problem or block of machine due to sediments water is not distributed, but this hppenrearely but consumers always blame the management'.*

The result concurs that of URT ,(2017) during assessment of 88,000 water points in 159 local government in Tanzania carried out in 2016. The assessment found that , 42% of the existing systems were non-functional. About 32 percent of rural water schemes were non-functional and another 10 percent were in need of significant rehabilitation.

4.5 To Examine Factors Contributing to Improved Access to Household Water Supply in the Study Area

One of the specific research objectives was intended to examine factors contributing to improved access to household water supply in in the area. To convenethe objective, household survey and interviews were done in project areas. Findings presented underneath.

4.5.1 Time and Distance Spent in Fetching Water

Cairncross (2000)Global Water Supply and Sanitation Assessment found that distance to a water facility and access to the water have an inverse relationship. Thus people water usage rate is influenced by the distance they cover to access the water. If people consider the distance to be far, the water they use daily is affected negatively. The repondentes (Figure 4.4) were asked on time in minutes they spend to fetch from their home to the domestic water points which involves time used to fill the bucket/ container.

The results showed that 186 (68%) of the respodentshas access to an improved water source that has a collection time of 30 minutes or less, this improved after introduction more water points . Apart from that, 55 (20%) indicated that they have an acees to 30-60minutes, while 32 (12%) of the of indicated that minutes to collection points is more than 60 minutes because they live far to the village with their cattle, but still the distance is not far compared to the past days.

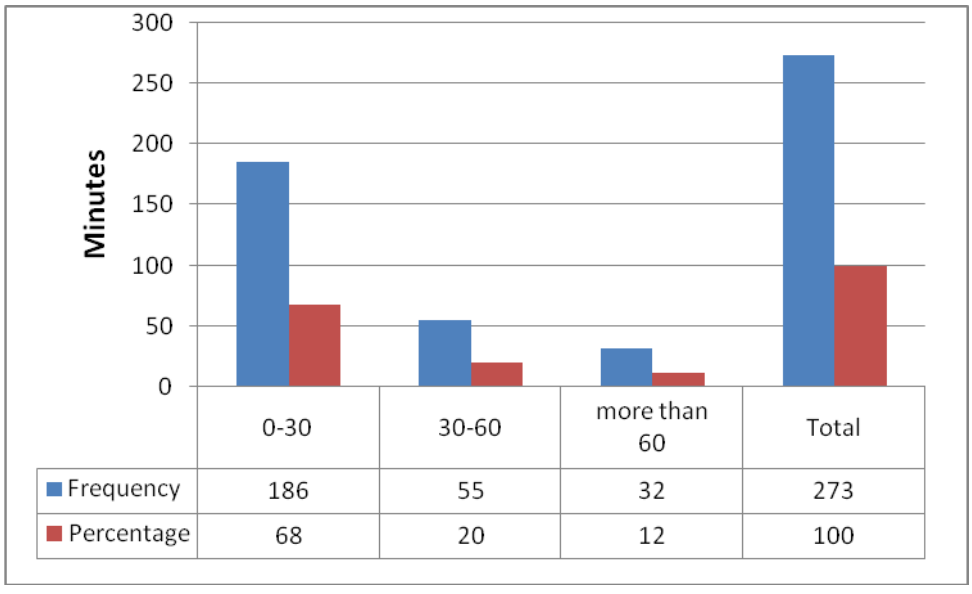


Figure 4.4: Time Spent to Fetch Water in the Study Areas

Source: Field data (2020)

Therefore, from the findings it is observed that majority of the respondents in the study area walked short distances to reach their main water sources.

One woman at a Kihumbu comment during the interview commented that,

> "*Before water improvent here, we used two or three hours to collect water. There is only few hand pump in our village. When you went to collection points often you find long queues waiting. Collecting water was very tiresome work,I would go up to 2 to 3 times a day. Water was very problem with water. But now this government has helped us. There is no traffic and it takes me about five to ten minutes to fetch water".*

These findings ressemble to Joint Monitoring and planning (2017) report that on average, Tanzanian's spend 36 minutes per trip to collect water. Assuming that water collection is a daily activity, with at least two trips per day, a household on average devotes more than eight hours per week to collecting water. Mulwafu (2003) study in Malawi added that if water supply is improved, women and girls would spend only one hour per day for collecting water; and use the time saved either for income generating activities or for domestic, social, and other developmental activities (Mulwafu, 2003).

ADB (2015) in Nepal found that Women and children were able to save time fetching water as water became available near theirhouses. The average time savings per household in 14 subprojects surveyed was estimated to be 1.8hours per day. This allowed the women to spend more time on other chores like child care, householdwork, or even more time for leisure and rest. The women were also able to help in the farm and other offfarmincome-generating activities. There was also a decline in security risks to women and girls as theydid not have to go out to fetch water in dark morning and evening hours.

4.5.2 Amount of Water used for Domestic Use

The study by Kosoe and Osumanu (2015) analyzing access to household water supply in municipality in Ghana found that problem of poverty are inexplicably linked with those of water. Its availability,proximity , quantity and quality and improving acess to water could also make major contribution towards achieving the eradication of poverty.

The respondents were asked to indicate the amount of water used for domestic use including laundry , bathing and kitchen purposes. Majority of the respondents 142 (52%), indicated that amount ofr water used ranges between 100 to 150 litres, while 66 (24%) of the respondents uses 50 to 100 litres and few respondents uses more than 200litres. The analysis shows the average amount water is 100litres per household equivalent to 20 litres per capital.

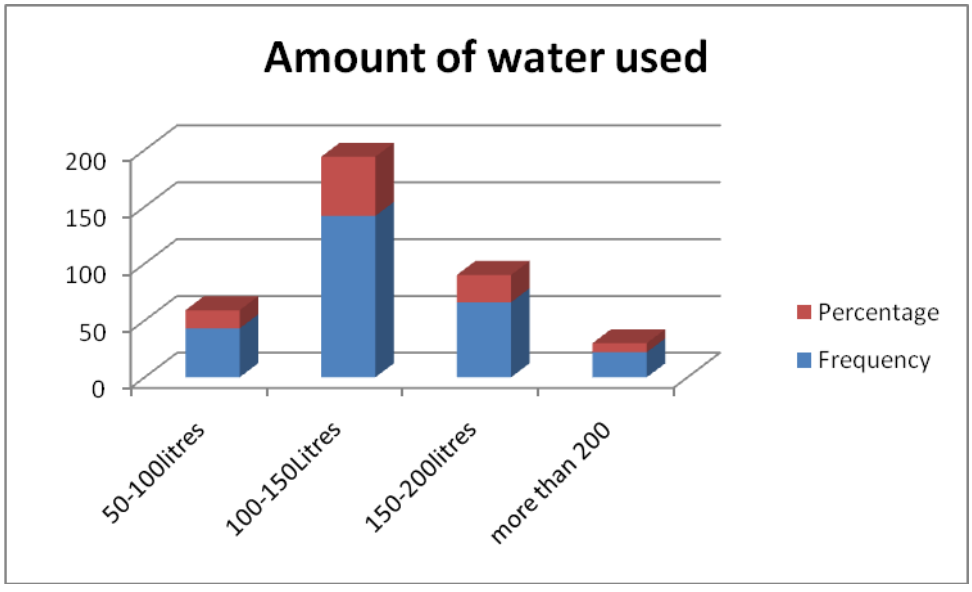


Figure 4.5: Amount of Water used Daily for Domestic Purposes

Source: Field Data (2020)

The respondents said that the amount of water used depend on season, during dry season more water is used from the public taps compared to dry season where majority of respondents harvest water from their house roofs, traditional wells and shallow wells.

