EFFECTIVENESS OF COWSO'S MANAGEMENT IN SUSTAINABILITY OF RURAL WATER SUPPLY PROJECTS IN TANZANIA: CASE OF KILOMBERO DISTRICT, MOROGORO REGION

By

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Dissertation submitted in partial fulfillment of the requirement for the degree of
Master of Business Administration of the University of Dodoma.

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CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by the University of Dodoma dissertation entitled *"Effectiveness of COWSO's management in sustainability of Rural Water supply projects in Tanzania: Case of Kilombero District, Morogoro region''* in Partial fulfillment of the requirements for the degree of Master in Business Administration of the University of Dodoma.

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Dr. VICTOR GEORGE

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Date: ………………………………

DECLARATION

AND

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I, GODFREY SANGA declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

Signature…………………………………

DEDICATION

This work is dedicate to my family especially my wife Elizabeth Ndumbaro and our Children Luginio and Leticia who missed me very much when I was busy preparing this dissertation. Without her patience and perseverance, it would have been difficult to complete this work successfully. I also dedicate this work to my beloved parents Mr & Mrs Timothy Sanga for their love, prayers and moral support in making my dream comes true. I will always love you and cherish your love. God bless you!

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This part is really hard to me to write because of so many people hand's has made this work possible. Nevertheless, I should have to write something to represent my deepest acknowledgement to few people who their names they just click in my head but it does not present the order of priority. I would like to thank Almighty God for the strength and good health during the whole course of my study.

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ABSTRACT

The study analyzed the effectiveness of the Community Owned Water Supply Organization (COWSO's) management in sustainability of Rural Water Project in Kilombero District. Specifically the study aimed to examine how the COWSO managed the RWP and analyzes their sustainability on post construction stage. The study adopted a cross sectional study design where by a total of 6 projects were surveyed across the study area and 34 users and 12 key informants were interviewed. In addition 2 FGD were conducted to triangulate the collected information. The collected data were then processed and analyzed by using SPSS 21 version. The study findings show that COWSO management model exists mostly on the newly constructed projects in the study area and the community started to know the role and responsibilities of them and the COWSO resulted to the stable water services for the surveyed projects within the study area due to capability of managing O & M cost. The study found that the operators of the projects are neither employed nor capable and are low paid which can hinder the life span of the RWP. Through study findings it has been seen that for sustainable management of RWP the Government of Tanzania should take immediate action though policy changes and start to standardize qualification of operators and subsidizes payment of operator's salary and some of the O & M cost rather than leaving full operation to COWSO. Finally the study concluded that COWSO management cannot brings the sustainability without other factors like community awareness and sensitization though local training and education, participatory and openness and continuous government support in both aspects of technical and financial because rural community needs safe and clean water for their daily life and future development.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

ABBREVIATIONS

ADB: African Development Bank

ATP: Affordability to Pay

CBO: Community Based Organization

COWSO: Community Owned Water Supply Organization

DC: District Commissioner

DCDO: District Community Development Officer

DED: District Executive Director

DHO: District Health Officer

DIA: District Internal Auditor

DPLO: District Planning Office

DWE: District Water Engineer

FGD: Focus Group Discussions

GoT: Government of Tanzania

IA: Internal Auditor

JMP: Joint Monitoring Programme

LGA: Local Government Authority

MDG: Millennium Development Goal

MKUKUTA: Poverty Eradication and Economic Empowerment in Tanzania

MoW: Ministry of Water

NAWAPO: National Water Policy

NGO: Non Government Organization

O & M: Operation and Maintenance

O & OD: Opportunity & Obstacles Development

RS: Regional Secretariat

RWSS: Rural Water Supply and Sanitation

RWP: Rural Water Project

SPSS: Statistical Package for Social Science

URT: United Republic of Tanzania

VEO: Village Executive Officer

VWC: Village Water Committees

WA: Water Aid

WEO: Ward Executive Officer

WHO:	World Health Organization
WPM:	Water Point Mapping
WSP:	Water and Sanitation Project
WTP:	Willingness To Pay
WUA:	Water User Association
WUG:	Water User Group

CHAPTER ONE: INTRODUCTION

1.0 Overview

The water supply service in Tanzania is divided into 4 main components which are; rural water supply, urban water supply, water resources and management and Institutions development and capacity building (United Republic of Tanzania, 2010).

The government of United Republic of Tanzania has made hugely investment of Rural Water Supply and Sanitation Projects (RWSSP) in many years (URT, 2010) but the report shows that over 30% of the invested projects are not functioning properly after construction. The problem of sustainability has made the government of Tanzania to review the management models of RWSS project to Community participation by introducing Community Owned Water Supply Organization (COWSO's), (URT, 2010). The new management model can be seen in the Figure 1.1.

The decision of formulating COWSO in each water project within the villages and even sub villages does not shows the significance improvement of sustainability in RWSS projects in Tanzania (WA, 2009). The sustainability of these water projects both existing and under construction depends very much in functionality and proper management of these COWSO's. Therefore this study has been designed to cover the issue of effectiveness management of these COWSO's for sustainability of rural water projects in Morogoro region.

Figure 1.1: Extracted RWP management Models Organization Chart

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                    ┌─────────────────┐
                    │ Ministry of Water│
                    └─────────────────┘
                             │
                    ┌─────────────────┐
                    │   Rural Water   │
                    │  Supply division│
                    └─────────────────┘
                             │
        ┌────────────────────┼────────────────────┐
        ▼                    ▼                     ▼
┌────────────────┐  ┌─────────────────┐  ┌─────────────────┐
│Technical support│  │   Community     │  │   Operational   │
│    section     │  │Management Support│  │ Planning support│
│                │  │     section     │  │  section (O & M)│
└────────────────┘  └─────────────────┘  └─────────────────┘
                             │
                    ┌─────────────────┐
                    │Regional Secretariats (RS)│
                    └─────────────────┘
                             │
                    ┌─────────────────┐
                    │ Local Government│
                    │ Authorities (LGA)│
                    └─────────────────┘
                             │
                    ┌─────────────────┐
                    │Water user Associations│
                    │ (COWSO)/ water  │
                    │   Committee     │
                    └─────────────────┘
                             │
                    ┌─────────────────┐
                    │Villages Communities/│
                    │  Beneficiaries  │
                    └─────────────────┘
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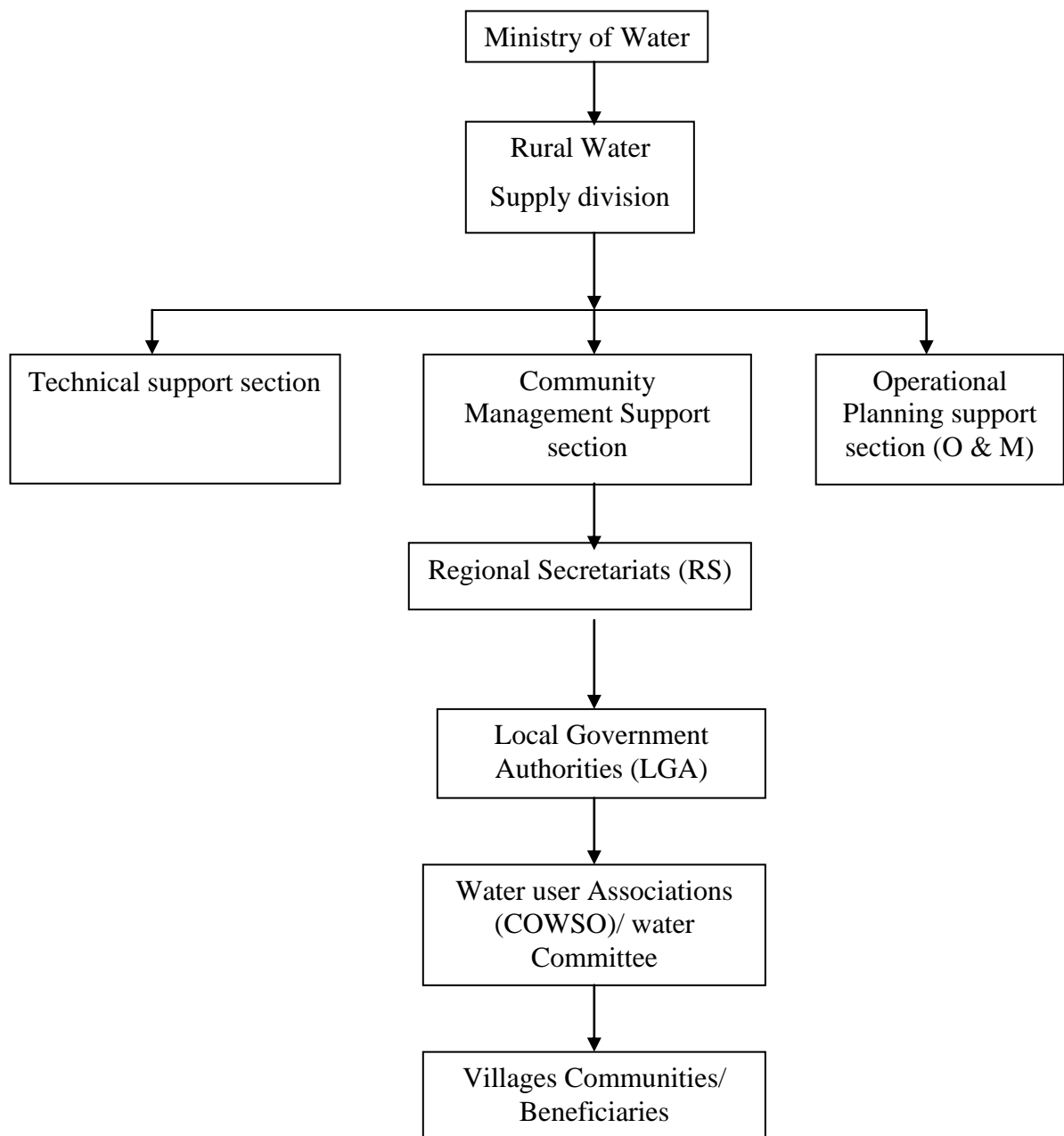
Source: URT, 2010

1.1 Background of the Problem

Water is precious natural resources, vital for life, development and the environment. It can

be a matter for life and death depending on how it occurs and managed. When it is too

much or too little it can bring destruction, misery or death. Irrespective of how it occurs, if properly managed it can be an instrument for economic survival and growth. However when it is inadequate in either quantity or quality it can be a limiting factor in poverty alleviation and economic recovery resulting in poor health and low productivity, food insecurity and constrained economic development (Karikari, 1996).

In the last decade particularly in the last half of the decade the issue of sustainable water resources management has attracted the attention of the international community and policy makers in Africa (Water Aid, 2012). For example, the issue was addressed at the Millennium Summit (2000), which produced the Millennium Development Goals (MDG's), the World summit on sustainable Development (2002), the 3rd World Water Forum in Kyoto (2003), The Africa Ministerial Council on Water and the programmes and actions articulated under the New partnership for African Development (NEPAD) framework.

In Tanzania the issue of rural water supply is of great concern where by the Government tried to strengthen mitigation measures by implementing Millennium Development Goal 2025 target in which about 75% of the rural population will be expected to have an access to adequate clean and safe water from 44% of the present rural population which have access to safe and clean water (URT, 2010). The goal goes together with the issue of sanitation where by overhaul investment of the rural water supply consists of personal hygiene and environment sanitation throughout the country (URT, 2010).

The water supply in the country is organized in two different ways of urban water supply whereby the system is centralized by piped networks and managed by Water authorities having the water tariffs settled commercially to support and strengthen the water services in almost full recovery and small profit margin. The other ways is rural water supply

whereby by systems is combinations of piped network, hand pump and similarly un -
improved water sources. The rural water supply is managed by local water committee
whom some are not even registered by service providers agencies. This may include
community based organizations, individual's water vendors and NGO's (URT, 2010).

Sustainability of water projects in urban water supply is not of great concern because of its
formal institutions arrangement. The focus of this study is mainly on management of rural
water supply projects through community participation whereby the idea behind was the
introduction of COWSO for the sustainability of the projects. National Water Policy
(NAWAPO, 2002) shows that with the community participation, sustainability of the rural
water projects would be very much raised but after introducing community participation in
2006 the trend does not show any significance improvement.

The recent study done in the year 2012 by the non - governmental organization known as
Water Aid Tanzania in 51 Districts of Tanzania shows that about 46% of the water points
national wide in Tanzania are non - function and most of them are recently constructed
(within 10 years) and are managed by COWSO's. There is inconsistent knowledge on the
role/effect of these COWSO's in improving and sustaining rural water projects and this
issue should not be left out. Thus this study has been designed to assess the effectiveness
of COWSO in sustainability of rural water supply projects.

1.2 Problem Statement

The world recognized that the water is a commodity of strategic importance because of
increasing demands and rising costs coupled with diminishing supplies. The government
of Tanzania has set aside a large budget for the financial year 2013/2014 for the
investment of rural water supply infrastructures amounting to about 580 billion compared
to 240 billion of the previous financial year 2012/2013 which is the increase of about

88%. This money will be of no sense if the proper management of the invested projects is not being properly managed. As a result the projects become burden to the government on operation and maintenance within a short time after completion and handling over other than investing funds to the other new projects.

In previous years (1964 - 1990) the top – bottom and free water approaches were used in managing rural water supply projects. These approaches were proved to be unsuccessful because the government used a lot of money to invest and operating the water services which were then no longer sustainable. The failure of these approaches resulted to introduction of community based approach in early 1990's. The approach of community participation during project selection, design and installation in order to increase sense of ownership on the part of the community was implemented to date but the result does not show any significant improvement on sustainability of rural water in Tanzania (WA, 2012).

Water points Mapping (WPM) surveys conducted in 51 Districts by Water Aid Tanzania in June, 2009 have very clearly shown the true extent of the sustainability problems facing rural water supplies. Nearly half (that is 46%) of public improved water points were found to be non - functional. Even very new water points have a problem: 25% of 2 – year old are already non – functional. An obvious starting point when looking at sustainability is to ask why water points become non - functional. And the most obvious answers are technical ones: pumps, engines and pipes all break down from time to time, thefts are relatively common and sometimes water sources dry up or become contaminated (URT, 2010).

The institutional arrangements for managing the water project are of great important. If responsibilities are clear and there are no conflicts of interest the management entity will

take its responsibility for sustainability seriously. This was the basis behind the policy changes in the NAWAPO (2002) moving away from Village Water Committees (VWCs) set up as part of the village government system and replacing them with a variety of more autonomous entities known as Community - Owned Water Supply Organizations (COWSO's) that are less vulnerable to interference by village government. Different types of COWSO's allowed by NAWAPO (2002) include Water User Groups (WUGs), Water User Associations (WUAs), trusts, societies and private companies. The issue remains on why the sustainability is still the problem in rural water projects managed by COWSO's. This study is designed to fill the existing information gap on institutional arrangement, policy and regulation on management models which causes low 'post – construction management' on rural water supply and sanitation projects (RWSP) which are operated and managed at village and mult - village levels by the Community owned water supply organizations (COWSO's.) contrary to private sectors.

