UNIVERSITY OF NAIROBI

ASSESSMENT OF COMMUNITY INSTITUTIONS' CONTRIBUTION TO FOREST AND WATER GOVERNANCE IN THE KILUNGU CATCHMENT, KENYA

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DECLARATION

I declare that this research thesis is my original work and has not been submitted for examination to any university or institution of higher learning.

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DEDICATION

This thesis is dedicated to God Almighty, my creator, steadfast supporter, and source of wisdom, inspiration, comprehension, and knowledge. Throughout this program, He has been the cradle of my forte, and I have only soared and thrived on His wings. In addition, I dedicate this work to my late parents, Joel Wambua Nguta and Ruth Kanindi Wambua, whose wisdom and unwavering commitment to education have been a driving force in my life and a constant source of inspiration for my efforts. Their joy at seeing me succeed has always been an inspiration to me. I also dedicate this work to my husband, Nicholas Mukua Mutua, who has supported me throughout the process and ensured that I have given it my all. You are my constant source of inspiration, Moses Mutua Mukua (Daktari), David Wambua Mukua (Charming Arnold), and Amy Mwende (The Artist). God richly bless you.

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ABSTRACT

The roles and responsibilities of Community Forest Associations (CFAs) and Associations of Water Resource Users (WRUAs) in forest and water resource management have been investigated. However, their comparative contributions to the management of water and forest resources, particularly in the Kilungu catchment, are unknown, as are their effectiveness and activities, organizational and structural design, opportunities and challenges, and capacity to manage catchment sustainably. As a result, a descriptive cross-sectional study design using cluster, simple random, and purposive sampling was carried out in Kenya's Kilungu catchment area. As a result, the seven clusters of the Kilungu catchment were chosen for the study: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. The study's main goal was to assess the contributions of the Kenze CFA and Upper Kaiti WRUA to Kilungu catchment management, with specific goals to examine the CFA and WRUA's activities and effectiveness, investigate the structure and functions of the CFA and WRUA, analyze the institutions' challenges and opportunities, and evaluate the CFA and WRUA's capacity in managing the catchment sustainably.

Focus group discussions, key informant interviews, and household questionnaires were used to collect quantitative data. Field notes, interview transcripts, and observation skills were used to collect qualitative data. The data was examined using ANOVA. Cross-tabulations and a Pearson Correlation analysis were used to see if any relationships existed between the study parameters. Even though more respondents were aware of the CFA (47%) than the WRUA (43%), focus group discussions revealed that the WRUA far outperformed the CFA in involving its members in active participation in all aspects of catchment management. A person's (p) correlation analysis of CFA and WRUA structure awareness, functioning, and efficiency in catchment management revealed a strong positive relationship (p=0.76). Furthermore, the upper Kaiti WRUA was more efficient at moderately (31%) and highly effective (37%) in catchment management. The Pearson correlations study on the relationship between education level and statutory function execution was found to be statistically significant to a low degree (p= 0.2 49) for both the CFA and the WRUA.

Kenze CFA faced more challenges than Upper Kaiti WRUA, receiving ratings of Very high (58%) compared to Upper Kaiti WRUA’s rating of Very high (22%), respectively. The findings revealed that the challenges had a significant impact on the outcomes of the Kenze CFA operation. The challenges level affecting CFA and WRUA performance and catchment degradation were positively correlated and statistically significant (p=0.72), according to Pearson correlations analysis. According to the institution's evaluations of aspects of continuously improving functioning, both the CFA and the WRUA were working well in terms of inclusion and equity, with extremely good ratings on accountability, effectiveness, and efficiency.

Finally, in terms of gender inclusivity, equity, and catchment management activity implementation, the Upper Kaiti WRUA structure outperformed the Kenze CFA. Upper Kaiti WRUA was far more effective in involving its members in all aspects of catchment

management. Furthermore, neither institution was fully addressing catchment degradation, with Kenze CFA facing greater difficulties in catchment management than Upper Kaiti WRUA. The study concludes by recommending new governance structures and operating frameworks for the Kenze CFA and the Upper Kaiti WRUA to ensure that these organizations effectively carry out their statutory functions. It also provides empirical evidence that can be used to develop strategies for reviewing the activities of these organizations.

The CFA, in particular, should be given the authority to carry out all of its legal obligations, with a focus on the timely preparation and implementation of management plans, whereas the WRUA should be continuously upgraded to ensure its effectiveness in carrying out its duties. These findings also indicate that to halt the catchment's degradation, it is critical to address the CFA difficulties, improve the adoption of their opportunities, and address all of their sustainability challenges.

The study recommends creating a new, open, and transparent governance strategy for CFA and WRUA structures to ensure institutional capacity, as well as developing new initiatives to improve CFA and WRUA activities and operations, addressing CFA and WRUA challenges, and capitalizing on opportunities to ensure long-term catchment management.

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ACRONYMS AND ABBREVIATIONS

CFM: Community Forest Management

CIDP: County Integrated Development Plan

FAO: United Nations Food and Agriculture Organization.

GEF: Global Environment Facility

HH: Households

HOC: Head of Conservancy.

IWRM: Integrated Water Resource Management

KACOFA: Kakamega Community Forest Association

KFAN: Kenya Forest Action Network KFS Kenya Forest Service

KFWG: Kenya Forests Working Group

KWS: Kenya Wildlife Service

MBOCOFOA: Mbooni Community Forest Association

MCSCUA: Makueni County Sand Conservation and Utilization Authority

MENR: Ministry of Environment and Natural Resources.

PFM: Participatory Forest Management

WRA: Water Resources Authority

WRUAs: Water Resource User Associations

WUAs: Water User Associations

DEFINITION OF OPERATIONAL TERMS AND CONCEPTS

Adoption: The process of incorporating new technology into an existing practice after some 'trying' and adaptation.

Catchment degradation: Any change in the condition or quality of the land, and thus its productive potential.

Catchment management: Achieving a balance between the use and preservation of natural resources at the watershed level. To reach long-term and shared goals, catchment management is performed by combining the activities of the community, the government, and non-governmental groups. Community-Based Natural Resource Management refers to a group of people with a self-defined, distinct identity using communally owned infrastructure to use and manage natural resources in rural settings.

Governance: All of the processes that an organization uses to coordinate and govern its resources and actions. Ethics, resource management processes, accountability, and management controls are all included.

Government: Government is a group of organizations that work in conjunction with other types of organizations, institutions, networks, traditional systems, conventions, and values to provide governance.

Institutions: Institutions are defined as established norms, regulations, and policies that help to guide behavior and activity. Institutions can be thought of as the "rules" of a game, and organizations as the participants. Organizations: A formal or informal group of people, governmental or non-governmental, with a specific purpose, such as a government or business department.

Processes: Policies or procedures in place to guide decision-making, resource utilization, and stakeholder relationships

Statutory functions: are jobs or duties that are defined by a statute or regulation

CHAPTER ONE

INTRODUCTION

1.1 Background

Through changes to national policies and legislation, many countries have implemented or are in the process of implementing catchment conservation and sustainable forest and water resource utilization (Busck-Lumholt & Treue 2018). Governments all over the world are collaborating with community governance organizations to guarantee that forest and water resources are exploited sustainably (Fisher, 2014). People around the world are becoming more concerned about the environment and watershed resources (Glazewski, 2000). For example, community institutions for forest and water management emerged in Latin America, with a focus on transferring rights to use, management, and administration to local people (Njeru *et al*., 2017). Through a process of inclusion, equity, and democratization, community governance institutions are being established to manage threatened forests and water resources (Amanor, 2004).

The appeal of community institutions in forest and water governance is based on Ostrom's (1990) narrative, which holds that local communities can emerge autonomously and form local institutions to modulate and manage natural resources sustainably.

The Indian Joint Forest Management was established in Asia to improve administration and provide people with more ability to defend forests from fires, illicit grazing, and illegal logging, as well as to ensure water catchment protection. Community institutions for forest and water control first appeared in Latin America, with a focus on transferring rights to use, management, and governance to local people (Njeru *et al.*, 2017). Furthermore, in Nepal, the devolution of forest rights resulted in the formation of over 20,000 Community Forest Users Groups (CFUGs), significantly improving forest

governance (Baynes *et al*., 2015). Furthermore, Asia's forest rights devolution resulted in the formation of nearly 20,000 Community Forest Users Groups (CFUGs) in Nepal, significantly improving forest governance (Baynes *et al.*, 2015).

In African community institutions, forest and water governance is concerned with actions and projects that affect people's lives in terms of resource utilization. In Kenya, Community Forest Associations actively develop and implement participatory forest management plans (PFMPs) created in collaboration with KFS, as well as user rights enforcement and data submission to KFS for forest management advancement. The Kenya Forest and Conservation Act of 2016 and a World Bank report back this up.

Kenya, on the other hand, passed the Water Act of 2002, which resulted in the Water Resource Authority (WRA) establishing numerous Water Resource Users Associations throughout the country (McCord *et al*., 2017). The WRUA's actions are focused on cooperative participation, supervision, and defense of a communal water supply (Watson, 2007). For example, the Upper Kaiti WRUA has two goals: increase member capacity and write sub-catchment management plans. Community institutions and effective governance systems, according to Mbeyale (2009) and Msuya (2010), determine the fate of catchments all over the world.

According to Kenya's Ministry of Environment and Forestry, the presence of Community Forest Associations and Water Resource Users Associations within several catchments throughout the country ensures successful catchment management. The significance of governing structures in communal institutions cannot be overstated (Macleod, C.J.A., D. Scholefield & Haygarth, P.M., 2007). The Forest Conservation and Management Act of 2016 and the Forest Act of 2005 in Kenya both support a system in which the local

community has access to the forest through Community Forest Associations and the government owns the forest (GoK, 2005).

The formation of user groups at the household level serves as the foundation for the formation of community forest associations and water resource users associations. The user groups that produce Community-Based Organizations (CBOs), which are essential community organization structures for stakeholder participation, are the source of the Community Forest Associations and Water Resources User representation (Thenya *et al*., 2014).

According to the County Government of Makueni (CGM), the Makueni Community-based Organization (MCBO) represents nine (9) registered Community Forest Associations, including Makuli, Nzaui, Kamukima, Nthangu, Kitondo, Mbooni, Kichapa, Makongo, and Kenze, as well as sixty-eight (68) registered WRUAs involved in various catchment management. This type of organization is essential because it can attract a diverse range of stakeholders while also ensuring the care of all administrative bodies in the catchment area. An effective framework fosters cooperation among numerous stakeholders, increases public support, protects property rights, improves intra-community forest user group governance, and results in tangible community benefits (Sattler *et al.*, 2018).

According to research on water governance structures, the European Union Water Framework Directive (2000) establishes a structured system for managing water resources based on the concept of river basin management (Moss *et al.*, 2005). For example, in Spain, WRUAs provide a wide range of institutional designs, such as the transition from traditional management and decision-making principles to the Water Use and Management Program (AGUA) designs, which were implemented to ensure the

resource's sustainability through alternative supply-based regulation methods. Over the last three decades, the incorporation of the local government structure into catchment management has grown in popularity. Despite the involvement of the upper Kaiti Water Resources Users Associations and the Kenze Community Forest Associations, watershed poor conditions persist in Kenya's Kilungu catchment area.

While the Water Resources Users Associations and Community Forest Associations' actions improve catchment management globally, they face a significant challenge in insufficient forest and water resource governance, which influences the outcomes of their activities. The numerous obstacles that the institutions must overcome also pose a serious threat, with excessive resource use in the watershed leading to degradation. These findings back up previous research by Davis *et al.* (2013), who discovered that strong governance institutions lead to favorable policies and efficient resource use, which mitigates catchment deterioration.

According to Thenya *et al.* (2017), CFAs face several challenges in Mt. Kenya's Hombe and Gathiuru forests, the most significant of which are injustice and a lack of resources. Furthermore, Community Forest Associations face challenges in carrying out their duties, such as developing forest management plans. As a result, organizations must improve their adaptability (Thenya *et al.,* 2014). Water Resource Users Associations, on the other hand, face several challenges. According to (Murtinho *et al.,* 2013), who discovered that outside financial aid significantly increased local communities' capacity to respond to water restrictions in Columbia, some communities lack adequate financial support, limiting their effectiveness. Kenyan Water Resources Users Associations face challenges from Non-Governmental Organizations (NGOs), many of which operate in silos and are tasked with water-related tasks (Biswas & Tortajada, 2010).

Favorable laws and policies improve opportunities for Community Forest Associations (Ongugo *et al.,* 2008). Water Resources Users Associations and Community Forest Associations are both excellent strategies for reducing the current demand for forest products and services in settlements located near forests (Ongugo *et al.,* 2007). According to Makueni County's Integrated Development Plan (CIDP) (2018-2022), Kenze Community Forest Associations and Upper Kaiti Water Resource Users Associations are in charge of Kenya's Kilungu watershed. Despite their existence and contributions to better catchment governance and management, including ecosystem provisioning, little is known about the operations of Upper Kaiti WRUA and Kenze CFA in the Kilungu catchments.

CFAs benefit from favorable legislation and policy in terms of opportunity (Ongugo *et al.,* 2008). CFAs and WRUAs are excellent strategies for reducing forest settlements' current demand for forest products and services (Ongugo *et al.,* 2007). The Upper Kaiti Water Resource Users Associations and the Kenze Community Forest Associations manage the Kilungu catchment in Kenya. Despite the presence and contributions of the Upper Kaiti Water Resources Users Associations and Kenze Community Forest Associations to improved catchment administration and management, including ecosystem provisioning, in the Kilungu catchments, nothing is known about how the CFA and WRUA function because the effects of the Water Resources Users Associations and Community Forest Associations are not documented, according to the Makueni County Integrated Development Plan (2018-2022).

Again, the actions of all Water Resources Users Associations and Community Forest Associations members involved in catchment management are unknown; there is no documentation on their statutory functions and contributions; the structure of the Water

Resources Users Associations and Community Forest Associations, as well as their function ability in catchment management, is unknown; and the lack of actionable data on the institutions' issues, possibilities, and long-term viability makes making well-informed and transparent critical decisions increasingly difficult.

1.2 Statement of the Research Problem

Concerns have grown around the world, particularly about community institutions' contributions to forest and water management (Glazewski, 2000). Governance of forest and water institutions around the world involves multiple stakeholders at various scales, with an increasing emphasis on win-win situations, attempting to protect forest and water resources while also supporting human well-being (McKinnon *et al.,* 2016). Several studies have been conducted all over the world on the goals of local community governance of water and forest resources, including in Kenya.

Significantly, community institutions are now widely regarded as successful when they contribute, participate, and get involved to further promote this multi-functionality by achieving both local livelihood and well-being benefits and biodiversity conservation or sustainable natural resource management (Calfucura, 2018). Furthermore, community institutions have been shown to improve governance and empower communities to protect forests and water catchments from fires, illegal grazing, and logging, but catchment management policies in developing countries, particularly in Africa, have largely ignored this critical role (Bond *et al.,* 2009).

Kenze community forest associations and Upper Kaiti water resource user associations manage the Kilungu catchment. Despite their involvement in catchment management, according to the Kenya Forest and Conservation Act (2016), no research has been conducted to compare their contributions, particularly in terms of how effective the CFA

and WRUA are at catchment management, how they are organized, and the opportunities and challenges they face, and their capacity to manage the catchment sustainably.

1.3 Study's Objectives

The general objective of this study was to assess the contributions of the Kenze CFA and the Upper Kaiti WRUA in the management of the Kilungu catchment. The specific objectives were:-

i. To examine the operations and legal obligations of community forest associations and water resource users'
ii. To determine the structure and functions of community forest associations and water resource user associations.
iii. To analyze the institutions' challenges and opportunities in managing the Kilungu catchment.
iv. To evaluate the capacity of Community Forest Associations and Water Resource Users' Associations to manage the Kilungu watershed sustainably.

1.4 Research Questions

i. How effectively do community resource user associations for water and forests uphold their legal obligations?
ii. How important is the leadership structure of the Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) in managing the Kilungu catchment?
iii. How are opportunities and challenges they face in managing the Kilungu catchment affect Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs)?

iv. Can the Community Forest Association (CFA) and the Water Resource Users Association (WRUA) manage the Kilungu catchment?

1.5 Study's Justification

Planning well and including all stakeholders in management are essential for improved forest cover in Kenya and other regions of the world, as well as effective governance of catchments, forests, and water resources. Additionally, catchment-adjacent communities and community governance organizations play a significant role in catchment resource management since they directly benefit from the resources. The theory linking CFA and WRUA's high social-ecological fitness and successful watershed management results is supported empirically by communities' involvement in catchment management (Bodin *et al*., 2019). It is thought that involving CFA and WRUA in catchment management is a good strategy for improving the management of the watershed's natural resources (Bodin, *et al*., 2017). The design and operation of the institutions of water and forest have an impact on the scope and efficacy of neighborhood activities as well as participation in catchment management decision-making, ensuring their sustainability (Thenya *et al*., 2017). In contrast, the activities and organizational structure of Kenze CFA and Upper Kaiti WRUA are unknown (County Government of Makueni, 2019). The Kilungu catchment serves over 22,956 people in 4,372 households and is at the heart of an ecological support system. The advantages of catchment areas stem from the support of livelihoods. Because of the catchment's continued reliance on it for water and a variety of livelihoods, it is nearing depletion (KFS, 2011). CFAs and WRUAs in the catchment must urgently improve their governance levels to ensure that communities continue to receive livelihood assistance. In Sub-Saharan Africa, efforts to strengthen the involvement of community forest groups and WRUAs have run across several difficulties (Ribot *et al*., 2007). Previous studies on participatory forest management have primarily

focused on the effects on livelihood. However, little research and data on the roles of community institutions in the governance of the Kilungu catchment have been collected, and the organizational structure of the two institutions is unknown.

As a result, this study must examine the institutions' mandates, analyze and document the structure and activities of the CFA and WRUA, document the challenges and opportunities, and explore the capacity options of the community institutions in forest and water governance in the Kilungu catchment. Additionally, a prior study has shown that Community Forest Associations and Water Resource User Associations bring a wealth of unrealized prospects while also facing many worldwide obstacles (Thenya *et al*., 2004); (Kinyanjui, 2009). In the Kilungu catchment, however, the CFA and WRUA challenges and opportunities are unknown (County Government of Makueni, 2019). Community-based forest associations (CBFAs) and water resource management through WRUAs have grown in popularity in most regions of Kenya, according to prior research (Thenya *et al*., 2017). These two institutions have been active in the governance of the forest and water resources, but their comparative contributions have not been made, particularly about the structure of the CFAs and WRUAs. This study will assist in achieving the Africa Agenda 2063 framework goal of ecologically sustainable economies and communities by strengthening the governance of Community Forest Associations and Water Resources Users Associations for effective catchment management.

1.6 The Study’s Significance and Scope

The research was limited to the study area, the Kilungu catchment, and the community institutions that govern it. According to the institute's requirements, the thesis approach was paper format anchored and based on the institutional and change theory respectively.

Only Kenze CFA and Upper Kaiti WRUA, both of which were established in 2013, were investigated. Kilungu catchment served as the site of the research.

The Kilungu catchment was chosen as the primary unit of analysis for several reasons. First, even though the catchment was managed by a registered Kaiti Water Resources Association (WRUA) and a registered Kenze Community Forest Association (CFA), its activities, structure, problems, opportunities, and sustainability status were not documented, necessitating further research. The catchment is also surrounded by various households. Around 22,956 people, including 4,372 households, rely on it both directly and indirectly for their livelihoods. It spans seven blocks in Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio (Government of Makueni County, 2019). The study's particular objectives were to analyze the effectiveness of Community Forest Associations and Water Resource Users Associations in carrying out their legal obligations, review the composition and functioning of the two organizations, and identify any gaps in knowledge. Find out what challenges CFAs and WRUAs face, what opportunities are available, and whether or not they can continue to manage catchments. The study's findings will be useful to policymakers because they will describe the contributions of community forest associations (CFAs) and water resource users associations (WRUAs), look at how these organizations are set up and run, pinpoint issues they encounter, and propose new initiatives to help CFAs and WRUAs better fulfill their legal obligations. By creating a new, understandable, and efficient governance structure and operating framework for the Kenze CFA and the Upper Kaiti WRUA, research will also give recommendations to policymakers on how to improve the contribution of the CFA and WRUA. The study will also advise decision-makers on the urgent need to expand their knowledge of the CFA and WRUA structures to boost their efficacy. By guaranteeing equal involvement of men and women in all institutional

structural structures, it would also assure gender balance and equity. Importantly, the study will detail the CFA and WRUA's challenges and how they can be overcome, as well as provide a guide to the institutional opportunities available and ensure the CFA and WRUA's long-term viability. The study will also inform policymakers about the critical importance of raising awareness about the CFA structure to improve its effectiveness.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction to the Chapter

This chapter's goal was to investigate the function of community institutions in the management of forests and water, with a particular emphasis on the contributions of the two organizations in charge of the Kilungu watershed. The study's intervening factors were the Kenze Community Forests Associations and the Upper Kaiti Water Resources Users Associations. The dependent variables include increased involvement in catchment management initiatives linked to community forests associations (CFAs) and water resources users associations (WRUAs), as well as a new, straightforward, functional governance structure and framework for community forests and water associations.

Improved community engagement, collaboration, and partnerships with significant federal, state, municipal, and local stakeholder groups, as well as an empowered and effective CFA and WRUA in carrying out their tasks. Furthermore, harmonized institutional governance structures for the CFA under the Forests Act and the WRUA eliminate jurisdictional overlaps to manage forests and water resources effectively and efficiently. This was accomplished through the Water and Forests Act, as well as government support for the Kenze CFA and the Kaiti WRUA through capacity building and public awareness of their structures. The Kenze CFA and the Kaiti WRUA aligned their plans and implementation with current government policies and priorities to maximize the uptake of all existing and available CFA and WRUA opportunities while minimizing difficulties.

The independent determinants include the sustainability of the Kenze CFA and Upper Kaiti WRUA, the challenges and possibilities these organizations confront, as well as the

design and management of the organization. Finally, the chapter discusses institutional governance theories, theoretical frameworks, and conceptual frameworks' contributions. Long-term management of catchments, which are widely recognized as significant producers of ecosystem services, can be accomplished through collaboration among community institutions, according to research (Pohjanmies *et al.*, 2017).

Local institutions are necessary when shared community pool resources (CPR) like water and forests are in danger, according to studies. When it comes to managing common resources like forests, big lakes, rivers, and the atmosphere, the public overwhelmingly favors community-based institutions, according to a previous study on the topic conducted in Nepal. The development of local institutions to facilitate communicative decision-making in the management and access to natural resources within and beyond catchments has long been regarded as critical to efficient resource governance. The number of reciprocal benefits required to increase human well-being and ensure environmental protection is determined by the efficacy and justice of community resource governance systems.

Nature conservation and enjoyment are rooted in resource governance, which leads to just communities capable of conserving and valuing nature. Many countries around the world use decentralized catchment management to improve decision-making and benefit-sharing equity. Decentralizing forests and water catchment management is widely thought to promote both efficiency and equity in catchment resource exploitation (Ribot, 2006). Local institutions and governments are encouraged to serve and provide acceptable services to local citizens through democratic means, resulting in increased efficiency and equality.

Decentralization of the forests, in particular, seeks to improve people's lives, alleviate poverty, and safeguard the state of the catchment. The management of forests management regimes by community institutions has piqued the interest of evolving countries in modern years, as it is regarded as a means to encourage financial proficiency, community responsibility, public and discrete enablement, and allocative adeptness in the forestry sub-sector (World Bank, 2007). To enhance catchment protection and the sustainability of woodland resources, many nations have already enacted policy and regulatory measures to be included in a system of PFM (Busck-Lumholt & Treue, 2018). In Kenya, for example, numerous policies focusing on catchment management and conservation have been implemented with contributions from community institutions such as CFAs and WRUAs. The first official forests policy, for example, was developed in 1957 and amended in 1968 as Session Paper No. 1 of 1968. This strategy was primarily concerned with the management and conservation of public lands and plantations, with no establishment for stakeholder involvement in wooded area management.

The Kenya Constitution 2010 however established new guidelines for community and gender rights, public participation, equitable benefit sharing, devolution, and the requirement to achieve a 10% forests cover. Forestry development is now required in both private and public areas due to depletion. Kenya's Water Resources Authority (WRA) was established following the enactment of the Water Act of 2016, which regulated the management and use of water resources through basin water resources committees, which are in charge of managing water resources within a basin area. Water basins in general, aquifer water resources, and water supply used for industry, agriculture, or other private purposes are all managed and conserved by the Water Resources Authority (WRA). Organizations of people who use water resources are created at the level of sub-basins in compliance with the Water Act of 2016. A community-based group known as a "water

resource user's association" is dedicated to managing water resources collaboratively and resolving disputes around their use (Water Act, 2016). Catchment protection in Kenya is also based on a multi-stakeholder strategy.

