

**The Management Factors Influencing Sustainability of Community Water Projects in  
Tharaka Central Division, Tharaka South District.**

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**A Research Project Report Submitted in Partial Fulfillment of the Requirement in the  
Examination for Degree in Masters of Project Planning and Management of the University  
of Nairobi.**

**DECLARATION**

This research project report is my original work and has not been presented for any other research in the University of Nairobi or any other University

Signed ..... date .....

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L50/66761/2011

The research project report has been submitted for examination with the approval of the university supervisor

Signed..... date .....

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## **DEDICATION**

This work is dedicated to my family for the great support and prayers for me during the whole period of my study, to my younger son Nickson Kithinji who could not understand why I could not be with them over the weekends during the period of my course work, To my brother Mr. Michael Murira and his family for the great sacrifices in terms of money and other resources support during my evening classes for the whole period of my course work. It is with humility that I say thank you.

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## TABLE OF CONTENT

Declaration	ii
Dedication	iii
Acknowledgement	iv
List of figures	ix
List of Tables	x
Abbreviation and Acronyms	xi
Abstract	xi

### CHAPTER ONE: INTRODUCTION

1.1 Back Ground to the Study	1
1.2 Statement of the Problem	2
1.3 The Purpose of the Study	3
1.4 Objectives of the study	3
1.5 Research Questions	3
1.6 Significance of the Study	4
1.7 Delimitations of the Study	4
1.8 Limitations of the Study	4
1.9 Assumptions of the Study	5
1.10 Definitions of Significant Terms	5
1.11 Organization of the study	6

### CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction	7
2.2 Sustainability and community water projects	7
2.3 Benefit Sharing and community water projects	12

2.4 Capacity Building and community water project	15
2.5 Communication skill and community water projects	18
2.6 Governance and community water projects	21
2.7 Participation and community water projects	23

### **CHAPTER THREE: RESEARCH METHODOLOGY**

3.1 Introduction	29
3.2 Research design	29
3.3 Target population	29
3.4 Sampling procedures	30
3.5 Methods of data collection	30
3.6 Validity and reliability	31
3.6.1 Reliability	31
3.6.2 Validity	31
3.7 Method of data analysis	33
3.8 Ethical issues	34

### **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

4.1 Introduction	35
4.2. Rate of return	35
4.3. Data analysis and interpretation	35
4.3.1 Total variance explained	37
4.3.2 Extent to which governance influences sustainability of community projects	39
4.3.3 Extent to which capacity building influences sustainability of community projects	40
4.3.4 Extent to which benefit sharing influences sustainability of community projects	41
4.3.5 Extent to which conflict resolution influences sustainability of community project	42
4.3.6 Extent to members participation influences sustainability of community projects	43
4.3.7 Extent to which communication influences sustainability of community projects	44

## **CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

5.1 Introduction	46
5.2 Summary of Findings	46
5.3 Discussions	47
5.3.1 Governance and sustainability of community water projects	47
5.3.2 Capacity Building and sustainability of community water projects	48
5.3.3 Benefit Sharing and sustainability of community water projects	48
5.3.4 Conflict Resolution and sustainability of community water projects	49
5.3.5 Participation and sustainability of community water projects	49
5.3.6 Communication and sustainability of community water projects	50
5.4 Conclusions	50
5.5 Recommendations	51
5.6 Suggestions For Future Research	51

## **APPENDICES**

Appendix i: References	52
Appendix ii: Full text of data collection instrument	56
Appendix iii: Major sources of water in Tharaka central division	64

## LIST OF FIGURES

Figure 2.8 Conceptual Framework

27



## LIST OF TABLES

Table 3.1: Operational Definitions of Variables	32
Table 4.1: KMO and Bartlett's Test	36
Table 4.2: Total variance explained	37
Table 4.3: Rotated Component Matrix	38
Table 4.4: Governance and sustainability of community water projects	40
Table 4.5: Capacity Building and Sustainability of community water projects	41
Table 4.6: Benefit Sharing and Sustainability of community water projects	42
Table 4.7: Conflict Resolution and Sustainability of community water projects	43
Table 4.8: Participation and Sustainability of Community Water Project	44
Table 4.9: Communication and Sustainability of Community Water Projects	45

## **ABBREVIATIONS AND ACRONYMS**

ABS	Access and Benefit Sharing
CBD	Convention on Biological Biodiversity
COP	Conference of Parties
EEC	European Education Centre
IGC	Integrated governmental Committee
IRD	Integrated Rural Development
ITPGRFA	International Treaty on Plant and Genetic for Food and Agriculture
IUCN	International Union for Conservation of Nature
MAT	Material Transfer Agreement
MTA	Mutually Agreed Terms
PIC	Prior Informed Consent
UNCED	United Nations on Environment and Development
UNDP	United Nations Development Program
WCED	World Commission on Environment and Development
WIPO	World Intellectual Property Office

## **ABSTRACT**

Community water Projects and particularly boreholes are a major source of water for domestic and livestock in Tharaka South District. Many of these water projects are done by Government and Donor agencies. Due to the cost involved in undertaking these projects, they are handed over to the communities for management. However, communities often face challenges in the endeavor of sustainably managing these facilities. The purpose of the study was to investigate the extent to which benefit sharing influences sustainability of community water projects, establish the extent to which capacity building influences sustainability of community water projects, investigate the extent to which members' participation influences sustainability of community water projects.

The study adopted a descriptive survey approach, where questionnaires were administered to project water committees Chairpersons, secretaries, treasurers and committee members to seek their opinion on the management factors. The data collected was processed and analyzed using the statistical package for Social Sciences (SPSS) Technique and the findings presented in frequencies and percentages.

The key findings of the study show that Governance, capacity building, benefit sharing, conflict resolution, members' participation and communication are factors influencing sustainability of community water projects. The study concludes that these management factors indeed influence the sustainability of community water projects.

The study recommends to the Government to come up with clear policies on these management agencies in development of community water projects to mainstream the concerns of the management factors from the initiation of the project to enhance the sustainability of community water projects.

The study recommends further research to be done in the area of influence of technology and influence of gender in the sustainability of community water projects.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the study**

The Brundtland Commission's brief definition of sustainable development as the ability to develop sustainably - to ensure that it meets the needs of the present without compromising the ability of the future generation to meet their own needs (Kates, Paris, Leserwitz 2008), equity to share

resources with the poor – is required to sustain them and that equity is encouraged by effective citizen participation (Kates, Paris, Leserwitz 2008). Sustainable development was promulgated as a concept that could; Provide a new vision for national and international development; unify the disparate elements that make up the development community; ease the unbearable pressures on the planet's fragile ecosystems in rich and poor countries alike and lead to the formulation of new solutions to the recurrent socio-economic needs of the world's least developing countries, foster significantly improved relationships between the governmental, business and voluntary sectors; and provide greater assurance that contemporary approaches to development would not deprive future generations of the resources needed for their development.(Este, 1993). The importance of context, the benefits of diversity and the inevitability of surprise all suggest that transparency and active public engagement are necessary qualities of governance for sustainability. Openness and participation are favored by the emphasis of sustainability on lively citizenship, which is seen not just as a means of building understanding and commitment, but also as an end in itself – an aspect of the necessary and richer alternatives to lives centered on material consumption (Gibson 2005). At the international level declaration and resolution exist which explicitly and or implicitly mention the right to have access to drinking water “in 1977 mar del plate declaration’ ‘all people whatever their stage, development, social and economic condition have the right to access to drinking water in quantities and quality equal to their basic need (UNDP water governance facility,2007). Glen-Marie Lange and Rashid Hassan (2006) indicates that global water demands has been growing rapidly over the past few decades owing to population growth as well as increasing per capital water demand; the millennium development report indicates that 939 million people do not have access to safe drinking water worldwide and 2481 million are not provided with sanitation services (UN millennium project, 2005), The problem is most severer in Africa where 42 percent of all people do not have safe drinking water (UN Millennium Taskforce on water and sanitation, 2004) Kenya is a water scarce country, therefore aims to conserve water sources and start new ways of harvesting and using rain water and underground water (vision2030, 2007) Kenya is water scarce country, in 2002 the government enacted the water act 2002 cap 935, which provides for the management , conservation, use and control of water resources (water act, 2002), the water sector is organized to deliver three main policy objectives and hence priorities which are; To improve access to water, Sustainably manage water resources and To improve land utilization (policy for

prosperity, 2010). Tharaka district is a semi arid district that experiences long spells of drought occasioned by low rainfalls, the district has a bi-modal rainfall patterns with an annual rainfall averaging between 500 – 800mm per year (Tharaka district development plan, 2008 – 2012), Communities in pursuit of alternative and reliable sources of income have turned to income generating activities which have advance effects on environment, further these activities often results in month of food deficit, catchment areas destroyed as more areas are being opened up, and water levels have thus reduced (Tharaka district development plan, 2008 – 2012). The major sources of water in the district are rivers, boreholes and harvested rain water. Community water projects (boreholes) remain the main source of water for the majority community members of Tharaka south district, Tharaka Nithi County

### **1.2 Statement of the problem.**

Water scarcity is a well - established context for development in arid and semi arid countries, climate change impacts add to the already difficult water management challenges in arid and semi arid regions (Arab water council) In Kenya's long development plan the vision 2030, water sector is organized to deliver it three main policy objectives and hence priority which are, To improve water and sewerage services, To sustainably manage water resources, and To improve land utilization (policy for prosperity 2010). Water and governance has been identified as key issues in water resources management and in the process of water supply and service delivery (UNDP water governance facility, 2007). Community water projects (boreholes) are an important source of water, the development of borehole in Tharaka district mainly has been the business of the government and the donors, completed boreholes are handed to the communities for operation and sustainable management. Despite the effort of the government to intervene through drilling and equipping water boreholes in district, the communities managed water projects (boreholes) continue to experience sustainability problems.

This study is therefore to establish management factors influencing the sustainability of community water projects in Tharaka central division in, Tharaka south district

### **1.3 The purpose of the study**

The purpose of the study was, to investigate the extent to which management factors influence the sustainability of the community water projects in Tharaka central division, Tharaka south district.

#### **1.4 Objectives of the study**

- a) To investigate the extent to which benefit sharing influences sustainability of community water projects in Tharaka central division, Tharaka south district
- b) To establish the extent to which capacity building influences sustainability of community water projects in Tharaka central division, Tharaka south district
- c) To establish the extent to which communication influences the sustainability of community water projects in Tharaka central division, Tharaka south district.
- d) To establish the extent to which governance influences the sustainability of community water projects in Tharaka central division, Tharaka south District.
- e) To investigate the extent to which participation influences sustainability of community water projects in Tharaka central division, Tharaka south District.

#### **1.5 Research questions**

- a) To what extent does benefit sharing influence sustainability of community water projects in Tharaka central division, Tharaka south district?
- b) To what extent does capacity building influence the sustainability of community water projects in Tharaka central division, Tharaka south district?
- c) To what extent does communication influence sustainability of community water projects in Tharaka central division, Tharaka south district?
- d) To what extent does governance influence the sustainability of community water projects in Tharaka central division, Tharaka south district?
- e) To what extent does participation influence sustainability of community water boreholes in Tharaka central division, Tharaka south district?

#### **1.6 Significance of the study**

The study established important knowledge about the sustainability of community water projects. This knowledge can be significant in changing practices in management of community water

projects. The information can help the government in formulation of policies and strategies in sustainable management of community water facilities. The knowledge found can help the field extension workers and community development workers in improving their output in the field of community water projects, effectively and efficiently, the report can help in removing doubts about the management factor influencing sustainable management of community water project enhancing equitability and resources allocation to community water projects.

### **1.7 Delimitations of the study**

The study was delimited to community water projects (boreholes) in Tharaka central division, Tharaka south district; this is the area covered Marimanti location, Ntugi location, Gituma location, Turima location and Nkondi locations in Tharaka south district. The study covered both operational and non operational community water projects (boreholes). In the area community water boreholes constitute the major source of domestic water. Community water projects (borehole) outside that area were not part of the study.

### **1.8 Limitations of the study**

The study encounter challenges in terms of limited by transport, considering the sitting of many community water boreholes are right interior in the village's, sometimes in area with inadequate transport, this pose the challenge during the research period. To overcome this challenge the researcher used the available 'boda boda' transport though it was cumbersome. Budgetary limitation was another challenge to the research study, bearing in mind that the area of study was large the resources in terms of funding turned out to be a challenging factor. To overcome this challenge the researcher as much as possible used research assistance from those local areas to minimize on the costs of accommodation and transport costs to and from the sampled water projects.

### **1.9 Assumptions of the study**

The research study assume that the respondents could be willing to cooperate in answering the questionnaires prepared and that the questionnaires were returned in time duly completed, the study assumes that the respondents were willing to give honest responses to the questions administered, and that project committee members, and officials were willing to divulge the required information from their specific areas. The study also assumes that the variables under investigation remained constant.