1.3 Objectives of the Study

1.3.1 General Objective

The broad objective of this study is to examine existing institutional arrangement and it is operation in post construction management of RWPs and assesses the factors influencing sustainability of the invested RWP in Kilombero District, Morogoro region.

1.3.2 Specific Objectives

The specific objective aims;

i) To assess types of institutional arrangement and their roles in sustainability of RWP in post construction stage

ii) To examine factors influencing sustainability of RWP during post construction stage.

iii) To assess better ways of improving sustainability of RWP during post construction stage.

1.4 Research Questions

This study will be guided by some questions in making broad understanding of the objective of the topic which are;

i) What type of institution management exists and their roles in sustainability of RWP?

ii) What are the factors influencing sustainability of RWP during post construction?

iii) What are the main challenges faced by community based rural water projects managed by COWSO and better ways to overcoming those challenges?

1.5 The Significance of the Study

This study of has a number of contributions in the aspect of knowledge generation, policy and sustainability management of water schemes after construction (post construction) for community benefits.

The dependent between water availability and development is justified by the link between water and poverty. Due to poverty the access to adequate water and sanitation is low in Tanzania as a result there is high incidence of communicable diseases that reduce vitality and economic productivity on the country. Inadequate access to water and sanitation is thus both a cause and consequence of poverty. Furthermore inadequate water resources and it is management becomes a constraint to improved agricultural development and food security. Therefore at the end of this report one could be able to identify recommended measures to be taken for sustainable management of community rural water supply in Tanzania. Furthermore the study will help in strengthening and reviewing 2002 national

water policy and sensitization of stakeholders on the roles and responsibilities of COWSO's. Also as a District Water Engineer this study will help to strengthen the knowledge on how the management of COWSO's done at the lower level and the challenges they faced in order to make improvement at District level and make an advisory to regional and national level.

1.6 Scope of the Study

The study aims to cover the whole areas of Kilombero District where by rural water supply services is provided and governed by public ownership especially village water committee (VWC) and Community Owned Water Organization (COWSO) of which the District government is responsible for mainstreaming policies and technical consultancy in respect of the Government of Tanzania to analyze and compare their effectiveness. A total of 34 respondent and 12 key informants from the households/beneficiaries and District official respectively were interviewed and assessed through questionnaires and in – depth interview respectively. Also 2 Focus Group Discussion (FGD) with COWSO's leaders and members for 2 projects were done.

CHAPTER TWO: LITERATURE REVIEWS

2.0 Overview

Literature reviews provide a thorough review of knowledge on the topic. The purpose of literature review is to bring clarity and focus to the research problem, improves methodology and widening the knowledge base on the subject (Kumar and Casley, 1988). This chapter contains three sections; the theoretical literature review, empirical literature review and conceptual framework. The theoretical literature review tries to discuss various policies, acts, views, data and various information that different authors have discussed on management and sustainability of rural water supply projects. The empirical literature review concern about various researches that have been conducted by various researchers in different places in the World. Lastly this chapter comprises conceptual framework and conclusion drawn from the two literature sources.

2.1 Theoretical Literature Review

2.1.1 Definitions of the Key Terms

For the purpose of this study three concepts of functionality, management and sustainability of the water schemes are defined as follows;

a) Functionality – SNV defines functionality according to four indicators: quality, quantity, accessibility and reliability. These indicators provide a framework for measuring and monitoring functionality. They are also part of the criteria used for the Water Point Mapping exercises. Using these indicators, five service levels are defined: no service, sub-standard, basic, intermediate and high. The values for each of the indicators corresponding to a service level are specific to the country context (SNV 2013).

The water point can be described as being functional if it is actually in use by the local community at a particular point in time. A poorly sited water point that still technically

works but which the community has decided not to use is therefore considered non –
functional. Therefore the functionality rates are the percentage of all water points in a
particular area (WA, 2009). In this study this definition will be applied and used as a key
factor to measure the sustainability.

b) **Management** - in this study it refers to the action of planning, operating, supervising
and controlling evaluation of the daily activities for delivering water services to the
intended community (URT, 2010).

c) **Sustainability** – The water point can be considered as sustainable if all the necessary
components that keep a water point functional are in place, that is to say if the technology,
management, finances, technical expertise, availability of spare parts are all in place. A
broken down water point can be considered sustainable not functional if the finances,
expertise and spare parts are available and work in progress to repair the problem. The
functioning water point can be considered unsustainable if there are no funds available,
parts or expertise to undertake repairs if it is ever to break down (WA, 2009).

2.1.2 Types of Water Supply Projects Technologies

The choice of technologies during the planning stage plays the major role in ownership of
the project and hence the sustainability management of the schemes in total. In Tanzania
the existing technologies in common rural water supplies are;

i) **Spring**

In some areas of Tanzania these technologies for water supplies where the ground water
naturally comes to the surface. Some of these are permanent throughout the year and the
other is dry up during the dry season. The main Operation and Maintenance consists of

keeping the surroundings clean and repairing of pipes and cracks in the structure (Alida Adams, 2012).

ii) Surface Water

This technology used water from the river, stream or lake found in some rural areas of Tanzania. The extraction of this water in rural areas is done individual using jerry cans. The only Operation and Maintenance (O & M) in here is the cleaning of jerry cans to reduce some contaminations.

iii) Hand dug Well

This is the hand dug well without a pump found within the homesteads of the rural families. The water is drawn manually using the bucket with a rope. The O & M requirements for this technology are cleaning of the well site and drain and rehabilitating with gravel or piping materials. But this technology is used in areas with high water table (SKAT – RWSN, 2007).

iv) Well and Borehole with Hand Pump

A hand pump is a simple technology to manually pump ground water from a well or borehole. The O & M includes the replacement of worn cup seals and washers, straightening of pump rods and replacement of corroded lock nuts. The major repairs include replacement of the pumps rods, plunger, foot valve, cylinder, rising main and pump handle. The expected life time is 10 to 15 years (SKAT – RWSN, 2007).

v) Well or Borehole with Motorized Pump

This is the last technology commonly used in rural areas using the motorized pump of either fuel or electricity as a source of energy. The common technology for this is permanent submersible pumps. The daily operation of the motorized pumps requires some small activities like checking and refilling the fuel, start and stop the engine, checking and cleaning air filters and tightening of bolts and nuts. The minor maintenance includes greasing, replacing filters and changing oil while the major maintenance includes replacement of engine parts like the drive belt, nozzles, injectors and gaskets (Alida Adams, 2012).

2.1.3 Approaches to Rural Water Supply Managements

In previous studies the two words Functionality and Sustainability were mostly used together because of their purposes. First the study of water management is to analyze the effect of management skills and levels to determine the performances of the post construction of the water schemes. In the other hand sustainability measures how the services level of water services is maintained during the life cycle of the water scheme. Therefore the study of management measures the level of sustainability.

In the past 30's years rural water supply was working under two basic approaches;

i. Demand Responsive Approach

This approach relies in two principles;

(a) Water is an economic and social good and should be managed as such and

(b) Water should be managed at the lowest appropriate level with users involved in the planning. In this approach the consumer demands do guide the investments decisions.

ii. Community Management Approach.

This concept is the bottom - up development approach whereby community members have a say in their own development and assumes control in managerial, operation and maintenance responsibility for the water systems (Doe and Khan, 2004).

The above approaches were mainly focused on implementation of water systems and were not good in continuation after the implementation stage and then the rise of new approach known as the Service Delivery Approach (SDA) was begun. This approach emphasizes the entire life – cycle of a service consisting of both infrastructures and service level to access water (Lockwood and Smiths, 2011).

2.1.4 Sustainable Management of Rural Water Supply

Studying management of rural water supply goes in full relation with the study of sustainability because the analysis of management will measure the sustainability levels (WSP, 2010).

A useful definition of sustainability of water systems is given within the framework of the water and sanitation program (WSP, 2010) of the World Bank. It defines as the maintenance of acceptable level services throughout the design life of the water supply system. The determinants factors are technical, institutional and social aspects with sub indicators and sources of data as indicated in the Table 2.1;

Table 1.1: Sub - Indicators and Source of Data for Sustainability

No.	Aspect	Sub – Indicator	Source of Data
1	Technical	Physical Condition	Technical assessment
2	Institutional	Operation and Maintenance (O & M)	Water Committee interview
		Financial Management	Technical assessment/ Water Committee interview
3	Social	Consumer satisfaction	Household survey
		Willingness to pay/sustain	Household survey

Source: URT, 2010

Apart from these general components of sustainability there are some other literatures which clarify some practical issues for determination of sustainability management of rural water supply. According to World Health Organization (WHO) guidelines for drinking water quality (WHO, 2011), the adequacy of a water supply is determined by;

1. Water quantity, whereby the basic access includes a water quantity of 20 litres per capital day for domestic uses

2. Water quality, whereby water should have acceptable colour, odour, taste, range of chemical and bacteriological parameters

3. Accessibility, whereby water should be accessible within one kilometer from people's homestead with a maximum round trip of 30 minutes. Although in Tanzania the policy states that the maximum walking distance should be 400m from the homestead

4. Affordability, whereby the costs of water supply should be so that it is affordable and not such way that would make people to start using unimproved water source or reduce their water quantities which increase the health risks.

5. Continuity/reliability. This is very important as interruptions can make users using un - improved water sources. Several studies have indicated that interruptions are a cause of

more diarrheal diseases (hunter et al, 2009). The causes of interruptions can be power failure, excessive demands, engineering inefficiencies or seasonal variation in water availability.

The others factors for sustainable management of rural water supply is post construction management where by an adequate tariff for recurrent costs and external follow - up support are found. The cost recovery of rural water supply is very problematic in many countries due to the fact that high poverty levels, lack of regular cash incomes, poor design of tariff structure and poor governance and poor management of collected revenues by local water committees (Tertiary International, 2012). From the issue of external follow – up we see that maintenance (preventive), spare parts availability, community management capacity, user satisfaction, motivation and willingness to pay, continued training and support to water user's interventions and water source production, quality and conservation play a major part of the sustainable management.

The community management capacity and user willingness to pay plays a major part to the rural water supply finance. There are some common factors which contributes to low willingness to pay (Merret, 2002) which are;

   i. Economic life is hard so that household need to take the greatest care over other domestic expenditure.
   ii. There is widely held view that certain public services should be free.
   iii. Persons or Parties in political life give their support to non – payment residence.
   iv. The quality of that public service is poor.
   v. The government is so manifestly corrupt that the payments for public services are known to line the pockets of the power elite and

vi. When neither of the government nor the public water utility is willing to exercise sanctions of the non – payment because of the likely political and/or public health consequences.

The water system is described as being financially sustainable if there is full recovery of all costs (Cardone and Fonseca, 2003). After construction of water system infrastructures these cost are for operation and maintenance but also the other cost like external governmental support. For a water service to be financial sustainable, the total costs should match with the total available money, see Figure 2.1

Figure 2.1: Matching of all Costs versus Sources of Funding for Sustainable RWP
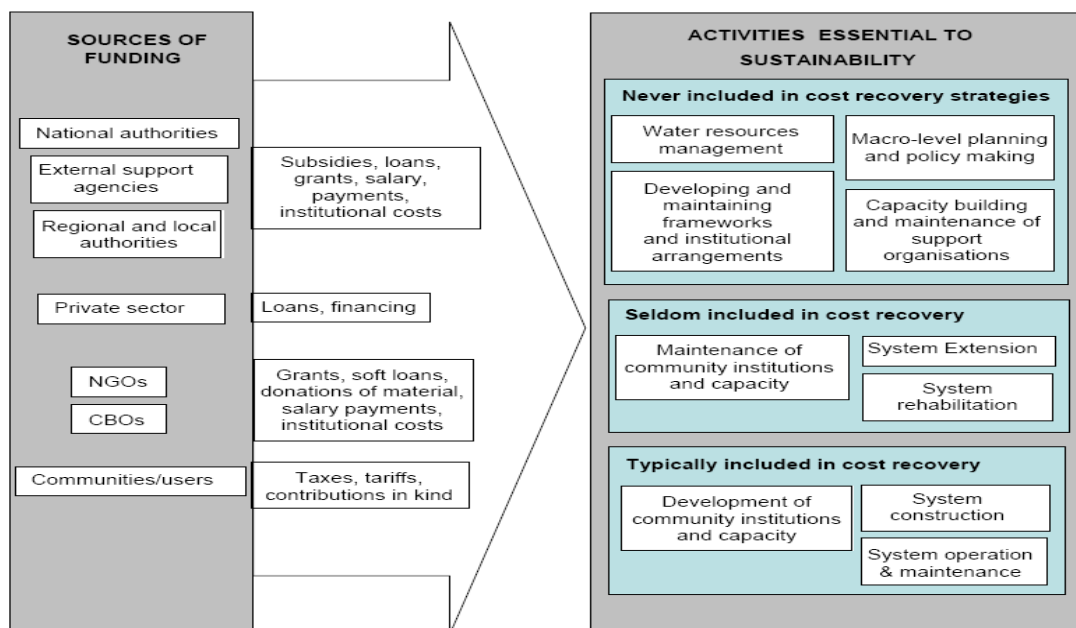
Source: Cardone and Fonseca, 2003

In managing rural water supply there are two distinguishable communities involvement such as community participation and community management (Harvey and Reed, 2006), the difference between Communities Participation and Community Management are shown in Table 2.2.

Table 2.2: Difference between Community Participation and Community Management

No.	Community participation	Community Management
1	Expression of demand for water	Water committee/user formation
2	Technology and location selection	Training and capacity building
3	Provision of labour and materials	Setting and collecting water tariffs
4	Financial contribution to capital costs	Management and/or implementation of O&M activities
5	Financial contribution to Operation and Maintenance costs (O & M)	Management and/or implementation of O&M activities
6	Selection of management systems	Training and capacity building

Source: Harvey and Reed, 2006

2.2 Empirical Literature Reviews

2.2.1 A Study in Asia (Indonesia and Malaysia)

To improve access to safe drinking water in Central Java, Indonesia, several governmental and non - governmental organizations (NGO's) initiated community - based water projects in the late 1980s and early 1990s. This paper addresses a question raised by the varied performance of these projects: why have some water services financed by these projects succeeded and why have others failed. The paper analyzes how closely these water projects followed the community - based approach which incorporates a demand - responsive focus on what users want and what they are willing to pay. Were the services truly demand - responsive, and whether the rules governing design, construction, and operation and maintenance (O & M) provide incentives for user participation. The paper

also analyzes the influence of social capital on user involvement and on the performance and impact of water services.