For instance, the Community Forests Association is required by the Forests Act of 2005 to enter into a contract with the Kenya Forests Service (KFS) to help protect and conserve forest resources through a legally recognized organization (CFA). Community involvement in catchment management and governance, long-term sustainability, equitable benefit sharing, conflict resolution, and biodiversity preservation are all aimed to be advanced. Community forestry and water governance have a positive impact on livelihoods and food security claims (Ojha & Chchatre, 2009). The Water Act of 2016 created the Water Resources Authority (WRA) to manage the protection of water resources through Water Resource Users Associations.

Additionally, a lack of accountability and transparency is usually linked to issues like illegal logging, exploitation, disdain, and poverty among cultures that depend on forests among indigenous peoples (Davis *et al*., 2013).

For ease of management, the Kilungu watershed, the research area, is divided into seven sections. The names of the blocks are Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. It provides a focal point for an ecological support network and a source of income for 4,372 households that comprises 22,956 people. The Upper Kaiti Water Resource User's Association and the Kenze Community Forests Associations are the two community forests and water resource user organizations that oversee the Kilungu catchment. Due to their active participation in the management of the Kilungu watershed, these two institutions are pertinent to our research. Given the deficiencies in community governance institutions mentioned above, it is obvious that this study on the contributions

of community institutions in managing the forests and water resources in the Kilungu catchment is urgently needed.

2.2 Community Governance Institutions

2.2.1 Meaning of Governance

The United Nations Economic and Social Commission for Asia and the Pacific (2016), defines governance as "decision-making and implementation methods. Governance is defined as the pursuit of common goals through equitable resource mobilization processes (Pierre, 2002; Capano *et al.*, 2015; Avis, 2016). Through governance, governments use authority and incentives to address communal issues (Capano *et al.*, 2015). Governments oversee resource allocation and management, set governance standards and guidelines, and monitor adherence to them. Local governance, social governance, network governance, and participatory governance are terms linked to community governance, which refers to community involvement, engagement, and decision-making in public affairs (Bond *et al.*, 2021, Baynes, 2015). Again, informal rules regulate the use of forest and water resources by various types of smallholders and groups (i.e., indigenous people, agro-extractive and traditional communities) in catchments in forest and water governance. Understanding the 'working rules,' which include both formal and informal rules, that individuals use in making decisions about water and forest resource access and usage, which affects benefit generation and distribution from such resource use, is prioritized. The distinction between formal and informal institutions becomes vital; their interaction is crucial in assessing human behavior. Pacheco, Pablo Barry, Deborah Cronkleton, Peter Larson, Anne M., 2008.

2.2.2 Community Governance Institutions

Insufficient contributions to community governance have become a major global concern in recent years. Governments and global agencies like the World Bank and the Food and Agriculture Organization of the United Nations (FAO) have pushed people to participate in the management of forests and water resources as a response (Kumar *et al*., 2007). Locals in Africa, for example, have a significant influence on decisions regarding forest management due to their needs for land, wood for electricity and construction, and other non-timber forest products (NTFPs). Due to this, several academics and educators (such as Agrawal and Ribot (1999); Ribot (1999, 2003; Larson, 2003; Blomley, 2013) believe that involving local communities and actors is an important step toward boosting resource contributions to community development and improving resource management through community participation and again diverse types of smallholders and communities (i.e.) indigenous people, agro-extractive and traditional communities) also informally govern water and forest resources. Some authors (Kumar *et al.,* 2007) claim that without first comprehending the values communities have for forests, it is dangerous to build all-encompassing forest management methods that are supposed to attain acceptable forest management (i.e., forests value orientations).

In South Africa, household tree values are little understood and acknowledged by politicians at the national, regional, and local levels. Furthermore, previous research failed to incorporate household values for forest resources into models that explain the factors that influence household engagement in community forest management. Another study discovered that grass-root community institutions are serious about the realization of sustainable natural resource management and catchment preservation and that these organizations must be recognized and supported to effectively carry out their missions (Wiggins *et al*., 2004). Sustainable catchment management, in essence, reflects a growing

recognition that human interventions, particularly community forests governance, can contribute to forest sustainability and catchment management (Poteete & Ostrom, 2002). According to previous research, institutions are "enduring regularities of human behavior in situations governed by rules, norms, and common techniques" (Crawford & Ostrom, 1995). To carry out specified jobs and activities, people create communal institutions. Organizations, in turn, organize and structure human activity to achieve shared objectives (Ostrom, 2005; Bussey *et al*., 2012). As a consequence, the preceding material recognizes and promotes the two community governance institutional organizations involved in the management of the Kilungu watershed. Community governance institutions can help or hinder individual activities in adapting to changing situations, necessitating policy development to ensure that CFAs and WRUAs are made adaptive to improve their ability to control catchments excellently and resourcefully (Engle & Lemos, 2010). Adaptive associations can also deal with the ambiguous goals associated with social-ecological systems. The Upper Kaiti WRUA and Kenze CFA are two of the most significant formal community systems of government involved in managing the Kilungu catchment.

This means that the formal institutions in the Kilungu drainage area are part of the rules and procedures by which official channels such as the executive or legislative branches formulate, transmit, and enforce laws aimed at ensuring catchment management for example, the Upper Kaiti WRUA constitution, Kenze CFA constitutions, Water use control and policing, Water Act 2016, and Kenya Forests and Conservation Act 2016, among others (Ostrom, 2005). The long-term viability and sustainability of watershed management options are heavily reliant on prescribed and familiar power institutes (Mbeyale, 2009; Msuya, 2010). Together, the County Governments (CGs) and the Kenya Forests Service (KFS) collaborate to maintain Kenya's forest resources. Indigenous groups must plan and catalog Community Forests Associations (CFAs) inside diverse

forests around the nation to enter into such co-management agreements. Further research by Thenya *et al.* (2007) confirms that CFAs are formed by community members who live near forests and benefit directly from them. They claim that CFAs are formed primarily to combat poverty and engage in income-generating activities that vary across different forests, as well as to manage forests within their jurisdiction. CFAs in Kenya are expected to perform two main functions: first, develop management plans for managing the forests, and second, protect, manage, conserve, and expand the forests cover. The contributions of Kenze CFA to the Kilungu catchment are unknown and thus form the basis of this study. On the other side, institutional design has received a lot of attention recently in discussions around water governance. The critical role that self-governance can play in water resource management, in particular, is based on critical principles such as contribution, an acceptable level of accomplishment, and enabling. In this context, institutions for collective water management come to the fore. Water User Associations, in particular, offer a particularly compelling and appealing blend of private and public functions. Water catchments have long been recognized as an essential part of food security, according to the 2002 World Summit on Sustainable Development, which stressed the significance of water resource management in meeting the Millennium Development Goals (UN 2002; Millennium Development Goals). Making wise use of natural resources and sustaining complex ecosystems are both necessary for the sustainable use of water resources. By managing local water resources, communities may democratize and decentralize decision-making and accountability. When community water management is well-executed, individuals (particularly the poor and other disenfranchised) are encouraged to participate in decisions that shape their future (Sokile *et al.*, 2003). It is becoming increasingly clear that to achieve objectively sustainable water resource management, we must implement a comprehensive strategy that includes

intentional and sustained community participation (Cheptoo, 2006). The shift from a resource-centered to a people-driven paradigm has resulted in the realization that water resource management should be primarily a governance process rather than a technical endeavor. Rather than focusing solely on identifying technical issues and implementing technical solutions, water, and forest resource managers must place a greater emphasis on defining, balancing, and applying societal values to resource use and management. As a result, this serves as the foundation for this investigation into the WRUA's contributions to the management of the Kilungu catchment.

2.3 The Connection between Community Forests and Water Resource Users Associations

The most important interaction between WRUAs and CFAs in Kenya is the fact that both of them take part in Integrated Water and Forests Resource Management (IWFRM). The IWFRM agenda and related Dublin ideas, which include a participatory technique for water and forest management, were used to achieve this (Molle, 2008; Allouche, 2016; Manzungu & Derman, 2016). Water Resources Users Associations (WRUAs) have been established in Kenya's six drainage areas as a result of the Kenya Forests and Conservation Act of 2016's recognition of the value of community participation in resource management (Lake Victoria North Basin, Lake Victoria South Basin, Rift Valley Basin, and Athi River Basin). The 2016 Forests Act and Water Act both recognize the importance of stakeholders in water efficiency and forests resource management and provide them with the chance to participate in resource management through WRUAs and CFAs, which are local organizations tasked with managing and conserving water and forests resources in a specific area, catchment, river, or aquifer (The Water Act, 2016).

The WRUA's main goals are to control and make legal efficient water use, good management practices for effectively and sustainably using water resources,

environmental flow protection for downstream biological needs and basic human needs, conflict resolution in water use conflicts, and catchment conservation measures that improve water quantity and quality. Whereas the main goals of the CFA are to guard, preserve, and realize such forests or portion thereof through an official supervision arrangement entered into under the Act (Note: Section 47(1) of the Forests Act 2005); Protection of sacred orchards and endangered plants; promotion of the provision in applying the requirements of this Act, as well as any guidelines and protocols enacted in response to it, particularly in the area of illicit forests harvesting; formation of collaborations with other people with the Board's permission to ensure efficient implementation of the provisions of this Act.

2.4 The Activities of Community Forests Associations and Water Resources Users' Associations in the Kilungu Catchment Management.

Evidence from around the world indicates that community participation in catchment management is important, especially when communities that rely on the catchment for a living are fully involved in both concrete actions and decision-making processes concerning the area they inhabit and use, and are actively involved in the implementation of decisions that affect them as a people (UNCED, 1992).

Community institutions are a crucial part of managing forests and water resources, according to environmentalists, since they give marginalized groups like women, young people, and the impoverished the opportunity to influence decisions that could threaten their very existence (Mayoux, 1995). According to a study, community forestry and water governance improve livelihoods and food security (Ojha & Chchatre, 2009). Poverty, food insecurity, and unsustainable levels of natural resource depletion are attributed to poor forests and water resource governance. Furthermore, a lack of transparency and

accountability is frequently associated with issues such as prohibited deforestation and deception, as well as disregard for communal basic needs and poverty among forest-reliant groups and indigenous peoples (Davis *et al.*, 2013). Participation of the general public in forest conservation and management operations is becoming increasingly popular around the world (Agrawal, Chhatre & Hardin, 2008). The Rights and Resources Initiative seeks to guarantee that indigenous peoples and local communities have distinct and secure property rights (RRI). The ability of nations to engage in a variety of activities and successfully carry out their statutory obligations in watershed management significantly increases their capacity to achieve national-level and even local forest conservation, as well as catchment restoration (RRI, 2014).

PFM, also known as public involvement techniques, is becoming more and more well-known as a practical solution for more efficient and fair forest management and conservation. Furthermore, effective forests, tree, and water resource governance activities are required to implement the Paris Agreement and achieve 14 SDGs, such as poverty reduction, improved food, and nutrition security, improving people's livelihoods, upholding maintainable agriculture, combating climate change, conserving natural resources, improving ecosystem services, and contributing to the long-term sustainability of communities (Davis *et al*., 2013).

Community Forests Associations (CFAs) are used in emerging countries to succeed in vulnerable woodlands and safeguard biodiversity maintenance over and done with inclusive, equitable, and democratic forest resource management (Amanor, 2003). According to Population Action International (PAI), the primary causes of catchment degradation in countries such as Brazil, Australia, Indonesia, and Nigeria are population density, dispersion, growth, and migration, among other variables (Population Action

International, 2011). Communities on the outskirts of these catchment areas contribute to the same catchment degradation in these countries by cutting down trees and removing vegetation for habitation, farming, and herb harvesting in unsustainable ways. Population growth necessitates increased food demand, which leads to greater conversion of catchments to agricultural lands for food, necessitating effective and proactive CFA activities to protect the catchments, according to Population Action International (2011). At least 21 African governments have approved Participatory Forests Management (PFM), a different approach to managing catchment resources that have been adopted by the majority of countries throughout the world. For enhancing community livelihoods and long-term resource management in catchments, decentralized catchment management is viewed as a viable solution. Participatory forest management is centered on villages in Asia, as opposed to the Kenyan model, which is based on Community Associations such as Community Forests Associations (CFAs) (Mutune & Lund, 2016). Importantly, during the 1990s, Nepal's community forests associations focused on forest preservation and administration with the explicit goal of slowing forest degradation, with a strong emphasis on research and group exchange (Hobley & Shakya, 2012).

A study of the state and efficacy of Community Forests Association activities in Cameroon's rainforests discovered that they were in poor condition. The majority of respondents (78%) believed that Community Forests Associations' actions did not meet the criteria for good catchment governance, particularly the accountability, equity, participation, representation, direction, and performance are noble supremacy ethics (Piabuo *et al*., 2018). Participatory forests management (PFM) was acknowledged by the Forests Act of 2005, however, there is little proof that it is being used or having an impact in Kenya. Additionally, there is little information available regarding Community Forests Associations' contributions to watershed management (Mutune & Lund, 2016). In

Kenya's Kakamega forests, a study on the activities, effectiveness, and impacts of CFAs and Community-Based Organizations (CBOs) on improving community livelihoods and reducing catchment over-dependence discovered that local community participation and impacts were at 78 percent, which was considered adequate.

However, up to 56% of respondents thought the CFA's actions were effective in ensuring catchment management, while 44% disagreed and labeled the CFA's operations ineffective. The Kenya Forests Service (KFS) was established in 2005 as a mostly autonomous government entity with assistance from other government ministries as a result of the Forests Act of 2005.

The Kenya Forests and Conservation Act of 2016 gave the Kenya Forests Service (KFS), forests conservation committees, and community forests organizations control (CFAs). The new policy uses integrated forest management as its supervisory norm, which is primarily carried out through CFAs (Ongugo *et al*., 2007). The Kenya Forests Action Network (FAN) and Kenya Forests Working Group (KFWG) have created several CFAs by teaching people close to Kenya's important forests (Ongugo *et al.,* 2007). To comply with the requirements of the Forests Act, the Kenya Forests Service recently approved the formation of CFAs.

Members of community forests can form partnerships and locals can consistently take part in the conservation, protection, and management of a specific forests area by working with the KFS through registered Community Forests Associations (CFAs), as long as the conditions of the forest management plan are met (World Bank Report, 2007). The Kakamega Community Forests Association (KACOFA), a local organization founded in 2006, has been engaged in the following activities: management and conservation of the Kakamega Forests, including the establishment of tree nurseries and afforestation,

encouraging community development on conservation, tracking forests condition, observing member group activities, reforestations, and instructing groups in nursery management (Ongugo *et al.*, 2008).

Unlike previous research on the scope to which Public Forestry activities contribute to the enablement of residents in Ngare Ndare Forests, CFAs enforced and carried out catchment management recommendations. The Kenze CFA is involved in catchment management in the Kilungu catchment to ensure that it is well conserved, which is consistent with previous research (Mutune & Lund, 2016) that claims that community participation in forests governance increases local participation in catchment resource use, right to benefits, and management. Research, on the other hand, indicates that to objectively ensure sustainable water resource management, we must employ a holistic approach that includes conscious and ongoing participation in local community activities (Cheptoo, 2006).

Community water management enables democratic, decentralized, and accountable decision-making. Water resource management is a governance process, not a technical activity, and water resource managers must focus on defining, balancing, and applying societal values to resource use and management rather than simply solving technical problems and applying technical solutions.

According to the International Conference on Water and the Environment, water development and management should be aided by a democratic approach that involves users, planners, and policymakers at all levels (ICWE, 1992). The general public and policymakers are being made aware of the significance of water catchment management. This indicates that water catchment management initiatives are created and put into action locally, with full national input and user involvement. In favor of bottom-up demand-

driven alternatives that take into consideration a wide range of local organizations' and individuals' experience, activities, skills, and expertise, many nations are moving away from top-down supply-driven systems.

The National Water Resource Management Strategy (NWRMS) and the Catchment Management Strategy must also be developed by the Water Act, and stakeholder participation in talks about the distribution of water resources is required (CMS). In response to a comprehensive system that facilitates the controlled use of water resources for community benefit, Kenya developed a basin-based approach to managing water resources. The water legislation of 2002, the Kenyan constitution of 2010, and the most current water act of 2016 all recognize the role of communal participation in source management. So, in each of Kenya's six drainage-basin regions, Water Resources Users Associations (WRUAs) were founded (Lake Victoria North Basin, Lake Victoria South Basin, Rift valley basin, Athi river basin, Tana River Basin, and Ewaso Basin).

The WRUA based its decisions on fairness, teamwork, and the defense of a shared water supply (Watson, 2007). The open-source, integrated water resources management organizations known as Water Resources Users Associations are based in Kenya's Kilungu watershed (WRUAS). The sole organizations in control of the Kilungu basin's tributaries, such as Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi, and others, are the Kenze Community Forests Associations and the Kaiti Water Resources Users Association (WRUA) (CFAs). According to this research, there is no information on the efficiency or operation of these institutions (County Government of Makueni, 2019).

2.5 Understanding of Forest and Water Governance Structures and Institutions

The United Nations General Assembly declared 2005 to 2015 to be the International Decade for Action "Water for Life." The main goal of the Decade is to hasten efforts to

resolve water-related international obligations and difficulties by 2015. Even though it is a global issue, water governance is frequently perceived as a local or regional one. When water problems extend beyond the boundaries of individual towns, the river basin is frequently regarded as the best unit for analysis, planning, and organizational arrangements. As a result, the majority of efforts are concentrated at the local or river basin level on establishing proper institutional setup (social order and cooperative structures or procedures).

According to the literature review, a water governance system is beneficial when local people are active in institutional structures and catchment management is sustainable (Poteete *et al.,* 2002). Residents own the resources in their catchment area. Human interventions in the form of community institutional management and governance frameworks can promote the sustainability of catchments, as evidenced by international efforts to establish standards and metrics for sustainable watershed management (Poteete & Ostrom, 2002). The World Resources Institute's (WRI) Governance of Forests Initiative (GFI) framework structure, which fosters policies and practices that increase sustainable watershed management and support local livelihoods, is one approach for assessing forest governance challenges. The GFI framework structure distinguishes three major structural components: players, regulations, and practices which aid in the understanding of forest governance.

Government agencies, legislators, businesses, and community groups such as Associations of Water Resources Users and Community Forests users, the media, and civil society are all actors with an impact on forest management and exploitation. The rules are the policies, laws, and regulations that govern forests, and the indicators are used to assess how policies are developed and changed within the framework of current

policies and laws. Actors can evaluate the influence of administrative processes and enforcement actions by examining how regulations are developed and implemented to guide operational practices (Davis *et al*., 2013). Kenya's national forests system, the Kenya Forests Service (KFS), is in charge of maintaining the country's forest resources. A law passed by the government of Kenya requires that residents form forest associations inside the country's numerous national forests. Additional research indicates that Section 69 of Kenya's Constitution mandates that the government encourage public participation in environmental regulation, safety, and preservation (1). It offers a legal foundation for both the federal government and county administrations, as well as the delegation of authority to counties, necessitating cooperative decision-making and discussion. If their management agreement with the Kenya Forests Service has been approved, Community Forests Associations may participate in forest preservation, conservation, and management under Section 49 of the Forests Act of 2001. The Guidelines for Participatory Forests Management are used to build and strengthen the Community Forests Association and other suitable community organizations (PFM). Members of the Community Forests Association have access to the user rights outlined in an approved Management Agreement under Section 49(2) of the 2016 Forests Act. There are only a few of these rights: medicinal herb gathering, timber or fuelwood harvesting for community-based businesses, tourism and educational activities, grass harvesting, and grazing. According to the CFA, the Community Forests Association (CFA) is a key community organization structure for stakeholder participation (Ongugo *et al.*, 2008).

CFA groups are important for catchment protection, attracting investors, and recruiting other stakeholders, especially when they are designed to accept new members quickly and have an inclusive leadership structure. According to Thenya *et al*. (2014), community forests associations (CFAs) are an important community organization framework for

stakeholder engagement. CFA organization is critical for attracting investors and other stakeholders, especially when newcomers are expected to be quickly integrated. The CFA is structured so that user groups are formed at the household level, which leads to the development of legal entities known as community-based organizations (CBOs). These CBOs are employed in the creation of the CFA's representation. According to studies on water governance structures, the Water Framework Directive of the European Union (2000) defines a structured order of water resource management based on the concept of river basin management (Moss *et al.*, 2005). Like other European Union (EU) directives, the Water Framework Directive encourages members to make appropriate administrative arrangements, such as identifying the appropriate competent authority, to ensure that the directive's rules are followed in each river basin under their jurisdiction. In terms of structure, China's top executive body is the State Council. There are many administrative divisions (Ministries, Commissions, and other authorities) that make up this organization, some of which are in charge of water, for instance, the Ministry of Environmental Protection is responsible for addressing water contamination (MEP). In Spain, water resource user associations are categorized based on how they were formed. Their formation can be voluntary or coerced by the government in certain circumstances (Del Saz, 2002). The Water Act of 1985 legally extended social institutions for water management in Spain to groundwater management and delegated authority from the national to the village level. According to a search conducted by the United Republic of Tanzania (URT) in 2017 water governance organizations in Tanzania include basin boards, village water committees formed by the village administration, water user associations, and district councils. They are governed by bylaws and work with other conservation groups.

Similarly, the Water Act 2016 oversees the running of Kenya's water resources, as stated in the Republic of Kenya's (ROK) constitution (2010). The Kenyan Constitution defines access to fresh and harmless water as a fundamental human right, and water catchment management, supply, and sanitization services are the responsibility of 47 newly formed counties. According to the amended Water Act, WRUA activities are shared by national and county government entities. The Act establishes several institutions with specific responsibilities for water resource management. Even though the previous act acknowledged community involvement, the new legislation does not specify the role of local communities in water distribution, consumption, or catchment protection.

The Water Resources Authority (WRA) is the national catchment management organization, managing the water resource data maintenance, sharing to countless users, regulating settings for water use permits and connected concerns and water catchment conservation planning and sustaining water resource records to achieve its objectives, it creates the National Water Resources Management Strategy (NWRMS). Each of the six regional catchment levels has a WRA area office and a CAAC (catchment area advisory committee). Together with CAAC, the WRA local office uses NWRMS to create a Catchment Management Strategy (CMS). Each region has several Water Resource Users Associations (WRUAs) based on sub-catchment levels. The area and WRUAs collaborate to create a Sub-Catchment Management Plan (SCMP). A sub-catchment management plan outlines a prioritized task list of the difficulties in managing sub-catchment water resources. The Kilungu catchment, which officially is a component of the Athi River catchment basin, is managed by the upper Kaiti WRUA.

According to a review of the literature, WRUAs typically begin as Self-Help groups, Community-based organizations (CBOs), or independent groups that have been approved

by the Department of Social Services (Watson, 2007). CBOs are easy to set up, with only a small amount of paperwork required before receiving a registration certificate, which is sufficient to open a bank account. Water users are more likely to comprehend and follow a catchment sub-management program if they participate in its creation and implementation.2.6 Associations of Water Resource Users and Community Forests Association

2.6 Catchment Management Challenges, Opportunities, and Institutional Capacities

In terms of Catchment Management Challenges, Opportunities, and Institutional Capacities, previous studies in China revealed that community institutions such as the water resource users face various challenges such as lack of coordination among competing ministries, limited data exchange, numerous bureaucratic roadblocks, and ambiguous water tenure. Water regulations are sometimes interpreted to refer to water projects managed by a single entity (Liu & Speed, 2009).

Furthermore, at all levels of government in China, citizen participation is low or non-existent. The South-North Water Transfer Project in China, for example, provides almost no opportunity for localized individuals affected by the transfer to provide feedback and this is a big challenge in the management of forest and water resources. Similarly, studies in India show that livestock grazing, fuelwood/fodder extraction, and burning are harmful to Indian forests and can have a large impact on the entire forests and water catchment, necessitating community governance to address such challenging characteristics. Another issue that CFAs face is the entitlement of some community members who believe they have unrestricted access to the catchment, which impedes the CFA's ability to manage the catchment effectively (Koech *et al*., 2009).