The global water supply and sanitation 2000 assessment suggests that the reasonable acess amount of water is 20 litres per person per day from source within one kilometers from users homes. The result is similar to those of WHO andUNICEF (2000) who suggested availability of at least 20 litres percapita and per day from a source within one kilometer of the user dwelling as a reasonabel. On the other hand Gleick (1996) suggest the minimum volume of 50 litres per person per day and basic requirement of 100-150Litres per household.

4.5.3 Respondents Level of Income

Income is very important in a in derterming water use development and purchasing power of goods.

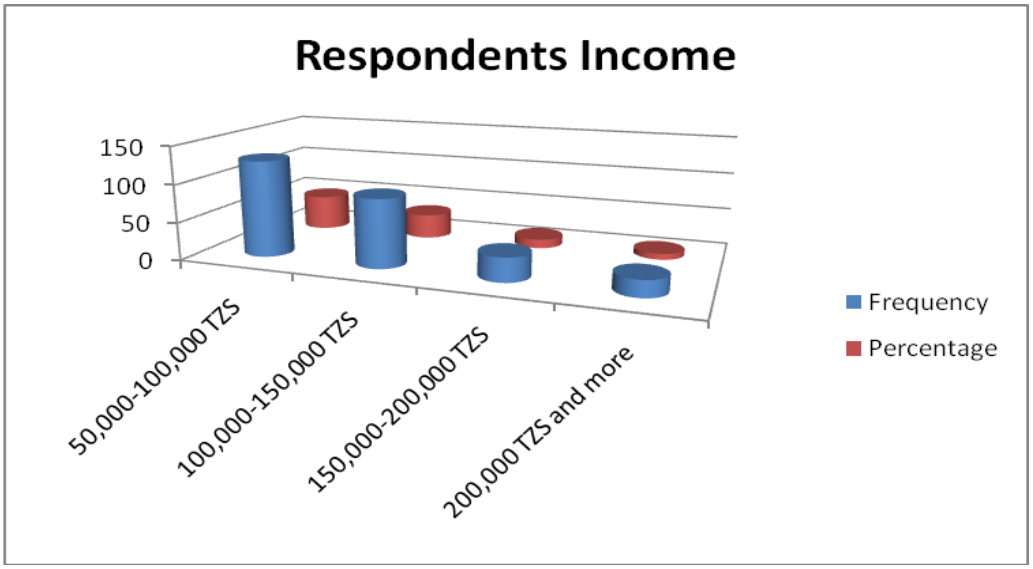


Figure 4.6: Monthly Income Level of Respondents in the Study Areas
Source: Field study (2020)

Figure 4.6 showed that majoritytheir monthly income were between 50,000 to and 100,000 TZS and few respondents their income is more than 200,000TZS. Figure 4.6 illustrates the results. The result indicated that income is very important in decision of individual to use water. If the income is very low the little amount of water is used.

4.5.4 The Setting of Water Tarrifin the Study Areas

Setting of water prices is the responsibility of the whole community through general meeting where all community members decide on the proper price that should be used (URT, 2002). According to Water Policy of 2002, community members are responsible for making decisions on the price of the water for community based water projects through general meetings. Also the price should be within the capacity of the people in the specific community but which should consider the current socio economic situations.

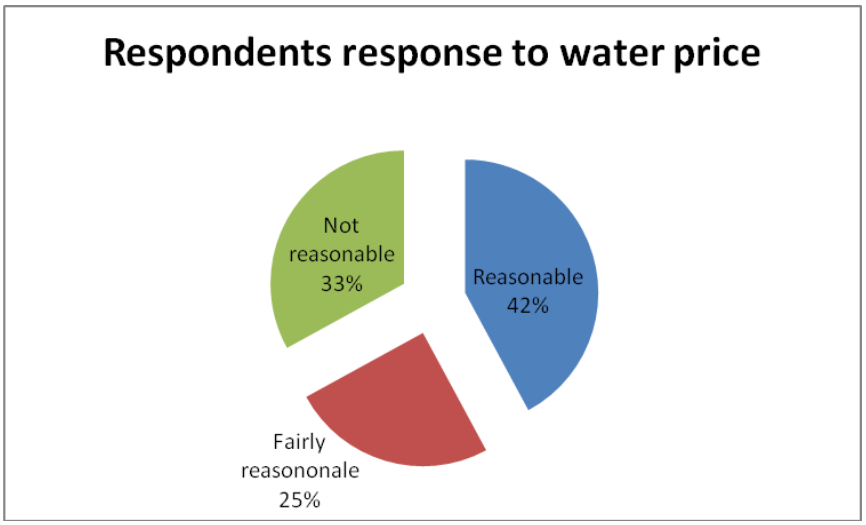


Figure 4.7: Respondents Responses to Water Price in theSstudy
Source: Field data (2020)

During the study respondents were asked whether or not the price of water of TZS of 0.50 was reasonable, the response varied across thestudy areas. The findings reveal

that 42% of the respondents revealed that the price was reasonable and was set by RUWASA and passed during general assembly, while.25 % reported that price faily reasonable despite being cheap compared to the past days. the rest of respondents about33% commented that that the price was not reasonable, there is a need to be reduce to TZS 0.20 per bucket of 20 litres. Figure 4.7 summarizes the findings.

During the interview majority of respondents commented that , increased number of water points and boreholes has made it is much easier for repodents to fetch water.They no longer walk long distances and wait in the queue, They have more time for economic and social activities. Water tarrif is no longer a problem.

During the interview one consumer at Kung'ombe Village informered that,

> *"Now I don mind paying for water because the burden of fetching water is no longer there. I am paying 0.50TZS per bucket. Thus,I wish the prices of water reviewed to be 0.70 TZS in order to meet rehabilitationcosts of the project, especially to purchase spare parts and pay electricity.*

CBWSO Chairperson of Karukererevillage , informed that

> *"The improvedmanagement system and corrected water tariff has increased revenues from TZS,800,000 to TZS 12,000,000 the money is deposited in the bank".*

Haysom. (2006) study shows that water costs were too high for the community to handle; thus this situation affected the project negatively as majority of the people decided to collect water from unprotected sources, and this does not have any cost implication. According to Water Supply and Sanitation Act (2009), requires EWURA to prepare annually comparative analysis report on the performance of the regulated water utilities. (EWURA, 2017).