### **1.10 Definitions of significant terms**

**Benefit sharing:** benefit sharing is a structured and transparent system of sharing benefit arising from community water project. Examples of benefits includes water itself, training opportunities etc.

**Borehole;** Is a long narrow well drilled to access underground water and fitted with hand pump to prevent contamination and ease of access.

**Capacity building:** This means strengthening people's ability/ capacity to determine their own values and priorities, and to organize themselves, and to act on these is the bases of development.

**Communication:** Communication process is the flow of information from one person to the other, it is the process by which people interactively create, sustain and manage meaning, Communication is not simply one or more things that happen in personal or professional life. It is the very means by which we produce relationships and professional experience, it is how we plan, control, manage, peruse, understand, lead, love, and so on

**Community:** Is a group of people living and interacting with one another, sharing common geographical location/ environment, same culture, same religion, some problems

**Empowerment:** means the process of enabling people to gain strength, confidence and vision to work for positive change in their lives, individually and collectively with others.

**Governance:** democratic management of the project; proper decision making, accountability of project resources, proper records, financial accountability, bank records, equitably use of other project, by-law and other projects regulation

**Participation:** is the involvement of local people in decision making mandate by the people and willingness to contribute to project, meeting attendance, project activity attendance, user fees payment and other activities for the people on matters that affect their lives.



**Project:** project refers to community water projects, specifically water boreholes drilled and fitted with hand pump for the purpose easy use, the projects are sited in public areas and institutions like primary school compounds and church compounds.

**Sustainability:** A project is sustainable when it continues to deliver benefits to the project beneficiaries and/or other constituencies for an extended period time after the Commission's or financial assistance has been terminated by the funders or donors.

### **1.11 Organization of the study**

In summary this research project report is organized in chapters, the first page is the Title page then followed by the preliminary pages. Chapter one of this study focuses on the background to the study, statement of the problem, purpose of the study, the objectives of the study, the research questions, significant of the study, delimitation of the study, limitation of the study, assumptions of the study and the definition of the significant terms. Chapter two is the literature review and the conceptual framework. Chapter three deals with research methodology, it starts with a brief introduction, research design, and target population, sampling procedure, methods of data collection, validity and reliability operational definition of variables and methods of data analysis. Chapter four is data analysis, presentation and interpretation. Chapter five of the research project report is summary of the findings, discussions of the findings, conclusion of the findings, recommendations and suggestions for further research, the research project report ends with references and the appendices

## **CHAPTER TWO**

### **LITERATURE REVIEW**

## **2.1 Introduction**

The literature review section of the study includes the account of what scholars have written about this subject matter. The review will compressively look at what scholars have written about sustainability, particularly in community based projects sustainability, communication skills, community capacity building, community participation, community projects governance and community projects benefit sharing. The review will lay the ground for this research study and guide the direction of gathering the research data.

## **2.2 Sustainability and community water projects**

According to Richard Heinberg and Daniel lerch (2010) the essence of the term sustainable is “that which can be maintained over a time”, ‘it is probably safe to assume that no human arrangement can be maintained forever’, thus sustainable is a relative term’. According to Richard Heinberg and Daniel lerch (2010) the first known European use of the word sustainability (German: Nachhaltigkeit) occurred in 1713 in the book ‘sylvicultura oeconomica’ by German forester and scientist Hans Carl Von Carlowitz, and later French and British foresters adopted the practice of planting Trees as a path to Sustained-yield forestry. According to (Kemp, S. Parto and Gibson, 2005) The concept of sustainable development arose from two main sources: increasingly worrisome evidence of ecological degradation and other biophysical damage, because of the greater wherewithal provided by economic growth, and largely disappointing record of post-WWII ‘development’ efforts, particularly the persistence, and in some places worsening, of poverty and desperation in a period of huge and overall global increases in material wealth, the United Nations and associated agencies worried about these matters separately for some decades before appointing the World Commission on Environment and Development (WCED) to address them jointly. The Commission’s conclusion was that the ecological and social failures had common causes and demanded a common response. Its final report, ‘Our Common Future’ (WCED, 1987), initiated a flood of interest in, debate about and experimentation with sustainable development, which was renewed after the publication and subsequent adoption of Agenda 21, the Rio Declaration on Environment and Development, and the Statement of principles for the Sustainable Management of Forests by more than 178 governments at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, in June 1992, (Kemp, S. Parto and Gibson, 2005)

At the start of the twenty-first century, the problem of global sustainability is widely recognized by world leaders, and a common topic of discussion by journalists, scientists, teachers, students and citizens in many parts of the world. The World Summit on Sustainable Development (WSSD, 2002) confirmed that the first decade of the new century, at least, would be one of reflection about the demands placed by humankind on the biosphere. The idea of sustainability dates back more than 30 years, to the new mandate adopted by IUCN in (1969). It was a key theme of the United Nations Conference on the Human Environment in Stockholm in (1972). The concept was coined explicitly to suggest that it was possible to achieve economic growth and industrialization without environmental damage. In the ensuing decades, mainstream sustainable development thinking was progressively developed through the World Conservation Strategy (1980), the Brundtland Report (1987), and the United Nations Conference on Environment and Development in Rio (1992), as well as in national government planning and wider engagement from business leaders and non-governmental organizations of all kinds. Over these decades, the definition of sustainable development evolved. The Brundtland Report defined sustainable as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This definition was vague, but it cleverly captured two fundamental issues, the problem of the environmental degradation that so commonly accompanies economic growth and yet the need for such growth to alleviate poverty. The core of mainstream sustainability thinking has become the idea of three dimensions, environmental, social and economic sustainability (Adam, 2006), According to institute of sustainable development (2013), Sustainable development has been defined in many ways, but the most frequently quoted definition is from “Our Common Future” also known as the Brundtland Report: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: The concept of needs, in particular the essential needs of the world’s poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.” (Adam, 2006). All definitions of sustainable development require that we see the world as a system – a system that connects space; and a system that connects time. When you think of the world as a system over space, you grow to understand that air pollution from North America affects air quality in Asia, and that pesticides sprayed in Argentina could harm fish stocks off the

coast of Australia. And when you think of the world as a system over time, you start to realize that the decisions our grandparents made about how to farm the land continue to affect agricultural practice today; and the economic policies we endorse today will have an impact on urban poverty when our children are adults. We also understand that quality of life is a system too (Adam, 2006). It's good to be physically healthy, but what if you are poor and don't have access to education? It's good to have a secure income, but what if the air in your part of the world is unclean? And it's good to have freedom of religious expression, but what if you can't feed your family? The concept of sustainable development is rooted in this sort of systems thinking, it helps us understand ourselves and our world, the problems we face are complex and serious-and we can't address them in the same way we created them. (Adam, 2006)

Sustainability is often seen as being about protection of amenities (including cultural diversity), but it is equally about continued advancement or creation, a better and more just world, both the protection of amenities and creation of new and better services for more people require innovation in institutions of governance and socio-technical systems. Innovation can help to ease the adverse effects of some trade-offs posed by existing technology, but innovation is not without problems; it also brings risks, which should be anticipated and dealt with. (Kemp, Parto and Gibson 2005)

The international development community interest in 'benefit sustainability' relates directly to the increasing evidence available in the late 1980's and early 1990's that expected benefit of many projects investment had failed to materialize following the completion of the projects. While the reason for this poor showing is varied, most research agrees that one factor is the focus on the life of the project, effectiveness that flows from assistance being provided in form of a project, given that projects accounts for much of the focus and structure of development activities. Researches shows that identifying, planning and implementing a project for benefit sustainability requires additional development mindset reinforced with practical management knowledge from the inception of the project ideas to the completion of the intended returns on investment (Kemp, Parto and Gibson 2005) According to, American Indian development association (2001), Sustainability is about maintaining and continuing program services after the funding is over. Sustainability means having needed services becomes a permanent part of the communities,' resources sustainability means not starting over with the next grant, sustainability means all your hard work has long term value for your community. Sustainability doesn't always

mean the project will continue intact, new projects and programs are only part of the changing and evolving community system. The most successful component should become part of the overall process of positive change. Developing sustainability begins with project development; the goals of any new program should be to improve individual and community well-being, this is not a short term goal. Sustainability requires structural transformation moving resources from lower to higher productivity, effective governance; competence accountability and accessibility of information (American, Indian development association, 2001). Sustainable is about change, implementing change is easy, sustaining change is very difficult, change is a process, timing is everything, expect unexpected, use your head but trust your heart, knowledge is power, and social marketing and salesmanship, there are no ending only beginning (American, Indian development association,2001).Sustainability efforts differ for different types of projects, there will always be competing interest, and there will always be multiple view of a project goal, goal of sustainability includes integration into the community, Sustainability programs ensure that people are aware of the program from the beginning, promotes the program, promote the program result, develop the program leadership, and incorporate marketing strategies. (American, Indian development association, 2001), strategies of sustainability examine program structure, participation and stakeholders and theoretical framework, develop project infrastructure, policies, procedures, and protocols, cost effective and affordable strategies, and acknowledge the importance of program evaluation data, use your data to solicit interest and support, promote spillover effect, identify benefits to the community that results from the services you provide. Sustainability isn't about more money, it is about continuous relationship building, finding a niche, diverse funding sources, flexibility, communication, trust, reciprocity, commitment. Creating niche addresses a current need, be innovative and flexible, don't duplicate existing services, and provides training and expertise that doesn't exist elsewhere in the community, Diverse funding source; grants and contracts from other sources e.g. private sources – fees for services, reimbursable services, volunteers, donation, in-kind, active fundraising programs. Community mobilization, social marketing, funding agencies continued funding, cooperation and assistance documentations, accountability, protocols policies and procedures, social marketing-special events promotional items, information materials, celebrations of success open to communications. Multiple dimensions of sustainability; the project applies systemic methods, address the needs for collective development purposes. The stakeholders develops

participations and coalitions, accommodates multiple views, project sustainability is best achieved through program development that includes long term focus, ongoing policies, reliable data, community interest and support (American, Indian development association, 2001), Sustainability in community water projects has been defined as the maintenance of an acceptable level of service throughout the design life of the water supply system (Jennifer Sara and Travis Katz, 1992). Experience has shown that even a well-constructed water system needs proper institutional arrangement to keep it functioning over a time. Most system requires some sort of preventive maintenance. Hand pumps may require grease for moving parts; gravity system may require sediment to be removed from storage tanks or repair of leaky taps and cracked pipes, in addition work is required to keep the water sources free of contaminations. Because most rural water systems are shared by a number of families, providing these inputs requires some sort of community management structure such as water committee to oversee operation and management and collect money to cover the cost of these services, the sustainability of a rural water system depends on the willingness of users to provide the necessary time, money and labor to keep the system functioning. The willingness may be affected by social economic factors such as income levels, ethnic homogeneity or the willingness of the village to work together. However the willingness will depend on consumer satisfaction with the service usually compared to previous water source in a community. When communities perceive significant improvement in the water services, they are usually more willing to pay for operation and maintenance (Jennifer Sara and Travis Katz, 1992). (Richard carter and Ronnie Rwamwanja, 2006), in the report functional sustainability in community water and sanitation; a case study from south-western Uganda says that ‘sustainability is dynamic concept, technology or way of doing things change, but service remains in place, sustainability adds time dimension to ‘success’ or ‘effectiveness. Sustainable interventions stand the test of time, sustainable services functions continuously; Sustainability is about continued enjoyment of the benefit. The factors that contribute to sustainability in water projects includes, meeting real needs, ensuring that the community is fully involved in decision making, building on what people already know, selecting appropriate technology, good quality construction, reliable support from private sector in terms of spare part supplies, strong community organization, ongoing support by an agency external to the community interns of community empowerment and able, energetic, skillful, knowledgeable leadership, (Richard carter and Ronnie Rwamwanja, 2006). The test of sustainability is whether

water continues to be abstracted at the same rate and quality as when the supply system was designed, whether the excreta and waste water disposal system continues to function and be used as planned and whether environment quality continue to improve, if the water flows, then all the many elements which are required for sustainability must have been in place, there must have been money for recurring expenses and for occasional repairs, there must have been acceptance from the consumers of the service, the source services must have been adequate, the design must have been properly done and there must have been sound construction (Richard C Carter, C Goel, Sean F Tyrrel and Peter Howsam, 1999).