According to the Kenya Forests Management and Conservation Act 2016, forest legislation has only had the barest institutional capacity for enforcement, as shown by a lack of staff, prosecutors' lack of training and awareness of forest legislation, low morale, and a lack of equipment for forest guards. Corruption has been noted as a problem in the distribution of forest land, the issuance of logging permits, and the transfer of forest products, as well as in the unrestricted exploitation of forests and the ineffective enforcement of forest laws and regulations. The degradation of catchments such as those in the Upper Imenti and Rumuruti catchments prompted the formation of several Community governance organizations in Kenya in the early 2000s. The main issues that Community Forests Associations encountered, per the study, were a lack of transparency on the part of the authorities, the difficulty of some members to generate some money, the failure to share earnings, and a dictatorial attitude on the part of some of the leaders (Koech *et al*., 2009). Additionally, because of the many difficulties that Associations for Water Resource Users and Community Forests Associations institutions encounter, the causes of catchment degradation occur in various sectors, and both the effects and causes vary across national and local boundaries. According to existing literature, agriculture is thought to be the primary cause of roughly 80% of watershed degradation worldwide, necessitating the participation of CFAs and WRUAs in water and forest governance to protect catchments. Approximately 5 million people live near or within protected areas, according to Kothari *et al*., (1995); however, (Mehta *et al.*, 2017) estimated the figure to be around 350 million, including 84 of the total communities. Water institutions, particularly Water Resource Users Associations and policy reforms, are springing up all over the world, but progress is slow, unpredictable, and fraught with challenges, such as fragmented and overlapping governance structures (Biswas & Tortajada, 2010). Several water management WRUAs exist, the vast majority of which are self-contained. WRUAs

in Kenya, for example, face challenges from a variety of organizations in charge of various water-related activities, including the Government of Kenya and non-governmental organizations (NGOs). In contrast, notable organizations have little or no coordination among themselves and do not interact with other sectors whose decisions affect water resources. According to the study, CFAs have several advantages, including favorable policy and legislation (Ongugo *et al.*, 2008). A sustainable approach to forests and water governance necessitates an integrated ecosystem approach in which all stakeholders are involved in resource sustainability by developing regional or global goals and priorities (Moss, 2005). According to the World Bank, only trees provide a living for 60 million indigenous people, 350 million rely solely on agroforestry farming systems for subsistence and income, and one billion rely solely on agroforestry farming systems (World Bank, 2007).

Community Forests Associations are established to manage forests sustainably, as opposed to Water Resources Users Associations, which are established to manage water resources. The potential of Community Forests Associations (CFAs) to provide institutions with sustained economic possibilities beyond small-scale, internal markets was highlighted in an assessment of CFAs conducted in the 1980s by a food agricultural organization in Guatemala, Nepal, Peru, and Sudan. According to the poll, to reap long-term benefits, community forest groups should be financially viable. People who live close to a natural resource are better able to protect it and preserve its long-term viability, according to a community-based resource governance system. People protect what directly benefits them, and the benefits must outweigh the costs of protection to ensure long-term viability. Government officials and other stakeholders must comprehend community forests and water resource conservation and management if they hope to improve access to water and forest resources while decreasing land degradation in arid

and semi-arid areas. Institutions in the community that control how natural resources are used are believed to promote economic growth and end poverty (Thenya *et al*., 2008).

The study reveals that community involvement is essential for attaining sustainable natural resource management (Poteete & Ostrom, 2002). True owners of natural resources may be the locals. Based on international attempts to offer standards and indicators for sustainable forests management, human interventions, as well as community forests management and governance, can help to assure forests sustainability (Poteete & Ostrom, 2002). The existence of governing structures will determine the forests' long-term viability (Mbeyale, 2009; Msuya, 2010). To ensure sustainable resource management, the nation is household to Community Forests Associations (CFAs) and Water Resource Users Associations (WRUAs). Together, the Kenya Forests Service (KFS) and the Water Resource Authority (WRA) collaborate to safeguard the long-term viability of Kenya's forests and water resources. Community Forests Associations (CFAs) and Water Resource Users Associations (WRUAs) manage resources in numerous catchments across the nation (MENR, 2007). According to Ongugo *et al*., there are a variety of difficulties that CFAs and WRUAs must overcome, such as a lack of socialization among officials, some members' refusal to make financial contributions, benefit-sharing, and specific leaders' dictatorial tendencies (2007).

Heterogeneity may affect their goals for managing the forests, which may also have an impact on the neighboring forests' resources. Once more, because CFAs lack the silvicultural expertise required to manage forests, they are dependent on partners, especially from the corporate sector, to help them with the technical aspects of doing so (Ongugo *et al*., 2007). Furthermore, according to Ongugo *et al*. (2007), for WRUAs and Community Forests Associations (CFAs) to effectively safeguard catchments, problems

must be solved and opportunities must be taken advantage of. All CFAs and WRUAs in Kenya have the choice to be registered and have constitutions written by consensus of all members, according to a survey of these organizations (Kinyanjui, 2009).

In the 1980s, the Food and Agriculture Organization (FAO) examined Community Forests Associations (CFAs) in Guatemala, Nepal, Peru, and Sudan, emphasizing CFAs' potential to provide institutions with long-term economic prospects, even outside of tiny domestic marketplaces. The survey's findings show, to reap long-term benefits, community forest associations should be made more sustainable. CFAs and WRUAs are excellent ways to help forest-adjacent communities meet their current forest product demand and services. People, in contrast, will struggle to realize this potential unless they are provided with the tools and resources necessary to manage local water and forest resources in a participatory manner and with effective decision-making. To alter people's perceptions of environmental issues and forest use and non-use, education is another option (Ongugo *et al*., 2007).

2.7 Theoretical and Conceptual Underpinnings

2.7.1 Theoretical Framework

Several theories exist to support community governance institutions' contributions. However, the two theories that best explain the current study's findings are the Institutional Theory (IT) and the Theory of Change (TOC). B. Loiseau, D. Benedict, R. Sibbald, S. Raman, L. Loh, and H. Dimaras (2016).

2.7.1.1 Institutional Theory (IT)

This study was guided by institutional theory to investigate how ethnic forces shape organizations' management practices rather than economic forces. The institutional theory describes how institutions such as CFAs and WRUAs strive for consistency in adhering

to the institutional environment's overarching rules and norms (Graziella McCarron, 2021). This research used institutional theory to assess community organizations' contributions to the forests and water governance in the Kilungu catchment, looking at their efficiency in carrying out their statutory obligations, organizational design and operations, problems and opportunities, and the viability of local organizations in the catchment management. The institutional theory was chosen as a theoretical framework for identifying and examining factors that support organizational sustainability and legitimacy, such as knowledge, awareness, problems, opportunities, and regulation, particularly in the context of the legal and statutory framework (Roy, 1997; Baumol *et al*., 2009; Lai *et al*., 2006). Organization theory has also made it possible to have a clearer knowledge of how groups and organizations, like CFAs and WRUAs, may more successfully defend their positions and validity by abiding by the rules and laws that regulate the institutional environment (DiMaggio & Powell, 1991; Scott, 2008).

Once more, the institutional theory was chosen because it clarifies why certain organizational exercises are chosen despite having clear economic benefits, how institutional structures and practices are developed, and how and why change happens (Berrone *et al*., 2010). The current study advances knowledge by studying the legal actions of the CFA and WRUA, their organizational design, and the opportunities and constraints they (the CFA and WRUA) confront in managing the Kilungu watershed while juggling their social, environmental, and financial duties. It was therefore determined that the governance frameworks of the CFA and WRUA are appropriate for shedding light on how the study's objectives are changing the positive outcomes for the catchment.

2.7.1.2 The Theory of Change (ToC)

This study's quantitative assessment of the influence of local institutions on the management of forests and water resources in the Kilungu catchment was conducted by the theory of change (ToC). The two components of change theory are a process and an outcome (Vogel, 2012). A theory of change (ToC) can be used to explain the effectiveness of an endeavor, especially when it comes to promoting institutional change within communities (Anderson, 2004). A dialogue-based strategy for creating a "description of a sequence of events anticipated to lead to a specific planned result" is the theory of change.

According to Harries *et al.* (2014), using a theory of change (ToC) is a technique to convey a need, the change you need to bring about (your outcome), and what you intend to do (Explain your actions). It is a completed literary work that describes the root causes and expected progression of events. This study is particularly relevant to the "missing middle" between what alternative efforts or programs accomplish (their activities or interventions) and how they help achieve the ultimate goal. Rehfuess *et al*. (2018) provide a more formal taxonomy of ToC approaches, classifying them as approaches that place more emphasis on describing the system in which participants, the intervention, and its context interact than on causal pathways connecting the intervention to multi levered outcomes, and (ii) approaches designed to support adaptive learning during interventions, whether they are iteratively conducted or not. The theory of change (ToC) also outlines how an intervention should result in outcomes and accomplish a certain objective (Dhillon & Vaca, 2018).

The theory defines the activity of modification by outlining the causal relationships in a project's short-, intermediate-, and long-term outcomes. The observed event is represented

as an "outcomes route," which depicts both the logical relationship of each consequence to the others and the chronological flow, Maru and his coworkers (2018a). To meet the study's objectives, the theory of change was used, which aids in describing the need being addressed, the changes expected (outcomes), and what needs to be done (activities and functions), as well as identifying success indicators and ensuring monitoring and evaluation (Maru *et al*., 2018a). This theory was also found to be relevant because it supports and complements the change process theory, which requires a clear understanding of what the CFA and WRUA must accomplish in the Kilungu catchment. This is done to ensure catchment management and to demonstrate the strategy's effectiveness. ToC, on the other hand, provides a unified framework for addressing "not only what works, but also where, how, for how much, and for whom?"

All functional leads stress the value of the ToC in developing success indicators that can then be used to direct monitoring (Vogel, 2012). It is significant to note that the theory of change aided the study in examining the actions and successes of Community Forests Associations and Water Resource Users' Associations in carrying out their statutory obligations, analyzing their organizational structure, identifying the difficulties CFAs and WRUAs face, and the opportunities available in Kilungu catchment management, as well as defining the process of selecting and implementing logic-based data. The theory also creates a more defined taxonomy of approaches, separating those used by institutions before interventions from those meant to support adaptive education more or less interactively through interventions; formulation based on describing the institutions in which interactions between CFA and WRUA associates, the interventions, and their context take place, rather than that convergent on causative path guiding. By outlining the goals of the study through guided surveys and illuminating the reasoning behind how the

suggested CFA and WRUA interventions and activities were expected to create outcomes, the theory was also used to steer the study's direction (Vogel, 2012).

Another one of the main objectives of the study was to assess the capability of Community Forests Associations (CFAs) and Water Resource Users Associations (WRUAs) to manage the Kilungu watershed. This goal was successfully guided by the hypothesis of change due to the ToC's key contribution of constructing large assessments of prosperity indicators of institutions like the CFA and the WRUA (Maru *et al.,* 2018a; Maru *et al*., 2018b; Thornton *et al.,* 2017). These two theories were used to address the following study questions: How successfully can community forest associations and associations of water resource users uphold their legal obligations? How can the Community Forests Associations (CFAs) and Water Resource Users Associations (WRUAs) manage the Kilungu catchment, and what opportunities and problems exist? Through their separate governance structures, how do Community Forests Associations (CFAs) and Water Resource Users Associations (WRUAs) contribute to the management of the Kilungu catchment? How effective are the Community Forests Association (CFA) and the Water Resource Users Associations (WRUA)? Both theories were used to investigate the importance and role of community institutions in the management of the forests and water resources in the Kilungu catchment.

2.7.2 Conceptual Framework Based on Institutional Theory (IT) and Theory of Change (TOC)

The institutional and change theory served as the study's conceptual foundation (Figure 2.1). The conceptual framework explains the connections between organizations like the Water Resources Authority and the Kenya Forests Services (KFS) (WRA). It also illustrates the important contributions made by the CFA and WRUA as a result of these

connections. All of these institutions have been demonstrated to be important in catchment management and overall environmental management (Huberty *et al*., 2011; Dercon, 2012; Janicke, 2012; Schmalensee, 2012). The independent variables, CFA and WRUA, followed the same logic as the dependent variables. The impact of the Kenze CFA and Kaiti WRUA in carrying out their statutory roles, community awareness and knowledge of the institutions' structure, the Kenze CFA and Kaiti WRUA's sustainability, adoption of available opportunities, and addressing the challenges they face may all contribute to reducing Kilungu catchment degradation and enhancing the institutions' sustainability. Furthermore, as intervening variables, CFA and WRUA institutions may carry out critical interventions, resulting in increased forest cover, water security, and livelihood development. The study discovered, however, that the aforementioned variables are required but not sufficient for improved Kilungu catchment management, necessitating the use of the aforementioned dependent variables or the study's recommendations, which included but were not limited to First, more Community Forests Associations and Water Resources User Association participation in catchment control programs; second, the development of a new, transparent, effective, and efficient governance structure and framework for CFAs and WRUAs; third, an assessment of the level of CFA and WRUA activity implementation for the efficient discharge of their statutory functions; and fourth, a new framework for catchment management initiatives. Finally, the two institutions present several opportunities, and as such, capacity must be built with a focus on the timely preparation and implementation of management plans. Additionally, to function effectively, the Kenze CFA and the Kaiti WRUA must coordinate their planning and execution with existing government policies and goals, as well as reduce barriers and increase acceptance of all current and prospective CFA and WRUA possibilities.

Furthermore, the research significantly contributes to the study's overarching goal of assessing community institutions' contributions to forests and water governance in the Kilungu watershed. This will be achieved by increasing public awareness of the CFA structure and, as a result, its effectiveness. New initiatives must be launched to help the CFA and WRUA meet their legal obligations, as well as a new and efficient framework for long-term Integrated Kilungu Catchment management.

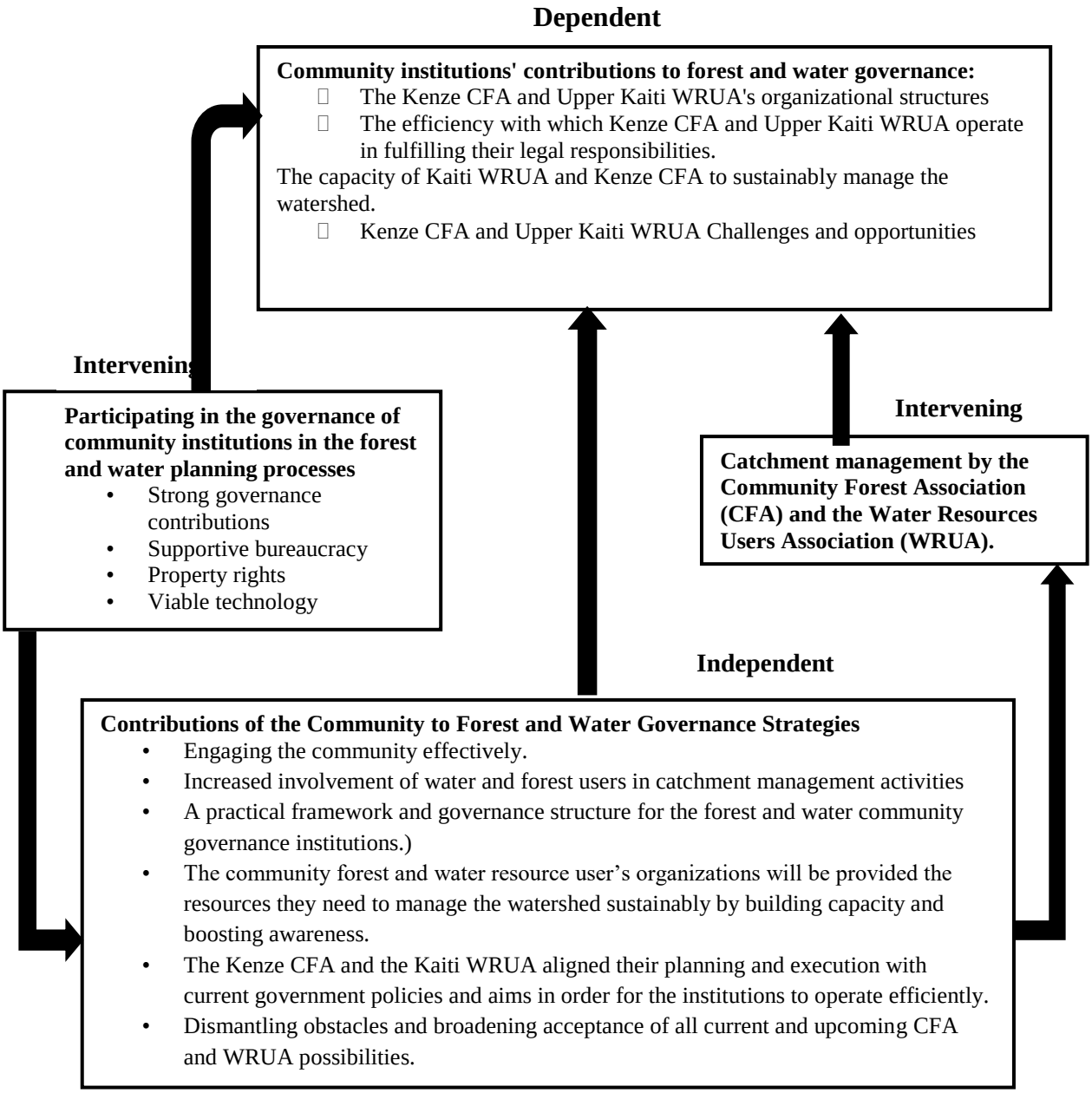

Figure 2.1: Conceptual Framework based on Institutional Theory (IT) and Theory of Change (ToC)

2.8 Research Gap Analysis

Several studies have been carried out all around the world, notably in Kenya, to explore the goals of local community forest and water resource governance, as stipulated by the Kenya Forest and Conservation Act of 2016. Community Forest Associations and Water Resource Users Associations, on the other hand, are still making significant contributions to community-led water and forest governance. The contributions of Community Forest Associations and Water Resource Users Associations to community-led governance in the Kilungu catchment's water and forests, on the other hand, are underappreciated. The organizational structures and operations of the CFA and WRUA in the Kilungu catchments, as well as their activities and opportunities, challenges, and capability, are unknown.

CHAPTER THREE

THE DATA AND THE METHODS

3.1 Introduction

The study's primary goal was to assess the contributions of the Kenze CFA and the Upper Kaiti WRUA to the management of the Kilungu basin's forest and water resources, while the research's specific goal was to examine the operations and legal obligations of community forest associations and water resource user associations, to investigate the structure and functions of community forest associations and water resource user associations, and to analyze the institutions' challenges and opportunities in managing the Kilungu catchment, and to evaluate the capacity of Community Forest Associations and Water Resource Users' Associations to manage the catchment. As a result, this chapter discusses the research techniques used to achieve the study's objectives. It describes the research topic and justification, biophysical and demographics, study design, sampling and sample size, data collection, and analysis.

3.2 Area of Study and Justification

The research was conducted in Makueni County's Kilungu watershed. The watershed's 615.1 hectares are depicted in Figure 3.1, with plantations occupying 253.8 hectares. It is separated into seven (7) forest blocks for administrative purposes, which are further subdivided into clusters for the study samples: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. The Upper Kaiti Water Resources Users Associations (WRUA) and the Kenze Community Forest Association (CFA) manage the catchment. The catchment experiences bimodal rainfall, with lesser downpours between March and May and greater downpours between October and December every year, between 800 and 1200 millimeters of rainfall. The area's soils have an acidic, humic top

layer and range in depth from relatively shallow to quite deep. The rivulets Kilome, Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi are among those that flow through the basin (County Government of Makueni, 2019). The Kilumwa, Kwanthi, and Kilome water springs, which are all protected and supply water to households up to six kilometers distant, are managed by the two organizations. The spring also supplies water to nearby academic institutions and the Kenya Forest Service, which uses it to build tree nurseries (KWTA Status Report, 2019). Additionally, the catchment is surrounded by people, whose actions have greatly decreased the catchment's capacity to capture water by causing high rates of catchment degradation (Ontiri & Robinson, 2015). Nine (9) registered CFAs including Makuli, Nzaui, Kamukima, Nthangu, Kitondo, Mbooni Community Forest Association (MBOCOFOA), Kichapa, Makongo, and Kenze as well as 68 registered WRUAs, are included in the Athi river basin catchment and participate in a variety of catchment management initiatives across the county. The management of the whole Kilungu catchment and its various tributaries, including the Kaiti, Kikoko, Kisusyo, Isuuni, Mitungu, Tiva, Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi Rivers, is currently only in the hands of the Kenze CFA and Kaiti WRUA (GoK, 2018).

The Kilungu catchment is of significant economic and ecological value in the region due to its significance as a catchment for the aforementioned rivers as well as a source of numerous springs, including Kikoko, Ilima, and Kisusyo, which is the source of the Kisusyo River and tributaries, and wetlands providing water to the community and supporting various livelihood activities. The Kilungu watershed was chosen as the primary unit of inquiry for several reasons. First, the catchment's operations, structure, issues, opportunities, and sustainability status had not been documented, making the research necessary. The catchment was maintained by the registered Kaiti Water Resources Association (WRUA) and the registered Kenze Community Forest Association

(CFA). Second, the watershed serves as an excellent illustration of a protected region where the contributions and activities of the CFA and WRUA, as well as the organization's operations, difficulties, possibilities, and sustainability, may be investigated. Third, the area's seven surrounding blocks: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio are made up of a variety of houses. Additionally, it serves as the focal point of an ecological support network for roughly 22,956 individuals representing 4,372 households whose direct and indirect livelihoods depend on the catchment (County Government of Makueni, 2019).

Anchored on the institutional and change theory, the examination sought to address the following research questions: How well do community forest associations and water resource user organizations uphold their legal responsibilities? , What function do Water Resource Users Associations (WRUAs) and Community Forest Associations (CFAs) have in managing the Kilungu catchment? What difficulties and chances do CFAs and WRUAs face in managing the Kilungu catchment? And can the Community Forest Association (CFA) and the Water Resource Users Associations (WRUA) sustainably manage the Kilungu catchment?

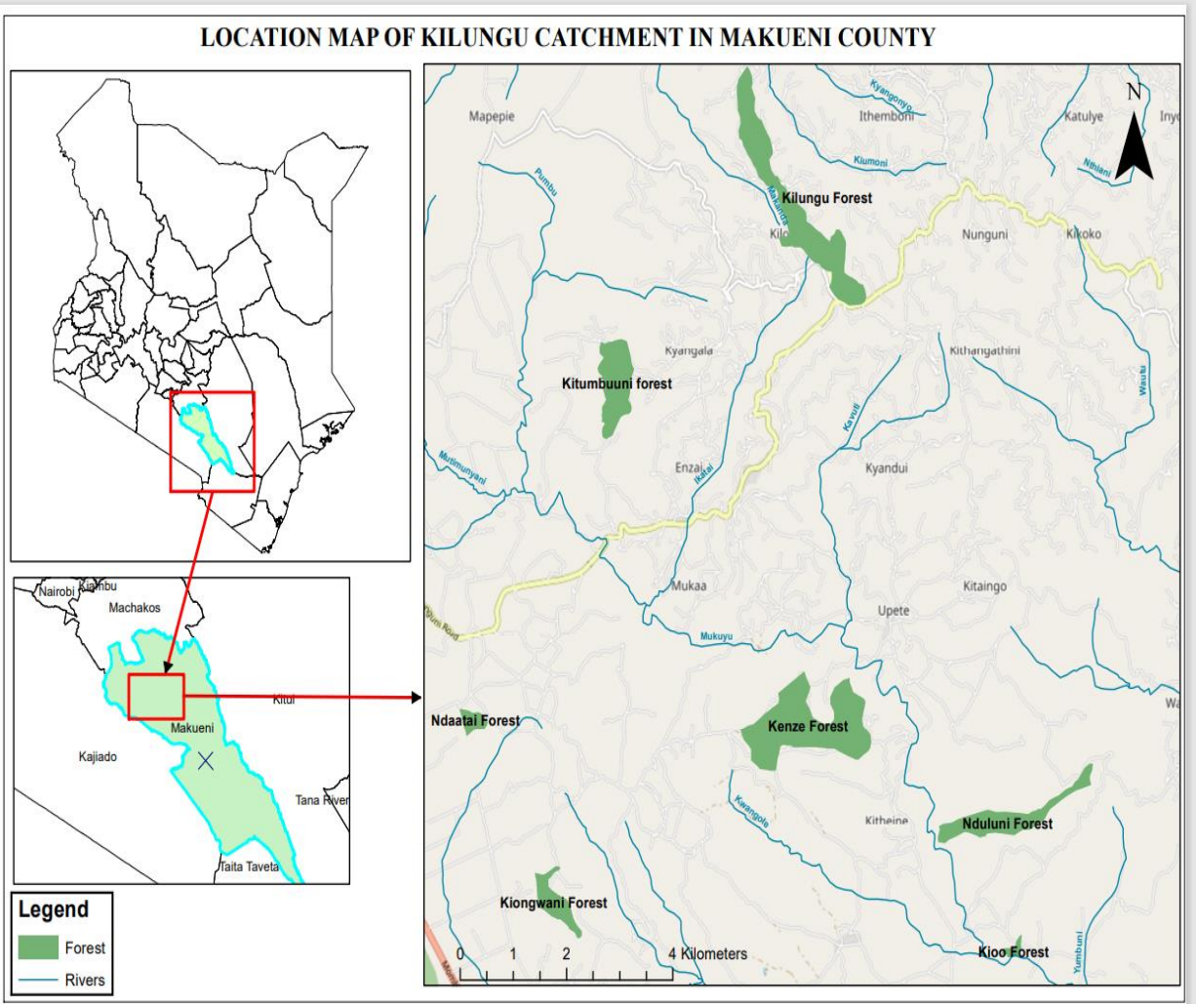

Figure 3.1: Study Area –Researcher

3.3 Biophysical Features

3.3.1 Climate

3.3.1.1 Rainfall

Short rains come in November and December, whereas long rains fall in March and April. The county experiences inconsistent distribution of rainfall. The catchment receives 1263.98 mm of rain annually on average. Extreme rainfall variability is present in the area. The area is typically arid and suffers from a significant water shortage, both of which have an immediate effect on economic growth. This is due to recurring droughts, diminishing water supplies, encroachment and damage to watersheds and towers,

unrestricted sand harvesting, and a lack of public awareness of water harvesting and catchment management (Makueni CIDP, 2018-2022).