4.5.6 Measuring Water Affordability

The water tariff in the project areas was set by EWURA, the agency responsible for setting water tariffs in the country. EWURA proposed water tariff of TZS 0.50 per 20 litres was enough for cost recovery of the project. Durng the study some respondents suggested water tarrif to be reduced to TZS 0.30 per Bucket of water of 20 Litres (RUWASA, 2019). Some international institutions such as the World Bank and OECD have suggested that household water bills should not exceed 3–5% of income. The margin is have been consideredas the margin for developed countries. Reynaud (2008) defined 'water-poor' householdas a household spending 3% or more of its income for paying water charges.

Generally, the analysis of affordability at different levels of income and amount of water used, the amount and income includes 100litres,120 litres, 150 litres and 200litres respectively. The income used in this analysis includes TZS 100,000, TZS150,000, TZS 200,000 and TZS 250,000.

Table 4.8: Measurement of Affordabililty to the Different Levels of Income

Details	Unit	Quantity	Price	Cost	days	Monthly/Cost
Amount of Water used	Litres	120	0.025	3	30	90
	Litres	100	0.025	2.5	30	75
	Litres	150	0.025	3.75	30	112.5
	Litres	200	0.025	5	30	150
Affordality to diffrrent level of Income						
Monthly water Cost	Monthly/Income	Affordabiliy (%)				
75	100,000.	8%				
90	150,000	6%				
112.5	200,000	6%				
150	250,000	6%				

Source: Field Study (2020)

The result show that affordability for customers with income levels of TZS 100,000 the marginl was 8%and for those with income levels of TZS 150,000, TZS 200,000 and TZS250,000 margin was 6%. Table 4.8 indicates the result of analysis and comparison of defferent income levels.

4.5.7 Wate Quality and Treatment of Drinking Water

The respondents were asked on quality of drinking water and how istreated , the results showed various means of treatments . Majority of the respondents (67.6%) revealed they used water from the source already treated 21.8% boil water before drinking , significant 6.7mentioned that put water into closed container for one weeks then used for drinking only,few respondent3.9%reported that they don't treat water for drinking.The findings indicate due to water treatment the cases of water borne diseases like cholera and bilhazia reduced in the study area.

The CBWSOS chairman of Kibara village reported that it is now 3 years there not any cases of chorela reported in the village which often happen in the past. The same result reported at Nyamuswa village. These results shows that few respondents still fetch untreated water directly from Lake, ponds and wells. Word Bank (2011) insisted that Management of water and treatment is imppirtant for domestic uses including driking water. Treating water issues good guality, remove pathogenic organisms and toxic substances that would harm the health of users.

4.5.8 Challenges of Water Project in the Study Areas

Despite performance of projects in the areas numbers of challenges hinder success of projecst in their respective areas. Numerous challenges pointed out consists water

price was too high, weak monitoring of water infrastructures, inadequate fund to increase service lines, low use of improved technologies and insufficient extension services.

On the whole, majority (71%) of the respondents suggested water price of TZS 0.50 to be reduced to 0.20 in order to be affordable.The respondents commented that the project need to consider poor resource member of the community like what is done with TASAF. The study findings revealed that few respondents (20%) blamedwater commitees for poor monitoring of the infrastructures frequently, much of the water was lost through leakage.

During the surveys water was observed leaking to the service line at Kung'ombe village. Some of the shallow wells established in 1990s were not functioning due to pumps defects. They worked for short periods and collapse.The study findings found also that people still carryout economic activities within 60 meteres from water sources. This has contributed to destruction of water source through silting, sendemitatation and pollution of water source.

4.6 Summary of the chapter

This chapter has explained and argued onthe result of the study of three research objectives. The chapter alienated into four divisions. The first part exhausted analysison demographic characteristics, the approaches used in engaging community during implementation of water projects, management practices of the water project., and lastlyexplainsfactors contributing to the improvement and access to household water supply in in the study area.

Findings of the study revealed that the success of the project is due to participation of communities in all stages of project development. 92% of respondents agreed that were involved in all stages in all stages of project development. The project was the result of need assessement carried in the study areas. CBWSOS is responsible for water management and members were selected during village assembly.

The study found that the perfomances of water projects in the study areas depends on on project management and capcity building. The main source of water as mentioned by respondents were Lake Victoria and boreholes. Respondents revealed that water distributed was enough to meets customers demand The findings found beneficies contributions collected were inadequate for project management. Respondents contributed 2% of project investment interms of cash and cash inkind.Community Based Water Organasations were formed in the study areas, water management committees were trained on administration and water management. During the training respondents were equipped with skills and knowledge that enable them to run the projects.

The project improve respondents walking distance and time taken to fetch water from the household. The distance is below 100 meters and less takes than 30 minutes. Majority of the respondents (52%), indicated that amount of water used ranges between 100 and 150 litres. Findings of this study indicated that majority of the respondents had their income wasbetween TZS50,000 and 100,000 whereas fewest respondents their income was more than 200,000TZS. The respondents mention some of the reason leading to insufficient water include unavailability of electricy for

pumping water due inadequate fund to buy electricity, about 35% pointed out water caused by water pipes. The remaining 33% revealed huge water requirement during dry season, the remeninng respondents about 33% commented that that the price was not reasonable, there is a need to be reduce to TZS 0.20 per bucket of 20 litres.

Majority of respondents 67.6% revealed that they used water from the source already treated.Water affordability analysis show that price of water exceeds household water bills of 3–5%of income as suggested by World Bank and OECD. The result show that there is a need to review water price in order to accomodate the needs of low resources customers. Several challenges were mentioned including water price is too high, weak monitoring of water infrastructures, inadequate fund to increase service lines, low use of improved technologies and insufficient extension services.

On the whole majority (71%) of the respondents suggestedwater price of TZS 0.50 to be reduced to 0.20 in order to be affordable. Thereponendents commented that the project need to consider poor resource member of the community like what is done with TASAF.Few respondents (20%) blamed Water commitees for poor monitoring of the infrastructures frequently leading water due to lack of fund for buying spare parts and technical skill.

The study findings found also that people still carryout economic activities within 60 metres from water sources. This has contributed to destruction of water source through silting, sendemetation and pollution of water source. Nonetheless, a clearly structure should be available, resources allocate and organasation trained on operation and maintenance (WHO and UNICEF, 2000).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This chapter involves the summary, conclusions and recommendations of the findings. The chapter is divided into three sections: Section 5.2 summarizes the result, section 5.3 give the conclusions while Section 5.4 elaborates recommendations and areas for further study.

5.2 Summary of Findings

The findings discuses factors influencing performance of water projects in Bunda in District, Tanzania. The study was guided by three specific objectives. Firstly, exploring approaches used in engaging community during implementation of water projects in the study area; secondly, to determinethe practices employed in the management of water project in the study area and thirdly, to examine the factors contributing to the improvement and access to household water supply in the study area.