### **2.3 Benefit sharing and community water projects**

Intergovernmental, global processes determine the policy direction that individual countries shall take to deal with implementation at local levels. In the case of access to biodiversity, use of the resources and sharing the benefits of such use, three major processes influence country level implementation. These are the Convention on Biological Diversity (CBD), the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) of the World Intellectual Property Office (WIPO) that deals with ownership and intellectual property rights issues related to genetic resources and traditional knowledge.(Suneetha and Balakrishna, 2009).The Convention on Biological Diversity (CBD) addresses Benefit Sharing through Articles 8(j), 15(4),15(5), 15(7), 16 (3), and 19(1), 19(2) of the CBD text. Article 15 provides guidance when benefits arise from different kinds of utilization of genetic resources and on essential principles of obtaining informed consent on mutually agreed terms (Tvedt and Young, 2007).The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization that were adopted by the COP of the CBD in 2002 were developed to serve as guidelines for, among other measures, ‘contracts and other arrangements under mutually agreed terms for access and benefit-sharing.’ With ABS debates based on issues of Prior Informed Consent (PIC), Mutually Agreed Terms (MATs) and Material Transfer Agreement (MTA), it is worthwhile to revisit how these issues are being addressed within the Bonn Guidelines. The Bonn Guidelines indicate that ‘mutually agreed terms should be set out in a written agreement’ with ‘guiding parameters in contractual agreements’ and provide ‘an indicative list of typical mutually agreed terms’ which may be applicable in contracts regarding access to genetic

resources. They provide basic requirements in the development of MATs for ABS, including legal certainty, awareness, institutional mechanisms, and an indicative list of elements that could be included as MATs. (Suneetha and Balakrishna, 2009). These elements range from resources that can be accessed to issues of ownership over the final product, terms to use and transfer the material and benefit sharing. A separate section on benefit sharing highlights what could be covered under the terms including type (monetary types and non-monetary types of benefits), timing (short-term, medium or long-term benefits) and distribution mechanisms among the different stakeholders (including government, indigenous and local communities, industry, etc.) to ensure that the sharing process is fair and equitable. The ABS Management Tool provides practical guidance for users of genetic resources to be compliant with the Bonn Guidelines, including best practices that may be followed in the implementation of the different provisions such as PIC, MAT, benefit sharing, traditional knowledge, conservation and sustainable use. Specifically, the Management Tool clearly highlights that fair and equitable benefit sharing is required to ensure compliance with the third objective of the CBD; it is provided based on the stages of value addition and should involve different stakeholders who may have contributed to the “resource management, scientific and commercial processes.” (Suneetha and Balakrishna, 2009). Given the role of the sovereign right to exploit genetic resources as enshrined in Article 3 of the CBD, it is important that every country assesses the way it wants to apply the principle in terms of its constitutional provisions. The complexity comes from the variety of ways countries are constitutionally organized to deal with ownership. There are sub-national bodies such as states or provinces, indigenous and local communities and private property land owners. It is therefore important that the ownership and/or other property rights of the resources be clearly defined in the PIC and MAT applications. One of the critical challenges for countries is to define community ownership of genetic resources, where applicable. In the absence of clear guidance on the ownership of resources, there is always scope for confusion in sharing the benefits. When defining the details of distribution, it is important to have clear guidelines on when and how the benefits are distributed. In instances where local devolution of power is envisaged and local communities provide PIC and negotiate MAT, the type and kind of benefits can be decided in consultation with such communities. Ideally, mechanisms for ensuring benefit sharing should be flexible, variable to suit stakeholder interests, include research co-operation, joint ventures, and preferential terms (Bonn Guidelines, 2002). One needs to be innovative in defining the



mechanism in order to maximize benefits. Experiences have shown that wider stakeholder consultations will be needed to define various mechanisms. Each of the potential options above provides an opportunity to maximize the benefits, given market capitalization and cost constraints (Suneetha and balakrishna, 2009). (Laird, Wynberg, et al, 2003) in the Bwindi Impenetrable National Park (BINP) for example revenue sharing and multiple uses of programs have improved community park relations and community participation in conservation activities, while enhancing local peoples sense of ownership and collective responsibility for the pack.

Water benefits includes, water quantity, quality, regulation soil conservation, ecological biodiversity, hydro power agriculture, fishing drought-food management, fresh water for domestic use , spiritual and religious, recreation and ecotourism, aesthetics, inspirational, educational, sense of peace, heritage, cooperation economic development, food security, political stability, integration of regional infrastructure, trade, regional stability (White D, Wester F, Huber-Lee A, Hoanh C T, and Gichuki, 2008) Many people appreciate and highly value water but their voices are not always heard. Sufficient water for domestic and productive needs can remain a luxury and dream. For society to increase and share benefits from water resources, a process is needed. Existing rules and customs (institutions) on water ownership and use are not only the pathway for change but are also a target for change. How can benefits be shared? Benefit sharing mechanisms can be monetary or non-monetary and can be classified as ways to: compensate for lost assets or loss of access, restore and enhance livelihoods, develop communities, develop basins, and share benefits. To achieve water benefits sharing, a series of overlapping processes regarding water management and policy need to occur: diagnosis, knowledge generation, consultation and negotiation, agreement and enforcement. Research has a key role throughout. Participatory diagnosis, design and implementation of water benefits sharing schemes can sustainably increase the total benefits derived from water and help to reduce conflict and poverty. Local and external insights are required to achieve better understandings of current and potential situations. Since advances in benefits sharing require consideration of distinct social contexts, (White D, Wester F, Huber-Lee A, Hoanh C T, and Gichuki, 2008).

## **2.4 Capacity building and community water projects**

Capacity building can be defined as “activities that increase an individual’s, population’s, or community’s ability for growth, development or accomplishment (Humbolt area foundation,

2001), in much of the literature it is defined much more specifically as “activities, resources, and support that strengthen the skills and ability of the people and community growth to take effective action and leading role in the development of their communities. There are many definitions of capacity building interpreted by researchers, practitioners, and decision makers, that are associated with serious demand for strengthening health promotion (poole, 1997), (Baker and teaser-polk, 1998), (smith et al, 2003), several other needs for research in capacity building comes from social economic development (Kinsley, 1996). Capacity often regarded as a kind of performance ability, capacity and potentiality is a qualitative buzzword when particularly assessing the characteristics of an object or a person. This word is also used to measure the qualitative object with which evaluation of size and volume, value, price and monetary power are associated. Social approach to capacity building could be regarded as judgment, will, ambition, justice, equity e.t.c, this capacity building is multidimensional concept to create enabling condition for individuals, institutions and communities that realize their potentials, values and pride to get skills, learning and knowledge (Eade, 1997). “Capacity development not separate to it, it is a response to the multi-dimensional process of change, and not a set of discrete or pre-packaged technical interventions intended to bring about a pre-defined outcome. In supporting organization working for social justice it is necessary to support the various capacities they require to do this, intellectual, organizational, social, political, cultural, material, practical or financial”. (Eade, 1997) capacity can be understood as “the ability of the people, organization and society as a whole to manage their affairs successfully, organizational capacity can be defined as the capacity of an organization to achieve effectively what it set to do (Fowler et al, 1995) The capacity of an individual, an organization, or a society is not static; it changes overtime and is subject to both internal and external influence (Simister, Smith, 2010) many of the changes are unplanned, for example organizations can lose capacity if key individuals leave or change positions within that organization. However capacity development can be seen as more deliberate process whereby people, organization, or society as a whole creates, strengthen and maintain capacity over time. INTRAC believes that capacity development is an internal process that involves the main actors taking primary responsibility for change process (Simister, Smith, 2010) capacity building is carried out for a variety of different purposes; broadly, they can be divided into two, Technical capacity building, this aims to addressing a specific issue concerning an organization’s activity. Technical capacity building would not normally be expected to

involve an organization in a fundamental process of change, and would be unlikely to touch on the culture, vision, values or other core element of that organization. Technical capacity building is often carried out in the context of a specific project or program within which an organization is involved. General capacity building on the other hand is provided to help organization develop their own capacity to better fulfill their core functions, and achieve their own mission. This type of capacity development can be slow, complex and continuous and can require in-depth reflection on the organization's culture, values, and vision. The ultimate goal of such work is to improve the organization's performance and its ability to adopt itself within a change context. Establishment of water supplies, storage, and distribution infrastructure, the sustainable operations and functions of water systems is dependent on mobilizing the community and the government to take ownership and operational management responsibility without these partnership communities including governments will not develop and acquire skills, resources and capacities to sustain operate and maintain water supply projects (Michael Mzina, 2004), needs for capacity building at all levels for water supply projects is crucial to protecting the investment in water projects, transfer ownership and operational managements responsibility to community, monitoring and managing water supply assets and sustainable use of water resources for all beneficiaries (Michael Mzina, 2004), Capacity building is a continuous process reflecting society's need to respond to new ideas and technologies and changing social and political realities. Water sector capacity building supports the process of transformation for the implementation of integrated water resources management, including water policies and legislation, institutional development and human resources development in a forthright review of technical co-operation (UNDP, 2002), Central role of local capacity which should be used as a starting point, not be ignored as in the past. As countries transform they build on the present, they do not start from zero, skills are extended knowledge grows and new opportunities are created to use those skills. Capacity building takes place not just in individuals but in the institutions and society in a continuous and complex process weaving the very fabric of society. Declaration from the Hague World Water Forum emphasized the need for a stronger water culture through awareness creation, the centrality of knowledge generation and dissemination and sharing and international co-operation in capacity building for developing countries (World Water Forum, 2000). Capacity has been defined as the ability of individuals and organizations or organizational units to perform functions effectively, efficiently and sustainably. This implies

that capacity is not a passive state but part of a continuing process and that human resources are central (UNDP, 1998) Capacity building consists of three basic elements; creation of an enabling environment with appropriate policy and legal frameworks; Institutional development, including community participation and Human resources development and the strengthening of managerial systems (Alaerts et.al., 1991): The complexity of the integrated approach to water resources management requires that capacity building must address holistically a wide range of issues, problems and opportunities across sectors. There is no one correct solution in implementing the generally accepted water resource management principles which again emphasizes the importance of local control and local solutions backed by local adaptation of internationally accepted knowledge and principles, Increasingly it is accepted that capacity building programmes are more successful and are more likely to be sustainable when they respond to an internal initiative and when they are approached through a process approach and not as single onetime events (Land, 2000) Current management concepts for water resources promote the integrated approach. Bringing together multiple disciplines, drawing in society to decision making processes, addressing financial, social and equity issues not only crosses traditional technical boundaries but demands new mixtures of skills. There are few capacity building institutions that could claim to have these skills much less have the experience on how to reach the right blend for efficient water resources management. Partnerships amongst capacity building institutions are emerging as an effective strategy to share experience and skills and reach the critical mass of expertise required to address the demanding requirements of reform towards sustainable management of water resources. At the same time as partnerships are being built horizontally between capacity building institutions, it needs to be ensured that requirements of water management implementers as well as policy makers are being taken into account. Their participation in partnerships for capacity building is therefore essential and in that way these partnerships need to expand also vertically within the water sector. Effective capacity building will only occur when the capacity building institutions are sufficiently in touch with the implementing agencies to understand the real problems to be addressed and when they have the appropriate knowledge and skills to impart. A partnership approach is the most effective means of achieving this in the short term and also forms a framework for effective collaboration in the future (Paul Taylor, 2002).