2.2.2 A Study in Africa (Swaziland, Benin, Kenya, Uganda and Ghana)

Water, sanitation and hygiene are essential to sustainable development and poverty reduction. In Africa, the number of people in rural areas without an improved water supply is six times higher than in urban populations (Baur and Woodhouse 2009). Providing safe drinking water in rural areas is a major challenge because it is not easy to establish institutional arrangements that will ensure that drinking water facilities are provided, maintained, and managed in an efficient, equitable and sustainable way. In fact, providing safe drinking water in rural areas is subject to both market and government failures. The private sector does not usually have sufficient incentives to invest in rural water supplies due to the high costs of infrastructure development in areas with low population density and the high transaction costs of collecting fees for drinking water in such areas, especially if the awareness of the value of safe drinking water is limited and if people can easily resort to other (although unsafe) water sources. If drinking water is provided by the government, there are major challenges to ensure that government staff has sufficient funds and incentives to manage rural water facilities in a sustainable way. Community - based approaches have been widely adopted to meet this dual challenge of market and government failures. However, it is well - known that communities may also fail to provide services effectively due to problems such as elite capture and limited capacity.

Against this background and using Ghana as an example the paper aims to assess the potential benefits and challenges of community - based water management. Ghana is a largely agricultural country with a population of about 20 million people. It is estimated that one - half of the population has access to safe water resources (Bohman 2005). About

65 percent of the Ghanaian population lives in rural areas with very limited access to pipe water (Gyampoh, Idinoba, and Amisah 2008).

In the past, the water supply in Ghana was operated by the central government similar to other African countries. Ghana faced budget constraints, low revenues, and shortfalls in operation and maintenance, which resulted in insufficient expansion of the system and failure to satisfy rural water needs (Engel, Iskandarani, and del Pilar Useche 2005). Ghana implemented the Decentralization Act in 1983 as part of a national reform, and since then District assemblies have gradually assumed more responsibilities. Ghana also has transformed the structure of its rural water supply and transferred responsibilities for water management both to the District assemblies and to community - based organizations that operate outside the local government structure. Ghana was one of the first countries to introduce a community - based approach to rural water supply on a large scale (Engel, Iskandarani, and del Pilar Useche 2005). Ghana's approach is in line with current drinking water policies in many countries, which are based on the paradigm that rural drinking water supply facilities, such as improved hand dug wells or hand pump fitted boreholes are best managed by local water users. This paradigm also entails the principle of "treating water as an economic good," which assumes that water users are willing to pay for water services if appropriate management approaches are used (Kleemeier 2000).

So far few studies have been conducted on community - based water management in rural Africa. The available evidence on the effectiveness of it shows rather mixed results. Therefore, the study was aimed to help to address knowledge gaps on the following questions: Which factors affect the functioning of a community - based approach and household participation in the management of water services.

2.2.3 Studies Conducted in Tanzania

Water points Mapping (WPM) surveys conducted in 51 Districts by *Water Aid Tanzania in June, 2009* have very clearly shown the true extent of the sustainability problems facing rural water supplies. Nearly half (46%) of public improved water points were found to be non - functional. Even very new water points have a problem: 25% of 2 – year old are already non – functional.

The Government of Tanzania has embarked on a major sector reform process since 2002. An ambitious National Water Sector Development Strategy that promotes integrated water resources management and the development of urban and rural water supply were adopted in 2006. Decentralizations has meant that responsibility for water and sanitation service provision has shifted to local government authorities and is carried out by 20 urban utilities and about 100 District utilities, as well as by Community Owned Water Supply Organizations in rural areas.

These reforms have been backed by a significant increase of the budget starting in 2006, when the water sector was included among the priority sectors of the National Strategy for Growth and Reduction of Poverty MKUKUTA. The Tanzanian water sector remains heavily dependent on external donors: 88% of the available funds are provided by external donor organizations. Results have been mixed. For example a report by GIZ notes that "despite heavy investments brought in by the World Bank and the European Union, (the utility serving Dar es Salaam) has remained one of the worst performing water entities in Tanzania"

Slightly more than half the population of Tanzania is estimated to have access to an improved water source, with stark differences between urban areas (about 79% in 2010) and rural areas (about 44% in 2010). In rural areas, access is defined as meaning that

households have to travel less than one kilometre to a protected drinking water source in the dry season. Trends in access to water supply are difficult to discern due to conflicting and unreliable data. However, it seems that access increased during the 1990s, particularly in rural areas, but stagnated during the 2000's. According to data from the Household Budget Surveys 2000/2001 and 2007 access to an improved water source in mainland Tanzania even decreased from 55% in 2000 to 52% in 2007 (WA, 2009).

Using a narrow definition, in 2007 around 34% of households had access to piped water as opposed to 40% in 2000. However using a broader definition of access that also includes stand pipes and protected springs, there has been a slight increase in the proportion of households reporting a drinking water source within one kilometre. Estimates from the Joint Monitoring Programme for Water Supply and Sanitation (JMP) show a different trend. They show a slight decline in access from 55% in 1990 to 53% in 2010. According to these figures, access in rural areas stagnated, while in urban areas it decreased from 94% to 79% over the same (URT, 2010).

2.2.4 Top - Down Projects and Free Rural Water Supply in Tanzania (1964–1991)

After the union of the former British colonies Tanganyika and Zanzibar to form the United Republic of Tanzania in 1964, the President Julius K. Nyerere implemented a policy of African socialism called Ujamaa. This included the forced resettlement of dispersed rural small holders to collective farms. One of the stated objectives of the resettlement was to facilitate the provision of education, health services as well as water supply. In the spirit of the Ujamaa the government launched a 20 - year Rural Water Supply Programme (RWSP) in 1971 with the aim of providing access to adequate and safe Water Supply within a walking distance of 400 meters from each household by the year 1991. Under this programme water was provided free of charge in rural areas, while moderate tariffs were

charged for house connections in urban areas. Implementation was highly centralized: In 1972 the central government abolished local government authorities that were replaced by central government representatives in committees at the District and village level under a policy that was ironically labelled "decentralization". Donors supported the program by funding more than 80% of investments in water supply during the 1970's.

According to a report by Water Aid (2009), "the resulting water projects were unsustainable and left a legacy of distrust among villagers for government programmes". Villages were selected based on purely technical criteria by the District water department without consultation with communities. Deep boreholes were drilled and equipped with pumps and diesel engines that should have been maintained by the government using central funds. This did not work well and many of the pumps were inoperable. In subsequent years public services collapsed and a serious outbreak of cholera occurred during 1976 to 1980 in many urban areas. In response to this failure Town and Municipal Councils were re-established in 1978, but remained without any revenue of their own and depended completely on central government funding. Public service provision remained poor. Although politicians and donors had recognized by that time that the policy of free rural water supply and centralized management had failed, it took them more than two decades from its inception to change that policy. A mid - term review of the RWSP conducted in 1985 showed that only 46% of the rural population had access to water supply services. Among the reasons were the lack of involvement by beneficiaries, the use of inappropriate technologies and an inadequate overly centralized institutional framework.

2.2.5 Community Participation and Management (1991 – Present Time)

The socialist policy of Ujamaa was gradually phased out when Mwl. Nyerere handed power over to Ali Hassan Mwinyi, first as President in 1985 and then as head of the ruling party in 1990. The government initiated political and administrative reforms, as part of which the first National Water Policy was approved in 1991. At the core of the reforms was the Local Government Reform Programme aimed at decentralizing power by devolving resources and responsibility for service delivery to District and municipal councils including transfers of conditional and unconditional block grants to the councils. The National Water Policy emphasized community participation in the selection of projects and in operating and maintaining them through water committees that charged for water. Villagers also had to make a cash contributions towards capital costs and contributed time and labour, local materials and hospitality for visiting government staff. They also undertook hygiene education and serve on health committees.

A pilot for the new policy was initiated by Water Aid in Dodoma Urban District together with the District government. An innovative feature of the project was that the water department worked closely with the community development department and the health department. Both had previously not been involved in water projects. Using the acronyms of the three departments and of Water Aid the integrated team was called WAMMA giving the project its name. Each of the three departmental teams had to have both men and women among its staff, although this was difficult to implement because of a shortage of female staff. Unlike before communities were selected based on a needs survey. However government staffs at all levels were poorly paid and had little interesting work to do. Some were consequently de - motivated. Like many other externally funded projects, the WAMMA project paid allowances to fieldworkers for work undertaken outside their offices in order to motivate them. However, "payments were made at the official rate, as

any higher allowances would undermine the government's capacity to sustain or replicate work without donor inputs." Interestingly, Water Aid initially worked directly at the District level without any formal agreement with the regional government until 1995. The programme which was considered a success by Water Aid and the District government was subsequently extended from Dodoma Urban District to three other Districts in Dodoma Region. 86 projects were built under between 1991 and 1996. The innovative collaborative work between three District departments and the participatory approach attracted visitors from all over Tanzania.

2.2.6 Responsibility for Water Supply and Sanitation

Water and sanitation policies and strategies are defined by Ministries at the national level; economic regulation of services provision is undertaken by a national authority and environmental regulation by a National Council; service provision is the responsibility of various local entities.

2.2.6.1 Legal Framework

The legal framework for water supply and sanitation is based on the *Water Supply and Sanitation Act No. 12* enacted in May 2009. The Act outlines the responsibilities of government authorities involved in the water sector, establishes Water Supply and Sanitation Authorities as commercial entities and allows for their clustering where this leads to improved commercial viability. It also provides for the registration and operation of COWSO and regulates the appointment of board members.

2.2.6.2 Rural Areas

In rural areas, water supply and sanitation services are provided by COWSO. They have been established through the local government framework of village councils following the adoption of the Water Sector Development Strategy. Out of 10,639 villages, 8,394 had

a Water Committee dealing with issues in the water and sanitation sector as of 2007. The role of COWSOs is to operate and maintain the water supply systems on behalf of the community. They are expected to meet all the costs of operating and maintaining their water supply systems through charges levied on water consumers, and to contribute to the capital cost of their systems. The main source of capital investment is block grants to local government authorities, disbursed by the Regional Secretariat. There are two main types of COWSOs: Water Consumer Associations (Vikundi vya Huduma ya Maji), who are responsible for drinking water supply and Water User Associations (Vikundi vya Watumiaji Maji), who are responsible for water resources and for solving conflicts among water users. As of 2006, 121 Water User Associations have been established (URT, 2010).

For example, in the Hai District in the Kilimanjaro Region, 200,000 people in 55 villages are served by gravity systems from sources in the rainforest on the slopes of Mount Kilimanjaro. Until the early 1990s the water systems were in bad shape: Local communities did not maintain the infrastructure, water quality was poor and some systems even failed to provide any water. The national water policies of 1991 and 2002, which emphasized local participation and ownership as well as payment for water and metering, turned the situation around. Together with investments financed as part of development cooperation with Germany the new approach achieved substantial improvements. It benefited from a strong local tradition of self-help. Water systems are now operated and maintained by employees of water supply trusts - the local name for a COWSO. Each trust has ten members, half of which have to by women by law, who are elected by the communities. They set tariffs, manage their own budgets and hire managers for each water system. The managers in turn supervise technicians and accountants employed by the water committee. Water is sold at public taps by tap agents or provided to metered house connections. An evaluation in 2002 showed that the incidence of waterborne diseases had

declined substantially compared to the early 1990s and that costs were more than fully recovered. As of 2009, water supply remained continuous and water quality good. The water committees remained financially sustainable with more than 90% of the customers paying their water bills (URT, 2010).

2.2.6.3 Public Opinion

The Afro barometer Survey (2008) collected information about Tanzanians' opinions about the water sector. The disparity in access to safe and clean water between rural and urban areas is illustrated by the responses: 51% of urban residents were satisfied with government efforts to deliver water and sanitation services, compared to 39% in rural areas. Accordingly the water sector is considered as a higher priority for government action by rural Tanzanians. 44% of respondents in rural areas cited water supply as one of the three most pressing issues that the government should address (for 16% it is the single most important problem). In urban areas water supply came third behind economic and health concerns in 25% of responses. Issues of corruption in the water sector were also examined by the Survey: 4% of respondents admitted that they had to pay a bribe, give a gift, or do a favor to government officials in order to get water or sanitation services in the past year.

2.2.6.4 Tariffs and Cost Recovery

The National Water Policy, NAWAPO (2002) identifies utilities as commercial entities that provide an economic and social good. It thus promotes operational and maintenance (O & M) cost recovery as basis for sustainable services. Rural Water and Sanitation Authorities are expected to meet full O & M costs and 5% of capital costs. Urban Water and Sanitation Authorities are divided in three categories according to their performance in cost recovery:

(i) Category A: authorities that cover all O&M costs, including staff wages, energy costs and some contributions to investment;

(ii) Category B: authorities that meet O&M costs, share energy costs with the government and are able to pay full salaries to permanent employees;

(iii) Category C: authorities that require government support to meet their energy costs and to pay out salaries to permanent employees.

COWSO falls in rural water supply and sanitation services category thus are expected to meet full O & M costs and 5% of capital costs. The matured and well managed COWSO are expected to operate as a water authority in category A.

2.3 Relevancy of Study

By analyzing the studies conducted by various researcher in developing countries i.e Malaysia, Indonesia, Swaziland, Ghana, Uganda, Benin, Kenya and Tanzania then the study will facilitates the National water policies to accommodate Community owned water services in favour of sustainability. This was due to the fact that the approaches used to select community water demand, technologies; management models e.t.c had proved failures. The Tanzania National Water Policy (2002) relates very much with the other developing countries in case of rural water services management. The issue remains that if the community participation in water demand and approaches are only enough in sustainability of rural water supply services. Therefore this study will take care of post construction management of the rural water supply especially for those projects managed by COWSO's in Morogoro a case of Kilombero District

2.4 Conceptual Framework

The conceptual framework helps in analyzing this study. It provides the real situation that most COWSO's are supposed to be formulated, organized and managed for the

sustainability of rural water projects in Tanzania. The effectiveness of COWSO on sustainability of community owned rural water projects (dependent variable) seems to be influenced by the following variables (stages); facilitation and formation stage whereby sensitization and community participation in choice of technology, cost sharing options, formation of COWSO and selection of leaders is demonstrated and implementation stage whereby tariffs setting and collection, expenditures, reporting, operation and maintenance are involved (see Figure 2.2).

Figure 2.2: Conceptual Framework

Independent variables   **Dependent variables**

National level:
Policy making and regulation implementation;
• Formation and function of COWSO (age, education, gender, social capital leadership, time limit)

Community level
• Community water service and demand approach (O & OD).
• Community participation in choice of technology.
• Open management in income and expenditures.

RS and LGA level
• Monitoring and evaluation by all levels (District, regional and consultancy to Ministerial).