The research has found that success of the water project in Bunda district was due to participation of communities in all stages of project development. About 92% of respondents agreed that they were involved in all stages of project development. The project was the result of need assessment carried out in the study areas. CBWSOS is responsible for water management and members were selected during village assembly.

The study found that the performances of water projects in the study areas depends on water management and capacity building. The respondents were satisfied with the better quality of service from CBWSOS. 98% of agree with good quality of water not linked with the prevalence of health problems in the study area. Majority of respondents reported that quality of water was of good quality and less salty. Usually, water quality test was done before implementing the project. CBWOs were formed in the study areas. Water management committees were trained on project management including administration and water management. During the training, they were equipped with skills and knowledge that enable them to run the projects.

The main sources of water as mentioned by respondents were Lake Victoria and boreholes. The respondents revealed that water distributed was enough to meet customers demand for 24 hours. The beneficiaries contributions were found to be inadequate for project management. Respondents contributed 2% of project investment in terms of cash and mankind. Access to domestic water points has a collection time of less than 30 minutes and 100 metres. They no longer walk long distances and wait in queues and therefore, they have now more time for economic and social activities.

Majority of the respondents (52%), indicated that amount of water used ranges between 100 to 150 litres. A vast of the respondents had their income rages between TZS 50,000 to 100, 000 with few respondents having their income more than TZS 200,000. Respondents further reported that some of the challenges facing the project in their study area include: unavailability of electricity for pumping water due inadequate fund to pay for electricity bills, water loss due to leakages and breakages

of water pipes (with 35% loss due to leakage of water pipes); lack of fund for buying spare parts, and lack of technical skills.

Further, 33% of water derived was found to be not enough to meet the demand during dry season and that people in the district still carry out their economic activities within 60 metres from water sources, hence polluting the water. The rest of respondents (about 33%) commented that the price was not reasonable and so, there is a need to be reduced to TZS 0.20 per bucket of 20 litres.

Majority of the respondents (67.6%) revealed that they used water from the source already treated. It is now 3 years with no any cases of cholera reported in the study areas like the past. Water affordability analysis show that price of water is between 6% and 8% which exceedshousehold water bills of 3% to 5% of income as suggested by World Bank. Other results show that there is a need to review water prices in order to accommodate the needs of low resources customers.

The study finally, found that the number of boreholes and water points had increased than before the project implementation. Due to that, access to domestic water points has a collection time of less than 30 minutes and 100 metres walking distance from home while 33% reported water derived was not enough to meet the demand in dry seasons.

5.3 Implication of Study Findings

The above study findingshave important future implications. To policy makers, it has a focus in raising their knowledge and skills through formulation of policies and

establishment of programmes that involve local communities and peer stakeholders in development decision making and particulary planning, implementation and monitoring of water projects. For the academics, this result has implications towards shaping the academicians on designs of trainings, research projects and curricula that address participation of communities in all stages of project development and management. For instance, based on the results, more studies may be carried out in the areas mentioned as those that need further search.

As it has been reported, the success of the water project in Bunda district has been partly due to development of the water industry. This result has therefore an implication in equipping both the management and technical staff on with strategies that dominate in improving the performance of rural water supply the projects. Involvement of COWSOS for instance, is a practice of combining indigenous and intellectual knowledge towards the successes of water projects, as pointed out by Kasiaka (2004).

5.4 Limitations of the Study

The researcher used her own resources to carry the research including transport cost, employment of enumerators and cost of stationeries. The aim was to speed the exercise in prisecely effectively due to limited resources allocated for research on the basis of convenience, financial factors and researcher's ability to speed up the process of data collection. Moreover, the area is scattered in the lower and midland zone. Consequently, the study was not exempted from limitations in different aspects. Firstly, the data collection process was challenging, as some of respondents were not available due to other domestic responsibilities. In this regard, their accessibility

posed challenges to data collection. On other hand time limits data collectionr due to moving from one place to another,The exercise was repeated when respondents were not found.

5.5 Conclusions

Basing on the research findings, it can be concluded that establishment of the water projects in Bunda district was a proper strategy for improving performances of water projects. Findings for each objective indicated below:

5.5.1 Approaches used in Engaging Community During Implementation of Water

The success of the project is due to participation of majorities in all stages of project development. Communties were invoved in need assessment, indentification and management of the project. Community Based Water Organasations were established in project areas to undertake functions of Community Owned Water Supply Organizations (COWSOS). Some respondents said that were not fully involved during project establishment. Every member of community should take part in all stages of project planning to increase tranparancy in project mnagemnt.

5.5.2 What are the Practices Employed in the Management Water Project

The study established that the perfomances of water projects was the result of tentative efforts towards adequate staffing and capacity building. The respondents revealed that water distributed was enough to meets customers demand. The respondents contributed 2% of project investment interms of cash and cash inkind.

5.5.3 Factors Contributing to the Improvement and Access to Household Water Supply

Nevertheless, the study indicated that number of water points increased. The access to domestic water points has a collection time of less than 30 minutes and 100 metres. Respondents were no longer walking long distances and wait in the queues like the past. They have now more time for economic and social activities.The amount of water used per household ranges between 100 to 150 litres. Majority of the respondents their income were between 50,000 to 100,000TZS and few respondents their income is more than 200,000TZS. The Result show that there is a need to review water price in order to accomodate the needs of low resources customers. Affordability index was 6 to 8% which is high compared to 3 to 5 % rccommended by World Bank. Water quality was good ,usually water quality test was done before implementing the project.

Thus, it can be concluded that the project contributed to the improvement of the peformance of water project, the water points increased, distance from home to domestic points is less than 30 minutes and 100 meters, less than 400 meters as recommended by NAWAPO 2002. Respondents suggested to review water price in order to accomodate the needs of low resources customers.

5.4 General Recommendations

5.4.1 Approaches used in Engaging Community During Implementation of Water

The assessment found inadeguate capacity building of village leaders and CBWSO members, that affects routine project operation and services. It is, therefore,

recommended that council authority and RUWASA management to arrange training to the beneficiaries according to the training needs.

5.4.2 What are the Practices Employed in the Management Water Project

It was illustrtedthatfew respondents were medium involved in setting contribution Thus, it is suggested in order to improve contributions communities should be fuill involved early during initial stages.and CBWSOS capacitatedin water management and administration for better project progress.

The findings revealed that water committees were blamed for poor monitoring of the infrastructures.It is, then, suggested RUWASA and District council to facilitate committees in project surpervision, monitong to insure project incresead efffiency and accountability.

5.4.3 Factors Contributing to the Improvement and Access to Household Water Supply

During the study majority (71%) of the respondents suggested water price of TZS 0.50was not affordable.The respondents commented that water price should reduced to TZS 0.20 to reach sustainable development goal of ensuring water to all by 2025.

In the study arespeople still carryout economic activities within 60 meteres from water sources. This has contributed to destruction of water source through silting, sendemitatation and pollution of water source. The study recommend By laws to be used to ensure economic aactivities not carried within water cachment areas.