3.3.1.2 Soils

The Kilungu catchment soils are well-drained, shallow to fairly shallow, have an acidic, humic top layer, and range in depth from moderate to very deep granites as the parent material for some regions, which also occasionally contain sandy clay loam and shallow rocks or stones (Regosols). The uplands' soils are primarily sandy loam and sandy clay to clay, typically brown and brownish red (Ferrasols), whereas the soil in Kenze is acidic. Furthermore, the catchment's soils are dominated by an undifferentiated basement and igneous rock structure. Vertisols (black cotton soils) are found in waterlogged river basins, marshes, and depressions that have become saline or acidic. The Kilungu catchment ranges in elevation from 600 to 1944 meters above sea level (Makueni CIDP, 2018-2022).

3.3.1.3 Hydrology

The nearby community relies on several streams for water. The streams' sizes, however, have shrunk over time, and stream water volume has been linked to a change in vegetation on the hilltops that began in the early 1950s, following the conversion of indigenous to exotic plantations. Changes in vegetation have hurt stream water volume through transpiration due to the nature of plantations (uniform age classes and high stocking density) compared to natural vegetation. Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi are among the streams that flow from the Kilungu catchment (Makueni CIDP, 2018-2022).

3.3.1.4 Vegetation

For productive purposes, forest plantations include Cupressus lusitanica, Pine species, Acacia mearnsii, Eucalyptus species, Callitris robusta, Araucaria species, Casuarina equestifolia, and Grevillea robusta. Olea species, croton megalocarpus trees species, Albizia gummifera, Acacia mellifera, Acacia nilotica, Calodedrum Japanese, Croton macrostachyus, Cordia Sinensis, Dombeya torrid, Erythrina abyssinica, Kigelia Africana, Terminalia brownii, Terminalia pruniocides, Terminalia Acacia species, Vitex kinesis, Olea Capensis, Spathodea nilotica, and numerous bushes are among the indigenous species found in Kilungu. Cupressus lusitanica, Pine species, Acacia mearnsii, Eucalyptus species, and Grevillea robusta are among the forest plantations (Makueni CIDP, 2018-2022).

3.3.1.5 Fauna

The catchment area is also household to antelopes, wild pigs, Skye monkeys, snakes, turtles, rats, and a variety of birds (Makueni CIDP, 2018-2022).

3.3.1.6 Industrial Plantations

Forest plantations of three exotic species are found in the catchment: Cupressus lusitanica, Pine, and Eucalyptus. During harvesting and planting, some natural forest areas, such as steep terrain, riparian areas, rocky sections, shrubs, and glades, are preserved. Consumption, on the other hand, is strictly regulated in the surrounding forest communities. They gather dead wood from the forest for firewood and herbal medicine. Controlled grazing, grass cutting, honey collection, and water utilization are some of the other applications. Pockets of natural forest are preserved during the planting and harvesting of plantations. This includes areas near waterways, important wildlife habitats, and glades. This is done to protect the forest's environmental integrity and to serve as a catchment area (Makueni CIDP, 2018-2022).

3.3.1.7 Land use

Makueni has 504,269 acres of arable land, 176,271 acres of non–arable, and 15100 acres of forest land, in that order. This corresponds to 63 percent, 23 percent, and 2 percent of county land, respectively. The Kilungu catchment community grows beans, maize, sukuma wiki cabbages, arrow roots, avocados, and other crops. Animals such as cows, goats, and sheep are examples of livestock. The typical size of a farm is between 0.5 and 2 acres. The majority of the nearby settlements have woodlots.

Agriculture and farm animal rearing are the most common sources of financial gain in most cases. Illegal woodcutting is a threat to forest conservation as a result of population growth in nearby forest settlements (GoK, 2009).

3.4 Demographic Features and Social-Economic Activities

3.4.1 Population Characteristics in the County

Makueni's projected population was 884,527, with 455,928 males, 428,599 females, and 18 intersex persons. According to the 2021 National Census, there are 77,495 households, with a population density of 6 people per square kilometer and an average social unit size of 5.8 people (KNBS, 2021). In comparison, the research area has a total population of about 22,956 persons composed of 4,372 households.

3.4.2 The Study Area's Legal and Administrative Status

Legal Notice No. 532 designated the Kilungu watershed as a forest reserve in 1960. The Eastern Conservancy is managed by the Kenya Forest Service, which is overseen by the Ecosystem Conservator in Wote, Makueni County, and the Head of the Conservancy (HOC) in Embu. A forest station manager is in charge of managing the operations in the watershed. The Kilungu catchment region is made up of seven forest blocks, which

simplifies administration and management. Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio are the names of the blocks (GOK, 2010).

3.4.3 Administrative and Political Units

The six electoral boundaries in the county are Kilome, Mbooni, Makueni, Kaiti, Kibwezi East, and Kibwezi West. There are thirty wards in the county assembly, with Makueni having seven and Kilome having three (Independent Boundaries and Electoral Commission 2013).

3.4.4 Population in the Study Area

Kamba people make up the entire population of Kilungu and the surrounding catchment communities (GoK, 2009). Kilungu block, Nduluni and Ndaatai block, Kitumbuuni block, Kiongwani block, Kiio block, and Kenze block are the sub-locations of the forest station. According to Table 3.1 below, there are 4,372 households supporting sub-locations with a catchment population of over 22,956 persons. Additionally, the Kilungu watershed is experiencing significant rates of resource degradation and encroachment due to family, cultural, economic, and human activities; this trend needs to be addressed (Ontiri & Robinson, 2014).

Table 3.1: The Demographics of the Research Area

Sub- location	Males	Females	Population	Household
Kilungu block	1997	2059	4056	676
Nduluni and Ndaatai Block	5054	5006	10060	1282 & 730
Kitumbuuni Block	1208	1012	2220	370
Kiongwani Block	932	963	1895	379
Kioo Block	601	479	1080	216
Kenze surrounding	1714	1931	3645	719
			22,956	4372

Source: Kenya population and housing census, 2019

3.5 Study Design

When little is known about a study, descriptive research designs are considered, which is why the descriptive cross-sectional research design was favored because so little was known about the particular study issue. Furthermore, an exploratory research technique was chosen for these inquiries since it allows the researcher to have a deeper understanding of the problem at hand (Kombo & Tromp, 2006). Researchers conducted a thorough search of the relevant literature, assessed articles and studies, and augmented their findings through snowballing in the grey literature to learn more about how community institutions in Kenya's Kilungu catchment contribute to forest and water governance.

In addition, structured questionnaires, interviews, observations, and transect walks were used to collect data from households in Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. Interviews were chosen as the data-collecting strategy because they provide rich material that can be used to investigate multiple perspectives and construct a comprehensive picture. The interviews were recorded and documented.

More observations, Focus Group Discussions (FGDs), interviews, and Key Informant Interviews (KIIs) were used to get input from study participants. The questionnaires were designed with the project's objectives in mind, to elicit responses from study participants. Furthermore, the qualitative data gathered utilizing the aforementioned instruments allowed for a more in-depth grasp of the concepts and quantitative results.

The quantitative data was also used to illustrate the CFA and WRUA numerical scale results-based comparisons. The qualitative and quantitative methodologies utilized throughout the study were acceptable for explaining the situation of CFA and WRUA in the Kilungu catchment based on respondents' opinions and experiences (Stake, 2010). The study's main sources of inspiration were the institutional and transition change theories created by Loiseau B, Benedict D, Sibbald R, Raman SA, Loh LC, and Dimaras H (2016). The researcher investigated the behaviors and efficacy activities of community forest associations and water resource users' associations in carrying out their statutory tasks using institutional theory as a theoretical lens. She also examined the capabilities of institutions and identified issues for CFAs, as well as the structure and operation of WRUAs and CFAs (Baumol *et al.,* 2009, Brunton *et al.,* 2010, Lai *et al.,* 2006, Roy, 1997). The theory also helps with the most crucial and in-depth characteristics of WRUA and CFA. Similarly, the theory of change was used to achieve the overall goal of the study, which was to assess community institutions' contributions to forest and water governance in the Kilungu catchment, because the ToC's main contribution is to establish effective measures of success indicators for organizations like the WRUA and the CFA (Maru *et al.,* 2018b). The questioning was utilized to acquire more data to answer the study questions and gaps, guided by the theory of change. The concept also provided a technique for implementing adaptable institutional adjustments to ensure the targeted intervention's long-term viability (Maru *et al.,* 2018b; Thornton *et al.,* 2018).

3.6 Sampling and Sample Size

3.6.1 Sampling

The Kenya Population and Housing Census (KPHC, Report of 2019), which also functioned as the study's sample frame, provided the study population. A total population of 22,956 persons lived in the research area, made up of 4,372 households who depended on the catchment for both direct and indirect income (County Government of Makueni, 2019). Cluster sampling was used since there were already seven recognizable and defined clusters that formed the entire study area, namely: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. A basic random strategy was then used to generate the study sample using a sample size formula. Each cluster represents a forest block in the catchment area. The forest blocks were chosen because they were in the Kilungu catchment and had CFA and WRUA that were active. Community members living within 5 km of the catchment boundary and those living within a 5 km radius of the sub-catchment were considered the best respondents for administering the questionnaires, as was the case in previous studies by the Kenya Indigenous Forest Conservation Programme that found that communities living close to a resource have the highest response rate.

3.6.2 Sample Size

A total of 366 respondents (sample $\boldsymbol{n}$ = 366) was obtained from a total household population of 4372, Cochran's formula was applied, Horse (2018) and Rucker (2017)

$$n_o = \frac{Z^2 pq}{(e_p)^2}$$

$where; -n_o$ = Cochran's suggested section size; Z = Z value (With example, 1.96 for a 95% self-reliance level); p = Population fraction equal to 50% and with a direct connection to sub-catchment governance at the required degree of precision-confidence

interval (0.07). With the required precision-confidence interval (0.07) and a population proportion of 50%, there is a definite association between the population proportion and sub-catchment governance. Since this area has the highest concentration of interactions between people and their watershed, data were collected within a 5 km radius of each cluster (Okumah *et al*., 2019). The data was supplemented through focus group discussions (FDGs), 10 key informant interviews (KIIs), and direct observations.

3.7 Data Collection and Data Analysis

3.7.1 Data Collection

The study focused on the leader of the family or the most senior member who had reached the legal consent age of 18, which was set at 18. A descriptive, cross-sectional survey was employed to do this. Data was gathered through structured household questionnaires, focus groups, key informant interviews, and direct observations. To disseminate questionnaires, a simple random sample approach was used. Between May 2017 and August 2018, structured interviews were done. Another group of ten (10) key informant respondents was purposefully chosen and drawn from relevant county heads of departments, including but not limited to the following: National Environment Management Authority (NEMA), Kenya Water Towers, Kenya Wildlife Service (KWS), Sand Conservation Authority of Kenya (KWTA), an agriculture officer, a CFA official, a WRUA official, and an environment official from the county government. A total of 366 community members were interviewed, comprising 202 men and 164 female-headed households.

The key informants were chosen with care and interviewed about the effectiveness of CFAs and WRUA activities in carrying out their statutory functions, their structure, the challenges the institutions face, the options available, and their long-term viability in

catchment management. Furthermore, transect walks were conducted across the catchment region, allowing for the discussion of everything seen or encountered that was relevant to watershed management, as well as the formulation of solutions and the collection of observable records (Leedy *et al*., 2013; Pearson *et al*., 2018). Focused group discussions were also held to clarify a broader range of information and to provide a tool to supplement the information gained from the other instruments.

3.7.2 Data Analysis

In the descriptive analysis, cross-tabulation was used. Cross-tabulations were used to make it easier to analyze the links between the data collected for the two institutions, the CFA and the WRUA. The data was presented using numbers, percentages, charts, and cross-tabulation tables. We examined information from both qualitative and quantitative sources. The information was entered into Microsoft Excel, which was also utilized to create charts and tables. Field notes, interview transcripts, observational approaches, and photography techniques were used in the qualitative data analysis phase.

The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 16 to see if there were any noticeable variations between the research parameters. A Pearson Correlation Analysis was also performed. Pearson's correlation was acceptable because we were working with two quantitative variables in the population, CFA and WRUA. Pearson correlation was performed to determine whether there were any correlations between the research parameters, whether positive, negative, or no linear associations.

CHAPTER FOUR

THE KNOWLEDGE AND AWARENESS OF CFA AND WRUA'S STRUCTURAL ARRANGEMENTS AND HOW THEY AFFECT THEIR ACTIVITIES AND OPERATIONS TO SUSTAINABLY MANAGE THE KILUNGU CATCHMENT.

ABSTRACT

Governance structures of local community institutions are increasingly being used in catchment management around the world, most notably in Kenya's Kilungu catchment, which is managed by the Upper Kaiti Water Resource Users Associations and the Kenze Community Forest Associations. This study investigated the organizational structures and catchment management capabilities of these institutions. A cross-sectional descriptive research design based on cluster and purposive sampling was used in the study. This study gathered both qualitative and quantitative data. The qualitative data was collected to enable a detailed description of the findings while attempting to establish respondents' structural awareness levels, attitudes, and opinions, as well as CFA and WRUA structure, whereas the quantitative data was numerical and thus quantifiable. Questionnaires, semi-structured interviews, focus groups, ten-key informant interviews, and direct observations were used to collect data. An analysis of variance (ANOVA) was performed on the data using the Statistical Package for Social Sciences (SPSS version 21). Pearson correlation analysis was used to determine whether or not the research variables were related. WRUA had a gender balance with nearly equal male and female representation, in contrast to CFA, which had a higher percentage of males than females. The findings also revealed no gender discrimination in activity performance, as demonstrated by the WRUA receiving 48% (moderately) more responses than the CFA (27% (moderately), a fact aided by the WRUA's strong structural policies. Further findings revealed that WRUA was more successful than CFA in involving members in catchment management activities. The person correlation analysis revealed a positive relationship between CFA and WRUA

structure and functioning, as well as the institutions' effectiveness in catchment management (p=0.5). Finally, the study findings call for immediate policy changes to ensure a balance of male and female engagement in all institutional structure arrangements, particularly the CFA structural arrangement. Furthermore, the individual's (p) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management, was significant (p=0.05), implying the need for ongoing awareness creation among all stakeholders on the structure and functioning of the two institutions. Finally, there is an urgent need to raise CFA structure awareness to improve governance, leadership, organizational management, and capability. There is an urgent need to raise awareness about the structure and operation of the two institutions.

Keywords: Awareness, Knowledge, Capacity, Structure, Effectiveness, and catchment

4.1 Introduction

Worldwide the governance frameworks and governance structures of community institutions determine the global future of catchments (Mbeyale, 2009; Msuya, 2010). Fundamental patterns of resource use and conservation are influenced by institutional frameworks that specify the distribution of rights over natural resources like forests and water, including both formal legal regulations and informal social norms. For instance, "open access" circumstances frequently result in resource depletion if resource rights are either completely undefinable or unenforced because no one has the incentive to guard a resource that is available for appropriation by any possible user, Nasi *et al.* (2008). According to the Kenya's Ministry of Environment and Forestry, claims that the presence of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) within numerous catchments spread across the country ensures effective catchment management, the importance of their organizational structure cannot be overstated (Thenya *et al.*, 2017). According to the to a United Republic of Tanzania land use report, unplanned land use is one of the factors contributing to the deterioration of natural resources, deforestation and forest degradation, soil erosion, and loss of soil fertility. All of this emphasizes the importance of watershed management organizations, as well as the involvement of local government and residents in catchment resource management (URT, 2017).

The importance of their organizational structure cannot be overstated, according to Kenya's Ministry of Environment and Forestry, which claims that the existence of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) within numerous catchments dispersed throughout the nation ensures effective management of the catchments (Thenya *et al.*, 2017). According to the United Republic of Tanzania report on land use and forest resources, unplanned land use is one of the

factors that contributes to the deterioration of natural resources, deforestation and forest degradation, soil erosion, and loss of soil fertility. All of this demonstrates how crucial community involvement, local government involvement, and watershed management institutions are to catchment resource management (URT, 2017).

The Forest Act of 2005 and its most recent version, the Forest Conservation and Management Act of 2016, both support a structure in which the state retains ownership of the forest while providing access rights to local communities through Community Forest Associations (GoK, 2005). Additionally, the Act gives civil society groups the power to ensure that forests are managed responsibly (UNEP, 2012). It also enables locals to collaborate with the Kenya Forest Service (KFS) via authorized Community Forest Associations through a forest management plan (CFAs). By doing so, local communities are allowed to actively contribute to the preservation, management, and protection of a specific forest region (World Bank Report, 2008).

According to Ongugo et *al.* (2008), catchment management is ensured in all regions of the world when Community Forest Associations (CFAs) are established to accommodate new members and have an inclusive democratic leadership. The Community Forest Association (CFA) is a vital community organization that brings stakeholders together (Thenya *et al.*, 2014). Similar to this, an analysis of WRUA governance has demonstrated the significance of its institutional structure, roles, and layout. This is a reference to their function in water resource management, which is based on the principles of participation, appropriate action, and empowerment. By the Water Framework Directive of the European Union, WRUA provides a systematic framework for managing water resources based on the idea of river basin management (Moss, 2012).

For instance, WRUAs in Spain offer a wide variety of institutional forms that allow them to respond to the difficulties of water management in the twenty-first century. The WRUAs are categorized according to how they were created, which may have been voluntarily or compelled by the government under specific circumstances (Del Saz., 2002). According to a Tanzanian study, water governance structures include, but are not limited to, basin boards, village water committees, water users' groups, and district councils that are guided by laws and collaborate with other conservation institutions (URT, 2017a). The WRUAs are frequently formed in Kenya from registered Self-Help Groups or Community-Based Organizations (CBOs) (Watson, 2007). The Kilungu watershed extends to and through Makueni County in the Athi River Basin. Nine (9) registered CFAs and 68 registered WRUAs, including Makuli, Nzaui, Kamukima, Nthangu, Kitondo, MBOCOPOA, Kichapa, Makongo, and Kenze, participate in various catchment management activities around the County. The Upper Kaiti Water Resources Users Association (WRUA) and the Kenze Community Forest Association (CFA) currently oversee the management of the Kilungu catchment and its numerous tributaries, including the Kaiti River, Kikoko, Kisusyo, Isuuni River, Mitungu, Tiva, Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi (GoK, 2018). The Kilungu watershed is crucial to the region's economy and environment, the literature review claims. It is the focal point of an ecological support network that provides for the livelihoods of around 22,956 individuals living in 4,372 households who depend on the catchment. However, to ensure catchment management, the Kenze CFA and Upper Kaiti WRUA's organizational management and sustainability need to be enhanced. A thorough analysis of these structures is also required to comprehend the significance of the CFA and WRUA structures in the management of the Kilungu catchment and to stop the trend of CFA and WRUA good practices improvement (County Government of Makueni, 2019). The goal

of the study was to determine the level of knowledge and attitudes toward the CFA and WRUA institutions' governance structures, with a focus on the performance of the Kenze CFA and Upper Kaiti WRUA governance structures as indicators of catchment management. The goal of the interview was to ascertain how effectively a suitable CFA and WRUA institutional governance framework ensures catchment management.

4.2 Context, Theory, and Conceptual Framework

Developing countries have recently paid special attention to the governance structures of the CFA and WRUA organizations (Agrawal, Chhatre, & Hardin *et al.*, 2008). Kenya's Forest Act (revised 2016), for example, supported CFA, which gained prominence in Kenya in 1997, and encouraged residents to participate in the management of neighboring forest resources while making sustainable use of them (GoK, 2005; 2007). The adoption of the Integrated Water Resource Management (IWRM) framework and associated Dublin principles, which include a participatory approach to water management, resulted in the establishment of the International Water Resource Users Association (WRUA) (Molle, 2008; Allouche, 2016; Manzungu & Derman, 2016).

In line, the Water Act of 2005, on the other hand, resulted in the formation of the Regional Water Resource Users Association (WRUA). The study's conceptual framework was based on institutional theory and change theory (Figure 4.1).

The institutional theory was found to be useful because it clarifies how and why change occurs within organizations such as CFA and WRUA, as well as how and why their structures and practices become established. Jennings (1994), for example, identifies two types of institutional pressure that may be effective in promoting organizational transformation. First, when new regulations are established and enforced, coercive pressures can either directly or indirectly induce organizational structural change via

institutional dependencies. Other theorists, like Ostrom (1990), had a significant influence on contemporary thinking about community-based natural resource management (CBNRMs), emphasizing the significance of collective structural management of catchments to enhance human well-being while empowering locals, both men, and women, to manage catchments without endangering, depleting, or degrading them (Fabricius *et al.*, 2007). The organization and functioning of community forest associations (CFAs) and water resource users associations (WRUAs) were also examined to correctly employ the Theory of Change (TOC) to guide this study. The theory of change (ToC) is defined as "a theory of how and why an action succeeds, particularly to promote community institutional structural change" (Anderson, 2004). The conceptual framework explains how organizations like the Kenya Forest Services (KFS) and the Water Resources Authority (WRA) are related; these links are crucial for watershed management and general environmental management (Huberty *et al.*, 2011; Dercon, 2012; Janicke, 2012; Schmalensee, 2012). It was also predicated on the core premise that independent elements, such as community awareness and institutional structure knowledge, might enhance Kilungu catchment governance and support the sustainability of the institutions.

Additionally, CFA and WRUA institutions could act as intervening variables to produce the necessary interventions, such as a clear, efficient, and functional new governance structure for CFAs and WRUAs, as well as structural capacity building and CFA and WRUA awareness raising. Thus, Kenze CFA and Upper Kaiti WRUA in Kenya's Kilungu Catchment governance structure and operation were analyzed using the two theories as a guide (Scott, 2008). Additionally, the theories were used to comprehend how CFA and WRUA, among other organizations, come to an understanding of what sustainability entails as well as how sustainability-related ideas or practices are developed

and disseminated throughout organizations. To comprehend how CFA and WRUA institutions operate locally, the study also conducted coercive pressure research, with a focus on the KFS and WRA mandates about CFA and WRUA devolved functions (Maggio & Powell, 1991). According to Kraft's Public Policy, both concepts are present in policy-making tools that highlight the formal and legal characteristics of governing structures (2007). To exist, institutions must uphold the moral principles that guide the society in which they function (2008).