Project Sustainability
• Proper tariffs setting, WTP, ATP
• O & M properly and timely done
• Savings in account for wages, allowances and expansion
• Effective COWSO functions
• Functional RWP

Source: Developed by researcher from literature reviews, February 2015

The study based on argument that functionality and sustainability of rural water projects is commitment to all communities whom are seeking for water service and being involved in selection of technology before formulating COWSO. The COWSO should be involved in each stage of construction. The arrow shows that the dependent variables such as proper tariffs settings, WTP and ATP, COWSO management and effective COWSO functions depends very much on independent variables such as water demand approach from the community themselves, participation on choice of technology and proper management of COWSO and following police and guidelines in selection of leaders in respect to age, gender, education level, social capital and time limit.

Furthermore independent variables such as monitoring and evaluation of the COWSO management through District, Regional and Ministerial levels should be engaged fully throughout the entirely life of the project. This will help to know the actual revenue and expenditures as per current market which in turn can compare the present tariffs in respect to contribution of fully O & M costs and 5% capital recovery.

The relationship observed in the conceptual framework is not directly, it is a complex casual relationship having both direct and indirect casual links. Generally, it could be said that sustainability of RWP (dependent variable) is the function of policy and guidelines, community participation in all stages and monitoring and evaluation in all levels of Ministerial, Regional and LGA's

2.5 Conclusion

Therefore we have seen from different authors that in community management there is a lack of incentives and responsibilities for the leaders to make full ownership of the rural water supply compared to private management. The developing countries such as Tanzania has put in place the policy for management of rural water supply services to

Community Owned Water Supply Organization (COWSO) models but the issue remains how do we go about it to make the projects sustainable with fully O & M cost and just 5% or 2.5% (depending on the technology) investment cost recovery. The study will tries to bridge the gap on how to make the rural water projects sustainable for the benefit of the community and economic development of Tanzania government through the use of COWSO as a management approach.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Overview

This chapter describes the methodological instances that were used in conducting the study. The chapter covers the research design, Case study, sample size and sampling techniques. It also includes a description of the data collection methods, validation of the instruments, data analysis procedure and ethical considerations that were involved in conducting the study.

3.1 Description of the Study Area and the Reasons for Selection

Kilombero District is one of the six Districts in Morogoro region south - western of Tanzania. The District is located on the western side of Morogoro Region lying between latitudes 70^040' and 9^021' South of the Equator and between longitudes 35^020' and 37^048' East. The District has an area covering a total of 14,246 square kilometers, it is situated in a vast floodplain, between the Kilombero river in the south - east and the Udzungwa - mountains in the north - west. On the other side of the Kilombero river in the south - east the flood plain is part of Ulanga District. On the Eastern side of the District is neighboring Kilosa District across Ruaha river as a boundary. Kilombero District has 2 different rain seasons, the long one starting from March to June and the shortest from September to November.

The District was chosen as the study area because of it is potentiality in water sources both surface water (rivers) and ground water (high water table) with very softy quality (tastes) hence the availability of domestic water services should be high thus the sustainability of water project was expected to be high. Kilombero District serve a total of 74% of its rural population with safe and clean water (URT, 2013) compared to the average of 44% of rural population of Tanzania and 55% of rural population of Morogoro region. Therefore

due to this reason of serving high percentage of rural water services in Kilombero District compared to the average of Morogoro region and Tanzania as a wholly, the District was chosen as a case to study the effectiveness of COWSO's in management and sustainability of water projects in Morogoro.

According to the last census in 2012, the population of Kilombero District was 407,880. The main ethnic groups are Pogoro, Ndamba, Bena and Mbunga and several others in small proportion. The area is predominantly rural with the semi - urban District headquarters Ifakara as major settlement. The majority of the villagers are subsistence farmers of maize and rice. There are large plantations of teak wood in the Kilombero and the neighbouring Ulanga District. In the North - West of the District, Illovo Sugar Company's sugar - cane plantations occupy most of the low lying area. The other Districts include Ulanga, Mvomero, Kilosa, Morogoro and Gairo. The Map showing the location of Morogoro region is shown in Figure 3.1.

Figure 3.1: Map of Tanzania Showing Kilombero District in Morogoro Region

Source: http://en.wikipedia.org/wiki/Morogoro_Region

3.2 Research Approach used in the study

Kothari (2004) defines research design as the logic that links the data to be collected and the conclusion to be drawn to the initial questions of the study; it ensures coherence. It is the action plan for getting from questions to conclusion.

The purpose of this research was to explore the causes of low sustainability of rural water schemes during post construction in Tanzania. In order to define the research hypothesis the results of water survey research design was analyzed for trends in functionality. The results reveal and demonstrate the functionality as correlated to the age of the scheme, affordability and willingness to pay for water resulting to sustainability and the following key variables and research hypothesis were formed;

(i)   Community participation during the water demand approach, selection of technology, formation of COWSO and selection of COWSO's leaders are key variables for sustainability of rural water services

(ii) Post construction management of rural water services (operations) are the dependent variables for sustainability of the completed projects provided that community participation were involved during all levels of project implementation to operation stage

Field work was carried out to test this hypothesis and further more to explore the reasons how the villagers were recovering from their schemes from breakdown. This study was dominantly base on two approaches: the ethno methodological and the mixed method approach. The ethno methodological approach allowed the researcher to let people express their worldview. Basing on this approach the people focused on how they benefit through COWSO's in their daily life on water services. When they encounter the researcher and at the same the researcher was able to get into the people's daily operations and construct practical explanations from the perspective of people. It is with this ethno methodological approach that the study made use of case study in order to study the phenomenon of management and sustainability of rural water projects.

3.3 Sampling Procedures

3.3.1 Sample and Sample Size

Kothari (2004) defines Sample as a small part selected from a large unit or entity. It is replica of the bigger part from which it is drawn. Sample size is the extent to which a group of selected item from the population. Bailey (1994) suggested a sample of at least 30 units is statistically significant to represent any population. A sample of 34 respondents was randomly selected within the Kilombero District. The distributions of were as

follows; Mangula A and B project (7), Katurukila (5), Ikela (7), Mlimba A and B (6), Viwanja sitini (4) and Namwawala (5). The sampling size is shown in the Table 3.1.

Table 3.1: Showing Sample Distribution of Respondents

Project/Village	No. of respondent
Mang'ula A and B	12
Katurukila	5
Ikela (Mkamba and Kidatu)	6
Mlimba A and B	7
Viwanja sitini	4
Namwawala	5
Total	**34**

Source: Field survey 2015

3.3.2 Sampling Techniques

The respondents were obtained through probability and non probability sampling techniques. With probability sampling technique every member from the population have a chance of being selected. With a non probability sampling technique the purposive sampling procedure were used where selection of a particular units of the population (Kothari, 2003). Three (3) gravity water projects, Two (2) Electricity pumped water projects, One (1) diesel pumped water project and at District level were randomly picked as shown in the Table 3.2

Table 3.2: Sample Composition

Sample Composition	Sample
Project Surveyed	6
Water user interviewed	34
Focus group held	2
Number of key informants	12

Source: Field survey, February 2015

3.4. Types of Data

3.4.1 Primary Data

These are data that have been by a researcher from the field for the purpose of answering research questions or issue (Kamuzora and Adam, 2008). Data related to respondent's characteristics such as sex, age, education, occupation were collected from various individuals.

3.4.2 Secondary Data

Kothari (2003) defines secondary data as those data that have already been collected by someone else and which has been passed through the statistics under process. They provide second hand information including raw data and published.

3.5 Data Collection Methods

In this particular part it presents techniques which were used in data collection and how they utilised. According to Saunders (2009), methods used for data collection are interviews, questionnaires, panels, observations, documents and many others. The method are categorised into two streams which are qualitative and quantitative.

As it has been mentioned earlier, this study has an approach that used mixed methods. It is for this reason there were quantitative data to be collected together with qualitative data.

Each respondent was approached personally by interviewer; questionnaires were introduced after consent from the interviewee. The questionnaire was administered in Kiswahili since it decreases the risk of mis - understanding. Three different interviews were held in each village, one on the technology which was conducted to scheme attendant or any person experienced with the technology, secondly on management, financial and installer issues was a representative of the management entity and the third one on demand held with a female villager. Also the questionnaires were distributed and collected to the top management of the Districts including Water, Health, Planning, Internal Audit and Community development departments.

3.5.1 Survey

Households and beneficiaries survey were done using questionnaire tool to collect the required data. The questionnaire was consisting of a series of questions and other prompts for the purpose of gathering data from the study area (Oulu, 2002). The study adopted both closed and open ended questionnaires so as to solicit information regarding the study at hand. Open ended questionnaires were sent to 34 respondents and they are aimed at exploring their ideas concerning the operations and performance of the COWSO in sustainability of RWP. The advantages of questionnaires are that the research covers the big area with little time, so they save time and money. Also it gives the respondents the freedom of say whatever they want concerning the problem being investigated.

The disadvantage of questionnaires is that majority of the people who receive the questionnaires do not return and those who fill might not be the true representative in the sample, but the selection was based on the strengths of questionnaires rather than disadvantages.

3.5.2 Interviews

Interviews are a systematic way of talking and listening to people (http://www.who.int) and are another way to collect data from individuals through conversations. (Kvale, 1996) found interviews as "an interchange of views between two or more people on a topic of mutual interest, sees the centrality of human interaction for knowledge production, and emphasizes the social situations of research data." Interview is another crucial part of receiving information from respondents concerning the problem being investigated. It provides useful information on the problems being investigated behind the participant's experiences.

The interview considered essentials not only as a supplement to the questionnaire in obtaining data and information but also to offset the disadvantage associated with the use of questionnaire as data gathering methods.

For this case, an interview guide was used to solicit answers from the government officials in which the researcher read the question to the respondents and recorded the answers in order to involve both literate and illiterate people and obtained their views on operations and effectiveness of COWSO in sustainability of RWP. Thus interviews were conducted to 12 respondents at the District level; District Planning Officer (DPLO), District Internal Auditor (DIA), 2 Internal Auditors (IA), 2 Economists, District Health Officer (DHO), District Community Development Officer (DCDO), 3 District water staffs and District Social Welfare Officer (DSWO).

3.5.3 Focus Group Discussions

The study used a focus group discussion method which is the most effective methods of data collection. The purpose of using this tool was to collect in depth information on issues, perception and ideas of the communities surrounding the water projects. Each

group (youths, elders, and women) consisted of ten people as it is suggested in Krueger *et al.,* (2000) that a focus group discussion must comprise 5 to 10 people so as to have effective and participatory group discussion. According to USAID (1996) noted the advantages of Focus Group Discussion as it is low cost and provides speedy results, its flexible format allows the facilitator to explore unanticipated issues and encourages interaction among participants. Lastly in a group setting participants provide checks and balances thus minimizing false or extreme views. 2 Focus Group Discussions were utilized in the study from 2 COWSO's leaders of Mlimba and Viwanja sitini water supply projects.

The FGD was conducted in the projects areas by organizing the meeting with Chairperson, Secretary, Treasurer, 3 COWSO members and VEO for each of the 2 projects and issuing the topic on general water project management and sustainability for discussion with them.

3.5.4 Documentary Review

The researcher studied the different documents in Kilombero District council as well as in village offices and solicited those provided additional information on the operations and effectiveness of the COWSO in sustainability of RWP's. On this study documents like projects progress reports, District water status and statistics report, District water budget, minutes on community social services, COWSO constitutions, registration and formulation of COWSO manual and Project Operation Manual (POM) were reviewed.

3.6 Validity and Reliability

Validity is the extent to which a test measures what it claims to measure. It is vital for test to be valid in order for the result to be accurately applied and interpreted. According to Saunders (2009) reliability is the extent to which results are consistent over time. Results

are referred to as reliable if the same result can be reproduced under a similar methodology then the research instruments are considered to be reliable. To achieve validity and reliability, the following were done:

1. The selection of the respondents based on established sampling procedures for quantitative data; for the qualitative data respondents were selected based on the opportunity to participate in rural water services in which mostly were the District head of departments or sections.

2. The quantitative data collected was computerised in order to avoid unnecessary loss of data and conduct more precise analysis with the use of computer software (SPSS).

3. Pilot test on the questionnaire was done after which some revision have been made to eliminate ambiguities in the questionnaires.

3.7 Data Processing, Analysis and Presentation

3.7.1 Data Processing

Gathered data was processed before getting into analysis. So data were edited to remove errors, omissions and making classifications before coded into numeral to make them guide analysis and then be entered into the computer system.

3.7.2 Qualitative Data Analysis

The information collected during the FGD's and in – depth interviews were subjected to content analysis. The content analysis was important in generating set of variables that are useful in detailing some characteristics of the research. For this study FGD's was conducted to COWSO leaders and members while in – depth interviews were conducted to some heads of department and sections and the results will be used as content analysis.

3.7.3 Quantitative Data Analysis

The recovery of the breakdown to assess the level of management of the schemes was done by either village committee of community owned committee. Finally the issue of tariffs settings and collection within the water consumers to assess the level of financial management and as a key factor to indicate the level of willingness and ability to pay hence the sustainability of the water schemes in total. For the community to have at least 5% or 2.5% depending on the technology cost recovery and full operation and maintenance cost. This is the requirement of NAWAPO (2002) which stipulates that communities themselves must achieve full O & M cost and at least 5% or 2.5% cost recovery depending to the abstraction technology.

Data analysis used to computerized software programme in analysis was Statistical Package for Social Science (SPSS 21.0 version) programme that is the multipurpose software for computing both qualitative and quantitative data.

3.7.4 Results Presentation

The output of the analysis is presented in forms of frequency tables, cross tabulation, bar chart, pie chart and graphs as will be seen in chapter 4.

Summary of Objectives, Data collection methods & methods of analysis (see Table 3.3)

Table 3.3: Summary of Objectives, Data Collection Methods and Methods of Analysis

No.	Objective	Data to be collected	Method of data collection	Method of analysis
1	To assess the types of institution arrangement and their roles in sustainability of RWP in post construction stage	Status of projects and functionality. Types of existing management practices and responsibilities	Document review. Questionnaire Interview	Descriptive Content analysis
2	To examine factors influencing sustainability of RWP during post construction stage	Existing technology. Community participation. COWSO's leader's composition. Tariffs payment/collection model. Tariffs charged. Expenditures. Funds serving for emergency Policy and guidelines follow up. Challenges of financial situation.	Document review. Questionnaire Interview FGD	Descriptive Content analysis Inferential statistics
3	To analyze better ways of improving sustainability of RWP during post construction stage.	COWSO formation stages. Tariffs setting guidelines. Qualification and selection of leaders. Time elapse for COWSO's leaders.	Document review. Questionnaire. Interview FGD	Descriptive. Content analysis. Inferential statistics

Source: Developed by Researcher, February 2015

3.8 Study Limitations and Delimitations

This study was subjected to numbers of limitations during the entirely time as mentioned hereunder;

i. The study was conducted in the projects in which their management models are only registered COWSO.

ii. The covered area was limited by geographical location whereby 1 project situated on the mountainous area was not accessible by road during the visit due to heavy rain (Tanganyika village)

iii. Budget limitation has caused not to travel and stayed for many number of days in one village thus reduces the number of respondents

iv. Time was not on my side as the employer limited me to be out of my duty station due to several planned and unplanned activities within my responsibilities. This made the postponement of completion in more than stipulated time.