5.4.4 Suggested Areas for Further Research

This study come across factors influencing perfomance of water projects. Thus its result cannot be discriminated across all water projects in Tanzania. However, the information obtained can be used for future planning of water sector projects. strategies and policies and suggestion incoparated.

Therefore, further studies are needed, including research on community participation in tarrif settings and project monitoring. The study has also shown that Community Based Water Organisations were blamed for inefficient monitoring and water fees. Therefore, research to determine the effectiveness of Communty Based Water Organisation in management of water project is important.

REFERENCES

Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: Analysis for South Asia and a Conceptual Framework. *World Development Bank, 29 (69),* 1623-1648.

Agrawal, A., & Gibson, C. (1999). Enchantment and disenchantment: The role of community in natural resource conservation. *World Development, 27(38),* 629-649.

Ahuja, R. (2010). R*esearch Methodology*. New Delhi India: Rawat Publication.

Asian Development Bank (ADB) (2016). Community participation key to water supply success completion report, Nepal Community-Based Water Supply and Sanitation Sector Project. Proceedings of the International Management Conference (pp.14-32). Manila, Philippines.

Barougha, A., Shoubia, M. V., & Skardib, M. J. (2012). *Application of game theory* approach in solving the construction project conflicts. Proceedings of the 8th International Strategic Management Conference, London, U.K.

Benson, D., Gain, A. K., & Rouillard, J. J. (2015). Water governance in a comparative perspective: *From IWRM to a 'nexus' approach Water Alternatives, 8(1): 756-773.*

Buchy, M., Ross, H., & Proctor, W. (2000). Enhancing the information base on participatory approaches in Australian natural resource management, Commissioned research under the Land and Water, Canberra, Australia: *Australia's Social and Institutional Research Program on Land & Water, 18(6): 226-273.*

Bunda District Counci,l (2000). Annual Report on Water Supply and Sanitation for Bunda Rural Water Supply and Sanitation (pp. 1-36). Bunda, Tanzania.

Bunda District Council, (2019). Annual Report on Water Supply and Sanitation for Bunda Rural Water Supply and Sanitation (pp. 1-66). Bunda, Tanzania.

Caleb B. D. (2010). Applying the Theories of Sustainable Water Aid (Master's Dissertation). Colorado State University: Colorado, USA.

Chambers, R., & Conway, G. (1992). Sustainable Rural Livelihoods: Practical Concepts for the 21st Century. Institute of Development *Studies University of Sussex Journal* 296(5), p.28.

Chumbula, J. J. (2016). Sustainability of Water Projects: A Case of Selected Projects in Iringa District, Tanzania (Master's thesis), Sokoine University of Agriculture, Morogoro Tanzania.

Cohen, J. M., & Uphoff, N. T. (1990). Participators place in rural development: Seeking clarity through specifity. *Journal of World development,* 23 (8), 213-228.

Cohen, L., Manion, L., & Keith, M. (2004). *Research Methods in Education (6th Ed.).* London, England: Routledge Falmer.

Cohen, L., Manion, L., & Keith, M. (2004). *Research Methods in Education (6th Ed.).* London, UK: Rutledge.

Conway, D. (2017). Future climate projections for Tanzania. *FCFA Programme Country Climate. 12(12), 111-119.*

Creswell J. W. (2014). *Research design: Qualitative, qualitative and mixed Approaches (4th Ed.).* London, England: Sage.

Creswell, J., W. (2009), *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (7th Ed.).* Los Angeles, USA: Sage.

Creswell, J., W. (2012). *Qualitative inquiry and research design: Choosing among five approaches*. Los Angeles, USA: Sage.

Creswell, J.W. (2003), *Research design. Thousand Oaks, CA*: Sage.

Damiba, C., & Traore, C. (2013). Delivering water, sanitation and hygiene services in an uncertain environment strengthening the 'W' in wash, community based water resource management for water security. Paper presented at the 36th WEDC International Conference, Nakuru, Kenya.

Dungumaro, W., E., Ndalahwa, F., and Madulu, F. N. (2003). Public participation in integrated water resources management: *The case of Tanzania. Physics and Chemistry of the Earth* 28: 1009–1014.

EWURA, (2018). Tariff setting guidelines for regulated water and sanitation utilities report. Dar es Salaam.

Fierro, A., Nelaj, E., Mwendamseke, E., Luca, T., & Muggianu, C. (2017). Rural water supply management in Tanzania: An empirical study on COWSO Strategy Implementation and Private Sector Participation Junco – *Journal of Universities and International Development Cooperation:* Retrieved from: htt://www.ojs.unito.it/index.php/junco/issue.

Garcia-Valinas, M. A., Martinez-Espineira, R., & Gonzalez-Gomez, F. (2010). Measuring water affordability Aproposal for urban centres in developing countries. *International Journal of Water Resources Development* 13 (2), 113-127.

Gebrehiwot, M. (2006). An assessment of challenges of sustainable rural water supply: The case of laworeda in Tigray region (Master's thesis). A. A. University, Addis Ababa, Ethiopia.

Gleick, P. H. (1996). Basic water requirements for human activities: Meeting basic needs. *Water International Journal* 21(2), 83–92.

Global Water Partnership (2009) and the International Network of Basin Organizations (INBO): *Design and layout by Scriptoria*, 978(91), 72-78.

Global Water Partnership (2014). Tanzania stakeholder perspectives on a water goal and its implementation. Proceedings of the Conference on International Network of Basin Organizations International Office for Water 21, *Rue de Madrid 75008* (pp. 38-58), Paris, France.

Global Water Supply and Sanitation Assessment (2000) Report. Retrieved from http://databank.worldbank.org/data/home.aspx.

Gray, D. E. (2004). *Doing Research in the Real World.* London UK: Sage.

Guijt, I., & Shah, M. K. (1998) (Eds). *The myth of community: Gender issues in participatory development*. London UK: ITDG Publishing.

Hair J. F. (2003) *Essentials of business research methods: An applied approach.* London, U.K: Pearson Education.

Hans C., & Komakech, L.K. (2020). Why prepaid technologies are not a panacea for inclusive and sustainable rural water services in Tanzania? *Water Policy Journal*, 22 (5), 925.

Haysom, A. (2006). A study of the factors affecting sustainability of rural water supplies in Tanzania (Master's dissertation). Cranfield University, Silsoe Institute of Water and the Environment. Cranfield, U.K.

Holcombe, S. (1995). *Managing to empower: The giameen bank's experience of poverty alleviation.* New Jersey, USA: Zed Books Ltd.

Hukka, J., and Katko T. (2004). *Liberalization of water sector*. Tokyo, Japan: UNU Press.

Ince, M., Bashire, D., Oni, O., Awe, E. O., Ogbechie, V., & Korve, K. (2010). Rapid assessment of drinking-water quality in the Federal Republic of Nigeria: Country report of the pilot project implementation in 2004-2005.