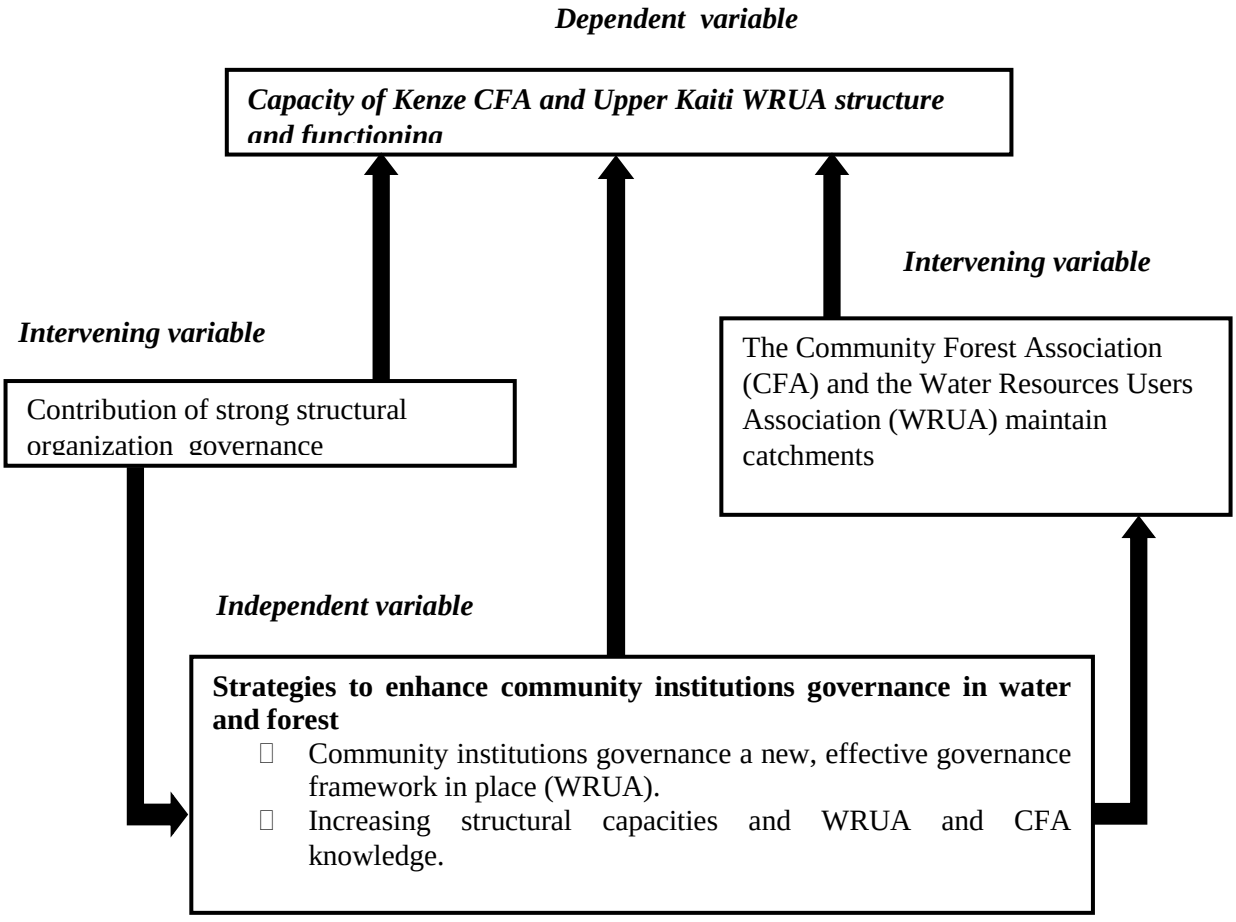

Figure 4.1: Conceptual Framework based on Institutional Theory (IT) and Theory of Change (ToC)

4.3 Data and Methods

4.3.1 Research Study Area

This paper focused on CFA and WRUA's structural arrangements and how they affect their activities and operations. It aimed to assess participants' knowledge of and familiarity with the CFA and WRUA systems to assess their contribution to catchment management in Kilungu.

The research was carried out in Makueni County's Kaiti sub-Kilungu county's catchment (Figure 4.2). The Kilungu watershed was chosen as the study area for a variety of reasons. It has two registered organizations: the Kenze Community Forest Association (CFA), established in 2013, and the Upper Kaiti Water Resources Association (WRUA), established in 2011. Even though both organizations are active in catchment management, the efficiency of their governance systems is unknown, which is why this research is required. Second, because it comprises both the CFA and the WRUA, the watershed is an example of a protected region. The Nthangu, Kitondo, Iuani, and Kiomo rivers are among the water sources of interest to the government and the residents of Makueni in the Kilungu basin. Furthermore, the catchment area is the source of many seasonal river streams that serve as key tributaries to the Athi River. Two of the most important rivers in the Kilungu watershed are the Kaiti and Kikuu. The Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi, and Kilome springs are also fed by the watershed. The downstream recharge system of the Athi River is extremely important because the River is the only one that is always running. Because water sources are 5 to 10 kilometers apart, the WRUA and CFA institutions must be effective in managing water supplies and the entire catchment (Makueni District profile, AMREF 2000). Third, there are seven close study blocks for human habitation: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni,

and Kiio. The blocks are once again the focal point of an ecological support system that supports 4,372 households.

Notably, all of these households rely on the catchment for their livelihoods, both directly and indirectly, necessitating a thorough evaluation of the CFA and WRUA organizational structures, as well as the institutions' administration and competency (County Government of Makueni, 2019). Furthermore, the resources of the Kilungu watershed have been rapidly depleted and encroached upon as a result of a combination of cultural, economic, and human activities, and there is an urgent need for community institutions to confront the challenge of degradation (Ontiri & Robinson, 2015).

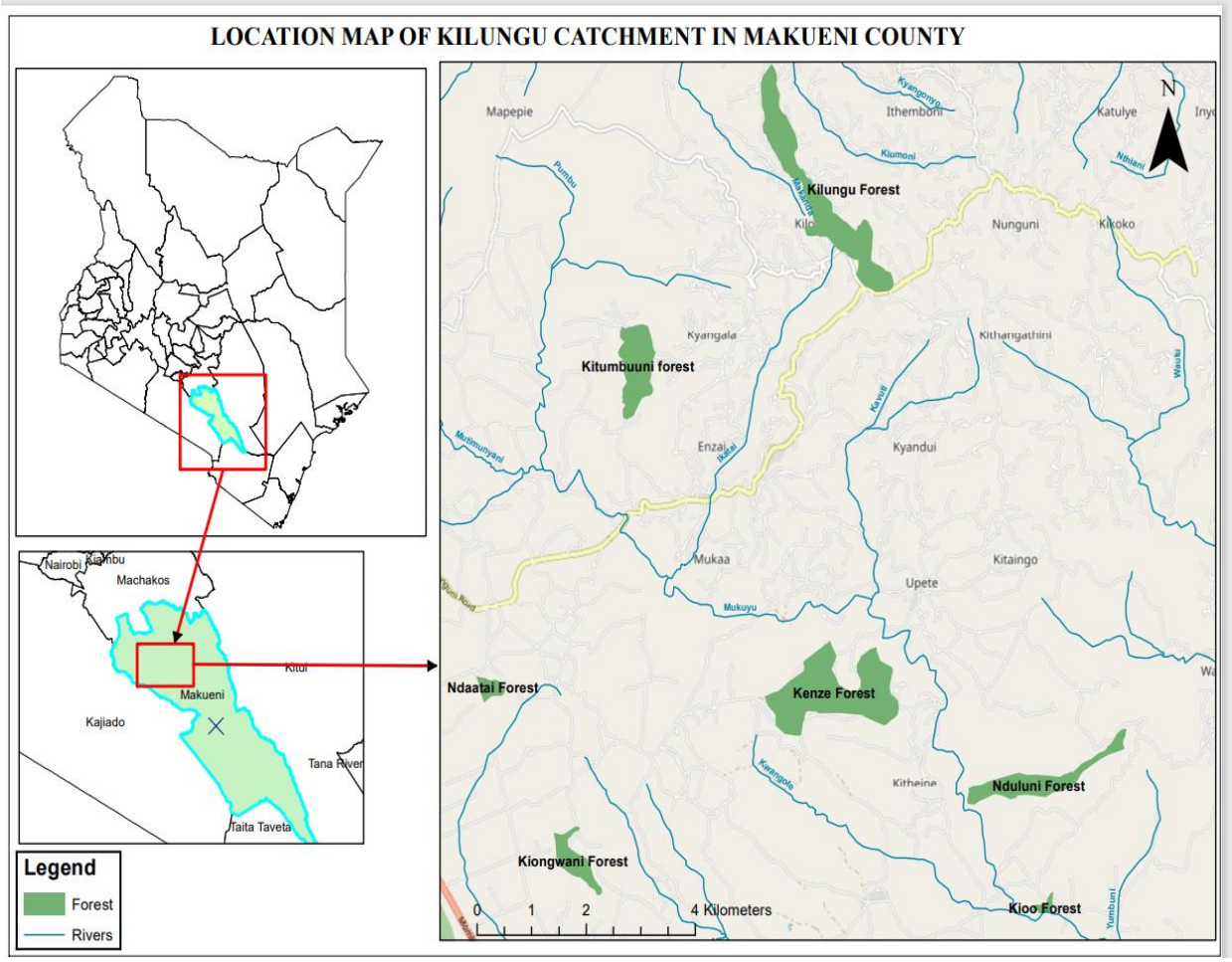

Figure 4.2: The Study Area

Source: MEMR-KFS 2020

4.3.2 Study Design and Data Collection

4.3.2.1 Study Design

When little is known about a study, descriptive research designs are considered, which is why the descriptive cross-sectional research design was favored because so little was known about the particular study issue. Furthermore, an exploratory research technique was chosen for these inquiries since it allows the researcher to have a deeper understanding of the problem at hand (Kombo & Tromp, 2006). Researchers conducted a thorough search of the relevant literature, assessed articles and studies, and augmented their findings through snowballing in the grey literature to learn more about how community institutions in Kenya's Kilungu catchment contribute to forest and water governance.

In addition, structured questionnaires, interviews, observations, and transect walks were used to collect data from households in Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. Interviews were chosen for the data-collecting strategy because they provide rich material that can be used to investigate multiple perspectives and construct a comprehensive picture. The interviews were recorded and documented. More observations, Focus Group Discussions (FGDs), interviews, and Key Informant Interviews (KIIs) were used to get input from study participants. The questionnaires were designed with the project's objectives in mind, in order to elicit responses from study participants. Furthermore, the qualitative data gathered utilizing the aforementioned instruments allowed for a more in-depth grasp of the concepts and quantitative results.

The quantitative data was also used to illustrate the CFA and WRUA numerical scale results-based comparisons. The qualitative and quantitative methodologies utilized throughout the study were acceptable for explaining the situation of CFA and WRUA in

the Kilungu catchment based on respondents' opinions and experiences (Stake, 2010). The study's main sources of inspiration were the institutional and transition change theories created by Loiseau B, Benedict D, Sibbald R, Raman SA, Loh LC, and Dimaras H (2016). The researcher investigated the behaviors and efficacy activities of community forest associations and water resource users' associations in carrying out their statutory tasks using institutional theory as a theoretical lens. She also examined the capabilities of institutions and identified issues for CFAs, as well as the structure and operation of WRUAs and CFAs (Baumol *et al*., 2009, Brunton *et al*., 2010, Lai *et al*., 2006, Roy, 1997). The theory also helps with the most crucial and in-depth characteristics of WRUA and CFA. Similarly, the theory of change was used to achieve the overall goal of the study, which was to assess community institutions' contributions to forest and water governance in the Kilungu catchment, because the ToC's main contribution is to establish effective measures of success indicators for organizations like the WRUA and the CFA (Maru *et al*., 2018b). The questioning was utilized to acquire more data to answer the study questions and gaps, guided by the theory of change. The concept also provided a technique for implementing adaptable institutional adjustments to ensure the targeted intervention's long-term viability (Maru *et al*., 2018b; Thornton *et al*., 2018).

4.4 Sampling Methodology and Sample Size

4.4.1 Sampling Methodology

The Kenya Population and Housing Census (KPHC, Report of 2019), which also functioned as the study's sample frame, provided the study population. A total population of 22,956 persons lived in the research area, made up of 4,372 households who depended on the catchment for both direct and indirect income (County Government of Makueni, 2019). Cluster sampling was used since there were already seven recognizable and defined clusters that formed the entire study area, namely: Kilungu, Kitumbuuni, Ndaatai,

Kiongwani, Kenze, Nduluni, and Kiio. A basic random strategy was then used to generate the study sample using a sample size formula. Each cluster represents a forest block in the catchment area. The forest blocks were chosen because they were in the Kilungu catchment and had CFA and WRUA that were active. Community members living within 5km of the catchment boundary and those living within a 5km radius of the sub-catchment were considered the best respondents for administering the questionnaires, as was the case in previous studies by the Kenya Indigenous Forest Conservation Programme that found that communities living close to a resource have the highest response rate.

4.4.2 Sample Size

A total of 366 respondents (sample = 366) was obtained from a total household population of 4372, Cochran's formula was applied, Horse (2018) and Rucker (2017)

$$n_o = \frac{Z^2 pq}{(e_p)^2}$$

$where; -n_o$ = Cochran's suggested section size; Z = Z value (With example, 1.96 for a 95% self-reliance level); p = Population fraction equal to 50% and with a direct connection to sub-catchment governance at the required degree of precision-confidence interval (0.07). With the required precision-confidence interval (0.07) and a population proportion of 50%, there is a definite association between the population proportion and sub-catchment governance. Since this area has the highest concentration of interactions between people and their watershed, data were collected within a 5 km radius of each cluster (Okumah *et al*., 2019). The data was supplemented through focus group discussions (FDGs), 10 key informant interviews (KIIs), and direct observations.

4.5 Data Collection

The study focused on the leader of the family or the most senior member who had reached the legal consent age of 18, which was set at 18. A descriptive, cross-sectional survey was employed to do this. Data was gathered through structured household questionnaires, focus groups, key informant interviews, and direct observations. To disseminate questionnaires, a simple random sample approach was used. Between May 2017 and August 2018, structured interviews were done. Another group of ten (10) key informant respondents was purposefully chosen and drawn from relevant county heads of departments, including but not limited to the following: National Environment Management Authority (NEMA), Kenya Water Towers, Kenya Wildlife Service (KWS), Sand Conservation Authority of Kenya (KWTA), an agriculture officer, a CFA official, a WRUA official, and an environment official from the county government. A total of 366 community members were interviewed, comprising 202 men and 164 female-headed households.

The key informants were chosen with care and interviewed about the effectiveness of CFAs and WRUA activities in carrying out their statutory functions, their structure, the challenges the institutions face, the options available, and their long-term viability in catchment management. Furthermore, transect walks were conducted across the catchment region, allowing for the discussion of everything seen or encountered that was relevant to watershed management, as well as the formulation of solutions and the collection of observable records (Leedy *et al*., 2013; Pearson *et al*., 2018). Focused group discussions were also held to clarify a broader range of information and to provide a tool to supplement the information gained from the other instruments.

4.6 Data Analysis

Cross-tabulation was employed in the descriptive analysis. To study the linkages between the CFA and the WRUA, cross-tabulations of activities, structure, functional data, challenges, opportunities, and capability were used. The information was given in the form of statistics, percentages, charts, and cross-tabulation tables. We looked at data from both qualitative and quantitative sources. The data was entered into Microsoft Excel, which also served as a tool for creating charts and tables. In the qualitative data analysis phase, field notes, interview transcripts, observational methodologies, and photography techniques were used. To evaluate if there were any noteworthy differences between the research parameters, the data was examined using the Statistical Package for Social Sciences (SPSS) version 21. To evaluate whether or not the research variables were related, Pearson Correlation Analysis and other inferential statistics techniques were applied. Pearson's correlation was acceptable because we were working with two quantitative variables in the population, CFA and WRUA. Pearson correlation was utilized to evaluate whether the research parameters had any positive, negative linear relationship.

4.7 Results Findings and Discussions

4.7.1 Results

4.7.1.1 Respondents' Age in Years

The majority of respondents for both the CFA (45%) and upper Kaiti WRUA (33%) were between the ages of 30-39. Ages 40 to 49 were next, with upper Kaiti WRUA accounting for 32% and Kenze CFA accounting for 17% of the total responses. Upper Kaiti had 17% and Kenze CFA had 26% of those aged 20 to 29. Kaiti WRUA had 16% in the 50-59 year age group, Kenze CFA had 11%, and Kaiti WRUA had 1% in the 60-year age group, Kenze CFA had 0% as shown in (Figure 4.3 below) the findings revealed that respondents

in both institutions were primarily between the ages of 30 and 39. In contrast to previous research by Maskey *et al.* (2003), which found that older people in Nepal participated in community forest and water association programs at a higher rate than younger people, this study discovered a different pattern.

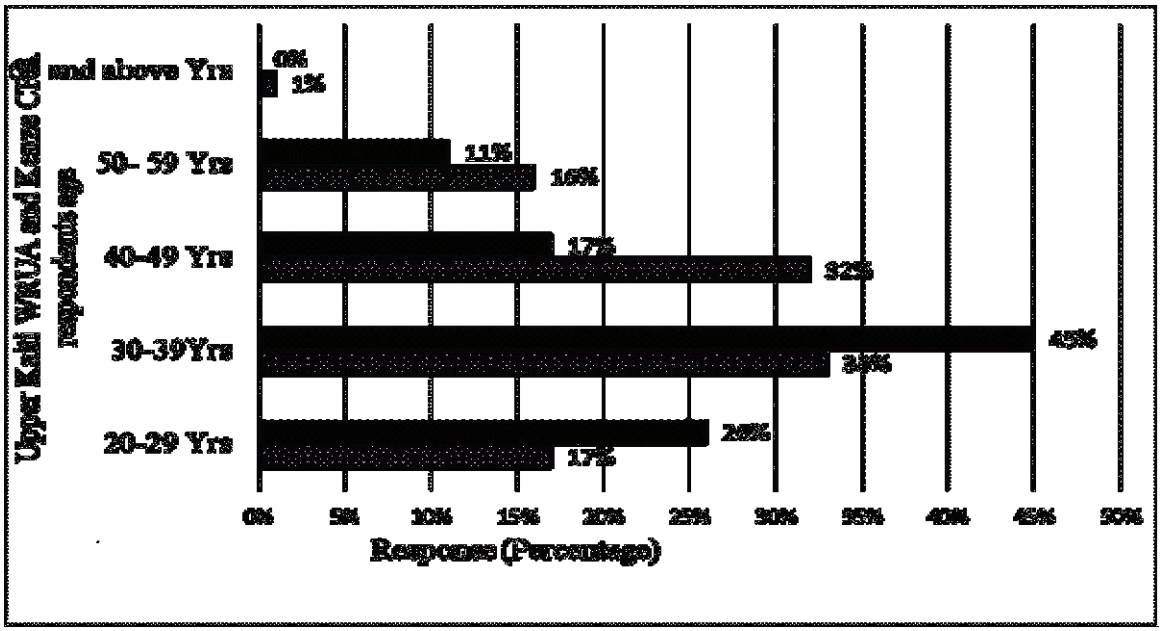

Figure 4.3: Respondents' Age in Years

The findings contrasted with those of a study conducted in Ondo State, Nigeria, which discovered that most farmers aged 35 to 54 engaged in Taungya forestry more than other age groups because they could plant and harvest trees within their lifetimes (Victor & Bakare, 2004). The findings were consistent with previous research by Dolisca *et al.* (2006), who discovered that while younger people were eager to participate in forestry and water program decision-making, older people were primarily interested in gathering forest resources and managing water resources.

4.7.1.2 Structural Gender Balance within the CFA and WRUA Institutions

The study's goal was to demonstrate what was revealed about the governance structure in terms of gender balance. The majority of respondents (93%) thought WRUA had gender balance because it had roughly equal representation of males and females; however, only

15% thought CFA had gender balance because it had more males than females (Figure 4.4) which depict the governance structure's findings regarding gender balance. Furthermore, unlike CFAs, the FGD and Key Informant Interview (KII) confirmed that men and women had equal access to all WRUA structural roles, and so both the chairman and subcommittee members were chosen.

Furthermore, the perception that more women than men participated in the Water Resources Association survey supports previous research indicating that women are more concerned and urgent about a variety of environmental issues than men, including global warming and water impurity, which could explain the higher female participation rate in the survey (Slovic, 1999; McCright & Xiao, 2014).

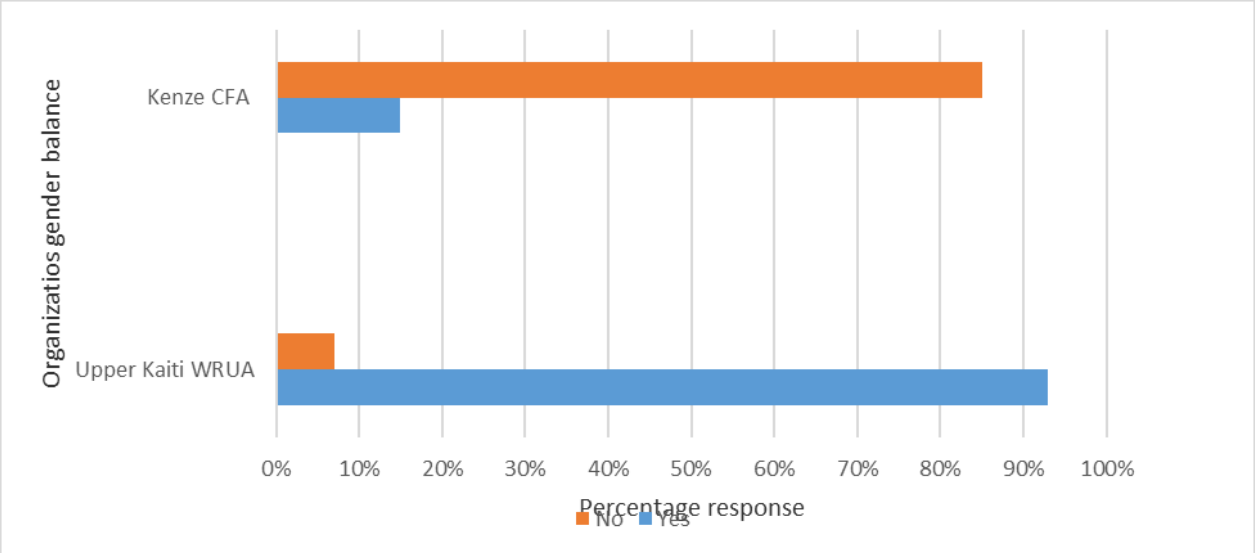

Figure 4.4: Gender balance within the CFA and WRUA institutions

4.7.1.3 Structural Gender Inclusivity and Equity

The findings also revealed that WRUA had no gender bias in activity implementation and was better at structural gender inclusion and equity (Figure 4.5). These findings were bolstered by the conclusion that, as stated by more WRUA respondents (48 percent) on gender engagement in decision-making, compared to only 14 percent of CFA respondents, there has been a balance between male and female inclusivity in decision-

making since WRUA's inception. These findings were confirmed by the revelation that there has been a balance of male and female inclusivity in decision-making since the founding of WRUA, as reported by (48 percent) of WRUA respondents, compared to only 14 percent of CFA respondents' gender involvement. Women and men should benefit equally from gender inclusivity and equity, defined as "a design that incorporates women's and men's concerns and experiences into the design, enforcement, monitoring, and evaluation of policies and programs in all political, economic, and societal spheres." Inequality is not perpetuated to eventually achieve gender equality through mainstream transformation (UNESCO, 1997 in GWA 2003a).

These findings imply that governmental measures should be taken to achieve a balance of masculine and feminine involvement in all institutional structural arrangements, particularly the CFA structural arrangement, which was found to be structurally inadequate in gender inclusion and equity.

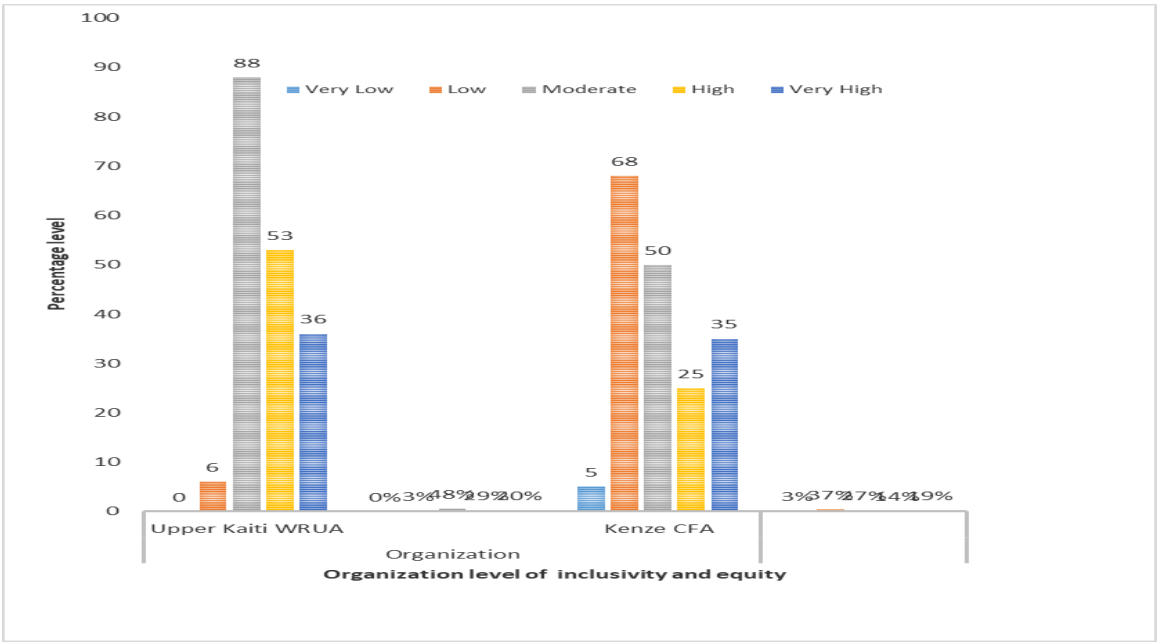

Figure 4.5: Gender Inclusivity and Equity

4.7.1.4 Awareness and Knowledge of WRUA and CFA Structure

According to the data, respondents were more aware of the CFA structure than the WRUA structure, with 46 percent being fairly informed and 39 percent being very aware, compared to 42 percent being moderately aware and 26 percent being very aware of the WRUA structure. A large number of responses on the CFA structure demonstrated that people were aware of the CFA structural arrangements, roles, and obligations, notwithstanding reports of insufficient capacity building on the implementation of the aforementioned tasks. Respondents also emphasized the urgent need for effective knowledge generation on the structure of WRUA to improve catchment management (Figure 4.6).