Though there were some of the mentioned challenges, the study succeeded by selecting projects which were accessible to replace the inaccessible one (Kamwene instead of Tanganyika village). Also through the limited budget, the study interviewed respondents by filling their responses physically other than leaving the questionnaires and come back to collect in other days thus reduces transport and leaving costs. In term of time limit for completion of this work the study was conducted and done all over the weekend and holidays to achieve the targeted time.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS

4.0 Introduction

This chapter presents and discusses the results and findings of the study using the data collected from the field. Discussions of findings are based on the designed objective mainly the specific objectives. The objective of the study is to assess the effectiveness of COWSO management in sustainability of Rural Water Supply Projects in Tanzania; a case of Kilombero District. The study managed to administer questionnaires whereby 34 respondents were accessed, 12 key informants interviewed and 2 FGD to COWSO leaders and members in 2 different projects conducted.

This chapter presents the research findings and discusses the results. The results presented are based on the specific objectives of the research: (1) To assess the types of institution arrangement and their roles in sustainability of RWP (2) To examine factors influencing sustainability of RWP during post construction stage and (3) To analyze better ways of improving sustainability of RWP during post construction stage.

4.1 Background Information of the Respondents

4.1.1 Sex of Respondents

Majority of the respondents were female represented by (55.9%) and (44.1%) of the respondents were males (see Figure 4.1). The study aimed to assess the effectiveness of COWSO management in provision of sustainable water projects in Tanzania.

The results concur with the report from the African Development Bank through the article called Rural Water Supply and Sanitation Initiative (2013) which identified women to be more sensitive than men on domestic water services as they are queuing to fetch water other than productive activities such as family and economic ventures.

It is known that women are more sensitive and vulnerable on the issue of domestic water services than men so the study used this idea to include more female so as to get more useful inputs and reliable data. Therefore the findings of this study can be regarded as sensitive and useful information with respect to management of RWP in sustainable manner.

Figure 4.1: Distribution Results of Respondents Sex
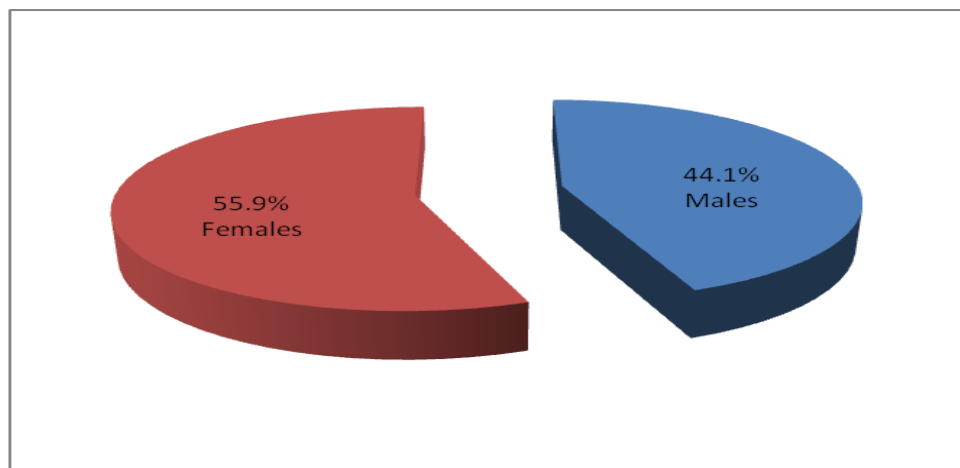
Source: Field Survey February, 2015

4.1.2 Marital Status

The study shows that most of the respondent in the study area were married (73.5%), followed by single (17.6%), widow (5.9%) and only (2.9%) were divorced/separated as illustrated in the Figure 4.2. The Study managed to interview more married people who always have more use and demand for water services thus will provide more useful and reliable information.

The findings conform to the study by Nyong (2001) concerning a survey of household domestic water use in rural areas. He found that most of volunteering groups in participation to contribution on reforming the management of RWP are married. Also Ministry of Water Program Operation Manual (POM, 2006) shows the organized family has more use of water per day than separated family or single. The findings of this study

can be regarded as sensitive and useful information with respect to management of RWP in sustainable manner.

Figure 4.2: Marital Status of the Respondents
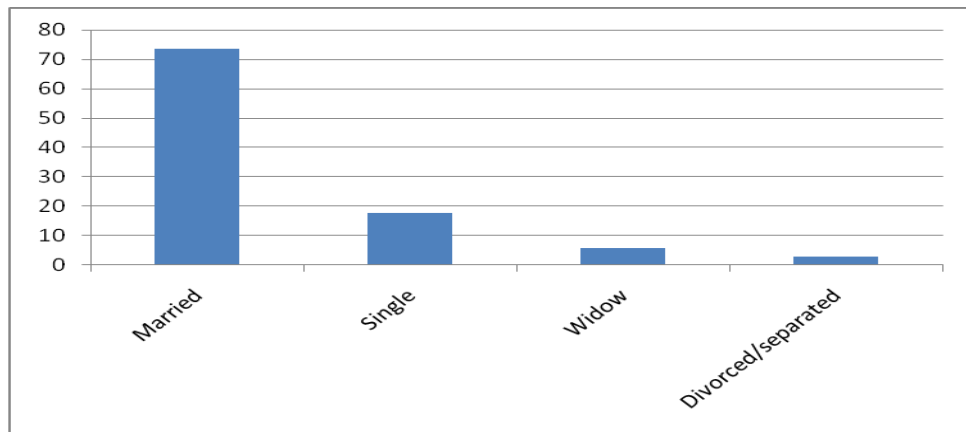
Source: Field survey February, 2015

4.1.3 Education Level

The study found that (44.1%) of the respondents had primary education, (32.4%) had secondary education and (2.9%) had graduate from high learning while (20.6%) of the respondents had no education. This reflects the education composition of the communities within the study area. The results are as shown in the Figure 4.3.

The findings on education level reflects the study done by George (2012) who found out that majority of respondents had primary education as compared to secondary or post secondary education. Low level of education of respondents could be as well linked to low awareness and participation of respondents in projects management issues. This might affect the level of sustainability of water projects during post construction stage.

Figure 4.3: Education Level of the Respondents
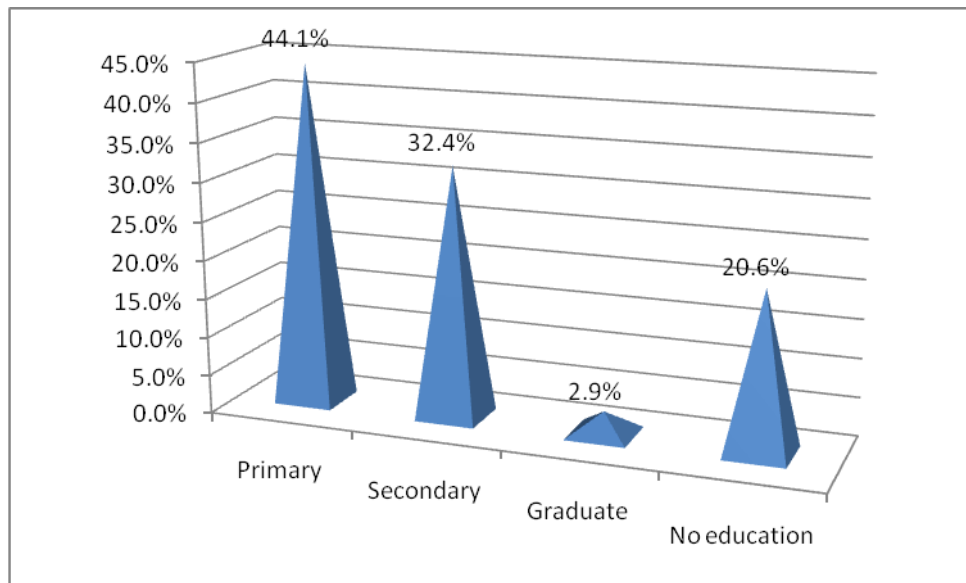
Source: Filed survey February, 2015

4.1.4 Occupation

Among of the issues the study captured was occupations of the respondents which are believed as the main source of their income. The study shows that (32.4%) were businessmen, (32.4%) peasant/farmers and (14.7%) were employed while (20.6%) were jobless. The findings concur with the study done by Cardone and Fonseca (2003) who found that the number of jobless can be reduced through the increases of quality of life and economic development due to improvement and sustainability of water services within the Communities.

The number of jobless is relatively low among the studied community, this implies that number of un – affordable to pay for water is low and thus collected revenues for O & M cost might be high which might result to sustainability of the projects. The results are as shown in the Table 4.1.

Table 4.1: Occupation Distribution of the Respondents

Occupation		Frequency	%
	Employee	5	14.7
	Businessmen	11	32.4
	Peasant/Farmer	11	32.4
	Jobless	7	20.6
	Total	34	100.0

Source: Field Survey February, 2015

4.2 Presentation of Results along Research Questions

4.2.1 Research Question 1: Accessing the Types of Institutional Arrangement and Their roles in Sustainability of RWP

The study was aimed to know the type of water project management models existing and approaches used to opt for that management model and whether they understand the responsibilities of the COWSO. The followings criteria were accessed;

4.2.1.1 Participation in the Selection of Existing Management Model

The study found that (88.2%) of respondents were participating in selection of the existing management models and (11.8%) were not participating. The results are shown in the Figure 4.4. The findings conform to the study by Lockwood and Smiths (2011) on Service Delivery Approach (SDA) which emphasizes the entire life – cycle of a service consisting of both infrastructures and service level to access water should be done by community participation Also NAWAPO (2002) emphasizes the community participation in the selection of projects and in operating and maintain them for sustainability.

Participation in selection of management on post construction stage might be very important criteria in sustainability of RWP or any other development project. The findings

reflect a participation in selecting management models which is a good sign for sustainability within the study area.

Figure 4.4: Participation in Selection of Existing Management Models
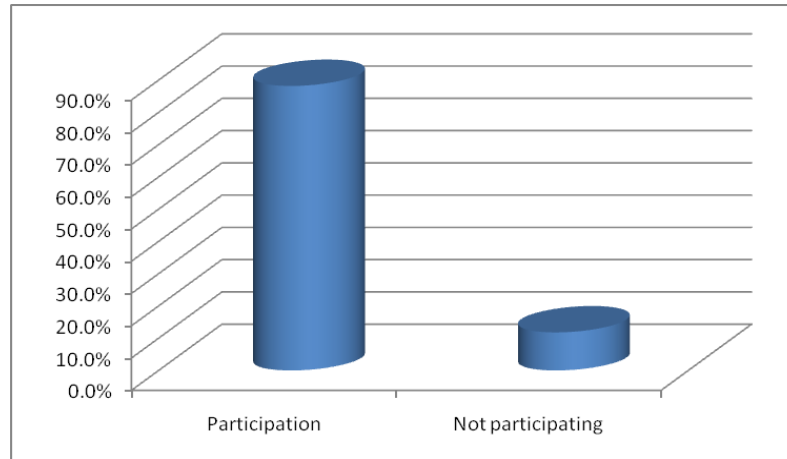
Source: Field survey February, 2015

4.2.1.2 Existing Management Models

Few of the respondents were not aware about the existing management model shown by (11.8%) while majority of the respondents (88.2%) are aware that the existing management model which is mainly COWSO model. The result implies that community is aware of the existing management models. The results are shown in the Table 4.2.

The findings concur to the study done by SNV (2010) which emphasizes the management of water projects through COWSO's model because its autonomous compared to the Village Water Committee and other management models. COWSO management model allow them to operate and maintaining the project in independent manner without political and village government interference thus might results to better ways of collection of revenues and expenditures and hence improvement of water services and sustainability.

The findings reflect the existence of the COWSO management models within the study area and might be due to majority of the surveyed projects were newly constructed. All new water projects constructed within current 5 years are operated by COWSO from the beginning due to the presence of compulsory criteria formed by the Government to the LGA.

Table 4.2: Percentage of Respondents Awareness on the Existing Management Models

Model	Frequency	%
COWSO	30	88.2
Not known	4	11.8
Total	34	100.0

Source: Field survey February, 2015

4.2.1.3 Understanding the Roles / Responsibilities of COWSO

In the study area, most of the respondents (76.5%) understand the responsibilities of COWSO while the remaining (23.5%) do not understand the responsibility of COWSO (See Figure 4.5). The findings conform to the study done by SNV (2010) whom outlined the responsibilities of COWSO board members and community themselves and their participation in the operation of water projects for sustainability manner. Furthermore Water Aid (2012) outlined the importance of COWSO's to know the responsibilities in the sustainable water resources management.

The results imply that if the community is aware with the roles and responsibilities of the COWSO then the function of the COWSO leaders will be easily to be undertaken as they will get support from them.

Figure 4.5: Awareness on the Roles/Responsibilities of COWSO
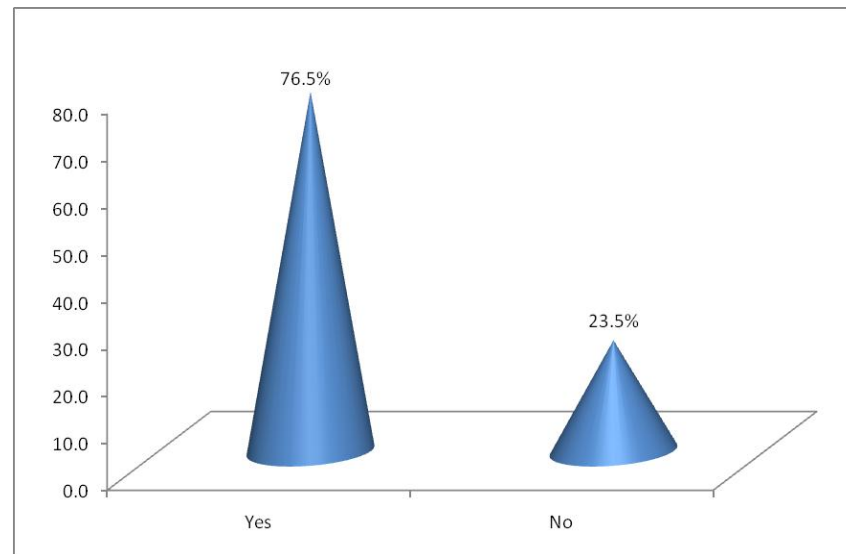
Source: Field survey February, 2015

4.2.2 Research Question 2: Examining Factors Influencing Sustainability of RWP during Post Construction Stage

The study specific objective was to analyze the factors which might influence the sustainability of RWP during post construction stage. The findings from the in – depth interview and FGD reveals the factors such as functionality, participation in choice of technology, type of technology used, selection of leaders methodology and approaches in terms of gender, education, awareness of leadership condition in terms of time, leaders participatory management, open management by conducting general water meeting, community awareness and acceptance of the revenues and expenditures report, sense of ownership by participation on project investment, Mode and payment of water tariffs, affordability to pay for water tariffs and participation on tariffs setting.