James, P., Nadarajah, Y., Haive, K. S. & Victoria, A. (2012*). Sustainable communities, sustainable development: Other paths for Papua New Guinea*. *Hawaii,* Papua New Guinea: University of Hawaii Press.

Jimenez. A., & Perez-foquet., A. (2008). Quality and sustainability aspects in water access indicators, an example from Same District, Tanzania. Proceedings of the 33rd International WEDC conference, Accra, Ghana.

Joint Monitoring Programme, (2015). WASH in the 2030 Agenda. Online brochure. Retrieved from:http://www.wssinfo.org/fileadm/userupload/resources/JMP-WASH-Jolita Vveinhardt, 2018.

Joint Monitoring Programme (2017). WASH in the 2030 Agenda. Online brochure. Retrieved from: http://www.who.int/water_sanitation_health/monitoring/coverage/jmp-2017 WASH-in-the-2030-agenda29September2020.

Kasiaka K., (2004 September 13). Participatory Planning and Sustainability of Water: TASAF Water Project. Retrieved from: www.tasaf.go.tz_2004 .

Kosoe, E., A., Osumanu, I., K. (2015) Water is life: situation analysis of access to household water supply in the Wa Municipality, *Ghana*.3 (1): 7528-7536.

Kothari, C., R. (2008). *Research methodology, methods and techniques, (Reprint Ed.).* New Delhi, India: Discovery Publishing House.

Lyer, P., Davis, J., Yavuz, E. & Evans, B. (2002). Rural water supply, sanitation and hygiene: A Review of 25 years of World Bank Lending (1978–2003): Water Supply & Sanitation Working Notes, World Bank. Retrieved from: http://www.worldbank.org.

Lyer, P., Davis, J., Yavuz, E., & Evans, B. (2002). Rural Water Supply, Sanitation and Hygiene, A review of 25 years of World Bank lending Water Supply & Sanitation World Bank Working Notes, *12(20),* 1978–2003

Mackenzie, N., & Knipe S. (2006). Research dilemmas: paradigms, methods and methodology. *Issues in Educational Research, 16(2),* 1-11.

Macnaghten, P., & Jacobs, M. (1997). Public identification with sustainable development: *Investigating cultural barriers to participation on global environmental change,* 7 (14), 5-24.

Maria K., Varouchakis E., & Karatzas, G. (2015). Game theory in water resources management geophysical research abstracts. *General Assembly,* 786 (17).

Masanyiwa, Z., Kilobe, B. M., & Mbasa, B. N (2019). Household access and Affordability to Pay for Domestic Water Supply Services in Small Towns in Tanzania: A Case of Selected Towns Along the Shores of Lake Victoria. *Intentional Journal of Applied and Pure Science and Agriculture,* 23 (8), 213-228.

Mbuagbaw, L., and Shurik, E. (2011). Community participation HIV/AIDS Programmes, HIV infection-impact, awareness and social implications of living with HIV/AIDS. Retrieved from: http://www.intechopen.com/books/

hiv-infection-impactawareness-and-social-implications-of-living-with-hiv-aids/community-participation-in-hiv- aids-programs15/09/2020.

Mbwambo, J. S., (2007). Agrobiodiversity and food security among mallholder Farmers in Uluguru Mountains (Phd thesis). Sokoine University of Agriculture, Morogoro, Tanzania.

Mengesha, A., Kumie, A., & Misganaw, F. (2002). *Sustainability of drinking water supply projects in Rural of North Gondar, Ethiopia*. 221(3), 229.

Mitlin, D., & Walnycki, A. (2016). Water and sanitation, shack/slum dwellers *International, urban poverty, briefing sustainable development goals, 5(4), 63*–78.

Mwakila, M., (2008). An assessment of community participation in water supply and sanitation services: The case of Yombo Dovya and Barabara ya Mwinyi, Water Community Projects, Temeke, Tanzania. (Master's Dissertation). Graduate school of development studies, The Hague, Netherlands.

Mwendamseke, E. (2016). Assessment of community-owned water supply organizations strategy for sustainability of rural water supply in Dodoma region (Master's dissertation). The University of Dodoma, Dodoma, Tanzania.

Organisation For Economic Co-operation and Development (2009). Managing Water for All: An OECD Perspective on pricing and financing. Retrieved from: http://www.oecdparis .ino09.

Organisation for Economic Co-operation and Development, (2003). Social issues in the provision and pricing of water services. Retrieved from: http://www. oecdparis.ino03.

Overhot, C. A., Clound, K., Anderson, M. B., & Austin, J. E. (1991) (Eds.). *Gender analysis: Framework in gender analysis and development planning.* West Hartford, USA: Kumarian Press.

Project Management Professional (PMP) (2020). Develop Project Management Plans Monitor and Control Project Work. Project Management Institute (PMI), USA.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, *sampling issues and instruments development*, 6(1), 403. doi: 10.4172/2162-6359.1000403.

Regina W., Githua, D.,l, & Wanyoike, M. (2015). Factors influencing performance of community water projects in Njoro Sub-County. *International Journal of Economics, Commerce and Management United Kingdom*, 11 (III), 11-33.

Rostapshova, O., Roumis, D. Alwang, J., & Pendley C. (2015). Impact evaluation baseline report of the MCC Tanzania Water Sector Project. *Millennium Challenge Corporation, 51 (4),* 91-133.

Roudi, F. (2002). Finding the balance: *Population and water scarcity in the Middle East and North Africa. 2*3 (13), 201-266.

Ruth, M. P. (2015). Exploring the usefulness of structural-functional approaches to systematically assess the functionality of governance arrangements for natural resource management planning in two Australian case studies (Bachelor's Research Report). Brisbane University: Brisbane Australia.

Shamoo, A. E., and Resnik, B.R. (2003). *Responsible conduct of research.* Oxford, UK: Oxford University Press.

Sharma, V. (2003). *Residual Sighted Children*. New Delhi: Discovery Publishing House.

Shepard, R. J. (2002). *Ethics in exercise science research*. Sports Med, 32 (3), 169-18.

Storey, D. (1999). Issues of Integration, Participation and Empowerment in Rural development: The case of leader in the republic of Ireland. *Journal of Rural Studies*, 15(11), 307-315.

Tanzania Water and Sanitation Network, (TAWASANET) (2019). Water Sector Equity Report (pp. 1-58). Dar es Salaam, Tanzania.

The United States Agency for International Development (2020). Tanzania water sector assessment for strategy Development. New York, USA.

United Nations (1992). Environment & Development. Conference proceedings of the Sustainable Development (pp. 62-116). Rio de Janerio, Brazil.

United Nations Development Programme (2005). Human Development Report. New York, USA

United Nations Educational Scientific and Cultural Organization (2016*).* The United Nations world water development report. 2016, place de fontency 75352. Paris, France.

United Nations University Institute for Water (2017). Environment and Health Global Water Crisis: The Facts Water Crisis Report (72-94.). Hamilton, Canada.

United Republic of Tanzania (2001). Rural development strategy: Prime Minister's Office. Dar es Salaam, Tanzania.