## **2.5 Communication skills and community water projects**

Communication process is the flow of information from one person to the other (Axley, 1984), communication is simply viewed as simply one activity among many others, such as planning, controlling, and managing (Deetz, 1994). It is what we do in organization. Communication scholars on other hand , define communication as “the process by which people interactively create, sustain and manage meaning (Conrad and Poole, 1998), as such communication both reflects the world and simultaneously help to create it. Communication is not simply one or more things that happen in personal or professional life. It is the very means by which we produce relationships and professional experience, it is how we plan, control, manage, peruse, understand, lead, love, and so on (Daiton, Zelly, 2005), “Ever since 1930’s management and communication experts have sought to explain the complex process of human communication with the help of models, two such American researcher, C. Shannon and W. Weaver devised a model, identified the key process of communication to explain their work in telephone and radio communication in the late 1930’s. Basically the Shannon and weaver model illustrate a one way system since they were interested in how an electronic signal was transmitted along a wire or radio wave and what happened to it during transmission. The concept of noise allowed for the distortion and interference of static upon the message’s signal which might prevent its clear reception. Today the concept of noise in human communication model refers to anything interfering between the transmission and reception of the message (Evans, 1990), for example an urgent memorandum might lie undetected upon an executive’s desk if blanked out by a canopy of white paper documents, or destruction of a noisy office might prevent a manager grasping crucial point of an on orally delivered report (Evans, 1990). Other communication theorists have emphasized the importance of two ways nature of the communication in which the success of process depend heavily upon the sender receiving feedback. Naturally, the sender needs reassurance that his points are being received and understood-hence the regular confirmation we all make over telephone to assure our contact that we are still paying attention. According to Evans (1990) there are six key stages in communication, these includes; conceiving the message; as the home spun philosopher so rightly advised, think before putting mouth in gear, consider the best means of getting your message across and remember timing is important, study your(s) recipient carefully and pitch your message to suit their particular needs; Encoding the message; chose the median (or media mix) in which to encode your message thoughtfully, graphic and pictures have immediate and can have emotive, words and numbers conveys details but may be

dull, the spoken words is faster but may leave no record, so think before leaping into print or reaching for your phone and decide before hand what specific outcome you need from your communication; Selecting the channel; the information technology revolution in electronics, office equipments has made an array of telecommunication channels available, computerized telephone, mobile phones and pagers, fax, electronic mails etc. alongside their traditional paper based counter parts, all embrace a trade-off between speed, cost and so on, so make sure you have made an intelligent decision on channel selection, and always remember electronic memos zapped out in anger cannot be retrieved; Decoding the message; thoughtful systems are necessary to ensure that important message coming in are given priority they deserve, that all messages are routed promptly and time is taken to absorb the meaning. This implies that the receivers is equipped to understand, perhaps, abstruse and technical jargon or speak the EEC language used or shares the sender's business culture and outlook, further more the receiver is duty bound to ensure that he/she is not acting as a block to the message as a result of hostility towards its sender or from destructive rivalry; Interpreting message; as a results of subtle and indeed sometimes devious relationship which exists between human beings, the explicit or overt meaning of a received message may conceal a hidden meaning-of a message to e read between lines, in such superficial feelings are phrased consciously or unconsciously to reveal underlying ones (Evans, 1990), People often communicate in a kind of code which is meant to exclude others not part of an inner circle, it is always important therefore for the message receiver to devote significant time and reflection to ensuring the incoming message are interpreted correctly. Feedback; unless the message sender is provided with prompt and unambiguous feedback than the communication process is likely to be frustrated, the receiver then, however busy, must take immediate step to provide feedback in person-person oral communication, this is not generally a problem with written message, self discipline and courtesy are needed to ensure that customers letter of complaints, is immediately acknowledged pending investigation (Evans, 1990)

Project communication is the exchange of project-specific information with the emphasis on creating understanding between the sender and receiver. Effective communication is one of the most important factors contributing to success of project; Project teams must provide timely and accurate information to all stakeholders. Members of the project team prepare information in a variety of ways to meet the needs of the project stakeholders; Team members also receive feedback from stakeholders. Project communication management is a knowledge area that

employs the process required to ensure timely and appropriate generation, collection, distribution, storage, retrieval and ultimate disposition of project information (project communication handbook, 2007). Preparing project communication plan assist the project team in identifying internal and external stakeholders and enhances communication among all partners involved in project. The project manager leads the project development team to prepare a communication plan to ensure that an effective communication strategy is built into the project delivery process. The communication plan is part of the management plan. Proper information distribution makes information available to all project stakeholders in timely manner. Following the communication plan ensures that all members of the project team are aware of their responsibilities to communicate with external stakeholders. The more information stakeholders have regarding a project deliverables the less likely last minute conflict, changes, or complaints will affect project. Team members can improve overall project communication by adhering to; communication strategies on stakeholders' needs and feedback; ensure that communication is shared in a timely manner, advocate open, honest, face-to-face two way communication, Create an environment where project team members and other stakeholders' can constructively challenge behavior and ideas. Remember communication is two-way, listen as well as deliver the message, involve senior management where appropriate Communication flow, coordinate communication with project milestone events, activities and results. Include key stakeholders in developing an interest based conflict management process. Effectiveness: Conduct regular assessment of communication plan and process, communication must focus on customer, format and media. Take advantage of the existing communication vehicle and opportunities. (Project communication handbook, 2007) Communications for development is a social process based on dialogue using a broad range of tools and methods. It is also about seeking consensus-based change at different levels, including listening, building trust, sharing knowledge and skills, building policies, debating, and learning, for sustained, participatory and meaningful change (Yehude Simon, 2011). Communications for development; builds trust through dialogue, transparency, mutual respect, strong evidence uses a mix of communication techniques, channels, and approaches to advance positive individual and social change; engages and empowers multiple stakeholders that is, individuals, the community and mass, interactive media achieve greater participation in the development process and to make interventions sustainable; (Yehude Simon, 2011) Evidence shows that projects with a strong Communications for

development component are cost-effective, Communications for Development helps reduce risks and enhance the effectiveness, efficiency, and sustainability of water and sanitation projects, Communications for development can contribute to democratic governance and accountability, In order to maximize impact, water and sanitation projects should use Communications for development tools and methods (Yehude Simon, 2011).

## **2.6 Governance and community water projects**

Governance like religion is a broad topic that could be subjected to varied and diversified interpretation and beliefs, and therefore may be quite difficult to measure to any reasonable degree of reliability; hence no single definition may suffice for the concept of governance (Frimpong, Jacques, 1998), however the world bank (1997) defines governance as the manner in which power is exercised in the management of countries, economic and social resources for the development, thus good governance is said to be synonymous with sound development management since it is central to creating and sustaining an environment which fosters strong and equitable development, and it is an essential complement to good economic policies, on the other hand poor governance exist where the following the following symptoms begins to noticed in a country, failure to make clear separation between what is public and what is private hence tendency to divert public resources to private gains, failure to establish a predictable framework of law and governance behavior conducive to the development, or arbitrariness in application of rules and laws, excessive rules, regulation, licensing requirements of market and encourage rent seeking, priorities inconsistency with development, resulting in misallocation of resources, excessive narrowly based or non-transparent decision making, when all these symptoms are sufficiently severe and occur together they tend to create an environment hostile to development and thus poor governance (frimpong, Jacques, 1997). Governance refers to the evolving process, relationships, institution and structures by which groups of people, communities or society's organizes themselves collectively to achieve things that matter to them (Hunt et al, 2008), it encompasses both formal and informal structures and processes (martin, 2003). Example; in indigenous Australian setting community governance involves actively strengthening indigenous decision making and control over the organization, and building on peoples skills, personal and collective contributions, and shared commitment to organization's chosen governance processes, goals and identity (Hunt and smith, 2006, a, b). It is important in its own right and for improving service delivery and raising the health and prosperity of



indigenous community (Dodson and Smith, 2003). One of the fundamental challenges in indigenous community governance is lack of agreed understanding, each community is different and local decisions need to be made about; Group membership and identity, (who is the 'self' in their governance); Who has authority within the group and over what?; Agree rules to ensure authority is exercised properly and decision makers are held accountable; How decisions are enforced?; How rights and interests with others are negotiated?; What arrangements will best enable the achievement of goals? (Hunt et al, 2008; Hunt and Smith, 2006 a, b), Good governance is a contested issue; it is defined by culturally based values and normative codes about what is the right way to get things done (Hunt et al, 2008). It is generally agreed that, good governance comprises legitimacy, leadership, power, resources and accountability (Dodson, 2002), in contrast, poor governance is identified by factors such as corruption, favoritism, nepotism, apathy, neglect, red-tape and self-serving political leaders and public officials (Knight et al, 2002). Allocated resources and the context in which it is to be carried out (Fanks, 1999), leads to a shift in focus over time to strengthen organization through a focus on organizational culture and developing mission, vision and value statement as well as strategic change, organizational structure and effectiveness. The term water governance encompasses the political, economic and social processes and institutions by which governments, civil society, and the private sector make decisions about how best to use, develop and manage water resources (Kristen Lewis, 2004) Water governance is more than national-level water legislation, regulations and institutions, though these are important components. It also refers to the processes that exist to promote popular participation in designing water and sanitation systems and where decisions about those systems are made (in the capital city or in the community itself) as well as how and by whom. It refers to social mobilization and other actions designed to promote ownership, co-investment, capacity building, incentives for participation, and willingness to pay for services at the community level (Kristen Lewis, 2004) Effective water governance builds institutional capacity from the local level upwards and empowers. Stakeholders with knowledge and the ability to make decisions about matters that directly affect their lives. It promotes the equal participation of women and men in decision-making. Water governance is critical for resource planning and allocation among riparian states (those sharing a water basin) and vital for conflict resolution to defuse upstream-downstream tensions and balance the needs of different groups sharing water resources. Good water governance

determines the appropriate role (Kristen Lewis, 2004) Water sector governance at micro-level is defined by global water partnership and UNDP as the range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services at different societies (Michael McGarry et. al, 2008); good water governance is based on principles of governance, which includes equity, efficiency, partnership, decentralization, integration, transparency and accountability. Sustainable of services are not achieved without involvement of other stakeholders and particularly water users in the development of policies and laws for sector development. This applies equally well to water resources management with good governance backed by appropriate policies and laws being key determinant of sustainability of water resources. (Michael McGarry et. al, 2008).

## **2.7 Participation and community water projects**

There can be no single definition or universally accepted understanding of the concept of participation. The practice of participation is equally relative, as its interpretation, and therefore, application will largely be dictated by the circumstances on the ground, for some, participation is an effort to involve the community in the implementation of already drawn-up blueprint plans, for political scientist participation is the springboard into issues of policy, presently sweeping across the African continent thus embraces the practice of inclusive plural governance (Bergdall, 1993). Bragger, Specht, and Torczyner (1987), defined participation as a means to educate citizens and to increase their competence. It is a vehicle for influencing decisions that affect the lives of citizens and an avenue for transferring political power, however, it can also be a method to co-opt dissent, a mechanism for ensuring the receptivity, sensitivity, and even accountability of social services to the consumers. (Armitage, 1988), defined citizen participation as a process by which citizen's act in response to public concerns, voice their opinions about decisions that affect them, and take responsibility for changes to their community. (Manga and Chappel, 1997) suggest that citizen participation may also be a response to the traditional sense of powerlessness felt by the general public when it comes to influencing government decisions; "people often feel that health and social services are beyond their control because the decisions are made outside their community by unknown bureaucrats and technocrats", (Westergaard, 1986) defined participation as "collective efforts to increase and exercise control over resources and institutions on the part of groups and movements of those hitherto excluded from control". This definition

points toward a mechanism for ensuring community participation. The World Bank's Learning Group on Participatory Development (1995), defines participation as "a process through which stakeholder's influence and share control over development initiatives, decisions and resources which affect them". A descriptive definition of participation programs would imply the involvement of a significant number of persons in situations or actions that enhance their well-being, for example, their income, security, or self-esteem, (Chowdhury, 1996), states that the ideal conditions contributing towards meaningful participation can be discussed from three aspects: The community development approach emphasizes self-help, the democratic process, and local leadership in community revitalization, Most community development work involves the participation of the communities or beneficiaries (Smith, 1998). Thus, community participation is an important component of community development and reflects a grassroots or bottom-up approach to problem solving. In social work, community participation refers to "the active voluntary engagement of individuals and groups to change problematic conditions and to influence policies and programs that affect the quality of their lives or the lives of others" (Gamble and Weil, 1995). One of the major aims of community development is to encourage participation of the community as a whole. Indeed, community development has been defined as a social process resulting from citizen participation (UN, 1963; Vaughan, 1972; Darby and Morris, 1975; Christenson and Robinson, 1980; Rahman, 1990 in Smith, 1998). Through citizen participation, a broad cross-section of the community is encouraged to identify and articulate their own goals, design their own methods of change, and pool their resources in the problem-solving process (Harrison, 1995). It is widely recognized that participation in government schemes often means no more than using the service offered or providing inputs to support the project (Smith, 1998). This is contrasted with stronger forms of participation, involving control over decisions, priorities, plans, and implementation; or the spontaneous, same line of argument, Oakley and Marsden asserts that participation is "organized effort to increase control over resources and regulative institutions in a given social situation, on the part of the group and movement hitherto excluded from such control (Oakley and Marsden, 1984), for others participation is nothing short of local decision making mandates by the people and for the people on matters that affects their lives (Mulwa, 2007). Participation is a concept that has been popularized in community development since 1970's, integrated rural development (IRD) approach that dominated the development scene in mid and late 1970's was its precursor

(Rondinell,1973), the IRD operated on the assumption that sectoral integration was imperative to check on the phenomenal dismal impact experienced then with community development initiatives. It was believed integration as opposed to isolation actions of various departments and sectors, would lead to symbiotic effects thus enhancing efficiency, even though this new strategy had its own benefits, the expected ‘miracles’ were not forth coming (Mulwa, 2007), it was soon realized that sustainability of community projects continued suffering as long as development professionals kept on doing everything for the people. It was identified that top-down, directive methodical approach employed were largely responsible for this inadequacy. It is the methodological choice and process involved during the entire project cycle (problem identification, project conceptualization, implementation, monitoring, evaluation and sharing of the outcome), that ultimately determined what happened after the project funding phase is over. Keen observers tend to point out that numerous community projects collapse soon after the handing over ceremony by the donor (Mulwa, 2007). Empirical observers indicate that community projects often collapse due to various factors. The most critical of which has proved to be low non-participation of key stake holders (community in particular), in decision making. Conversely, where the target community is involved, there will not only sense of local ownership, but equally important, high chances of project sustainability, people are also likely to experience impact from their own project initiatives. The fact that people are involved right from the planning stages, it is expected the development project will address peoples top priority needs with significant impact towards their goal (Mulwa, 2007), protected area managers and policy makers have also come to realize that involvement of indigenous people and local communities is essential to avoiding conflict and ensuring the long term sustainability of the protected areas (Laird, Wynberg, et al, 2003) The concept of community participation is viewed as a basis for project success. The World Bank (2004) defines participation as “a process through which stakeholders influence and share control over development initiatives, and the decisions and resources which affects them”. The concept of community participation originated about 40 years ago from the community development movement of the late colonial era in parts of Africa and Asia. To colonial administrators, community development was a means of improving local welfare, training people in local administration and extending government control through local self-help activities (McCommon, 1993). However, during this era, the policy failed to achieve many of its aims primarily due to the bureaucratic top-down approach adopted by the colonial