The study used those criteria's from in depth interview and FGD to assess households and beneficiaries views regarding the matters. These criteria were then included in questionnaires tools and used to interview the beneficiaries. The findings were as follows;

4.2.2.1 Status of Project Functionality

In this study the project functionality has been mostly used as a factor for accessing sustainability of the project. The study shows that (82.4%) of the respondents reported that water projects are functioning while only (17.6%) of the respondents reported that water projects are not functioning. This shows that most of the projects are functioning (see Figure 4.6).

The findings contrary to surveys conducted by WA (2009) in 51 Districts showed the sustainability problems facing rural water supplies that nearly half (46%) of public improved water points were found to be non - functional even very new water points have a problem. 25% of 2 – year old are already non – functional.

This study was conducted mostly on newly constructed water projects (less than 3 years) and found that 82.4% are functioning which reflect high functionality ration and the government might strengthen and maintain this model for sustainability.

Figure 4.6: Status of Project Functionality
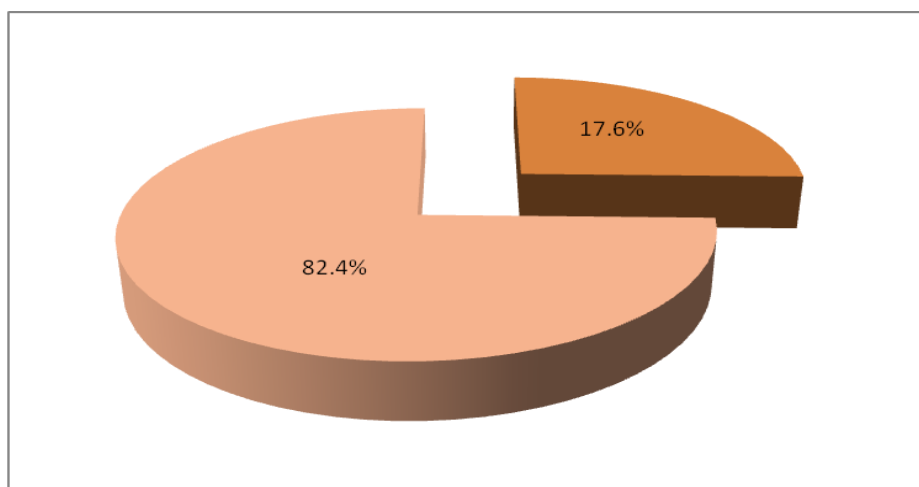
Source: Field Survey February, 2015

4.2.2.2 Participation in Choice of Existing Technology

On participating in selecting technology suitable for the project, (88.2%) of the respondents reported to participate while the remaining (11.8%) did not participated in the process of choosing the suitable technology for the project as shown in the Table 4.3.

Reflecting the study by Harvey and Read (2006) who argued that Community Participation on choice of Technology as a major impact in sustainability of RWP, then we could say that the findings of this study conform to their findings. Furthermore NAWAPO (2002) emphasizes the community participation in the selection of projects and in operating and maintain them for sustainability. Therefore findings shows that participation of the selection of technology had been taken care for the study area hence there might be a sense of ownership and sustainability.

Table 4.3: Percentage of Respondent in Selecting Type of Technology

Response	Frequency	%
Yes	30	88.2
No	4	11.8
Total	34	100.0

Source: Field survey February, 2015

4.2.2.3 Type of Extraction Technology Used

The most commonly used technology are gravity projects due to the presence of spring intake on the Udzungwa Mountains and other surrounding reserved mountains within the study area. The results showed that (52.9%) of the respondents were selecting gravity projects (32.4%) of the respondents shows electricity and the least used type of technology is diesel reported by (14.7%) of the respondents as shown in the Table 4.4.

According to Alida Adams (2012) who identified that solar and gravity projects have high investment cost but relatively low operation and maintenance cost followed by electricity and diesel. The findings reflect the sustainability of the water projects within the study area because most of the projects were gravity followed by electricity justifying the sustainability level within the study area. Other extraction methods can be sustainable if there is high level of government support in O & M compared to the gravity systems.

Table 4.4: Results of the Existing Extraction Type Technology

Technology type	Frequency.	%
Electricity	11	32.4
Diesel	5	14.7
Gravity	18	52.9
Total	34	100.0

Source: Field survey February, 2015

Plate 1: Storage Tank Owned by COWSO in the Study Area.

Plate 2: Gravity Extraction Source in the Study Area

Plate 3: Diesel Generated Pump House in one of the Project in the Study Area

4.2.2.4 Selection of COWSO's Leader's Composition

4.2.2.4.1 Sex

The study found that the post of Chairperson and Operator were dominated by male reported by (100%) of the respondents, while females dominating in the post of Treasury reported by (58.8%) of the respondents (see Table 4.5).

The results contrary the Tanzanian government policy (URT, 2010) which stipulates the gender balances in leadership and other development activities. The findings shows Chairperson and Operator's post were fully occupied by Male. Also encouragement of government policy that leadership to be 50% by 50% was not met even in other posts which was found to have both genders.

Furthermore a report from African Development Bank (ADB, 2013) justify Women involvement in management and leadership in water services is very important as they are most vulnerable group in water issues Women always fill sense of ownership and maintaining its functionality which will result to sustainability. Therefore the findings reflect the impact of low female participation in leadership and management of RWP might affect sustainability level within the study area.

Table 4.5: COWSO's Leaders by Sex

Position	Sex	Frequency	%
Chairperson	Male	34	100
	Female	0	0
Secretary	Male	24	70.6
	Female	10	29.4
Treasury	Male	14	41.2
	Female	20	58.8
Operator	Male	34	100
	Female	0	0

Source: Field survey February, 2015

4.2.2.4.2 Education Level for COWSO Members

The results showed that most of the Leaders are Primary Education Level reported by 55% followed by Secondary Level Education reported by 42% while Higher Education was only 3% (see Table 4.6). Water Supply and Sanitation Sector Reforms on Challenges and lessons in sustainability of RWP conducted in Kenya, Tanzania, Kenya and Zambia by GIZ, (2008) showed the Education Level to COWSO leaders was very low and found to be one of the challenges in sustainability of RWP in the Developing Countries.

Furthermore the Ministry of Water Registration and Formulation of COWSO Manual stipulates the Education level to all management post to have a minimum of primary education level. Though the criteria stipulated by the Government is only a minimum of Primary education level then this might be challenges in operation and sustainability of RWP as some of training and operation manuals has been seen to be in English language which is somehow complicated to those with Primary education level..

Table 4.6: Education Level for the COWSO's Leaders

Education Level	Chairperson (%)	Secretary ((%)	Treasury (%)	Operators (%)	Average (%)
Primary	20.6	35.3	64.7	100.0	55.0
Secondary	67.6	64.7	35.3	0	42.0
Graduate	11.8	0	0	0	3.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

4.2.2.5 Time for COWSO/s Leaders to be in Place

The findings show that all COWSO leaders are within 3 years in place (see Table 4.7). The study was targeting to explore the time for COWSO leaders being in place as per NAWAPO (2002) and COWSO regulation manual requirements of being in place for maximum of three (3) years. The study by Baur and Wood house (2009) suggested that for Sustainable development and poverty alleviation in Africa there must be exchanging of leadership position in within stipulated time.

Furthermore the study by Engel (2005) outlined the necessity of rotating the management skills in RWP through his findings in Management of Rural Water Supply in Ghana. Also Joint Monitoring Programme for Water Supply and Sanitation Program (2012) reveals some challenges faced by some RWP in Tanzania through the leadership whom were in place for more than 3, the problems included undisclosed management of collected funds and conflict of interest between them.

The findings of this study reflect the importance of thorough monitoring by District Government in guiding Leaders election in all COWSO's through team working from Water, Community Development, Legal and Cooperatives Department to facilitate sustainability of RWP. It is known that being a leader in long time without approval of the

community that you are leading is a source of misunderstanding and confusion which will results to conflicts of interest thus sustainability of the project might be in doubt.

Table 2: Time for COWSO's Leaders in Place

Time in position	Frequency	%
One year	7	20.6
Two years	14	41.2
Three years	12	35.3
not known	1	2.9
Total	34	100.0

Source: Field survey February, 2015

4.2.2.6 Participatory Management of COWSO's Leaders

The study interviewed the respondent in their views regarding COWSO leader's participation management. The study found that the majority of the respondents (88.2%) reporting the COWSO leaders being participatory and only (11.8%) of the respondents reported there are not participatory (see Figure 4.7).

Mashauri (2007) argued on the necessity of community participation in management of RWP to each stage from the selection of projects and in operating and maintain them for sustainability. Open management in RWP is one part of participatory management. The finding of the study reflects the participatory management of the COWSO's leaders within the study area.

Figure 4.7: Participatory Management of COWSO's Leaders
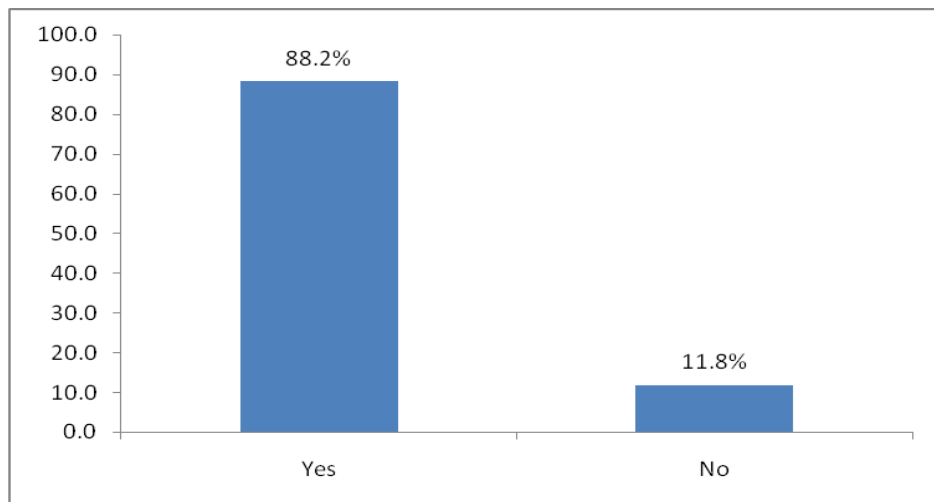
Source: Field survey February, 2015

4.2.2.7 General Water Meetings

In the study area (82.4%) of respondent reported on the presence of general water meeting, (14.7%) reported that there were no general water meeting and only (2.9%) of the respondents were not aware about the general water meeting (see Table 4.8).

The findings concur with Doe (2004) who found the presence of open management in sustainability of RWP. One of the key assessing factors was the presence of General Water Meeting for members and beneficiaries. The result concur with other studies which reflects the presence of general meetings makes the community awareness and trust to the COWSO leaders resulting to the project ownership hence sustainability of the RWP.

Table 4.8: Results on General Water Meeting Conduction

Response	Frequency	%
Yes	28	82.4
No	5	14.7
Not known	1	2.9
Total	34	100.0

Source: Field survey February, 2015

4.2.2.8 Reporting Revenues and Expenditures to the Communities

The researcher aimed to analyze if there was transparent in financial issues especially in revenues and expenditures reporting. About (70.6%) of the respondents reported the openness of the revenue and expenditures in the study area and (11.4%) of the respondents said there were no openness while (17.6%) their not aware about the revenues and expenditures (see Table 4.9).

The findings concur with Doe (2004) who argued the presence of open management in sustainability of RWP. One of the main assessing factors was the presence of General Water Meeting for members and beneficiaries in which Revenues and Collection will be read openly. The community feels that the tariffs collected are used by the COWSO leaders on their private issues therefore by reading the actual revenues and expenditures openly could make them trust and feel of ownership which might be cause of sustainability.

Table 4.9: Results on Transparent on Revenues and Expenditures

Response	Frequency	%
Yes	24	70.6
No	4	11.8
Not known	6	17.6
Total	34	100.0

Source: Field survey February, 2015

4.2.2.9 Investment Participation/ Contribution

The respondents were interviewed on the participation in the Capital Investment Participation in order to measure their sense of ownership. The study found that all the respondents have contributed/participated in the construction of the existing /on construction of water scheme either in cash or in kind.

The findings conform to the study of Merret (2002) which emphasizes the Community Participation in the selection of projects and Willingness to Pay for operating and maintain them for sustainability. Participating and contributing to the capital investment in RWP might lead to project ownership which might result to sustainability.

4.2.2.10 Operation and Maintenance Cost towards Assessment of Cost Recovery

4.2.2.10.1 Payment of Water Tariffs

The findings shows that 70.6% were paying water tariffs and 29.4% were not paid (see Table 4.10). The reasons of not paying was varying from disabled people, inability to pay but mostly was un - Willingness To Pay due to political issues. NAWAPO (2002) emphasizes the community participation in the selection of projects and in operating and maintain them for sustainability

The findings conform to argument by Bohman (2005) who found that the Water Status in Developing Countries is mostly affected by the ATP and WTP for the tariffs. Paying water tariffs will make the COWSO financially able to operate and maintain the water project in sustainable manner. Main reason for post construction sustainable management is availability of funds for operation and maintenance and at least 5% cost recovery. The study reflects the payment of water tariffs will improve the sense of ownership and sustainability.

Table 4.10: Percentage of Respondent on the Payment of Water Tariffs

Response	Frequency	%
Yes	24	70.6
No	10	29.4
Total	34	100.0

Source: Field survey February, 2015

4.2.2.10.2 Modes of Payment and Amount Paid

This section was interviewed for assessing the ability of COWSO to collect funds for their daily O & M cost and investment cost recovery. The results shown in the Table 4.11. The findings shows different modes of tariffs payment from per bucket (25%) to lump sum in specific time (45%) and some areas both depend to the agreement between the community and the COWSO (30%).

The findings contrary with the Tanzanian Household Budget Survey (2007) which stipulates that piped water in housing unit should be charged as per consumption (metered or per bucket and not flat rate. Only 25% of the respondents showed that water tariffs are paid on collection contrary to the argument. The mostly recommended tariffs collection

mode by Ministry of Water is per bucket as it is very simple and precise collection of actual revenue and expenditures because the water loss and un - accounted for water is very low.(NAWAPO, 2002). Monthly payment mode might be well applicable for the metered connection projects mostly in urban area and not flat rate as the collection of water tariffs will be very low resulting to inability to manage O & M costs.