Furthermore, Kenze CFA respondents who were more aware of its structure had higher levels of education, with secondary level education accounting for 36%, secondary level education accounting for 28%, college education accounting for 28%, and university education accounting for 3%, compared to Upper Kaiti WRUA, where secondary level education accounted for 25%, a college certificate accounting for 11%, and a university degree accounting for 0% (figure 4.6).

This could imply that the majority of people with higher education levels do not live in rural areas, but rather seek employment or work to support themselves in cities or elsewhere, therefore filtering the literacy rates within the research area. FGD data also revealed that institutional structural leadership and problems requiring a high level of literacy were not adequately addressed, contributing to the catchment's continued degeneration, implying that leadership, education, and environmental concern are all intertwined. These findings supported Elizabeth's (2013) argument that, even after controlling for age, knowledge, gender, and money, there is a substantial relationship

between educational levels at institutions and environmental concerns. Further, KII conversations revealed that, while the CFA was better known, the structure of the two institutions was only partially understood, which could explain its ineffectiveness in catchment management. This finding complements previous research by Thenya (2017), who discovered that members of well-structured CFAs, in particular, are attentive to their commitments and can easily carry out their activities and meet their structural mandates.

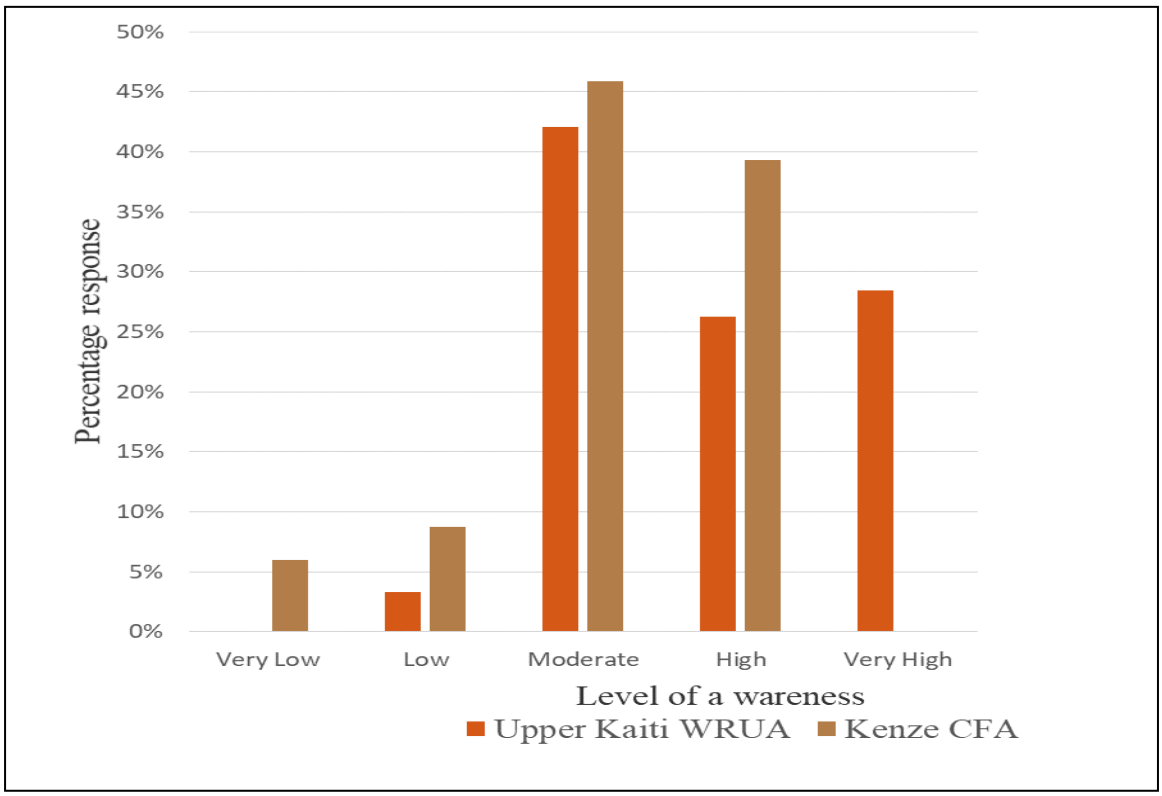

Figure 4.6: Awareness and Knowledge of WRUA and CFA Structure

Furthermore, the person's (p) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management (Table 4.1) were significant (p=0.05), implying the need for ongoing awareness creation among all stakeholders on the two institutions' structure and functioning.

Table 4.1: Pearson's correlation between the awareness and functioning of the CFA and WRUA structure and the institutions' effectiveness

		Awareness of structure and functioning	Effectiveness and efficiency
structural and functional awareness	(2-tailed) Pearson Correlation Sig.	1	.115*
			.027
	Correlation by Pearson	366	366
Effectiveness and efficiency		.115*	1
	Sig (2-tailed)	.027	
		366	366

* 0.05 level of significance for correlation (2-tailed).

4.8 Respondents' Level of Education

Respondents from Kenze CFA had higher levels of education than respondents from Upper Kaiti WRUA, where only 25% had completed secondary school, 11% had a college certificate, and none had a university degree, according to the study (Figure 4.7). These Kenze CFA respondents were more knowledgeable about the organization's structure (by 36%) and had higher levels of education, implying that the majority of people with higher education do not live in rural areas, but rather seek employment or make a living in large cities or abroad, filtering the literacy levels in the research area.

Focus group discussions (FGDs) found that institutional structural leadership and challenges requiring a high level of literacy were not adequately addressed, contributing to the continued degradation of the catchment. This suggests a connection between leadership, leadership development, and environmental consciousness.

These findings validated Elizabeth's (2013) argument that there is a substantial association between institutional educational achievement and environmental concerns, even after controlling for age, education, gender, and income. Further discussions with the KII indicated that, despite the CFA's larger reputation, both institutions' organizational structures were only hazily understood, possibly contributing to their failure to succeed in catchment management. This finding is consistent with prior research by (Thenya, 2017), who claimed that members of well-structured CFAs, in particular, are aware of their tasks and responsibilities and can readily carry them out.

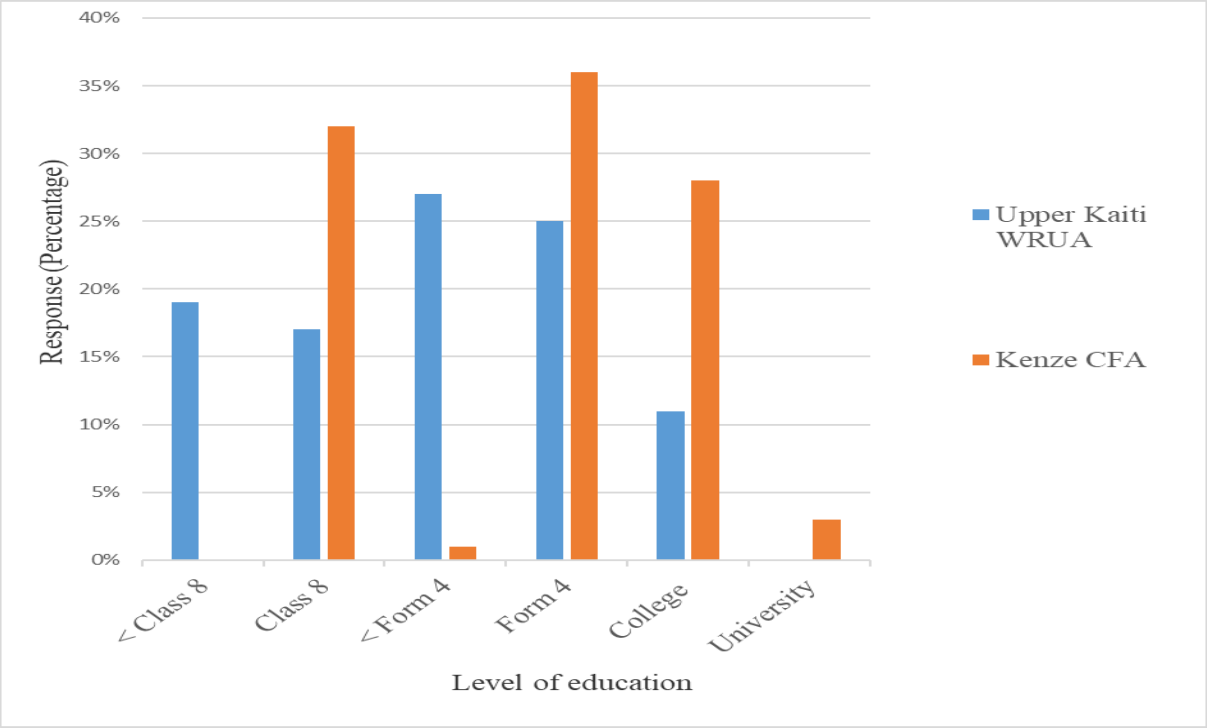

Figure 4.7: Respondent's Educational Level

4.9 The Kenze Community Forest Association Structure

Participants in focus groups and key informant interviews concluded that the organizational structure of the Kenze Community Forest Association (CFA) is characteristic of a grassroots organization. According to sources, the majority of CFA user groups are concentrated in seven forest blocks: Kilungu, Kitumbuuni, Ndaatai,

Kiongwani, Kenze, and Nduluni. There were several self-help organizations, as well as an executive committee elected by local users to oversee the management and direction of the CFA at the local level. Kenya Forest Service assisted this group of users in establishing Community-Based Organizations (CBO).

Furthermore, the KII findings revealed that the Kenze CFA is a reflection of the CFA produced by these CBOs, specifically the administrators of the administrative districts surrounding the forest. The CFA's structural operation was to design laws that restrict forest use and access by the standards established at the top by the government through the KFS to ensure that communities engage in sustainable forest activities that improve their lives and catchment management.

According to the report, the CFA's leadership structure includes both male and female national government representatives, local ward representatives, the local Kilungu forests station forester, opinion leaders, and other stakeholders in the area.

Finance, procurement oversight, patrol, monitoring and evaluation, and the human resource committee were among the sub-committees that may be constituted under the system. Further conversations indicated that, despite their presence, these structural leadership organizational committees were unable to deliver scheduled activities due to a lack of facilitation. The lack of short-term work plans and corresponding financing for structural plan implementation was blamed for the CFA's structural failure.

These findings identified flaws in the National Forest Programme (NFP) (2016-2030), a strategic framework for forest policy, planning, and execution aimed at meeting the requirements of Kenyans over the next 15 years. To improve forest development, the framework focuses on the Kenya Vision 2030 guiding principles and constitutional values.

Finally, focus group discussions, highlighted that the current Kenze CFA organization lacks a defined hierarchy and structure at the local, county, and national levels, leading to member mistrust and suspicion. All of the shortcomings highlighted above in the CFA structural organization render the institution ineffective in assuring catchment management.

Based on these findings, Kenze CFA's structure should be enhanced to effectively coordinate its operations and serve as a communication center for CFAs and member communities. The CFA structure is represented in (Figure 4.8) below, as indicated in the FGD.

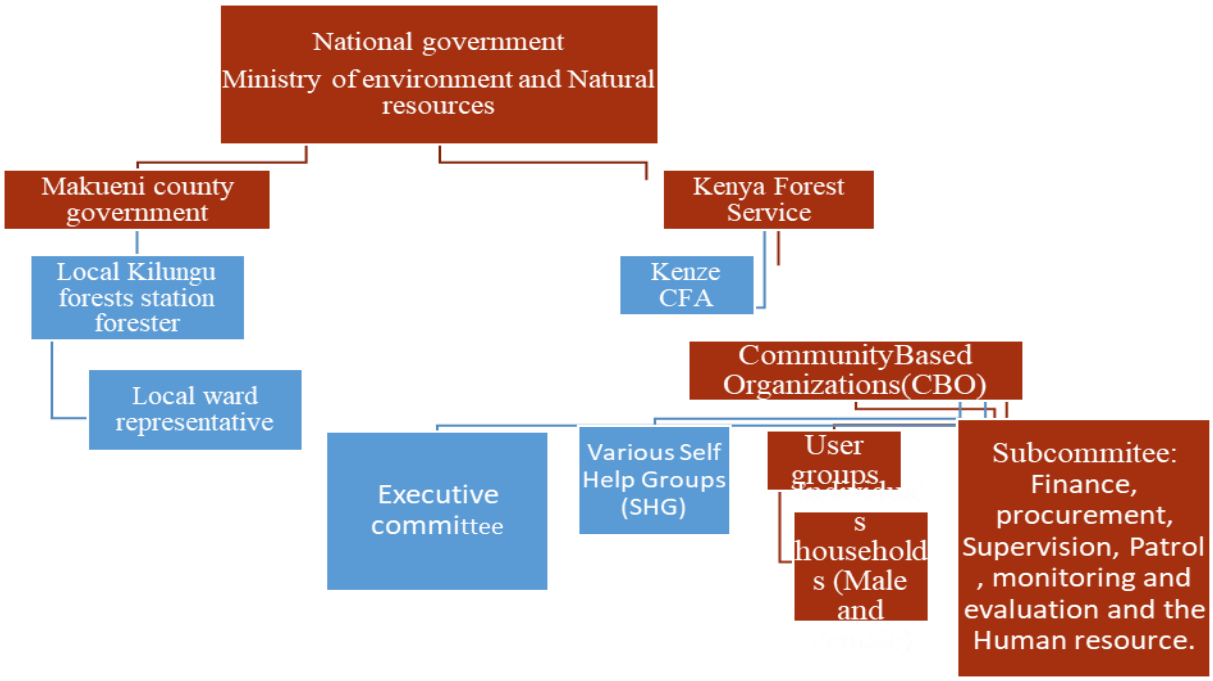

Figure 4.8: Kenze CFA Structural Organization

4.10 Upper Kaiti Water Resource Users Association (WRUA) Structure

According to the findings of the Key Informant Interviews (KII) and Focused Group Discussions (FGD) on the association's structure, the Upper Kaiti Water Resource Users Association (WRUA), formerly known as Kanzuma, was made up of water users, riparian landowners, and other volunteers who had come together to cooperatively share, manage, and serve all water resources within the Kilungu catchment. The WRUA prioritized springs in the Kilungu basin, as well as the Kaiti River and its tributaries (Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi). Water users, riparian landowners, and other volunteers (KWRUAN) worked together to develop the Upper Kaiti River Water Resource User's Associations Network. The Upper Kaiti WRUA was created after the KWRUAN and other self-help groups joined forces. The WRUA's top management was the Water Resources Authority (WRA), which was in charge of defining and classifying the catchment area's state at sub-regional levels, as well as leading the development of the upper Kaiti WRUA's conservation and management objectives. The WRUA enabled the formation of subcommittees in areas such as finance, procurement, monitoring and evaluation, and human resource management. Figure 4.9 depicts the current situation of the WRUA organization. A WRA representative, an executive committee, and a water service board that was active in the organization's activities comprised the WRUA's leadership structure. Raising community understanding of the WRUA system is critical to improving resource management in the watershed. This is consistent with a previous study that found that increasing community awareness of institutional structural arrangements results in greater water conservation behaviors (Lee *et al*., 2011). The Upper Kaiti WRUA structure fails to take local experience and priorities into consideration to create localized and overlapping solutions for livelihood and environmental objectives in the medium and long term, according to focus group

discussions. Furthermore, whether WRUAs report to the WRA or local communities on an upward or downward trajectory must be made explicit in policy and practice because the current structure and hierarchy at both the local and national levels foster mistrust and suspicion among members. According to these findings, the Upper Kaiti WRUA organization should be reinforced to better coordinate its efforts and serve as a hub for information transmission to others.

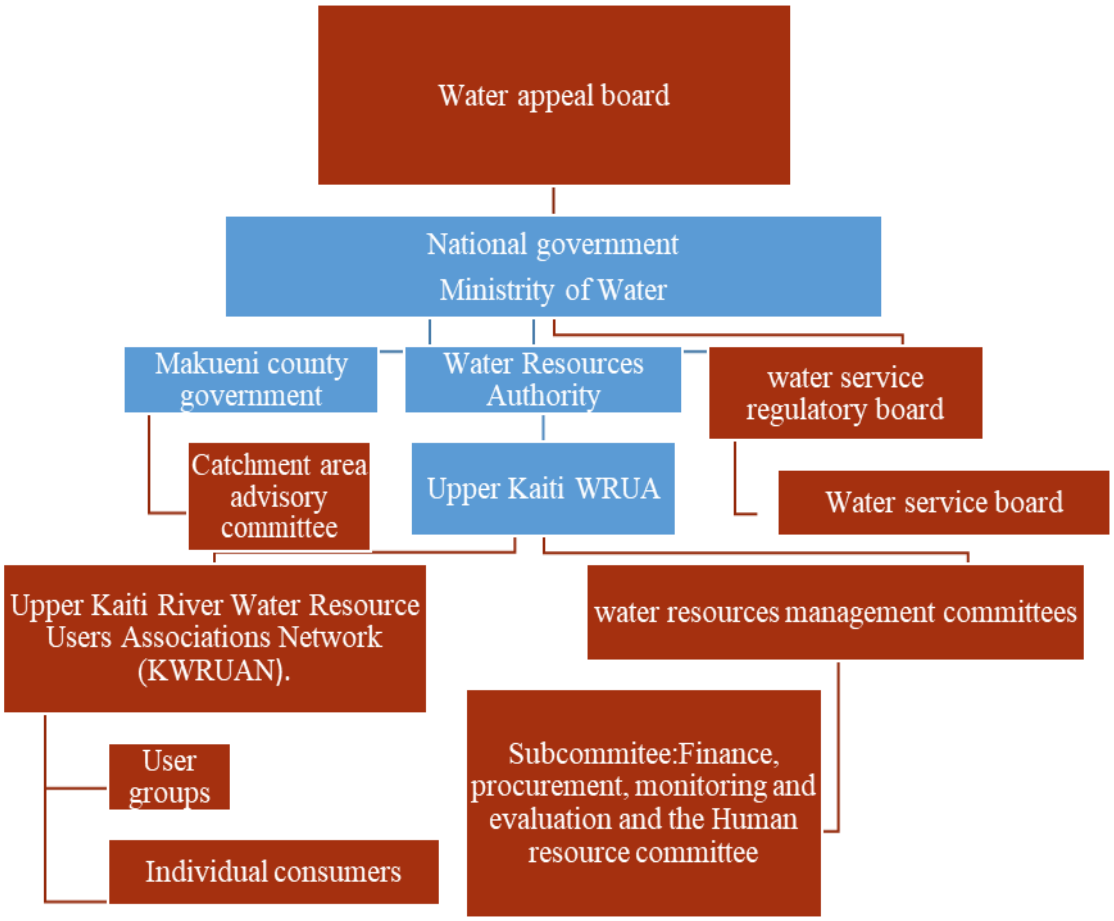

Figure 4.9: Upper Kaiti WRUA Structural Organization

4.11 Discussions and Conclusions

4.11.1 Discussions

The functions of Community governance institutions in managing forests and water resources have been investigated. However, there is little information available about the structure of the CFA and WRUA, particularly in terms of the Kenze CFA and upper Kaiti WRUA structure's ability to sustainably manage catchment, making this study in the Kilungu catchment relevant. The Kilungu catchment area is 615.1 hectares, with plantations totaling 253.8 hectares in Makueni County, and the catchment was chosen as the primary unit of investigation for a variety of reasons.

The key reason is, even though the catchment was managed by a registered Kaiti Water Resources Association (WRUA) and a registered Kenze Community Forest Association (CFA), institutional organizational structure design data was lacking and undocumented, necessitating this additional research. The study's objectives were limited to determining the effectiveness with which community forest associations and water resource users' associations fulfilled their legal obligations, as well as the level of knowledge and awareness of the institution's structure.

A cross-sectional descriptive research design based on cluster and purposive sampling was used in the study to collect relevant information, while household surveys, Key Informant Interviews (KII), and Focus Group Discussions (FGD) were used to collect quantitative data. Field notes, interview transcripts, observational techniques, and photographic methods were all used to collect qualitative data. The results were analyzed using ANOVA, and Pearson correlation analysis was used to see if there were any correlations between the variables in the study.

The findings of the study revealed that, in terms of gender inclusion and equity, WRUA had a better gender balance with equal representation of males and females and roles that could be filled by either gender, compared to the CFA, which had more males than females actively involved in catchment management. Gender imbalance issues in the CFA structural arrangement must be addressed in all political, economic, and sociological arenas with the ultimate goal of ensuring gender equivalency by changing the mainstream for women and men to achieve equality and eliminate unfairness within the CFA institution, as supported by previous studies by (UNESCO, 1997 in GWA 2003a.) that define gender equity and inclusivity as a method for incorporating both men's and women's experiences.

According to the study's findings, respondents were more familiar with the CFA structure than the WRUA structure; however, even though respondents were more familiar with the CFA structure than the WRUA structure, the overall results indicated that awareness of the two institutions structures was insufficient and limited, indicating the need for further development. Ineffectiveness, unstructured activity implementation, and leadership at the Kenze CFA and Upper Kaiti WRUA may be explained by a lack of structural expertise. The WRUA was far more successful than the CFA in involving its members in all aspects of catchment management, including decision-making, accountability, social governance, network governance, and participatory governance.

The two-tailed Pearson correlation (r) analysis results for CFA and WRUA structure awareness and functioning were statistically significant, supporting the previous study hypothesis that high CFA and WRUA structure social-ecological fitness is correlated with successful catchment management outcomes (Bodin *et al*., 2019). The Pearson correlations relationship was significant in terms of structure awareness and functioning,

as well as the institutions' effectiveness in catchment management, demonstrating the importance of all stakeholders maintaining ongoing awareness of the two institutions' structures and functions. Finally, increasing awareness of the CFA structure is critical for improving organizational management, capability, governance, and leadership.

4.11.2 Conclusion

This study found that the Upper Kaiti WRUA structure was superior in terms of gender inclusion and equity, as well as leadership management; however, the CFA structure was more well-known than the WRUA structure. Furthermore, the CFA structures were discovered to be quite diverse, necessitating a rapid harmonization of the CFA structure. As a result, rapid policy changes are needed to ensure gender balance in all institutional structure arrangements, particularly the CFA structural arrangement. Furthermore, the individual's (r) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management, was significant (r=0.05), emphasizing the importance of ongoing awareness creation among all stakeholders on the two institutions' structure and functioning. Finally, raising CFA structure awareness is critical for better governance, leadership, organizational management, and capability, and Upper Kaiti WRUA and Kenze CFA should work together to create a more transparent and efficient governance structure.

4.12 Recommendations

It is recommended that new governance and operational frameworks should be in place for Upper Kaiti WRUA and Kenze CFA. This is because, while the CFA structure is more well-known than the WRUA, there is a pressing need to raise awareness of it to increase its efficacy. According to these findings, government initiatives should be launched to ensure a gender balance in all institutional structural arrangements, particularly the CFA structural arrangement, which was found to be structurally insufficient in terms of gender inclusion and equity.

CHAPTER FIVE

EFFECTIVENESS OF COMMUNITY FOREST ASSOCIATION AND WATER RESOURCE USERS' ASSOCIATIONS IN DISCHARGING THEIR STATUTORY FUNCTIONS: A CASE OF KILUNGU CATCHMENT, KENYA

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ABSTRACT

Despite the efforts of Community Forest Associations (CFA) and Water Resource Users Associations (WRUA), catchment degradation has continued worldwide. In Kenya, the Kilungu catchment area is managed by the Kenze CFA and the upper Kaiti WRUA. The purpose of this study was to examine the effectiveness of Kenze CFA and Upper Kaiti WRUA in carrying out their statutory duties. To do this, an exploratory, descriptive survey was used. Data was gathered through questionnaires, focus group discussions, and interviews with ten important informants, and direct observations. The descriptive approach was used. Figures, tables, and percentages were used to display data.