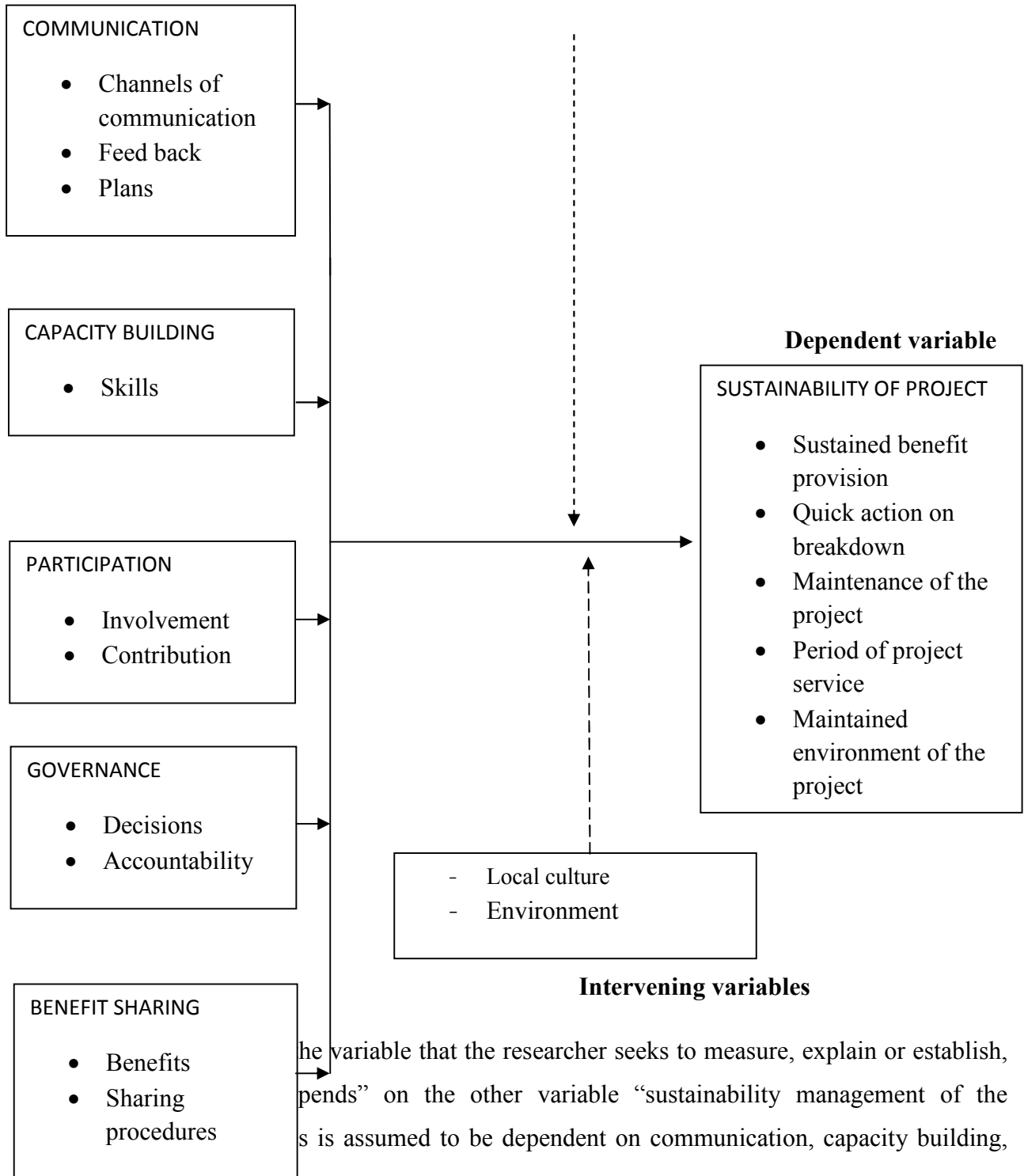
administrations (McCommon, 1993).The objectives of community participation includes following: empowerment; building beneficiary capacity; increasing project effectiveness; improving project efficiency; and project cost sharing. The framework identifies four levels of intensity of participation, namely: information sharing; consultation; decision making; and initiating action (Thwala, 2001). Community participation generally is more successful when the community takes over much of the responsibility than when higher level public agencies attempt to assess consumer preferences through surveys or meetings (Thwala, 2001). In order for community participation to work, projects must include special components. Villagers can be recruited to help in all phases of designing, implementing, maintaining, supervising, and evaluating new water supply and sanitation systems, but only if the time, effort and money is spent to do it right. Special attention must be paid to the development of local committees and governance structures that can adequately oversee local participation. Water points such as open wells, boreholes and taps have user groups that are responsible for their management the water users indicates that they perform a number of activities in order to ensure that water sources are protected and continue to provide water these activities includes guarding the water facilities against theft and robbery, repairing, cleaning and cleaning surrounding, planting flowers to beautify the surrounding as well as dredging as well as constructing raised surface (Robert Kafakoma and Chikosa Sulungwe, 2003).

**Figure 2.8: Conceptual Framework**

- Government polices
- Government strategies

**Independent variables**

**moderating variables**



the variable that the researcher seeks to measure, explain or establish, depends” on the other variable “sustainability management of the is assumed to be dependent on communication, capacity building,

participation, governance and benefit sharing of the projects. The independent variables (predicator or explanatory variables) are the variables that which explains, they have a role in predicting nature and amount of variation that occurs in another variable, in this study communication, capacity building, participation, governance and sharing of benefit are the independent variables and will seek to measure, predict or explain the amount of variation in sustainability management of community water boreholes. Moderating variables are that influences the strength of the relationship between two variables (the independent and the dependent) it affects the direction/ or the strength of the relationship between the independent and dependent, in this study government policies and government strategies are the moderating variables. The intervening variables (mediator variable) seeks to explain how external events takes internal significant in the context of the relationship between independent and dependent variables, in this study the intervening variable is local culture and environment.

### **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter focuses on research methodology; it is organized to elaborate on procedures and strategies on data collection. The chapter starts with research designs, target population, the sampling procedures and methods of data collection. The chapter also looks at validity and reliability of study, operational definition of variables and ends up with methods of data analysis.

### **3.2 Research design**

The study is based on descriptive survey approach; descriptive research involves gathering of data that describes events as they are and then organizes, tabulates, depicts and describes the data collection (Glass and Hopkins, 1984). The study seeks to answer the question of what is going on in particular reference to, communication, capacity building, participation, governance and benefit sharing among the community water projects (boreholes). A research design is a logical structure of inquiry adopted by a researcher in relation to the research question. Social researchers ask two types of questions, what is going on (descriptive research) and why is it going on (exploratory research) the design is appropriate since the study will be able to seek information from representative sample and generalize this on a larger population.

### **3.3 Target population**

This refers to the group, or individual to whom the survey applies, the element of population whom the study seeks response from in relation to the research question. In the study the target population included all 132 community water projects (boreholes) both operational and non operational in Tharaka central division, Tharaka south district, the study included all community water projects (borehole) in Tharaka central division including water borehole within the primary school setting serving both the school and the communities around the schools, the community water projects (borehole) are fitted with hand pump operated machines for ease of operations. The study did not address any privately owned water project (borehole) in the area of study.

### **3.4 Sampling procedures**

Sampling is the procedure whereby a fraction of the data is taken from a large set of data, and then reference drawn from the sample is extended to the whole group (Raj, 1972). According to



Kothari (2004) 'a sample design is a definite plan for obtaining a sample from a given population, it refers to technique or the procedure the researcher would adopt in selecting items for the sample'. One of the real advantages of quantitative method is ability to use smaller group of people (items) to make inference about a larger groups of people (items) that would be prohibitively expensive to study (Holton & Burnett, 1997). According to (Krejcie & Morgan, 1970), a margin error of .05% is acceptable for categorical data. The study assumed confidence level of 95% and 5% confidence interval, using the computer based sample size calculator, with a population of 132 borehole (projects), the sample size acceptable was 98 boreholes (projects) in order to identify actual project for the study the researcher applied simple random sampling. Random sampling is deemed suitable because it is designed to avoid biasness (Ogonda, 1991:36). This is because in such samples (random), the inclusion of an item is a matter of chance, independent of the researcher's will and judgment or the nature of the item. (Hursh-Cesar and Roy, 1976) outline the necessity for probability sampling as arising from indefinite population, unavailable sampling frames, small budgets and lack of time among others. A total of 115 community water projects (boreholes) were studied in this research.

### **3.5 Methods of data collection**

Mixed method data collection strategies are those that are explicitly designed to combine elements of one method such as unstructured interviews, observation or group focus discussion in either a sequential or simultaneous manner (Axinn, Fricke, 1997; Pearce, 2002; Sieber, 1973) mixed data collection is considered to be a subset of multi-method research in which what is learned from one particular method is integrated in application of another method. Varying the data collection approach can; Provide information from one approach that was not identified in the alternative approach, Reduce non sample error by providing redundant data from multiple sources, and Ensures potential biases coming from one particular approach is not replicated in alternative approaches (Axinn, Fricke and Thornton, 1991). Survey method can be used to take census of population or to interview a large representative sample of a population; this is generally considered the positive aspect of the survey, because inferences based on large representative sample are known to be more reliable than inferences based on small non representative sample (Kish, 1965). Observation is used to discover complex interactions in natural settings; it entails systematic noting and recording of events, behavior and artifacts in the

social setting. Chosen for the study, the observational records are referred to as field notes details, non judgment, concrete description of what has been observed. (Knodd, 1993; Morgan 1997), (Marshal and Rossman, 1989) define observation as a “systematic description of events, behavior and artifacts in social setting chosen for study” (p.79) observation enables the researcher to describe existing situation using the five senses, providing “written photograph” of situation under study (Erlandson, Skipper, and Allen, 1993), The study used the Questionnaire, Interview and the Observational instruments to collect the data from the field.

### **3.6 Reliability and Validity**

The reliability of research instrument concerns the extent to which the instrument yields the same results on repeated trails while validity can be said to be the degree to which the test items measure what is supposed to measure and do this in a consistent manner.

#### **3.6.1 Reliability**

Joppe (2000) defines reliability as ‘the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of the study can be reproduced under similar methodology then the research instrument is considered to be reliable’. Kirk and Miller (1996) identify three types of reliability which includes, the degree to which a measurement given repeatedly remains the same, stability of the measurement over time and similarity of measurement within a given time period. To determine reliability, study adapted split half approach, also according to Croccker and Algina (1986), it is the researcher’s responsibility to assure high consistency and accuracy of the test scores.