Table 4.11: Results on the Mode of Payment and Amount Paid

Tariff charged (Tshs)	Frequency	%
50 per bucket	3	8.8
3,000 per month	2	5.9
2,000 per month	5	14.7
40 per bucket	5	14.7
500 per month	3	8.8
200 per month	6	17.6
Not specific	10	29.4
Total	34	100.0

Source: Field survey February, 2015

4.2.2.10.3 Affordability to Tariffs Payment

The Study interviewed the respondent on the affordability of the water tariffs required to pay for the water services. The results showed that 55.9% were afforded to pay water tariffs. The results are shown in the Table 4.12.

The findings contrary with the Kilombero District Baseline Economic Survey Data (2012), it shows that only 24% of the populations are living below poverty level. Also the Bohman (2005) argued that the Water Status in Developing Countries is mostly affected by the ATP and WTP for the tariffs. This implies the ATP for water tariffs should be about 76% and not 55.9% as revealed. The findings reflect the low ability to manage O &

M costs hence the sustainability doubt. Several reasons might be present to why others are not paying water tariffs and will be discussed in section 4.4.9.4

Table 4.12: Results on the Affordability to Pay Water Tariffs

Response	Frequency	%
Yes	19	55.9
No	8	23.5
Not known	1	2.9
Not specific	6	17.6
Total	34	100.0

Source: Field survey February, 2015

4.2.2.10.4 Reasons of Affordability and Un - Affordability to Pay Water Tariffs

The findings shows that 20% were not have the specific reasons to why they don't have paying for water tariffs. Respondents were interviewed regarding their reasons whether on affordability or un – affordability on the payment of the required water tariffs. This helped the study to know the reasons and to facilitate suggestions and the way forward on the tariffs setting and overall management. The results were as shown in the Table 4.13.

The findings revealed that If those unknown reasons will be dealt with then the affordability to pay will conform to the Kilombero District Baseline Economic Survey Data (2012), that is 59% present to date plus 20% will be 79% which is above the Kilombero District poverty level (76%)

Table 4.13: Reasons for Affordability Level To Pay Water Tariffs

Response	Frequency	%
Affordable and agreed on general meeting	19	55.9
Are very high for low income people	4	11.8
No charges	2	5.9
Too low compared to operational costs	2	5.9
Not – specific	7	20.6
Total	34	100.0

Source: Field survey February, 2015

4.2.2.10.5 Water Tariffs Setting Procedures (Responsible Groups)

The findings showed that 5.9% of water tariffs was set by COWSO themselves, 2.9% set by communities, 82.4% was set by all together that is the District government guide, COWSO and communities themselves during the general water meeting and 8.8% reported that they don't know (see Figure 4.8).

Hunter (2009) argued that Water Tariffs setting is Mathematical calculation and practical variation in water services availability. The findings conform to the study by Hunter (2009) and NAWAPO (2002) which emphasizes the community participation in the selection of projects and in operating and maintain them for sustainability. Participatory tariffs setting play a major part in ATP, WTP, project ownership and hence sustainability of RWP. This criteria is very important to assess whether the tariffs setting is participatory in which the judgment on the reasons of ATP and WTP towards the successful collection of revenues, sometimes it is better to reduce profit margin to incorporate ATP and hence

sustainability of RWP during post construction stage. The study reflects the participation in tariffs settings within the study area which might results to sustainability.

Figure 4.8: Procedures and Participation on Tariffs Setting
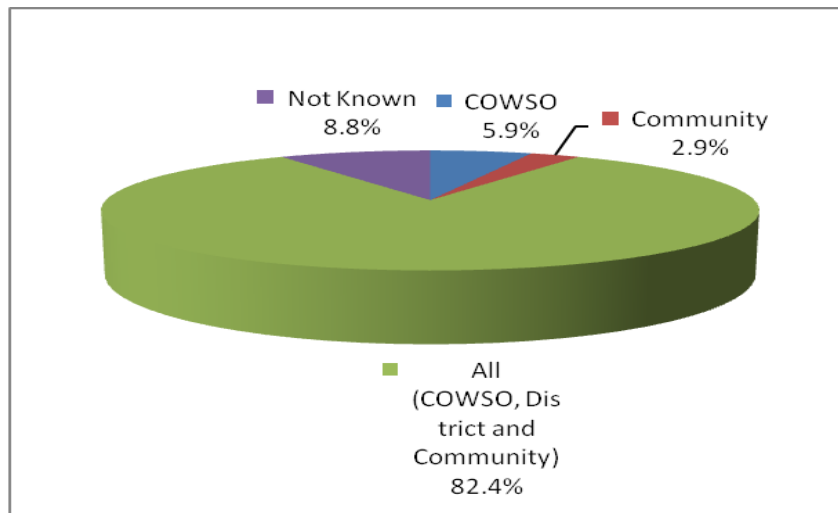
Source: Field survey February, 2015

4.2.2.10.6 Expenditure Areas of the Collected Tariffs

The results showed that the projects which used electricity power and diesel generated as an extraction source use more funds in paying operation and maintenance cost than those which use gravity extraction source. The results of the interviewed respondent are shown in the Figure 4.9.

The findings concur to the study by Karikari (1996) who argued that sustainability of RWP will depends on the proper Management of Water Supply Resources. Not only that but also the Ministry of Water Project Operation Manual (POM, 2006) emphasizes the main areas of the expenditures are paying of electricity, diesel, wages and allowances, minor repair, office operation saving for capital recovery. Only 12% were found to be used in unknown areas. Proper use of collected water tariffs will lead to the smooth operation and maintenance expenses which might result to sustainability.

The study interviewed respondent on their views whether they know the main areas of the expenditures for the collected tariffs in order to assess the ownership because this factor has implication on the willingness to pay hence may increases the sustainability of the RWP during post construction stage.

Figure 4.9: Areas of Collected Tariffs Expenditures
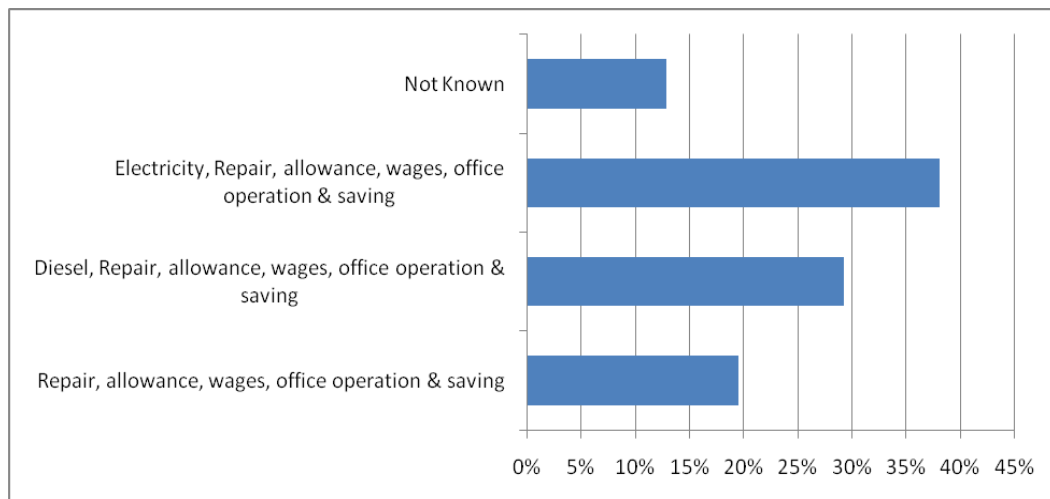
Source: Field survey February, 2015

4.2.2.10.7 Estimated COWSO's Net Income

The results revealed that almost 44.1% are not able to recover the investment cost because there was no serving amount per month while 32.4% said they don't know about the serving fund per month and 23.5% said the serving is about Tshs 250,000/= to Tshs 610,000/= per month (see Table 4.14). The researcher interviewed the respondent on views about whether they know the approximate serving after paying all necessary costs per month through their general water meeting report. This aimed to assess the COWSO's ability to recover the 5% investment and repair cost after paying all O & M cost as required by the NAWAPO (2002)..

Doe (2004) reported that community members have the responsibilities in managerial, operation and maintenance for their water project systems. The finding contrary with the Scholar because it shows there is a risk of repair for breakdown as only 23% of the projects had a serving amount per month ranging from Tshs 250,000/= to Tshs 610,000/=. This might affect the sustainability of RWP in the study areas.

Table 4.14: Results of Estimated COWSO's Net Income

Response	Frequency	%
Not known	11	32.4
Tsh 310,000	4	11.8
Tsh 250,000	1	2.9
Tsh 400,000	2	5.9
Tsh 610,000	1	2.9
0	15	44.1
Total	34	100.0

Source: Field survey February, 2015

4.2.3 Research Question 3: Accessing Challenges and Suggesting Better Ways of Improving Sustainability of RWP during Post Construction Stage

In – depth interviews and FGD conducted to key informants through District official and COWSO leaders and members had revealed some area which can be considered as the better ways for improving sustainability of RWP. Among of them were functionality and reasons for acceptance/rejection of the COWSO management models, awareness on participation and reasons on future investment cost and general comments from the beneficiaries.

These factors were then included in questionnaires tools and used to interview the beneficiaries. The findings were as follows;

4.2.3.1 Acceptance of Existing COWSO's Management Model

The results showed that 79.4% accepted the COWSO's management model while 20.6% they rejected the management model. The reasons for acceptance and rejection are as assessed in the section 4.5.2 (see Table 4.15).

The findings concur to the study done by SNV, 2010 which emphasizes the management of water projects through COWSO's model because its autonomous compared to the Village Water Committee and other management models. COWSO management model allow them to operate and maintaining the project in independent manner without political and village government interference thus might results to better ways of collection of revenues and expenditures and hence improvement of water services and sustainability.

Furthermore the findings concur with the Ministry of Water Project Operation Manual (POM, 2006) which emphasizes the management of water projects through COWSO's model has it is more autonomous compared to the Village Water Committee and other models

Table 4.15: Acceptance Level for COWSO's Management Models

Response	Frequency	%
Yes	27	79.4
No	7	20.6
Total	**34**	**100.0**

Source: Field survey February, 2015

4.2.3.2 Reasons for Acceptance and/or Rejection of COWSO's Management Model

The results showed that the presence of transparency and accountability (35.3%) and stable water services (44.1%) made most of the respondent to accept the COWSO

management models while (20.6%) rejection was due to the presence of poor leadership among the COWSO's (see Table 4.16). The respondents were interviewed on reasons on their acceptance and/or rejection of the COWSO's management models in sustainability of RWP. This will guide the researcher to advise the police makers on the guidelines and institutional arrangement on the management of the RWP during the post construction stages.

The findings concur to the study by Karikari (1996) who argued that the presence of COWSO management in RWP does not guarantee the sustainability of project itself. There are must be other factors such as Strong Leadership, Transparency and Participatory management. Some of the respondent showed that there is Poor Leadership amongst the COWSO which justifying that COWSO management model itself is not the solution for sustainability of RWP.

Table 4.16: Reasons on the Existing COWSO's Management Model

Response	Frequency	%
There is transparency and accountability	12	35.3
There is stable water services	15	44.1
There is poor leadership	7	20.6
Total	**34**	**100.0**

Source: Field survey February, 2015

4.2.3.3 Awareness on Participation/ Contribution on Future Investment Cost

The results showed that 100% of the respondents were ready to Participate/ Contribute towards the future investment cost. This is the measure of community awareness and ownership of the RWP. The respondents were interviewed on their willingness to participate in any other future investment for new or expansion/major rehabilitation of the

projects. The aim was to compare the post construction sustainability and ownership for future investment other then the government or donors to finance again the same project during major repair or expansion.

The findings conform to the study of Merret (2002) which emphasizes the Community Participation in the selection of projects and Willingness To Pay for operating and maintain them for sustainability. Participating and contributing to the capital investment in RWP might lead to project ownership and sustainability.

4.2.3.4 Respondent General Comments on Sustainable Management Practices of RWP

One of the specific objectives to undertake this work was to analyze the better ways of improving sustainability on post construction stage. To achieve that objective the respondent were interviewed on views regarding their suggestions on what should be done in the sustainable management practices of RWP. Their results are presented in the Table 4.17.

The findings reveal community awareness to project ownership should be encouraged, strong COWSO leadership and improvement of technologies were the general comments from the respondents which conform to the study done by Harvey and Read (2006) who argued that Community Participation on choice of Technology as a major impact in sustainability of RWP. Also Alida Adams (2012) identified solar and gravity projects have high investment cost but relatively low operation and maintenance cost followed by electricity and diesel projects. Furthermore findings concur to the study by Karikari (1996)

who argued that the presence of COWSO management in RWP does not guarantee the sustainability of project itself. There are must be other factors such as Strong Leadership, Transparency and Participatory management.

Table 4.17: Results on Selection Sustainable Management Model of RWP

Response	Frequency	%
Community ownership should be encouraged for sustainability.	13	38.2
Employment of more water operators for technical help	1	2.9
Strong leadership in COWSO is needed for sustainability.	9	26.5
Improvement of technologies.	9	26.5
Auditing of financial reports	1	2.9
Not aware	1	2.9
Total	34	100.0

Source: Field survey February, 2015

4.3 Conclusion

This chapter have analyzed and presented the results of field study on the effectiveness of COWSO's management in sustainability of RWPs in Tanzania. It provides analysis of responses of each question. The information's provided were collected through questionnaires, interview and FBD. Tables and Figures have been used to present the data from the field and the study guided the reader by defining the implication on the subject matter. The results of In - depth interview, FGD and document reviews were not directly analyzed and recorded in this chapter but only used to strengthen views on the way to

make survey to Households/ Beneficiaries and on comparison and some critical judgment and content analysis throughout the study.

In − depth interview conducted at the District level and document review helped in knowing the guidelines for Leader's composition in terms of age, gender, education and time for leaders to be in place. Furthermore illustrated and itemized responsibilities and roles of the each part that is the government, communities and COWSO. Furthermore the FGD and document review through Planning and Internal Audit offices showed that the surveyed projects were initiated by communities through Obstacles and Opportunities development (O & OD) approaches and supervised by the District government. The COWSO's are audited quarterly and regularly or upon requested by the village or ward government and other institutions. Through this chapter the researcher is now able to make some conclusions and recommendation of this dissertation work.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary, conclusion and recommendations and area for further research originating from the research findings as discussed according to research objectives and questions. Some remedial actions or measures to improve the existing situation and to minimize the problems found are proposed. The general objective for the study was to assess the effectiveness of COWSO's management in sustainability of RWP in Tanzania on post construction stage. This chapter has been divided into three sections, the first one will be conclusion extracted from the findings and discussion of the results. Second section will provided recommendations with respect to awareness, policy, regulations and management practices. Last section will provide and highlights areas for further research.