United Republic of Tanzania (2005*).* The National Stratertigy for Growth and Reduction of Poverty: Vice President's Office. Dar es Salaam, Tanzania.

United Republic of Tanzania (2006). Agricultural Sectoral Development Programme. Dar es Salaam, Tanzania.

United Republic of Tanzania (2009). Water Supply and Sanitation Act (December 16). Retrieved from http://www.mow.go.tz.

United Republic of Tanzania (2013). The National Agricultural Policy. Dar es Salaam, Tanzania.

United republic of Tanzania (2014). Bunda district socio-economic profile. National bureau of statistics, ministry of finance. Dar es Salaam, Tanzania.

United Republic of Tanzania (2014). Bunda District Socio-Economic Profile. Retrieved from: www.nbs.go.tz.

United Republic of Tanzania (2014). Water Sector Development Programme Phase II (2014/2015 – 2018/2019). Retrieved from: http://www.mow.go.tz.july 2015–june 2020.

United Republic of Tanzania (2015). *National Rural Water Sustainability Strategy.* Ministry of Water. Retrieved from: http://www.mow.go.tz.july 2015 – june 2020.

United Republic of Tanzania (2016). National FYD PII. Ministry of Finance and Planning. *Retrieved from:* http://www.mof.go.tz.

United Republic of Tanzania (2017). Water Point status in Rural areas by Region: District/Local Government Authorities. Ministry of Water and Irrigation. *Retrieved from:* http://www.mof.go.tz.

United Republic of Tanzania (2020). *Improved Opportunities and Obstacles to Development: An Approach that Enhances Community Engagement Towards SDGS Implementation in Tanzania.* Dodoma, Tanzania.

United Republic of Tanzania (2020). *Water sector report* Ministry of Water Dar es Salaam, Tanzania.

United Republic of Tanzania (URT) (2010). *The National Irrigation Policy. Ministry of Water and Irrigation*. Dar es Salaam, Tanzana.

United Republic of Tanzania (URT) (2013). *Agricultural Sector Development Program: Impact Evaluation of the Irrigation Investment of the Agricultural Sector Development Program. A report Submitted to MAFC, JICA, USAID and World Bank (Tanzania Office).* Dar es Salaam, Tanzania.

United Republic of Tanzania (URT).(2002).*The National Water Policy*, Ministry of Water and Livestock Development. Dar es Salaam, Tanzania.

United States Environmental Protection Agency (2017). *Pricing and affordability of water services source: World Development Indicators* (database). *Retrieved* from: http://databank.worldbank.org/data/home.aspx.

WaterAid Tanzania (2018). Involving the Private Sector In Rural Water Services: Lessons From Sangara Village, Tanzania. Dar es Salaam, Tanzania.

World Bank (1996). *World Bank Participation source book [online]*. Retrieved from: http://www.worldbank.org/wbi/sourcebook/sbintro.pd 20thNovember2020.

World Bank (2015). *Developing a High Resolution Poverty Map for Tanzania: Final Report.* . Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2016). *World Development Indicators (Database*). Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2017). *Reaching for the SDGs.* The Untapped Potential of Tanzania's Water Supply, Sanitation, and Hygiene Sector. Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2017). *Tanzanians Economic Outlook Managing water wisely, The urgent need to improve water resource management in Tanzania.* . Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2018). International Bank for Reconstruction and Development. . Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2018). *Reaching for the SDGs: The untapped Potential of Tanzania's Water Supply, Sanitation, and Hygiene Sector*. WASH Poverty Diagnostic. Retrieved from http://databank.worldbank.org/data/home.aspx.

World Bank (2018). *The Africa Utility Performance Assessment*. Retrieved from http://databank.worldbank.org/data/home.aspx.

World Health Organization & United Nations International Children's Education Fund (2000).

World Health Organization (2014*). International authority on public health and water quality, water sanitation hygiene international authority on public health and water quality*. WHO leads global Geneva, Switzerland.

World Health Organization (2015). *Progress on Sanitation and Drinking Water*: *2015 Update and MDG Assessment*. Retrieved from http://databank.worldbank.org/data/home.aspx.

World Health Organization (2017). *Safely Managed Drinking Water: Thematic Report on Drinking Water 2017*. Retrieved from http://databank.worldbank.org/data/home.aspx.

APPENDICES

Appendex I: Questionnaire on Assesment of Factors Influecing Perfomance of Water Projects in Bunda District, Tanzania

A: BASIC DEMOGRAPHICS/ DEMOGRAPHIC INFORMATION OF RESPONDENTS

1. Age:

How old are you (years) ? …….

Gender:

i) M:……..ii) F:…….

3. Marital staus:

(i) Single ……. (ii) married ……. (iii) separated/divorced ……. (iv) Widow/widower ……. (v) Living together…….

4. Occupation:

i) Main occupation…….. ii) Others (specify)……..

5. Educational attainment:

i) Not attended …….. ii) Did not complete primary education…….

iii) Completed primary education ….. iv) Did not complete secondary education…… v) Completed secondary education …… vi) University degree……vii) others (specify)…….

6. Household composition

Type	**No. of household members**
Children under 18 years	
Adults (18-65)	
Aged (65+)	

B. PPROACHES USED IN ENGAGING COMMUNITY DURING IMPLEMENTATION OF WATER PROJECTS

7. Are you aware on the way water projects are run in your community?

Yes [ ] /No[ ]

8.Who decide for excursion of water project in the area?

1. All village members [ ] 2. Local community leaders [ ] 3. Donors. [ ] 4. Government 5. Other (specify) …….....
…….

9. Are you usually involved in any way in making decisions on water projects around your area?

1. Yes [ ] 2. No [ ]

10. If the answer in 9 above is Yes, at which stage have you ever been involved?

11. Through your participation, what was your responsibility?

12. Does water management committee exist in your village?

1. Yes [ ] 2. No [ ]

13. If the answer is Yes above, who are the persons that make up this committee?

14. Is there women representation in the village water committee and if so, how many of them are members?

15. How often have you attended water meetings?

I. Not at all [ ]

II. Occasionally [ ]

III. Frequently [ ]

IV. All the time [ ]

16. If the answer in 15 above is Not at all, describe briefly…….....

17. Are your opinions freely valued when you meet and share the discussion as a commitee?

I. Yes [ ]

II. No [ ]

18. Is there any member from your community who is trained to manage water project funds?

I. Yes [ ]

II. No [ ]

III. I do not know [ ]

19. Who plays the role of inspection of water facilities in your area?

I. District water technician [ ]

II. Village community [ ]

III. Water attendants [ ]

IV. Water user association [ ]

20. Indicate wherever it applies as your inclusion in water project development in the village (please Tick)

		Stages				
No.	**Process**	**Information**	**Consultation**	**Decision**	**Acting**	**Control**
1	Proposing the project					
2	Prioritizing theproject					
3	Setting objectives					
4	Collecting project inforamation					
5	Analyzing project information					

		Stages				
No.	**Process**	**Information**	**Consultation**	**Decision**	**Acting**	**Control**
6	Capacity building					
7	Developing action plan					
8	Action-plan implementation					
9	Contributions in terms of cash/in-kind)					
10	Monitoring and evaluation meetings					
	Total score					

Key: =1, Consultation = 2, Participation = 3, Acting = 4 Control = 5

C THE PROCESS EMPLOYED IN THE MANAGEMENT OF WATER PROJECT IN THE STUDY AREA

21. What are the main sources of water for your daily use?

I. ……

II. ……

III. ……

22. Who established those water source? .....

23. Do you have village water committee in your area?

1. Yes [ ] 2. No [ ] 3. Do not know [ ]

24. if 23 above is Yes, what are the responsibilities of that commitee as far as water projects are concerned?