According to the data, the upper Kaiti WRUA was more effective in catchment management moderately (31%), significantly (37%), and moderately (29%) than the CFA. In terms of statutory functions, Upper Kaiti WRUA beat Kenze CFA, getting ratings of 27% (good) and 23% (very good), compared to Kenze CFA, which obtained ratings of 3% (good) and 6% (very good). According to the findings of this study, Upper Kaiti WRUA was more effective than CFA in all aspects of watershed management.

To summarize, it is critical to develop a strategy for leveraging on the CFA's ability to carry out all of its legal responsibilities, with a focus on timely management plan creation and implementation, as well as WRUA's continuous improvement. Furthermore, evaluating the level of CFA and WRUA activity implementation is essential for improving their efficacy in fostering community participation in all of their institutional

operations. The study suggests new initiatives to improve CFA and WRUA activities so that they can carry out their statutory functions more effectively, as well as the development of a new strategy for reviewing CFA and WRUA activities and functions so that they can carry out their statutory functions more effectively.

Keywords: Community Forest Association (CFA), Water Resource Users Associations (WRUA), and catchment management.

5.1 Introduction

Through Participatory Forest Management (PFM), the majority of the world's continents, including America, Asia, and Africa, are advocating the adoption of community association activities by rural people in the management and exploitation of natural forest catchments. Many nations have either enacted or are in the process of making reforms to national policies and regulations to encourage watershed conservation and sustainable forest resource utilization (Busck-Lumholt & Treue, 2018).

Community Forest Associations (CFAs) are employed in developing nations to manage vulnerable forests and promote biodiversity conservation through a process of inclusion, equity, and democracy (Amanor, 2003). During the 1990s, for example, CFAs in Nepal concentrated on forest protection and management, with the stated purpose of slowing forest degradation through learning and exchange amongst user groups (Hobley & Shakya, 2012). The Forest Act of 2005 established the Kenya Forest Service (KFS) as a semi-autonomous government agency with representation from other government ministries. Section 35 of the Forest Act of 2005 mandated that all forests (state, local authority or provisional forest, registered private forest) be managed in line with an authorized Forest Management Plan (FMP). Through the participatory forest management (PFM) concept, local communities can also participate in the management and use of forests. According to research, community forest associations were formed after the Forest Act of 2005, primarily to encourage community participation in forest management. Participatory Forest Management was first piloted in the Dida area in Arabuko Sokoke forests with permission from the Ministry of Environment in 1997. Under Sections 46 (4) and (5) of the Act, CFA shall submit draft management plans with their applications to the Director KFS for approval to participate in forest conservation and management. Community forest engagement is primarily done through CFAs, and

integrated forest management is the key idea underpinning the new policy (GOK, 2005; 2007).

They are made up of neighboring forest communities that reside up to 5 kilometers from the forest boundary and are recognized as forest co-managers under the Forest Act through Participatory Forest Management. Several CFAs have been formed as a consequence of community awareness efforts by the Kenya Forest Action Network (FAN) and the Kenya Forests Working Group (KFWG), as well as the KFS (Thenya *et al.,* 2007). Thus, under the provisions of a forest management plan, local populations can directly participate in the protection, conservation, and management of a specified forest area (World Bank Report, 2007). The Kakamega Community Forest Association (KACOFA), for example, was created in 2006 and has been participating in a variety of forest activities aimed at safeguarding the forest (Ongugo et al., 2008). According to research, CFAs under the Kenya Forest and Conservation Act (2016) are primarily responsible for actively preparing and implementing a participatory forest management plan (PFMP) in collaboration with KFS, exercising user rights, and providing any useful information to KFS for management improvement. According to a global study, collective communal water management has been practiced for about 1,000 years, as evidenced in Spain. More than a century ago, the Spain 1879 Water Act permitted the voluntary development of irrigation towns (Del Saz, 1990).

The Water Act was amended in 1985 to incorporate additional provisions that enlarged Irrigation Communities to include not only irrigation but also other water users such as public water supply and businesses, changing them into Water Resource User Associations (WRUAs). According to further research, Kenya's Water Act (2005) formed the Water Resources Users Association.

The Water Resources Management Authority (WRMA) was mandated by the Act to create a Catchment Management Strategy for the management, use, development, conservation, protection, and control of water resources within each catchment region (Water Act 2002 section 5, paragraph 1). The catchment management strategy provides mechanisms and facilities that allow the public and communities to participate in the management of water resources within each catchment area, as well as conflict resolution and cooperative management of water resources in catchment areas (Water Act 2002 section 5, subsection 3[e]). The WRUA was founded and works by Section 10, Subsections 1 to 14 of the Water Resources Management Rules 2007, and a holistic strategy is required for the WRUAS activities to be objectively implemented (Cheptoo, 2005). Given the aforementioned, Kenya adopted a basin-based approach to water resource management, which is a comprehensive methodology that allows for the controlled use of water resources for community benefit. The passage of the water act (2002), the Kenya Constitution (2010), and the most recent water act (2016) resulted in a concerted recognition of the importance of community participation in water resource management, resulting in the formation of WRUAs within Kenya's six drainage areas, namely Lake Victoria North basin, Lake Victoria South basin, Rift valley basin, Athi river basin, Tana river basin, and Ewaso N'giro river basin. The presence of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) inside diverse catchments around the country, according to the Ministry of Environment and Natural Resources, enables successful catchment management (MENR 2007).

Makueni County is located in the Athi River Basin and contains nine (9) registered community forest associations (MBOCOFOA), Kichapa, Makongo, and Kenze, as well as sixty-eight (68) registered WRUAs active in diverse watershed management. The Upper Kaiti WRUA, formerly known as Kanzuma, was formed in mid-2010 to manage the Kaiti

Rivers and the other water resources in the Kilungu catchment. Upper Kaiti WRUA and Kenze Community Forest Associations (CFA) are the sole organizations now managing the entire Kilungu catchment and its different tributaries of Kaiti River, Kikoko, Kisusyo, Isuuni River, Mitungu, Tiva, Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, and Kwanthi (GOK, 2018). The Kilungu catchment is of major economic and ecological importance in the area due to its value as a watershed and catchment area for the above rivers, as well as a source of various springs, namely Kikoko, Ilima, and Kisusyo, which is the source of Kisusyo river and tributaries and wetlands providing water to the community and supporting various livelihood activities. The catchment population of around 22,956 people, made up of 4,372 households, is spread out across the seven blocks of Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio, and it is an epicenter of ecological support system for their livelihoods. Even with these institutions present, the catchment has seen rampant degradation, compromising the country's limited sustainable water and forest resource base, necessitating active CFA and WRUA actions to reverse the trend (Makueni CIDP, 2018-2022). According to the Makueni county government, the activities of all CFA and WRUA involved in various catchment management activities, as well as their contributions to the county, are unknown, and a lack of actionable data and information makes making informed and transparent decisions on sustainable catchment utilization increasingly difficult (Makueni CIDP, 2018-2022). The study's overarching purpose was to look into CFA and WRUA activities and their efficacy in carrying out their mandates.

5.2 Materials and Methods

5.2.1 Context, Theory and Conceptual Framework

This study used institutional theory to investigate Kenze CFA and Upper Kaiti WRUA actions and efficacy in carrying out their statutory tasks, as shown in Figure 5.1 below. It

concentrated on the activities of the institutions, their effectiveness in carrying out their statutory functions, their organizational structure and functioning, catchment management, and general environmental management (Chunguang & Sarkis, 2010, De Ron, 1998, Herron & Braiden, 2006, De Brito *et al*., 2008, Wong *et al*., 2012). The institutional theory was chosen because it explains why certain practices within institutions are chosen without an obvious economic return (Berrone *et al*., 2010; Meyer & Rowan, 1977, Dimaggio & Powell, 1983), particularly why organizational structures and practices become entrenched, as well as how and why change occurs, according to Jennings (1994). The study was guided by institutional theory, which investigated how the institutional activities of the Kenze CFA and Upper Kaiti WRUA influenced the outcomes of the institutions' contributions to Kilungu watershed management.

Upper Kaiti WRUA and Kenze CFA activities piqued our interest, especially in terms of performance, law enforcement, fines and penalties, effectiveness in delivering desired outputs, official leadership, and their influences on the outcomes of the institutions' contributions (Scott, 2004). The study then looked at coercive pressure, specifically on the KFS and WRA mandates about CFA and WRUA, to explain how the CFA and WRUA institutions work (Maggio & Powell, 1991).

This was guided by the fact that the issue of the CFA and WRUA institutions' activity is widely recognized since it stresses the formal and legal features of the governance institutions. According to Scott (2004)'s institutional theory, institutions such as CFA and WRUA must follow the sustainable rules and belief systems that exist in the context in which they operate to be effective in catchment management. Such evidence from current research drives an endeavor to obtain a more in-depth description of the role of CFA and

WRUA operations and structure in carrying out their legislative mandates in the Kilungu catchment management.

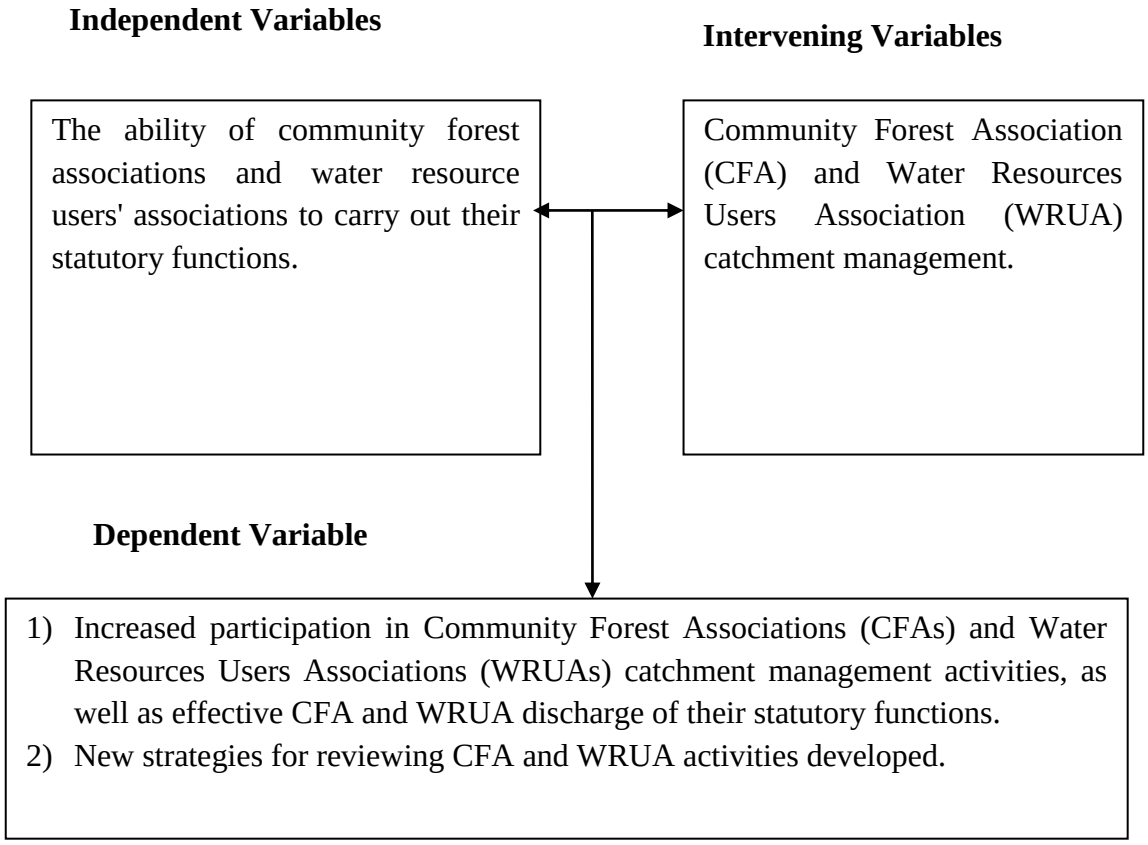

Figure 5.1: Conceptual Framework-Researcher

5.3 Methodology

The study area includes seven blocks whose occupants both directly or indirectly interact with and rely on the catchment for their livelihoods (Figure 5.2). For a variety of factors, the Kilungu catchment was chosen as the study region. First, it has a registered Upper Kaiti Water Resources Association (WRUA), created in 2011 and registered in 2013, and a registered Kenze Community Forest Association (CFA), formed in 2013 and registered in 2013. These groups were active in catchment management, but their actions were not documented, necessitating the investigation. Second, the catchment is a classic example of a protected area where the actions and contributions of the CFA and WRUA might be explored. Third, the area is surrounded by human communities spread out across the

seven blocks of Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio, and it is an epicenter of ecological support system for more than 22,956 people comprised of 4,372 households who rely on the catchment for their livelihoods directly or indirectly (County Government of Makueni, 2019).

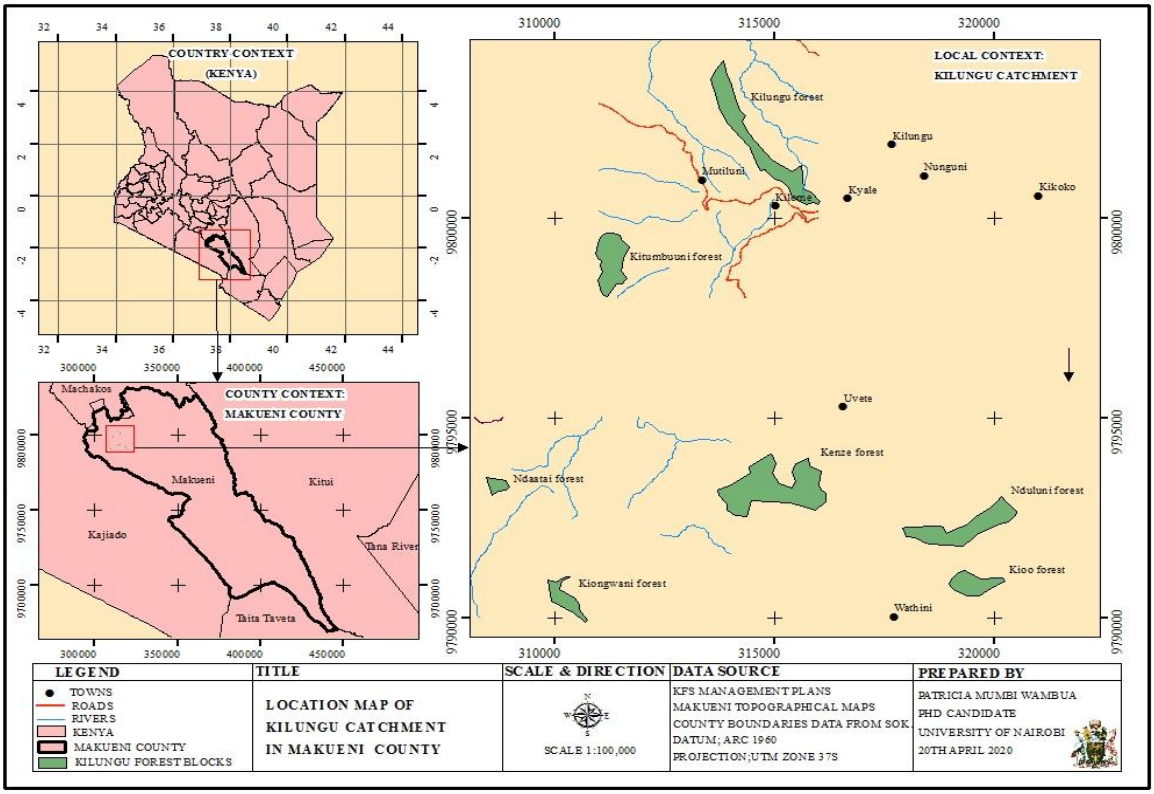

Figure 5.2: Study Area

Source: MEMR-KFS 2020

A combination of cultural, socioeconomic, and human activities has also resulted in high rates of degradation and encroachment on Kilungu catchment resources (Ontiri & Robinson, 2014). The Kaiti and Kikuu Rivers are two of the most important rivers in the Kilungu watershed; they also feed rivulets including Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi, and Kilome Springs. They also serve as an essential recharge system for the Athi River downstream. A descriptive cross-sectional survey was utilized to collect data from houses in Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni,

and Kiio that were already delineated, existing groups: Based on a total household population of 4372, semi-structured questionnaires were delivered to 366 randomly selected household respondents, derived using Cochran's formula by Horse (2018) and Rucker (2017), as follows. $$n_o = \frac{Z^2 pq}{(e_p)^2}$$

where; $-n_o$ =Cochran's sample size recommendation; Z = Z value (i.e. 1.96 for 95% confidence level); p =proportion of the population with direct attribute to the sub-catchment governance; e_p = desired level of precision-confidence interval ±7% = (±0.07)) and population proportion= 50%. The household questionnaires were distributed equally in order to collect data on the activities of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) as well as their effectiveness in carrying out their statutory functions. 366 household questionnaires, 10 focus group discussions, 10 key informant interviews, and direct observations were used to collect data. The descriptive method was used. Figures, tables, and cross-tabulations tables were used to present information.

5.4 Results and Discussions

5.4.1 Respondents Age in years

Figure 5.3 depicts the age distribution of survey respondents. While upper Kaiti WRUA received 33% of the responses and Kenze CFA received 45%, the bulk of respondents for both the CFA and WRUA were aged 30-39. The next age group was 40 to 49, with upper Kaiti WRUA accounting for 32% and Kenze CFA accounting for 17%. Upper Kaiti had 17% of individuals aged 20 to 29, whereas Kenze CFA had 26%. In the 50-59 year age group, Kaiti WRUA had 16%, Kenze CFA had 11%, while in the 60 year age group, Kaiti WRUA had 1% and Kenze CFA had 0%. According to the data, respondents in both

institutions were mostly between the ages of 30 and 39.This study found a different trend than prior research by Maskey *et al.* (2003), which found that elderly people in Nepal participated in community forest and water association activities at a higher rate than younger people. The findings contrasted with those of a study conducted in Ondo State, Nigeria, which revealed that farmers aged 35 to 54 were more likely than other age groups to engage in Taungya forestry since they could plant and harvest trees throughout their lifetimes (Victor & Bakare, 2004).

The findings supported prior research by Dolisca *et al.* (2006), who observed that while younger individuals were keen to engage in forestry and water program decision-making, older people were more interested in acquiring forest resources and managing water resources.

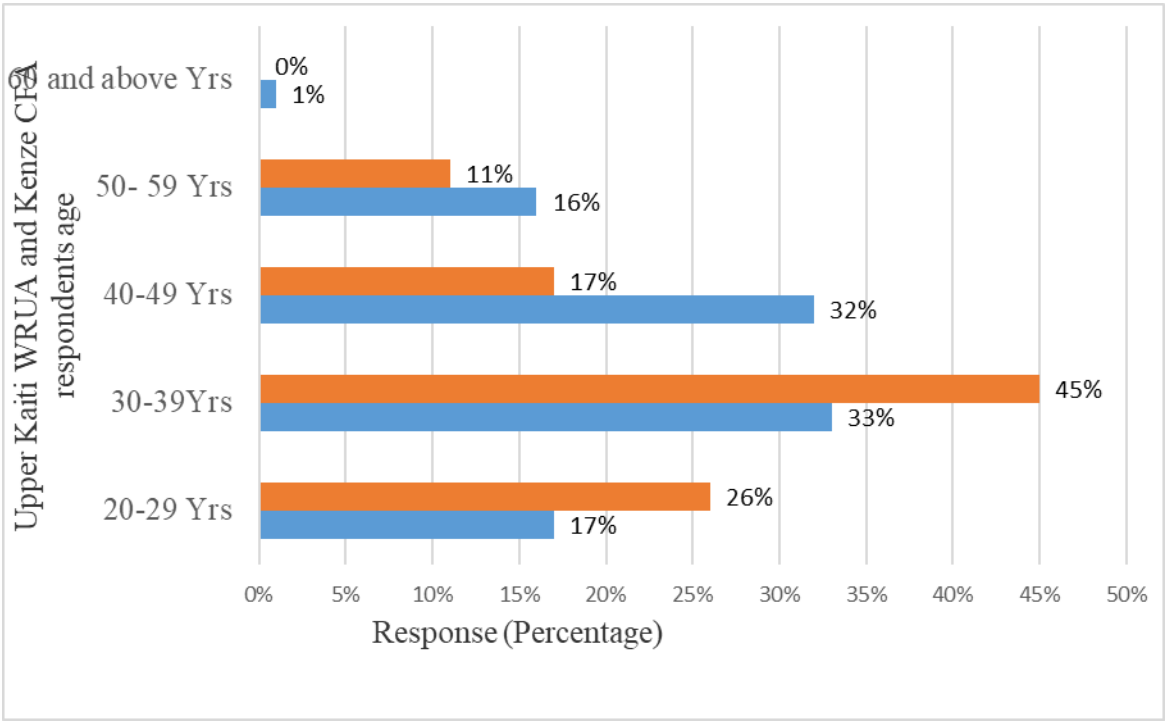

Figure 5.3: Respondents Age in Years

5.4.2 Respondents' Educational Level

According to the study, Kenze CFA respondents had a higher level of education, with 36% having a secondary level, 28% having a college certificate, and 3% having a university degree, compared to upper Kaiti WRUAs (25% having a secondary level, 11% having a college certificate, and none having a university degree), as shown in figure 5.4 below. This could imply that the bulk of people with higher levels of education are not in rural areas, but rather in urban areas or elsewhere looking for jobs or working for a living, and that this has filtered the literacy levels within the research area. Further information derived from FGD and KII indicated that all issues requiring a high literacy level of interrogation were addressed, which was supported by the current study's observation that education did not determine community participation in catchment management and that other factors other than levels of education were discovered to be contributing to the continuous degradation of the catchment.

Previous studies by Campos et al. (2012), Dolisca *et al.* (2007), and Sodhi *et al.* (2010a) found that formal education influenced views of environmental, catchment conservation, and ecosystem service provisioning. Furthermore, these findings were consistent with Chowdhury (2004)'s study on community participation in social forestry in Zathila and Betaga villages in Gazipur, Bangladesh, which discovered that people's educational level influenced their participation in forestry projects. Jakariya (2000) discovered that people's participation was influenced by their educational level, with the higher the literacy level, the higher the level of catchment management.

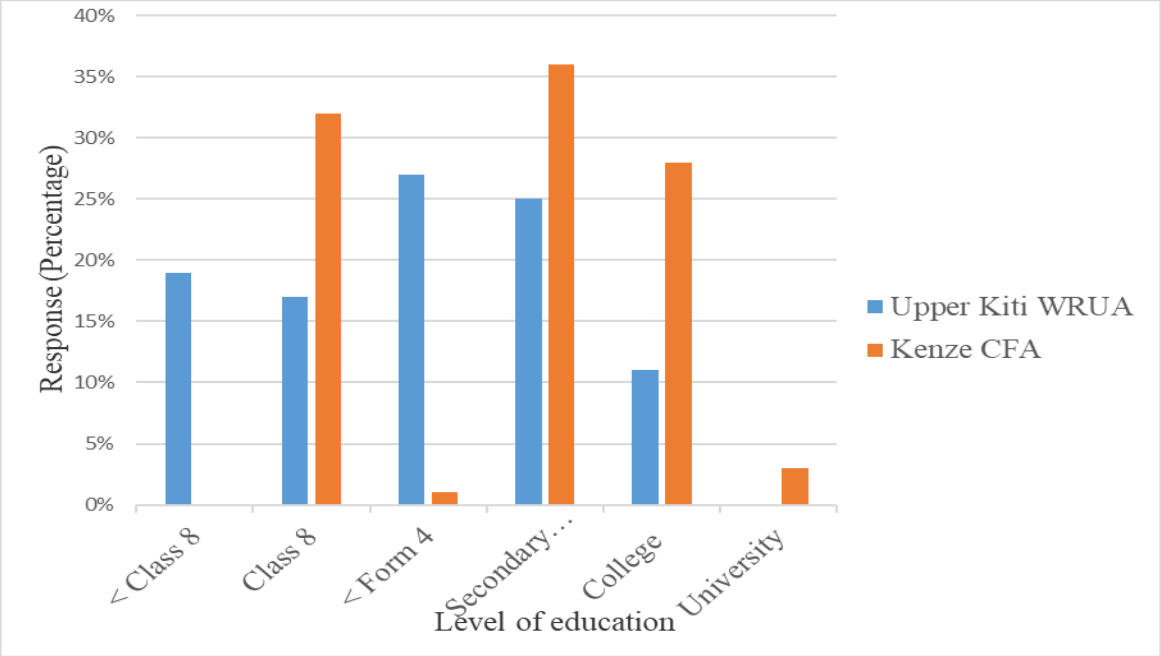

Figure 5.4: Respondents Level of Education

Pearson's correlation coefficient was used, which is a statistical measure of the strength of a linear relationship between two sets of data.