#### **3.6.2 Validity**

According to Joppe (2000) validity determines whether the research truly measures that which was intended to measure or how truthful the research is, Weiner and Braun (1989) describes the validity in quantitative research as the “construct validity “the construct is the initial concept, notion, question, or hypothesis that determines which data to be gathered and how it is gathered. The study validity was determined through the process of test, and the advice from the expert (supervisor)

### **Table 3.1: Operational Definitions of Variables**

<b>Objective /Research Question</b>	<b>Type of Variable</b>	<b>Indicator</b>	<b>Measure</b>	<b>Data Collection</b>	<b>Level of Scale</b>	<b>Approach of Analysis</b>	<b>Level of Analysis</b>
To investigate the extent to which benefit sharing in fluencies sustainability of community water projects	Independent Variable	Benefits Sharing procedures	Percentage frequency	Questionnaire Interview Observation	Nominal Ordinal	Quantitative and Qualitative	Descriptive
To establish the extent to which capacity building influences sustainability of community water project	Independent variable	Skills	Percentage frequency	Questionnaire Interview Observation	Nominal Ordinal	Quantitative and Qualitative	Descriptive
To establish the extent to which communication influences the sustainability of community water projects	Independent variable	Channels of communication Feedback Communication plans	Percentage frequency	Questionnaire Interview Observation	Nominal Ordinal	Quantitative and Qualitative	Descriptive

To establish the extent to which governance influences the sustainability of community water projects	Independent variable	Decision making  Accountability	Percentage frequency	Questionnaire  Interview  Observation	Nominal  Ordinal	Quantitative and Qualitative	Descriptive
To investigate the extent to which participation influences sustainability of community water projects	Independent variable	Involvement  Contribution	Percentage frequency	Questionnaire  Interview  Observation	Nominal  Ordinal	Quantitative and Qualitative	Descriptive

**3.7 Methods of data analysis**

It is a key step in the research process; the researcher organizes the data collected to attach meaning applicable to the research question and research objectives. The researcher begins with rough definition of a problem or issue, appropriate cases are examined and possible explanation of the problem is formulated and investigator then examines further appropriate cases to establish how well the data collected fits the hypothetical explanations, coding represents a key step in the process, it has been described by Charmaz (1983), as “simply the process of categorizing and sorting data” such coding provide the link between data and conceptualization, coding will be the process of breaking down, examining, comparing, conceptualizing and categorizing data (Strauss and Corbin ,1990), coding here represents the gradual building of categories out of the data. Hamersley and Atkinson (1983) Recommends immersing oneself into the data and then searching out patterns, identifying possible surprising phenomena and

being sensitive to inconsistencies such as divergent views offered by different groups of individuals. Editing data means penetrating data to be familiar with it, to check for completeness, accuracy and uniformity, the researcher assigns the collected data to the relevant research questions and objectives, identifying the themes emerging from various responses based on research questions and specific objectives. The study adapted factor analysis methods for the data analysis and used frequencies, and percentages in data presentation.

### **3.8 Ethical issues**

According to O.M Mugenda and A.G Mugenda (2003) ethical issues are issues that a researcher must be aware of before starting the research; the awareness will protect the integrity of the researcher and ensure honest results. In this research project report ethical issues were highly upheld by the study throughout the process. Among the ethical issues were integrity, it was the duty of the researcher to ensure all those involved were people of integrity and high moral values who command respect in the society, the study totally avoided all acts of plagiarism, plagiarism is the act of stealing other people's ideas and referring to other peoples work without acknowledging them. This study as much as possible tried to misuse the privileges by the researcher; the study totally upheld the principle of confidentiality and privacy of the respondents by properly handling the information and keeping it confidentially, the design of the research tools was such that it was to conceal the identity of the respondent, reason being not to disclose their identity and also to encourage honesty responses. Another ethical principal followed by the study was that of voluntary and informed consent. It was the duty of the researcher to introduce the purpose of the research and seek consent of the respondent to voluntarily participate in the study without coercion or undue inducement whether in kind or monetary form. Another issue is that of findings the study findings will not be concealed for any purpose.

## **CHAPTER FOUR**

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

#### **4.1 Introduction**

The chapter presents the procedure and activities followed to analyze raw data. The main purpose of the study was to investigate and establish the extent to which management factors influence the sustainability of the community water projects. The chapter highlights sample, the questionnaire and the data collection processes; it also gives an insight of the data analysis and interpretation.

#### 4.2. Return Rate

The researcher administered 115 questionnaires to the respondents and received back 100 questionnaires. This was 86.95% of the questionnaires administered

#### 4.3. Data Analysis and Interpretation

In this study factor analysis was adopted in order to reduce the dimension of the data as well as group the variables in meaningful categories. The choice for this method was also driven by the fact that the response variable (sustainability) is latent. A latent variable is one that is not directly observed but is rather inferred from other observable or measurable variables.

Factor analysis in SPSS is run to extract principal components which have an eigenvalue greater than 1. The Varimax rotation method and set a maximum of 25 iterations for the convergence of the rotated solution. The study set the program to suppress loadings (squared correlations between variables and factors) less than 0.55.

**Table 4.1: KMO and Bartlett's Test**

<hr/>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.782
<hr/>		
Bartlett's Test of Sphericity	Approx. Chi-Square	1416.495
<hr/>		

df	378
Sig.	.000

The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. Kaisen (1974) recommend 0.5 as the least acceptable, values between 0.7-0.8 acceptable, and values above 0.9 are superb. Our value here is 0.782 which is within the acceptable range.

Bartlett's test indicates the strength of the relationship among variables. This test is meant to test the null hypothesis that the correlation matrix is an identity matrix. From the results we observe that the Bartlett's test of sphericity generated an associated probability of 0.000 which is highly significant at 95% confidence level.

#### **4.3.1 Total Variance Explained**

The next item shows all the factors extractable from the analysis along with their eigenvalues; the percent of variance attributable to each factor and the cumulative variance of the factor; and the previous factors. The study indicates that the first factor accounts for 23.136% of the

variance, the second 8.417%, and third 6.631% up to the eighth component which contributes 4.596%. All the remaining factors are not significant and hence shall not be used for further analysis of this data.

**Table 4.2: Total variance explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	7.605	27.160	27.160	7.605	27.160	27.160	6.478	23.136
2	2.431	8.682	35.842	2.431	8.682	35.842	2.357	8.417	31.553
3	1.986	7.093	42.935	1.986	7.093	42.935	1.857	6.631	38.184
4	1.417	5.062	47.996	1.417	5.062	47.996	1.805	6.446	44.631
5	1.347	4.812	52.809	1.347	4.812	52.809	1.500	5.356	49.987
6	1.213	4.333	57.142	1.213	4.333	57.142	1.469	5.248	55.235
7	1.131	4.041	61.182	1.131	4.041	61.182	1.449	5.174	60.409
8	1.070	3.823	65.005	1.070	3.823	65.005	1.287	4.596	65.005

**Table 4.3: Rotated Component Matrix**

Factors	Component							
	1	2	3	4	5	6	7	8
when was the community borehole started								.651



The extent to which community water project has benefit		.760
the committee has some method for sharing benefit		
method used for benefit is not equitable to all members	.810	
benefit sharing cause personal difference in the project	.643	
the personal difference caused sharing are resolved amicably		
these personal fin difference are sources of failure in this water project		.763
the project committee has been trained	.763	
training is relevant for sustainability of water project	.679	
the committee needed a different training for sustainability		
project member have receive adequate training to sustain the project	.647	
training is important aspect for sustainability of the water project		.744
there is inadequate training for member of this water project		
the committee has good communication meth0d to the member	.646	
decision by the committee reach member	.785	
timely feedback is received is received by the committee	.749	
communication affect proper functioning of this water project		.708
proper communication can improve sustainability of this community	.572	
the committee of this project has the constitution/law for governing the project	.771	
that the constitution /by law are followed in making decision	.838	
all member of this project are involve indecision making	.792	
the water projects are properly kept	.755	
failure to keep proper records cause personal difference to this project		.659

project member participated in the development of this project	.720		
project member continue to participate in maintenance of the project	.714		
user fee are necessary for this water project		.653	
the member pay their dues promptly and willing	.725		
failure by member to actively participate in projects work can kill the project			.803

#### 4.3.2 Extent to Which Governance Influences Sustainability of community water projects

The factor on governance comprises of; how the committees are run and how information flows between the management committees and the members. The most important variable in this factor is the adherence to a constitution while making project decisions. Second in importance is factor on involvement of members while making decisions and making personal contribution for the betterment of the project. These factors accounted for 23.16% of all the variation. This implies that when all the others factors are assumed to have zero contribution, about 23 out of 100 projects will succeed if functions described by these variables are executed to satisfaction.

On descriptive analysis, the finding shows that from the total of 100 respondents, 14 respondents strongly disagree that governance is a factor influencing sustainability of community water projects, accounting for 14%, 15 respondents disagree that governance is a factor influencing sustainability of community water project, accounting for 15%, 21 respondents somehow agree that governance is a factor influencing sustainability of community water projects, accounting for 21%, 33 respondents agree that governance is a factor influencing sustainability of community water projects, accounting for 33%, 17 respondents strongly agree that governance is a factor influencing sustainability of community water projects, accounting for 17%

**Table 4.4: Governance and sustainability of community water projects**

<b>Rating</b>	<b>Frequency</b>	<b>Percent</b>
Strongly Disagree	14	14.0
Disagree	15	15.0
Somehow Agree	21	21.0
Agree	33	33.0
Strongly Agree	17	17.0
<b>Total</b>	<b>100</b>	<b>100</b>

#### **4.3.3 Extent to Which Capacity Building Influence Sustainability of community water projects.**

The factor on capacity building was obtained by combining the second component and forth component from the analysis results. The variable identified revolves around the training of all project members. This factor encompasses the technical competence of the members as well as committee members on sustainable management of the projects. This factor accounts for 14.863% of the total variance.

The descriptive analysis table 4.5 shows that out of 100 total respondents, 3 respondents' disagree that capacity building is a factor influencing sustainability of community water projects, accounting for 3%, 8 respondents somehow agree that capacity building is a factor influencing sustainability of community water projects, accounting for 8%, 36 respondents agree that capacity building is a factor influencing sustainability of community water projects, accounting for 36% and 53 respondents strongly agree that capacity building is a factor influencing sustainability of community water projects accounting for 53%

**Table 4.5: Capacity Building and Sustainability of community water projects**

<b>Rating</b>	<b>frequency</b>	<b>Percentage</b>
Disagree	3	3.0
Somehow agree	8	8.0
Agree	36	36.0
Strongly agree	53	53.0
<b>Totals</b>	<b>100</b>	<b>100</b>

#### **4.3.4 Extent to Which Benefit Sharing Influences Sustainability of community water projects**

The factor on benefit sharing is obtained by combining the third and fifth components from the analysis of the results above. These includes, whether the project has benefits to members, if there is equitable distribution of benefits and that whether poor method of sharing benefits can cause personal differences which in turn affects sustainability of the project. This factor accounts for 11.879% of the total variance,

Descriptive analysis, Table 4.6 shows that out of the total respondents, 4 respondents' strongly disagree that benefit sharing is a factor influencing sustainability of community water projects, accounting for 4%, 1 respondent disagree that capacity building is a factor influencing sustainability of community water projects, accounting for 1%, 7 respondents somehow agree that benefit sharing is a factor influencing sustainability of community water projects, accounting for 7%, 32 respondents agree that benefit sharing is a factor influencing sustainability of community water projects, accounting for 32% and 56 respondents strongly agree that benefit sharing is a factor influencing sustainability of community water projects, accounting for 56%.

**Table 4.6: Benefit Sharing and Sustainability of community water projects**

<b>Rating</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly disagree	4	4.0
Disagree	1	1.0
Somehow agree	7	7.0
Agree	32	32.0
Strongly agree	56	56.0
<b>Totals</b>	<b>100</b>	<b>100</b>

Table 4.11 shows, respondents from non operational community water projects was 20, of which 2 respondents strongly disagree that benefit sharing is a factor contributing to sustainability of community water projects, accounting for 10%, 1 respondent disagree, accounting for 5%. 5 respondents somehow agree that benefit sharing is a factor influencing sustainability of community water project, 7 respondents agree, accounting for 35% while 5 respondents strongly agree, account for 25% of the respondents.

#### **4.3.5 Extent to Which Conflict Resolution Influences Sustainability of community water projects**

The factor talks about how personal differences originating from benefit sharing are resolved.

The study revealed that personal differences are an important factor in explaining sustainability of the community water project. This factor accounts for 5.356% of the total variance in the study.

Table 4.7, descriptive analysis shows that total respondent was 100, out of which 9 respondents strongly disagree that conflict resolution is a factor influencing sustainability, accounting for 9%, 13 respondents disagree that conflict resolution is a factor influencing sustainability of community water projects, accounting for 13%, 11 respondents somehow agree that conflict resolution is a factor influencing sustainability of community water projects, accounting for 11%, 18 respondents agree that conflict resolution is a factor influencing sustainability of community water projects, accounting for 18% and 49 respondents strongly agree that conflict resolution is a

factor influencing sustainability of community water projects, accounting for 49.0% of the respondents.

**Table 4.7: Conflict Resolution and Sustainability of community water projects**

<b>Rating</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly disagree	9	9.0
Disagree	13	13.0
Somehow agree	11	11.0
Agree	18	18.0
Strongly agree	49	49.0
<b>Totals</b>	<b><u>100</u></b>	<b>100</b>

#### **4.3.6 Extent to Which Members Participation Influence Sustainability of Community Water Projects**

The member's participation factor comprises of two variables. Member participation occurs when users are assigned project roles and tasks, which lead to a better communication of their needs, and help, ensure that the system is implemented successfully. The most important variable is that, failure by members to actively participate in project work can kill the project. Lack of participation of some members negatively affects the morale of other members and this can easily lead to collapse of the project. This factor explains 5.174% of the total variance.