5.1 Conclusion

The study has analyzed the effectiveness of COWSO's management in sustainability of RWP in Tanzania taking Kilombero District as a case study. The study has a number of key findings and conclusions as follows;

5.1.1 Existing Management Practices of RWP

The study has shown that COWSO management models have increased in the study area as it was shown by 88.2% of the respondents was aware of this management model. The study also concludes that the COWSO's management is effective in the study area as it has been shown by 82.4% of the respondent that the surveyed projects are functioning. This was achieved by the community participation in choosing their RWP management model as 88.2% of the respondents were participated in selecting COWSO management models after been sensitized and educated by the District government during project

facilitation stage using the village general meetings. Finally the communities seemed to know the roles and responsibilities of the COWSO as shown by 76.5% of the respondents within the study area. This made the COWSO's management to be effective in the study area.

Although mostly of the surveyed projects owned by COWSO are newly constructed (66.7% were constructed within 5 years) as presented by the this study, then it reflects that all new coming projects and the existing projects should be facilitated and managed by COWSO during post construction stage for their sustainability. The study found that all (100%) of the respondents were participated/contributed on the existing and on construction RWP in the study area.

5.1.2 Factors Influencing Sustainability of RWP

The study revealed that community involvement and participation in selecting type of extraction technology has a major impact in sustainability of RWP in the study area. 88.2% of the respondent showed that they were involved and participated in selecting type of technology. The study found that the type of technology affected the initial investment cost and also O & M cost as shown by the total expenditures for the gravity extraction system is low followed by diesel generated and electricity power extraction systems. The results showed that 19.6% of the water tariffs are used in O & M cost for gravity extracted system, 28.6 % for diesel generated system and 39.1% in electricity extraction projects. Gender consideration has been noted in COWSO's leaders though in small ratio of 79% male to 21% female in the top position of Chairperson, Secretary and Treasurer but it can be improved in the coming new election.

Also the study found that the level of education for the COWSO's leaders has some impact and considered as guided by District government as shown by 67.6% of

Chairperson are Secondary education level, 20.6% Primary education level, 11.8% higher education level and non with no education. For the position of Secretary founded that 64.7% were Secondary education level and 35.3% with Primary education level. The District Government and COWSO's formation and regulation stipulate that all post of the COWSO's Leaders should be a minimum of Primary education level. All

The study also found that all COWSO's leaders in the study area are within their managing time with various time left for new election. 20.6% of them are at 1 year of management, 41.2% were at 2 years and 35.3% they are about to retire (3 years). The leaders were found to be participatory as shown by 82.4% of the respondent, conducting general water meeting (82.4%) of the respondent, reporting revenues and expenditures (70.6%) of the respondent and acceptance of their submitted report (61.8%) of the respondent.

Furthermore the study dealt with the O & M cost as the factor for the sustainability on post construction stage and found that 70.6% of the respondent were paying water tariffs and 29.4% were not paid due to un - affordability to pay through several reasons like age and disability while most of the gravity extracted scheme was due to political interference (Water is the free service and flows with no cost from the mountain).

The mode of water tariffs payment was found to be on collection (per bucket) and monthly basis depending on their mutual agreement and the method of extraction was found to be either at public domestic point or in private house connection. The tariffs were set by different procedures but the most existing is the guidance of the District government to the COWSO and agreed by the communities through general water meeting, this procedure has been shown by 82.4% of the respondents.

Finally the study found that most of the COWSO has no funds served after paying all necessary O & M cost a shown by 44.1% respondents followed by average of Tshs. 310,000/= per month supported by 11.8% of the respondents.

The study reveals that sustainability of RWP in Tanzania is cross cutting issue to both communities themselves, stakeholders, government and end user beneficiaries. Now we would be able to identify recommended measures to be taken for sustainable management of community rural water supply in Tanzania. The implication of the study is on reviewing and strengthening the 2002 National Water Policy and sensitization of stakeholders on the roles and responsibilities of COWSO's rather than leaving them idle after handing over the projects.

5.2 Recommendations

The study has found some areas for recommendation to policy makers, government and other water services providers and experts as follows;

5.2.1 Recommendation on Technical Operation

The study found that all COWSO's operators are employed by COWSO and have primary education level and are low paid (Less than Tsh. 100,000/= per month) while they operate a project with high investment cost. This is very dangerous to the sustainability of the invested RWP in Tanzania. I recommend the followings;

i. To have the special training to all operators which will be facilitated and financed by the Government through the Ministry of Water

ii. To establish the education standard and dealing with their employment other to leave the recruitment to the COWSO management.

iii. To empower District Government to have more technical staffs whom can be categorized and allocated at least in ward or division level to provide immediate and effective technical support to the village

iv. To collect water tariffs through on collection other than flat rate this reduces tariffs revenues.

5.2.2 Recommendation to Policies

The study found that the post construction management of RWP in terms of O & M cost is fully responsibility of community themselves governed by the COWSO. This is the Government policy in which I can say it is a burden to the rural communities because the rural water supply is still the services and not a business. The government must subsidize RWP as it does in health and education sectors or even to urban water services. Therefore I recommend the amendment to the existing water policy and regulations to accommodate the followings;

i. To standardize operators/technical supervisor salary scale and allowances and even to facilitate those costs to make them initiatives, responsible and full committed towards the sustainability of the RWP.

ii. To subsidizes some of the O & M cost like fuel and electricity as they do to the urban projects.

5.2.3 General Recommendations on RWP

The study found that community is aware of new management models which include cost sharing for the RWP. It is further found that the District government and other stakeholders should be in continuous basis do the followings;

i. Community sensitization and encouragement on the RWP ownership for sustainability

ii. Close supervision and monitoring of the project to the technical part and auditing of the financial reports

iii. Supervision of their election to have the best COWSO's leaders with respect to the stipulated guidelines.

iv. Improvement of technologies as it shown that some technologies are very expensive to run

5.3 Areas for Further Research

The main objective of this study was to analyze the effectiveness of the COWSO management practice in sustainability of RWP during post construction stage. From what has been found it is noted some aspects were beyond the scope of this study and thus they are recommended as areas for further research. The study recommends the areas for further research as follows;

1. The study observed the projects which are only owned and governed by the COWSO which in new management model established current in less than 10 years by the government of Tanzania; therefore further study should be made to the other management models like private sector management prior to conclusion of the best management practices.

2. The study was undertaken in one District but the study findings can be generalized in all part of the Tanzania. Therefore the same study may be done in other areas of the Tanzania with the different geographical location and culture to examine the effectiveness of COWSO management.

3. The study observed the management of COWSO's which are mostly manage newly constructed projects, therefore the study should be done after some years (say 5 years) to examine their effectiveness because by that time O & M cost will be increase due to expiration of design life time of the projects.

REFERENCES

ADB, Rural Water Supply and Sanitation Initiative (2013)

Alida Adams (2012), Rural Water Supply Technologies

Baur & Woodhouse (2009), Sustainable development and poverty alleviation in Africa

Bohman, Gyampoh et al (2005), Water status in Ghana as a indicator for poverty reduction

Cardone & Fonseca (2013), Sustainability of Rural Water Supply Project in Africa

Damas A. Mashauri and Tapio S. Katko (2007): Water Supply Development in Tanzania

Doe, S. R & Khan, M. S, 2004. The boundaries and limits of Community management; Lessons from the water sector in Ghana, *Community Development Journal*, 39 (4), 360

George, V (2012), Sustainability of Community Based Water Projects in Central Tanzania, unpublished PhD thesis, UDOM

Engel, Iskandaran et al (2005), Management of Rural Water Supply in Ghana

GIZ (2008): Water Supply and Sanitation Sector Reforms in Kenya, Tanzania, Uganda and Zambia:Challenges and Lessons, 2008, pp. 8-9

Harvey & Read (2006), A study in Community participation for Rural Water Supply Projects

Household Budget Survey (2007) - Mainland Tanzania "Private piped (tap) water in housing unit"

Household Budget Survey (2007) - Mainland Tanzania, pp.13-16. Link was broken on

February 28, 2010. 7 November 2011 - HBS document is still available on website of Tanzanian National Bureau of Statistics link to Tanzania National Data Archive (TNDA).

http://www.infoplease.com/atlas/country/tanzania.html

Hunter et al (2009), Engineering variations in water service availability

Joint Monitoring Programme for Water Supply and Sanitation: Drinking water and sanitation coverage: country estimates by type of drinking water, February, 2010

Joint Monitoring Programme for Water Supply and Sanitation: United Republic of Tanzania, Sanitation Data, March 2012, accessed on April 19, 2012

Joint Monitoring Programme for Water Supply and Sanitation: United Republic of Tanzania, Water Data, March 2012, accessed on April 19, 2012

Karikari, K (1996), Water Supply Management in Rural Ghana: Overview and case studies, International Research Council (IDRC), Canada

Lockwood, H. at el, 2011. *Assessing Sustainability in Rural Water Supply: The Role of follow up Support to Communities,* Literature review and desk review of Rural Water Supply and Sanitation Project documents, Britain

Merret, S. (2002) Willingness to pay – A review; Deconstructing household's willingness to pay for water in low income countries, Water policy, 4, 157 – 172

Millennium Challenge Account Tanzania (20 June 2012). "The Water Sector".   May 2013.

Ministry of Water and Irrigation Water Sector Status Report (2009), retrieved Feb 2010

Ministry of Water and Irrigation (2008): Draft Water Sector Performance Report for the Year 2007/2008

MOWI (2009) ,Water and Sanitation Act, Ministry of Water and Irrigation, Tanzania.

MOWI (2010), National Water Sector Development Strategy .

NAWAPO (2002), National Water Policy, Ministry of Water, Tanzania.

Nyong, A. at el, 2001. A survey of household domestic water - use patterns in rural semi - arid Nigeria. Journal of Arid Environments, 49; 387 – 400

PIM (2006), Project Implementation Manual, Ministry of Water and Irrigation, Tanzania

POM (2006), Project Operation Manual, Ministry of Water and Irrigation, Tanzania

Skat et al (2007), Rural Water Supply Network

SNV joins hands with Water Aid and CONCERN during Water Week, retrieved Feb 2010

United Republic of Tanzania (2010), Water Sector Status Report, Dar es salaam, Tanzania

Water Aid (2009), Water Point Mapping in Tanzania

Water Aid (2012), Sustainable Water Resources Management

Water Aid: WAMMA (2010), Empowerment in practice, How an evolutionary Government/WHO Statistical Information System - Tanzania, retrieved Feb 4, 2010

WHO (2011), Guidelines for Drinking Water Quality (2011)

WSP, 2010, *Making Rural Water Supply Sustainable*: report on the Impact of Project Rules, NGO partnership has helped Tanzanian villagers to attain sustainable water and Sanitation services, UNDP – World Bank Water and Sanitation Program, Washington.

www.swsdproject.wordpress.com

www.wateraid.org

www.maji.go.tz

APPENDICES

1.0 QUESTIONNAIRE

The University of Dodoma

Research on Effectiveness of COWSO's management in sustainability of rural water supply projects in Tanzania; case of Kilombero District

Introduction

Dear, my name is Godfrey Sanga, I am a candidate of Master in Bussiness Administration at the University of Dodoma. Currently I am conducting a study to analyze the issues of sustainability of rural water projects owned by community organization in Tanzania specifically in Kilombero. You have been selected randomly to participate in the study by discussing truthfully about water projects in your community. Your contribution in terms of ideas is very important to raise awareness and sustainability of rural water projects in Tanzania. The information provided herein will be kept confidential and will be used for academic purposes only.

A: Community level

Division…………………………. Ward…………………………

Village……………………….. Date: ………………………

Time: Start …………………………. End …………………………

Name of interviewer: …………………………………………………….

Part I: Background information

Put (√) to the right answer

1. Age ………. years

2. Sex

(a) Male   (b) Female

3. Marital status

   (a) Single   (b) Married   (c) Widow   (d) Divorced/Separated

4. Education

   (a) No education   (b) Primary   (c) Secondary   (d) Graduate

5. Occupation

   (a) Employee   (b) Businessmen   (c) Peasant/Farmer (d) Jobless

6. How long have you been in this village? ………. years

7. Any physical abnormalities if any …………………….

Part II: Information on existing water supply services and management

Put circle or tick to the right answer

Objective 1

8. Is the existing project functional? Yes/No, if No when was the services stopped ………years?

9. What is the reason of not functioning?

……………………………………………………………………………………………

10. Have you participated in the selection of management models? Yes/No

11. What type of management model exists?

…………………………………………………………..

12. Do you know the responsibilities of the existing water management models?

13. If Yes what are they?

………………………………………………………………………………………………

Objective 2:

14. Have you participated in the selection of the existing technology? Yes/No

15. What type of technology is existing: Gravity/Pumped/diesel/Electricity/Solar/hand pump/Un improved

16. Have you participated in selection of COWSO's leaders? Yes/No

17. What is the status of each leader?

SN	Title	Gender (M/F)	Age	Education level	Remarks
1	Chairperson				
2	Secretary				
3	Treasury				
4	Operator				

18. Is the COWSO's management participatory? Yes/No

19. For how long is the existing COWSO's leaders are in place? ………. years

20. Why are there for those years?

………………………………………………………………..

21. Are the general meetings on water issues conducted? Yes/No

22. Are you participating in village water meetings? Yes/No

23. If No why? ………………………………………………………………..

24. If yes, is the revenue and expenditures of collected water tariffs read openly? Yes/No

25. If Yes in 24 above is the community accepted the read out? Yes/No

26. If No what are the main causes of disagreement?

……………………………………………………………………………………………………

…………………………………………………………………………………………………

27. If No in 25 above what is the reason of not attending?

……………………………………………………………………………………………………

………………………………………N.A…………………………………………………

28. If Yes how often? …………………………………………………………….

29. Have you participated/contributed in the construction of the existing/on construction water scheme? Yes/No

30: If Yes how? In kind/cash

31. If No why?

…………………………………………………………………………………………..

32. Are you paying water tariffs? Yes/No

33. How often have you paid for? On collection/monthly

34. How much? ………………………..

35. Are the water tariffs charged reasonable? Yes/No

36. Why? …………………………………………………………………………………..

37. Who is responsible for water tariffs setting? ……………………………………………..

38. What are the main areas of expenditures of the collected tariffs?

………………………………………………………………………………………………

………………………………………………………………………………………………

39. Are there any serving per month after paying all necessary costs? Yes/No

40. If Yes how much? ………………………………..

Objective 3

38. Do you support their management leading style? Yes/No

39. What are the bases of your answer above?

………………………………………………………………………………………………

………………………………………………………………………………………………

40. Are you read for contribution to another new/improvement of water scheme? Yes/No

41. Why?

………………………………………………………………………………………………

42. What are your general comments on water service supply and management?

………………………………………………………………………………………………

………………………………………………………………………………………………