1. Operating and maintaining water projects [ ]

2. Collecting water bills [ ]

3. Conducting meetings on water projects [ ]

4. To inform community on project progress [ ]

25. Do you hold village meetings for discussing issues based on water projects?

1. Yes [ ] 2. No [ ]

26. If no. 25 above is Yes, how many meeting sessions per annum are held? ……..……

27. Which personnel is responsible for maintainaances of water system in the village ?

……

……....

28. How would you rate the extent of performance of your village water committee?

1. Excelent [ ]
2. Very good [ ]
2. Good [ ]
3. Bad [ ]
4. Very bad [ ]
5. Extremely bad [ ]

29. Does your village water committee give any feedback to domestic water users?

1. Yes [ ] 2. No [ ]

D. FACTORS CONTRIBUING TO IMPROVED ACCESS TO HOUSEHOLD WATER SUPPLY IN IN THE STUDY AREA

30. Is water service equally accessible to all villagers ?

1 = Yes [ ] 2 = No [ ]

31. If the answer in 30 above above is No, explain …….…….

32. Do you incur any cost for getting water service?

1= Yes [ ] 2 = No [ ]

33. How much does it cost to buy 20 litres of water? (Mention below).

…….

34. Is that price in 30 above affordable for getting the service?

1= Yes [ ] 2 = No [ ]

35. Do you participate in deciding for water service prices?

36. What opinions would you suggest for improving water services in your area?

1……..

2……..

3……..……

37. What time may it take to reach a domestic water points and come back after service?

1.less than 30 minutes ( )

2. 60 minutes ( )

3. 90 minutes ( )

4. 90 minutes and above ( )

38. Do you think that price is reasonable?

1. Yes ( )

2. No ( )

39. If no, give the reasons for why you think it is not reasonable

1…….……...……

2. ……

40. How frequent does your project get maintained and serviced?

1. Only once ( )

2. 2-3 times ( )

3. 4-5 times ( )

4. 6 times and above ( )

41. What makes sustainable progress of water project in your area?

1. Regular maintenance ( )

2. Cheaply access to spare parts ( )

3. A firm management team ( )

4. Community involvement ( )

42. If not, what are the failure factorts facing your project functionalities?

1. Unaffordable water prices ( )
2. Long distances to reach sources ( )
3. Irregular maintenance ( )
4. Shortage of spare parts ( )
5. Litle community participation ( )

43. Is the water supplied pure and clean?

1. Yes 2. No ( )

44. Do you consume treated water from the production plant?

1. Yes 2. No ( )

45. How often per month do you get water services at your point?

1. 2 to 3 days ( )
2. 4 to19 days ( )
3. 20 to 29 ( )
4. 30 days and above ( )
5. Not getting at all ( )

Most Thankful!

Appendix Ii: A Checklist for Key Informants

Pump attendants

1. What water sources are mainly usable in your area?

.....

.....

2. Do you think water service is adequately supplied enough to meet the demand? in your area? ……..……

…….

3. Do you treat water frequantly?

4, Are there any health problem associated with water in the district ?

……

……

5. What are the major factors limiting water vailability in the district?

……

……

6. If the reply is Yes in question 5 above, list the causes of those obstacles.

……

……

Much Thanks!

Community Development Officer

1. What priority is given to the water sectors in your district area?

……
……

2. Is there budgetaty considerations on financing maintenance of water projects in your district? ……..……

3. If Yes in 2 above, how regularly do you allocate money for this purpose?
……
……

4. Do you have a schedule for further training of water management personnel at this district?
……
……

5. If the answer 4 above is Yes, how many times do such happen per year
……
……

Grateful, Thank you for your time!

Interview Question guideline for District Water Engineer

a) An overview about the project.

1) How many water projects are under RUWASA

2) Out of these projects how many are completed?

3) What is the role of the community in planning stage at the village

level?

b) Participation in project activities.

4) What steps have been taken by the funding agency to make

sure that the project is understoodand accepted

5) What communication methodologies are employed to communicate

with the people during all stages of the project implementation

6) How do community participate in the planning processes?

7) How long does it take to put the people into discussion given

their low level of understanding?

8) Are there any problems associated with community participatory
planning? If any, mention them .....
……
……

c) Monitoring of the project

9) Monitoring of the project is adequately adone and involve beneficiaries?

10) What strategies in place to ensure sustainability of the project?

11) What do you think are there any other important factors to achieve118performance of project?

d) Capacity building

12) Is there any capacity building /training done to the community/project leaders to enable them sustains project interventions?

What kind of training and who were involved?

13) Do you think the community have been empowered enough to

carry on the project activities? Give reasons.

Thank you

District development officer

1. By what means do you play your part as a the District Water Committee Chaiperson?……
……..……

2. Water as a service needs be fairly and equally supplied to all people. Whow do you ensure this archievement? ……..……
……

3. what challenges are frequently facing water accessibility to residents in the district?
……
……

4. How do you solve those?
……
……...……

5. What what stratergies are in plan for raising awareness on water projects management to local community?
……
……

6. If the you respondef Yes in 5 above, explain how often do you organize such campaigns. ……..……
…….

I am thankful to honesty participation!

Village Exuctive Officers

1. In what ways is water service delivery is made fair and equally distributed to all people at this village?

……

……...……

2. What challenges hinder adequate water supply to people in your village?.....

3. If the answer is yes in question 2 above, how do you deal with those challenges?

.....

.....

4. Is there gander consideration in the village water committee? .....

5. Whose responsibility is in decision making on operational and maintenance of water projects? ……..

6. Do the project facilities get inspected at least once a month or a year?

1. Yes ( ) 2. No ( )

If Yes, explain ……

…….

The end, Thank you!

Appendix III: Community Based Water OrganasationsChairpeson …….

1.What sources of water are available in this your?

2. By whom were these sources established?

3. is there water committee at the village?

4. Is the aspect of gender taken consideration in the village water committee?

5. Do you usually meet to discuss water issues?

6. Do you give opinions when you meet at water meetings?

7. Which are the major problems that face water project in your area?

8. What opinions can you give to ensure better performance of water project?

9. What would you suggest for achieving sustainable existance of water projects?

Thank you for your response!