Table 4.8, Descriptive statistics show that out of the total respondents, 4 respondents' strongly disagree that member's participation is a factor influencing sustainability of community water projects, accounting for 4%, 1 respondent disagree that members participation is a factor influencing sustainability of community water projects, accounting for 1%, 5 respondents somehow agree that members participation is a factor influencing sustainability of community water projects, accounting for 5%, 21 respondents agree that members participation is a factor influencing sustainability of community water projects, accounting for 21% and 69 respondents

strongly agree that members participation is a factor influencing sustainability of community water projects, accounting for 69%

**Table 4.8: Participation and Sustainability of Community Water Project**

<b>Rating</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly disagree	4	4.0
Disagree	1	1.0
Somehow agree	5	5.0
Agree	21	21.0
Strongly agree	69	69.0
<b>Totals</b>	<b>100</b>	<b>100</b>

#### **4.3.7 Extent to Which Communication Influence Sustainability of Community Water Projects**

The factor on communication identified one variable, which is the extent to which communication affect proper functioning of the water project. This factor explains 4.596% of the total variance.

Table 4.9, Descriptive analysis shows that out of the total respondents, 6 respondents strongly disagree that communication is a factor influencing sustainability of community water projects, accounting for 6%, 16 respondents disagree that communication is a factor influencing sustainability of community water projects, accounting for 16%, 14 respondents somehow agree that communication is a factor influencing sustainability of community water projects, accounting for 14%, 38 respondents agree that communication is a factor influencing sustainability of community water projects, accounting for 38% and 26 respondents strongly agree that communication is a factor influencing sustainability of community water projects, accounting for 26% of the respondents.

**Table 4.9: Communication and Sustainability of Community Water Projects**

<b>Rating</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly disagree	6	6.0
Disagree	16	16.0
Somehow agree	14	14.0
Agree	38	38.0
Strongly agree	26	26.0
<b>Total</b>	<b><u>100</u></b>	<b>100</b>



## CHAPTER FIVE

### SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

#### 5.7 Introduction

The chapter focuses on the summary of the finding, discussion, conclusion and recommendations of the study. The findings will relate to each objectives of the study which included, investigating the extent to which benefit sharing influences sustainability of community water projects, to establish the extent to which communication influences the sustainability of community water projects, to establish the extent to which capacity building influences sustainability of community water projects, to investigate the extent to which participation influences sustainability of community water projects and to establish the extent to which governance influences the sustainability of community water projects.

#### 5.8 Summary of Findings

From the analysis of the data it emerged that majority of the respondents' agree that governance is a factor influencing sustainability of community water projects with a score of 50%, while 21% of the respondents somehow agree and 29% of the respondent disagree that governance is a factor influencing sustainability of community water projects. On the objective of capacity building, majority of the respondents agree that capacity building is a factor influencing the sustainability of community water projects at 89%, while 8% somehow agree that capacity building is a factor influencing sustainability of community water projects and 3% disagree. On the objective of benefit sharing, the finding shows that the majority of the respondents agree that benefit sharing is a factor influencing sustainability community water projects at a score of 88% of the respondents, 7% of the respondents somehow agree, and 5% of the respondents disagree that benefit sharing is a factor influencing sustainability of community water project. Conflict resolutions emerged from the analysis of the data as a strong factor influencing sustainability of community water project with majority respondents at a score of 67% in agreement that conflict resolution is a factor influencing sustainability of community water projects, 11% of the respondents somehow agree and 22% of the respondents disagree that conflicts resolution is a factor influencing sustainability of community water projects. The objective of member's

participation, the finding shows that majority of the respondents agree that members participation is a factor influencing sustainability of community water projects at 90%. While 5% somehow agree and 5% of the respondents disagrees that member's participation is a factor influencing sustainability of community water projects. On the objective of communication, the majority of the respondents agree that communication is a factor influencing sustainability of community water project at 64%, while 14% somehow agree and 22% of the respondents disagree that communication is a factor influencing sustainability of community water projects.

## **5.9 Discussion.**

This section of the report is addressing the finding of the study as per the objectives and discussion and ties the study to the literature review

### **5.3.1 Governance and sustainability of community water projects**

On the objective of governance, the finding shows that the respondents' score of 29% disagree that governance is a factor influencing sustainability of community water projects, 21% of the respondents somehow agree that governance is a factor influencing sustainability of community water projects and 50% of the respondents agree that governance is a factor influencing sustainability of community water projects. According to the results it is true that governance is a factor influencing sustainability of community water projects, this agrees with (Michael McGarry et al, 2008) that good water governance is based on governance, which includes equity, efficiency, partnership, decentralization, integration, transparency and accountability. (frimpong and Jacques, 1997) that failure to make clear separation between what is public and what is private hence tendency to divert public resources to private gains, failure to establish a predictable framework of law and governance behavior conducive to the development, or arbitrariness in application of rules and laws, excessive rules, regulation, licensing requirements of market and encourage rent seeking, priorities inconsistency with development, resulting in misallocation of resources, excessive narrowly based or non-transparent decision making, when all these symptoms are sufficiently severe and occur together they tend to create an environment hostile to development and thus poor governance

### **5.3.2 Capacity Building and sustainability of community water projects**

The objective of capacity building, the finding shows a score of 3% of respondents disagree that capacity building is a factor influencing sustainability of community water projects, 8% somehow agree that capacity building is a factor influencing sustainability of community water projects, while 89% of the respondents agree that capacity building is a factor influencing sustainability of community water projects. The results clearly shows that capacity building is a factor influencing the sustainability of community water projects, this agrees with (Michael Mzina, 2004) that capacity building of community water supply is crucial to protecting the investment in water projects, transfer ownership and operational management responsibilities to community, monitoring and managing water supplies assets and sustainable use of water resources for all beneficiaries. (Eade, 1997) that capacity is the ability of the people, organization and society as a whole to manage their affairs successfully, the same is shared by (Humbolt area foundation, 2001) that capacity building is an activity that increases individual's, population's or community's ability for growth, development and accomplishment

### **5.3.3 Benefits Sharing and sustainability of community water projects**

The objective on benefit sharing; the finding shows that a score of 5% of respondents disagree that benefit sharing is a factor influencing sustainability of community water projects, 7% of the respondents somehow agree that benefit sharing is a factor influencing sustainability of community water projects and 88% of the respondents agree that benefit sharing is a factor influencing sustainability of community water projects. The result indicates that benefit sharing is a factor influencing sustainability of community water projects. This is in agreement with (White D, Wester F, Huber-Lee A, Hoanh CT and Gichuki, 2008) that water benefit includes, water quantity, quality, regulation soil conservation, ecological, biodiversity, hydro power, agriculture, fishing, drought-food management, fresh water for domestic use, spiritual and religious, recreation and ecotourism, aesthetic, inspirational, education, sense of peace cooperation economic development, food security, political stability, integration of regional infrastructure and regional integration, for society to increase and share benefit from to compensate for lost assets or loss access, restore and enhance livelihood, develop communities, develop basin and share benefit. Water resources a process is needed, rules and customs on water ownership and use are not the only pathways, benefit mechanism can be monetary or none

monetary and can be classified as a way. (Laird, Wynberg, et al, 2003) that in the Bwindi Impenetrable National Park (BINP) for example revenue sharing and multiple uses of programs have improved community park relations and community participation in conservation activities, while enhancing local peoples sense of ownership and collective responsibility for the pack.

#### **5.3.4 Conflict Resolution and sustainability of community water projects**

Conflict resolution; conflict resolution was not an objective in the study; this is an area which emerged from the data analysis as an important factor explaining the sustainability of community water projects. The finding shows that a score of 22% of the respondents disagree that conflict resolution is a factor influencing sustainability of community water projects, 11% of the respondents somehow agree that conflict resolution is a factor influencing sustainability of community water projects and 67% of the respondents agree that conflict resolution is a factor influencing sustainability of community water project. It is therefore correct to say that conflict resolution is a factor influencing sustainability of community water projects.

#### **5.3.5 Members Participation and sustainability of community water projects**

Objective of members' participation; the finding shows that a score of 5% of the respondents disagree that members' participation is a factor influencing sustainability of community water projects, 5% of the respondents somehow agree that members participation is a factor influencing sustainability of community water projects and 90% of the respondents agree that members participation is a factor influencing sustainability of community water projects the results clearly shows that members participation is a factor influencing sustainability of community water projects. This is in agreement with (Robert Kafakoma and Chikosa Sulungwe, 2003) that Water points such as open wells, boreholes and taps have user groups that are responsible for their management, the water users indicates that they perform a number of activities in order to ensure that water sources are protected and continue to provide water these activities includes guarding the water facilities against theft and robbery, repairing, cleaning and cleaning surrounding, planting flowers to beautify the surrounding as well as dredging as well as constructing raised surface. (Francis Mulwa, 2007) that sustainability of community projects continued suffering as long as development professionals giving everything for the people, it was identified that top- down, directives methodical approach employed were largely responsible for the inadequacies. (Francis Mulwa, 2007) says the fact that people are involved right from

planning stage it is expected the development projects will address people's priority needs with significant impact towards their goals. (Smith, 1998) that community participation is an important component of community development and reflects a grassroots or bottom-up approach to problem solving, (Laird, Wynberg, et al, 2003) protected area managers and policy makers have also come to realize that involvement of indigenous people and local communities is essential to avoiding conflict and ensuring the long term sustainability of the protected areas

### **5.3.6 Communication skills and sustainability of community water projects**

Objective of communication; the finding shows that a score of 22% of the respondents disagree that communication is a factor influencing sustainability of community water projects, 14% of the respondents somehow agree that communication is a factor influencing sustainability of community water projects and a total 64% of the respondents agree that communication is a factor influencing sustainability of community water projects. The figures therefore agree that communication is a factor influencing community water projects. This is in agreement with (Yehude Simon, 2011) that 'evidence shows that projects with a strong Communications for development component are cost-effective, Communications for Development helps reduce risks and enhance the effectiveness, efficiency, and sustainability of water and sanitation projects, Communications for development can contribute to democratic governance and accountability, In order to maximize impact, water and sanitation projects should use Communications for development tools and methods. (Conrad and Pool, 1998) that communication is the process by which people interactively, create, sustain and manage meaning, (Darto and Zelley, 2005) points that communication is no one thing or more that happens in personal or professional experiences, it is how we plan, control, manage, peruse, understand, lead and so on. Therefore it is important to emphasis the aspects of communication in our projects to enhance the sustainability

### **5.4 Conclusions.**

Community water projects particularly boreholes remains a major source of water in the Arid and Semi-arid areas in Kenya. Government and donor agencies have and remain key providers of the facilities due to prohibitive cost of drilling and equipping the boreholes, community members are main beneficiaries assumes the role of management and sustainability of the project to continuously benefit from the water and other fringe benefits. However the problems of non-functioning community water projects continue to be reported in Tharaka south district which is

a semi-arid District. The study sought to establish the extent to which management factor influence the sustainability of community water projects (boreholes). The study adopted descriptive survey design, the target population was 132 community water projects (borehole) in Tharaka central division both operational and non operational, questionnaires were administered to 115 respondents and 100 questionnaires were received. Factor analysis technique was used to analyze the data. Based on the findings of this study, it come out that; water projects governance, capacity building, benefit sharing, conflict resolution, projects members' participation and communication are critical factors influencing the sustainability of community water projects in Tharaka central division, Tharaka south district.

### **5.5 Recommendations.**

Based on the finding of this study community water projects are viable projects and can be sustainably managed to benefit the members. The researcher makes the following recommendations; the government to take immediate action to strengthen all the management committees of currently running community water projects and revive the non functioning projects by imparting skill, knowledge and right attitude on project governance, capacity building, proper methods of benefit sharing, conflicts resolutions, members participation and communication among group members. The government to make clear policies to guide all stakeholders intervening in community water projects to develop comprehensive sustainability management programs targeting areas covered by this report. All the extension workers in the field of community development should enhance their skills and knowledge in on project governance, capacity building, proper methods of benefit sharing, conflicts resolutions, member's participation and communication to help change practice in management of community projects.

### **5.6 Suggestions for Further Research.**

1. The influence of technology on the sustainability of community water projects (boreholes)
2. The influence of gender on the sustainability of community water projects (boreholes)

## APPENDIX I

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**APPENDIX II**

**FULL TEXT OF DATA COLLECTION INSTRUMENTS**

**Questionnaire**

Zachary K Mukiira

University of Nairobi

Po Box 28174 – 00200

Nairobi

.....

.....

Dear participant

This is to inform you that I am undertaking a research study leading to master’s degree in project planning and management at the University of Nairobi. The study focuses on management factors influencing sustainability of community water project’s (borehole) in Tharaka central division, Tharaka south District, when successfully completed the finding will help to enhance and improve the management of community water project’s (borehole) for sustainability. In this regard please take some time and complete this questionnaire, accurate and frank responses will highly appreciated.

All information received will be treated with confidentiality. The finding for this study will be used only for the research purpose.

Yours faithfully,

Zachary K Mukiira

Questionnaire

1. Name of the location.....
2. Name of the community water project (borehole) .....
3. Gender of the respondent(please tick); Male  Female
4. Position of the respondent (please tick) Chairman    
Treasurer  Committee member  Any other specify
5. When was the community borehole started.....
6. Who started the borehole.....
7. Has the project been operational? .....

**Benefit Sharing and community water projects**

Please tick the correct answer (N/B The rating are (I) Strongly disagree (II) Disagree (III) Somewhat agree (IV) Agree (V) Strongly agree.)

1. To what extent do you do agree that community water project has benefit? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
2. To what extent do you agree that the committee has some method for sharing the benefit? (I) strongly disagree. (II) Disagree. (III) Somehow agree. (IV) Agree. (V) Strongly Agree.
3. To what extent do you agree that the method used for benefit sharing is not equitable to all members? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
4. To what extent do you agree that benefit sharing cause's personal differences in the project? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
5. To what extent do you agree that the personal differences caused by benefit sharing are resolved amicably: (I) strongly disagree? (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
6. To what extent do you agree that these personal differences are sources of failures in this water project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

### **Capacity Building and community water projects**

1. To what extent do you agree that the project committee has been trained? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
2. To what extent do you agree that the training is relevant for sustainability of the water project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
3. To what extent do you agree that the committee needed a different training for sustainability? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
4. To what extent do you agree that project members have received adequate training to sustain the project? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
5. To what extent do you agree that training is important aspect for sustainability of the water project? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
6. To what extent do you agree that there is inadequate training for members of this water project? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

### **Communication skills and community water projects**

1. To what extent do you agree that the committee has a good communication method to the members of this water project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
2. To what extent do you agree that decision by the committee reach members? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
3. To what extent do you agree that timely feedback is received by the committee? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
4. To what extent do you agree that communication affects proper functioning of this water project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

5. To what extent do you agree that proper communication can improve sustainability of this community water project? (I) strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

### **Governance and community water projects**

1. To what extent do you agree that the committee of this project has the constitution/by-laws for governing the project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
2. To what extent do you agree that the constitution/by-laws are followed in making decisions? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
3. To what extent do you agree that all members of this project are involved in decision making? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
4. To what extent do you agree that this water project's records are properly kept? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
5. To what extent do you agree that failure to keep proper records causes personal differences to this project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

### **Participation and community water projects**

1. To what extent do you agree that project member participated in the development of this project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
2. To what extent do you agree that project members continue to participate in maintenance of the project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V)Strongly agree.
3. To what extent do you agree that user fees are necessary for this water project? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.
4. To what extent do you agree that member's pay their dues promptly and willingly? (I)Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

5. To what extent do you agree that failure by members to actively participate in project's work can kill the project? (I) Strongly disagree. (II) Disagree. (III) Somehow agree (IV) Agree (V) Strongly Agree.

### **Interview Schedule**

This interview schedule is intended for the water project (borehole) members.

#### **Introduction**

My name is Zachary K Mukiira, A student of University of Nairobi undertaking master's degree in project planning and management. I would like to ask you a few questions on factors influencing sustainability of community water projects (boreholes). When successfully completed, the finding of this study will help improving management and sustainability of the community water projects. The interview should take 15 minutes, are you available to respond to some questions at this time?

Let me begin by asking you some question about yourself.

1. What is your Name  
.....
2. What is the respondent gender A) MALE      B) FEMALE (Please tick)
3. What is your education level .....
4. How long have you been a member of this project? .....
5. How old is the project .....
6. Has it been functioning throughout .....
7. II) Give your comment .....
- .....
- .....
- .....
8. BENEFIT SHARING: - I) what benefits do you get from this project.  
.....
- .....

.....  
.....  
.....  
.....

II) Do you think the benefit are equitably shared among the members

.....  
III) Why?.....  
.....  
.....  
.....

9. COMMUNICATION: -I) Do you think the project management communicate with member? .....

II) How?.....  
.....  
.....  
.....

III) Do members give feedback .....

IV) How .....

10. PARTICIPATION: - I) Do you involved in project activities.....

.....  
.....  
II) How? .....

11. GOVERNANCE:- I) Who makes projects decisions?.....

.....







### APPENDIX III

#### MAJOR SOURCES OF WATER IN THARAKA CENTRAL DIVISION

Source: Ministry of Water and Irrigation Tharaka South District

S/No	Borehole Name	Location/ constituency	Yield M3/hr	Pop Served	Current status /yield production	Remarks
1	Kanyaga 1	Ntugi/Tharaka	1.2	150	-	Breakdown
2	Rrwakimangara	“	1.32	180	Below normal	Operational
3	Iruruma III	“	9.0	240	-	Non operational
4	Nkururuni	“	2.18	200	Below normal	Operational
5	Ngaara	“	0.8	210	Below normal	Operational
6	Kibuka	“	0.626	120	Very low	Operational
7	Kithiori	“	10.0	230	-	Non operational
8	Gaciongoni school	“	0.7	300	-	Non operational
9	Kangombe	“	0.512	150	Below normal	Operational
10	Mukinyango	“	1.2	120	Below normal	Operational
11	Marinyambiti	“	7.2	240	Normal	Need installation of solar panel system
12	Rukenya	“	7.2	220	-	Need installation of solar panel system
13	Gauntini	“	3.6	160	Slightly normal	Need installation of solar panel system
14	Kanoa	“	6.0	180	Normal	Operational
15	Ithanga	“	0.9	180	-	Non operational

16	Kiamba	“	6.0	120	-	Non operational
17	Gautini	“	3.6	20	-	Non operational
18	Nkundi	“	0.45	380	-	Non operational
19	Kamayeye	“	3.80	120	-	Non operational
20	kamatuandunku	“	5.556	100	Below normal	Need installation of solar panel system
21	Kamatungu A	“	-	120	-	Non operational
22	Tharaka boys	“	0.2	400	-	Non operational
23	Marimanti market	“	2.10	100	-	Non operational
24	Gacee	“	0.422	150	Below normal	Operational
25	Karuma	“	3.6	80	Normal	Operational
26	Karurukuni	“	-	150	Below normal	Operational
27	Kithigiri	“	1.22	180	Normal	Operational
28	Igumo pry school	“	3.6	250	-	Non operational
29	Nkararu	“	3.6	220	-	Non operational
30	Marimanti centre	“	6.0	202	Normal	Operational
31	Kiiji	“	0.8	120	Normal	Operational
32	Magetani	“	1.8	150	Norma	Operational
33	Kamutega	“	6.0	200	Below normal	Operational
34	Rwakiora	“	1.8	180	Below normal	Operational
35	Chagitu	“	6.0	220	-	Non operational
36	Marimanti II	“	2.4	200	-	Non operational
<b>Gituma /Tharaka</b>						
37	Maranatha mission	“	-	400	Below normal	Need installation of solar panel system
38	Kathanje	“	9.0	280	-	Non operational
39	Kaarani pri school	“	0.8	350	-	Non operational
40	Gituma	“	3.45	180	-	Need installation

						of solar panel system
41	Marigoni	“	10.26	180	-	Non operational
<b>Turima</b>						
42	Ngonya	“	10	180	-	Non operational
43	Turima pry school	“	10	300	Below normal	Non operational
44	Kibunga H/C	“	0.72	100	Below normal	Non operational
45	Ushindi	“	2.88	80	Below normal	Non operational
46	Kibunga chiefs camp	“	0.6	50	Below normal	Non operational
47	Gituri pry school	“	8	350	Below normal	Requires service
48	Romoko	“	3.6	110	Below normal	Requires service
49	Kirwiro	“	0.6	80	Below normal	Requires service
50	Kiagu	“	0.9	70	Below normal	Requires service
51	Kibunga poly	“	0.144	100	Below normal	Requires service
52	Rugiika	“	6.0	80	Below normal	Requires service
53	Kiaga kamue ‘B’	“	1.6	200	Below normal	Requires service
54	Kamathagwe	“	9.0	160	Below normal	Requires service
55	Kathuura pry school	“	2.8	320	-	Non operational
56	Kambu	“	6.0	80	Below normal	Requires service

<b>Karocho</b>						
57	Ruungu pry school	“	1.552	300	-	Requires service
58	Ruungu market	“	2.4	230	-	Requires service
59	Karuti	“	0.6	100	-	Requires service
60	Kiamaara	“	1.2	270	-	Requires service
61	Kaongoni pry school	“	-	80	-	Requires service
62	Mpunja	“	2.4	150	-	Requires service
63	Kkaroch pry achool	“	2.4	80	-	Requires service
64	Mukuyuni	“	0.39	90	-	Requires service
65	Kamburu	“	6.0	100	-	Requires service
66	Murotoi	“	1.2	110	-	Requires service
67	Ruria	“	5.143	300	-	Requires service
68	Gakunguguni	“	1.286	280	-	Requires service
69	Tonya pry school	“	-	320	Below normal	Requires service
70	Karocho sec school	“	7.2	100	-	Requires service
71	Rwakaronga	“	1.8	330	-	Requires service
72	Kithioroka pry school	“	1.6	100	-	Requires service
<b>Nkondi</b>						
73	Kamariru	“	1.2	80	Below normal	Operational
74	Mukuyu	“	2.0	90	Below normal	Operational
75	Mupuruni	“	2.4	110	Below normal	Operational
76	Polepole	“	6.0	100	Below normal	Operational
77	Murigichani	“	2.4	110	Below normal	Operational
78	Muchubi	“	6.0	100	below normal	Operational
79	Kanunga	“	-	120	below normal	Operational

80	Kareni	“	0.5	130	Below normal	Operational
81	Kiegeni	“	0.9	160	Below normal	Operational
82	Kagendo	“	9.0	140	Below normal	Operational
83	Mutoroni	“	0.4	130	Below normal	Operational
84	Bondeni	“	2.36	90	-	Non operation
85	Kigucwani	“	1.2	100	-	Non operation
86	Kamugucwa	“	7.2	-	-	Non operation
87	Ntithini	“	2.4	120	-	Non operation
88	Kaurani	“	10.285	100	-	Non operation
89	Matakiri pry school	“	5.54	300	-	Non operation
90	Muembeni II	“	1.176	100	-	Non operation
91	Gatondoni	“	8.9	150	-	Non operation
92	Gankiru	“	9.0	130	-	Non operation
93	Kiorimba pry school	“	1.8	400	-	Non operation
94	Ithinju	“	1.63	150	Below normal	Operational
95	Njukini	“	-	180	Below normal	Operational
96	Rukurani	“	10.282	110	-	Non operational
97	Matakiri	“	3.6	130	Below normal	Operational
98	Karwamba pry school	“	5.142	300	Below normal	Operational
99	Matakiri II	“	3.6	160	Below normal	Operational
100	Kithiri	“	4.8	120	Below normal	Operational
101	Mugumoni	“	2.0	110	Below normal	Operational

102	Mutithini	“	9.0	140	Below normal	Operational
103	Gitendera	“	0.80	120	below normal	Operational
104	Kanuga	“	10.285	150	Below normal	Operational
105	Muberethini	“	7.20	100	Below normal	Operational
106	Kibukona	“	2.40	110	Below normal	Operational
107	Karuruni	“	2.4	140	Below normal	Operational
108	Nkondi pry school	“	18.0	160	Below normal	Operational
109	Nkondi pry school II	“	1.60	120	Below normal	Operational
110	Mubobua wa kingori II	“	0.4	180	Below normal	Operational
111	Kabooto	“	1.50	100	Below normal	Operational
112	Turima tweru pry school	“	2.25	280	Below normal	Operational
113	Gakuuru pry school II	“	2.2	300	Below normal	Operational
114	Kagaaga ciaruguaru	“	2.6	280	Below normal	Operational
115	Makongeni	“	1.2	100	below normal	Operational
116	Kamuthetu	“	10.285	140	Below normal	Operational
117	Kiuguni pry school	“	2.80	300	-	Non operational
118	Mwanyani pry school III	“	1.40	280	-	Non operational



119	miomponi pry school III	“	3.6	400	-	Non operational
120	Kiburini camp	“	0.90	200	-	Operational
121	Gatagatani II	“	4.0	180	Below normal	Operational
122	Tumbure	“	4.0	220	-	Non operational
123	Kiuguni pry school I	“	1.227	180	Below normal	Operational
124	Gakurume	“	10.335	190	Below normal	Operational
25	Makururuni	“	3.6	450	Below normal	Operational
26	Iria ria mathunka pry school	“	8.0	250	Below normal	Operational
27	Matakiri I	“	4.3	180	Below normal	Operational
128	Matakiri pry school	“	3.6	280	Below normal	Operational
129	Kereria SDA	“	3.6	200	Below normal	Operational
130	Makena	“	2.4	100	Below normal	Operational
131	Tumanya	“	0.2	100	Below normal	Operational
132	Muuguna	“	2.4	80	Below normal	Operational