This study looked at the relationship between CFA and WRUA to establish if there was one, and if so, whether they were associated. We achieved this by considering, for example, what happens to the catchment if the CFA or WRUA challenges go unchecked; this method was judged relevant because it swiftly provided data that influenced the study's recommendations. Pearson correlations study on the association between education level and statutory function execution was found to be significant at a low level (p= 0.249) for the two organizations supporting the above-mentioned results.

Table 5.1: Pearson's Correlation Level

Correlations			
		Level of Education	**Execution of Statutory functions**
Level of Education	Pearson Correlation	1	-.249**
	Sig. (2-tailed)		.000
	N	366	366
Execution of Statutory functions	Pearson Correlation	-.249**	1
	Sig. (2-tailed)	.000	
	N	366	366

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

5.4.3 Gender Inclusivity and Equity Level of the Respondents

The analysis of whether WRUA and CFA organizations observed gender balance in their operations found that the WRUA structure accommodated gender balance better than the CFA. This was demonstrated by 93% of WRUA replies being affirmative versus 15% for CFA (Figure 5.5). Furthermore, the FGD and KII certified that both genders in WRUA had equal access to all WRUA events. Attending all meetings, contributing to decisions and matters affecting them as equal members of the WRUA, and being appointed to leadership roles were among the actions cited by respondents without bias.

Furthermore, respondents stated that appointments to subcommittees and chairpersons are made without regard for gender, as opposed to CFAs. These findings also point to a gender disparity in CFA participation in CFA activities.

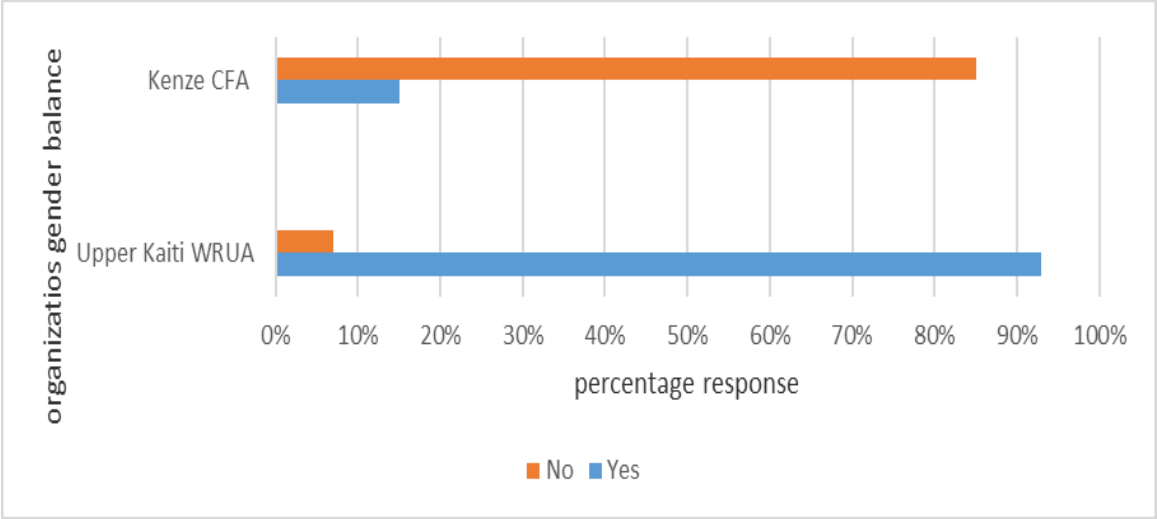

Figure 5.5: Gender within the CFA and WRUA Institutions

Furthermore, the findings demonstrated that WRUA as an organization performed better in terms of gender inclusion and equity, with no prejudice against the implementation of activities by either gender. This was proved by the results, which revealed WRUA at moderately (48%), strongly (29%) as compared to CFA at moderately (27%), highly (14%), implying that gender discrimination and exclusion were more prevalent in CFA activity implementation than in WRUA activity implementation (see figure 5.6 below). Based on the facts above, policy should be developed to ensure a balance of male and female involvement in catchment management.

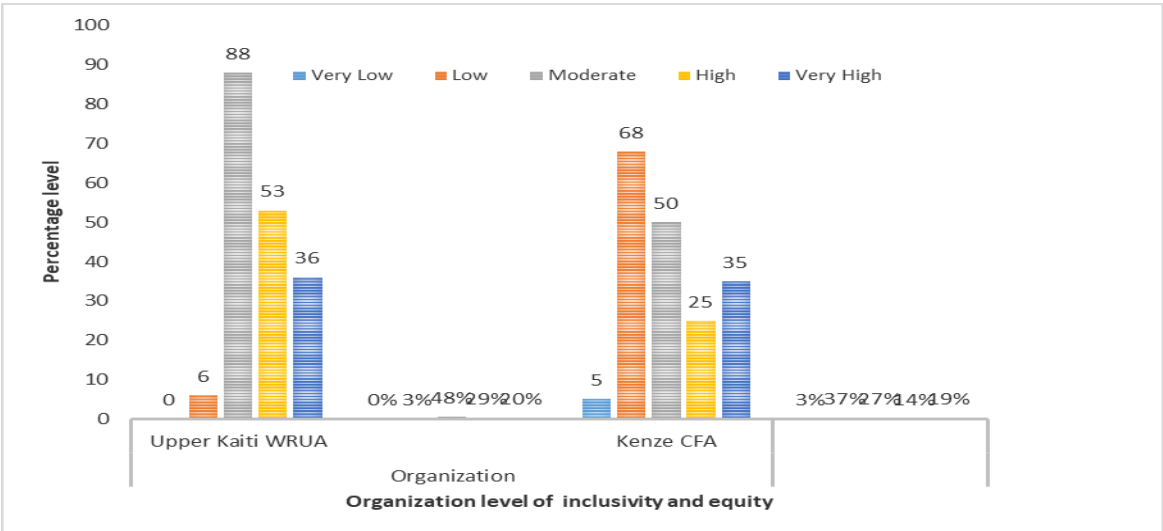

Figure 5.6: Gender Inclusivity and Equity

5.5 WRUA and CFA Implementation of Activities

The study discovered that upper Kaiti WRUA operations were more effective in catchment management than CFA activities, with 31% rating them as (moderately) and 37% rating them as (very) (Figure 5.7). The WRUA allows for the exchange of information and ideas about the use of water resources within the catchment, according to Key Informant Interviews (KII) and Focus Group Discussions (FGD). It also functions as a venue for brainstorming future water-related projects and developments to garner acceptance from other WRUA members and the broader public. WRUA was also involved in resolving water-related conflicts and advocating for resources from various institutions, including donors, to improve the availability, reliability, quality, or other aspects of the Kilungu catchment's water resources. Furthermore, the Kilungu catchment's main streams are Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi, and Kilome, according to the debates. According to the debate, all of the above springs have been mapped, and the Kilome and Kilumwa springs have been protected by the Kaiti WRUA. According to the FGD and KII, the CFA's legal responsibilities include actively preparing and implementing participatory forest management plans in collaboration with the KFS office, establishing tree nurseries, planting trees, conflict resolution, and general protection of the Kilungu catchment. Furthermore, the CFA was expected to protect the catchment from illegal activities such as illegal logging, grazing within the catchment, forest fire control, conservation sensitization of communities, enjoyment of user rights, and provision of any useful information to KFS for catchment improvement. However, the findings revealed that CFA actions were failing to achieve these goals, and the catchment was considered to deteriorate. Furthermore, the FGD and KII talks shed light on why the CFA was ineffectual in catchment management due to a lack of finance, low levels of involvement in CFA activities, and unresolved disagreements among members.

Other issues included inadequate leadership and leadership squabbles, as well as members' lack of motivation to accomplish their jobs. Furthermore, a lack of transparency and accountability at the top levels of Kenya Forest Service leadership has been connected to concerns such as illegal logging and corruption, as well as the marginalization and impoverishment of catchment-dependent communities and the general public. The FGD, which indicated that weak forest and water resource governance is a major danger to the CFA and WRUA's actions, supplemented the above conclusions. In addition, the CFA's actions were hampered by the absence of a management plan, which acts as a road map in forest management. This was owing to the Forest Conservation and Management Act 2016 section 47 (1) requirement that all forests be managed through authorized management plans produced with stakeholder engagement.

Furthermore, the findings revealed that the CFA violated Section 48 (1) of the Forest Conservation and Management Act 2016, which states that a member of a forest community, along with other members or persons residing in the same area, can register a Community Forest Association under the provisions of the Societies Act.

Furthermore, a registered CFA may request the Service for permission to participate in all activities aimed at the conservation and management of a public forest under section 48 of the act. The threat of not having a management plan was also attributed to unsustainable levels of watershed resource usage, which resulted in deterioration. Davis *et al.* (2013) discovered that governance institutions carrying out their tasks result in excellent policies and sustainable resource usage, resulting in less deterioration. The upper Kaiti WRUA, on the other hand, was judged to be more effective in catchment management due to the WRUA's consistent holding of annual general meetings (AGM). Furthermore, the FGD reported that during the AGM, new officials are elected every

three years, with the next elections slated for 2021. The WRUA also had a work plan and an active executive committee to steer the organization's business. The actions of the Kenze CFA and the upper Kaiti WRUA were similar in that both were developed to provide an ecosystem-based approach to watershed management. This is expected to be accomplished through integrated management of the land, water, and other living resources in the research region. Based on the findings, it was obvious that the degree of CFA and WRUA activity implementation needed to be assessed to verify its effectiveness to promote equitable conservation and sustainable use of the watershed. According to KII, the KFS, and WRA have a structural arrangement conflict in their coordination of the affairs of the CFA and WRUA, respectively, hurting the successful implementation of their activities. The findings show that proper implementation of the CFA and WRUA programs is critical for the conservation of the catchment. Furthermore, there is an urgent need to strengthen the CFA's efforts, particularly participatory catchment management. Watson (2007) stated that CFA operations should include community participation, jointly sharing, managing, and protecting a common watershed resource. Furthermore, Community Forest Association participation contributes to gains in forest conservation, rural livelihoods, and forest governance (Lund & Treue, 2008; Tacconi, 2007). Furthermore, several case studies have demonstrated that decentralized catchment management results in effective catchment utilization control (Lund & Treue, 2008), improved ecosystem functions and quality (Carter & Gronow, 2005), improved resource status (Sauer & Abdallah, 2007), and sustainable management of forest resources by local people (Ribot, 2004). Furthermore, these findings are congruent with those of Coulibaly-Lingani *et al.* (2011), who found that the majority of CFA carrying out their legal obligations in Burkina Faso were those who benefited directly from engaging in such programs. Dolisca *et al.* (2006) found that respondents who had benefited from the Forêt

des Pins Reserve in Ahiti were more motivated to support social, environmental, and economic catchment management efforts.

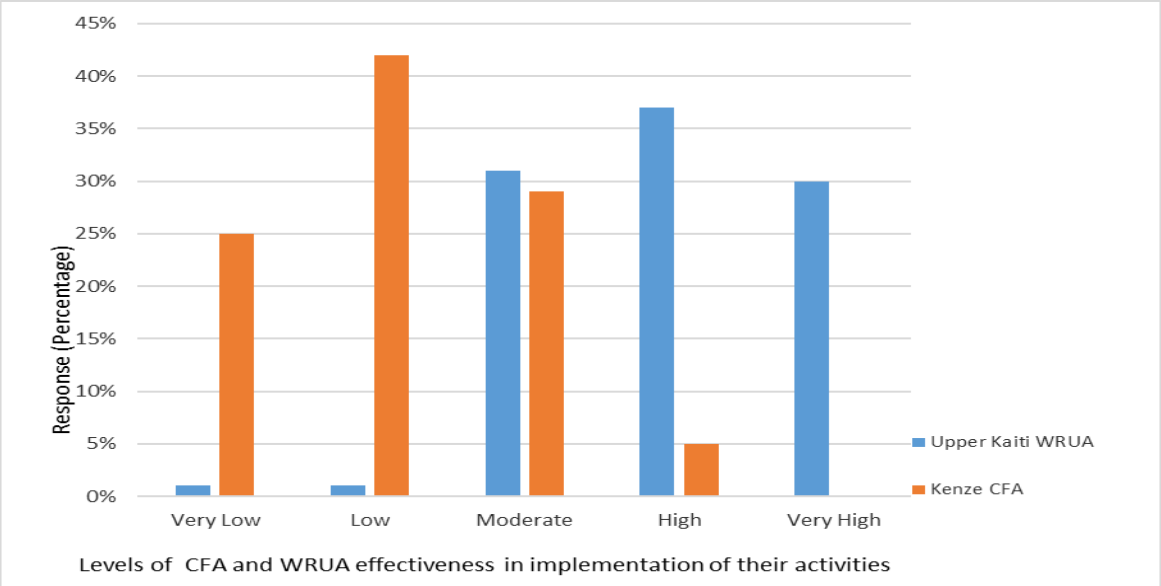

Figure 5.7: WRUA and CFA Implementation of Activities

Furthermore, Pearson correlations analysis on the relationship between the level of equity and inclusiveness and the Effect on CFA and WRUA activities for the two organizations was found significant (r=p= 0.335), implying that equity and inclusivity could affect the effectiveness of both CFA and WRUA activities, as shown in Table 5.2.

Table 5.2: Equity and Inclusiveness and Effect of CFA and WRUA Activities

Equity and inclusiveness	Pearson Correlation	1	.335**
	Sig. (2-tailed)		.000
	N	366	365
Effect of activities	Pearson Correlation	.335**	1
	Sig. (2-tailed)	.000	
	N	365	365

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

5.6 WRUA and Kenze CFA Carrying out Statutory Obligations and Delivering Planned Results in the Kilungu Catchment

5.6.1 WRUA and Kenze CFA Carrying out their Statutory Responsibilities

In terms of statutory functions, Upper Kaiti WRUA outperformed Kenze CFA. As indicated in Figure 5.8, 27% of WRUA respondents chose level (good) and 23% chose very good, whereas Kenze CFA received just 3% (good) and 6% (very good). The findings were supplemented by FGD and KII findings, which listed the statutory WRUA functions as managing the Kaiti River and other water resources within the catchment, developing sub-catchment management plans (SCAMP), managing water resources within the catchment properly, and increasing water resource availability. Besides, the Focus Group Discussions that the WRUA is interested in boosting water consumption for economic and social advantages, ensuring access to water for upstream and downstream communities, and preserving springs from degradation caused by animal and human contamination. The WRUA was also involved in borehole placement, controlling sand harvesting from the Kaiti River and its tributaries within the catchment, conflict resolution, water use monitoring, member activity monitoring, and nursery management training. Furthermore, WRUA was claimed to be involved in sensitizing the community to activities that could degrade the catchment, such as spring pollution and community empowerment on watershed management concerns. Kenze CFA, on the other hand, was mandated with the following duties: Prepare and implement a participatory forest management plan in partnership with the KFS office, including the creation of tree nurseries, tree planting, dispute resolution, forest fire control, and community conservation sensitization. Other statutory activities included the preservation of wooded slopes, the monitoring of forest state, the exercise of user rights, and the provision of any helpful information to the KFS for catchment improvement.

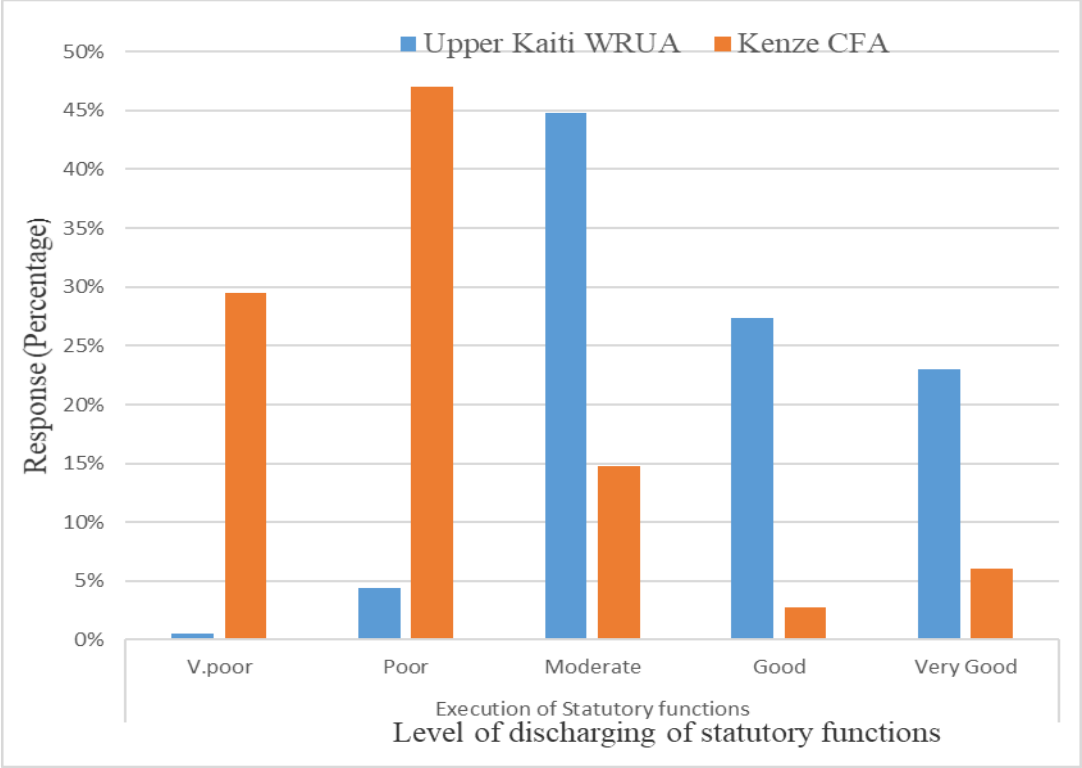

Figure 5.8: Discharge of Statutory Functions by WRUA and CFA

5.6.2 Upper Kaiti WRUA and Kenze CFA Delivery of Desired Outputs in Kilungu Catchment

In terms of CFA and WRUA delivery of intended outputs in the Kilungu catchment, the upper Kaiti WRUA was rated highly at moderate (40%) and good (38%), while CFAs were rated moderate (26%) and good (4%), as shown in Figure 5.9. The findings were backed by both focus group discussions and key informant interviews, which demonstrated that upper Kaiti WRUA was actively participating in catchment management and had achieved the anticipated goals. Furthermore, some of the key indicators of such delivery of desired aspects were the preparation of the Sub Catchment Management Plan (SCAMP), sensitizing the community against activities that may lead to degradation of the catchment, such as pollution of the catchment's springs, and community empowerment on catchment management issues. Furthermore, the WRUA was discovered to be holding monthly meetings and engagements, including the development of the Kaiti River Water Resource Users Associations Network

(KWRUAN), a new body to improve the WRUA's function delivery. Kenze CFA, on the other hand, received a low rating for output delivery since the CFA did not have a participatory forest management plan or a work plan in place. Furthermore, the executive committee designated to oversee the management of the association was unaccountable for guaranteeing the delivery of planned activities, and the CFA executive leadership had not had an AGM in over five years. Furthermore, CFA officials had overstayed without being replaced for the same duration, and they lacked a resource mobilizer to gather funding from other partners such as the private sector, business community, and even local and international civic organizations. The lack of a written agreement between Kenze CFA and KFS, as well as other development partners, hampered the delivery of intended results.

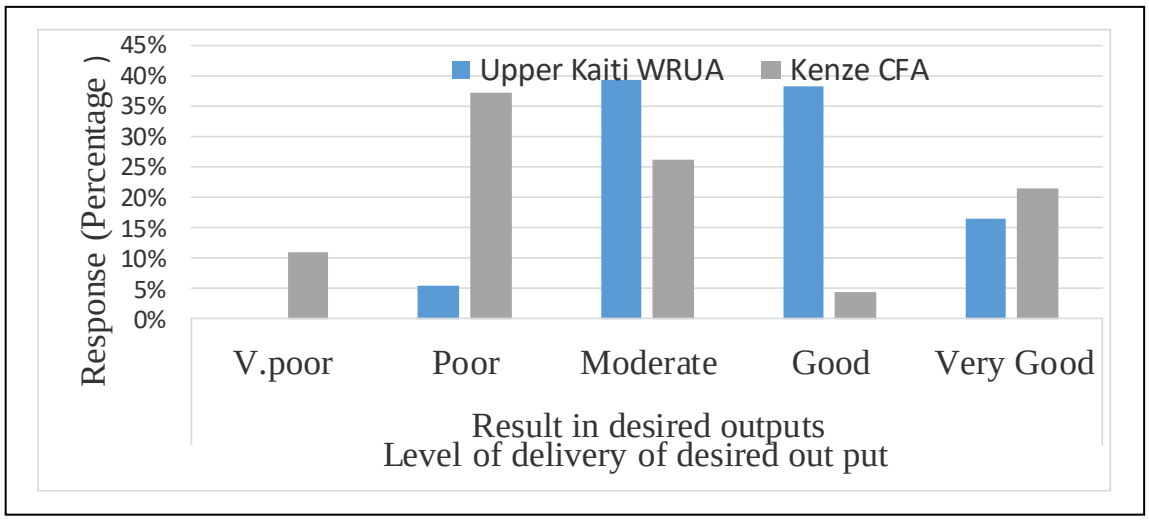

Figure 5.9: Level of CFA and WRUA statutory functions expected delivery of desired outputs in catchment management

5.7 Measures aimed at Ensuring Continuous Delivery of Desired Outputs on Catchment Management

5.7.1 Use of Fines and Penalties

On law enforcement and compliance, out of all the WRUA respondents, 41% (agreed) while 38% (moderately agreed) that the use of more fines and penalties are important

tools of enforcing compliance to laws aimed at ensuring catchment management as opposed to only 21% (moderately agree) and 20% (agree) for CFA as shown in figure 5.10. These results imply that according to CFA respondents, fines and penalties serve little or no purpose in deterring non-compliance with the by-laws differing with previous studies done by Thenya (2007) who asserted that for the activities of CFA and by large the WRUA to be significant, then fines and penalties should be applied to defaulters of all the set rules and regulations.

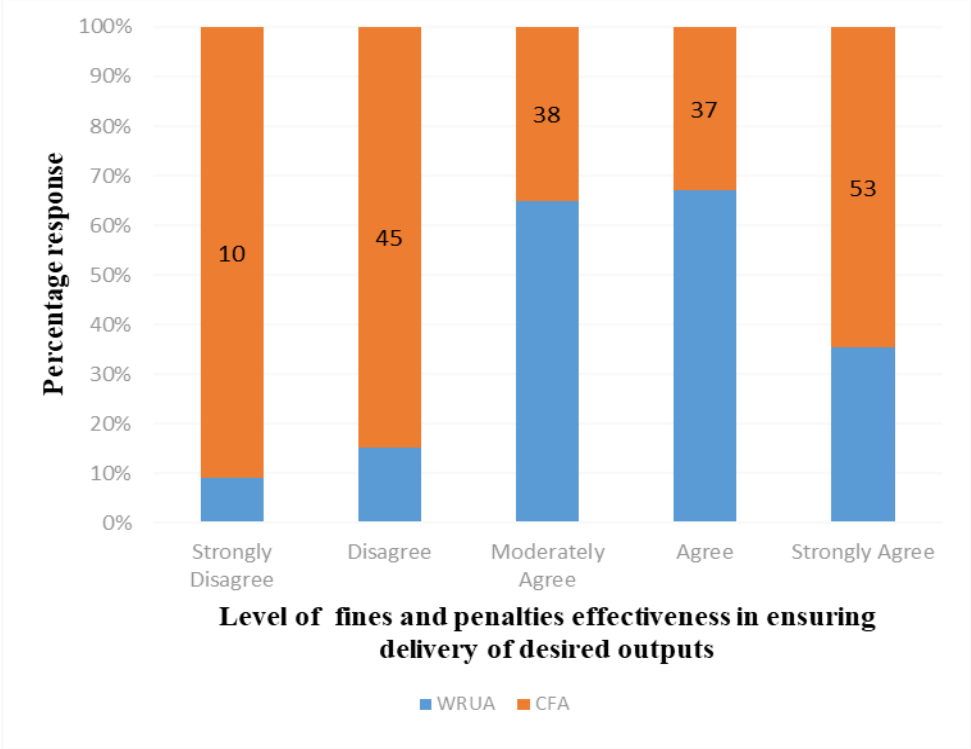

Figure 5.10: More fines and penalties should be put in place to ensure compliance with the CFAs and WRUAs by-laws.

5.7.2 Responsibilities of the WRUA and CFA Institutional Officials and Community Participation

The majority of the WRUA respondents moderately agreed (43%), agree (38%) while CFA positively confirmed, moderately agree (32%), agree (8%) that in order for the Upper Kaiti WRUA and Kenze CFA to discharge their statutory functions and be effective in the delivery of desired outputs, then the WRUA and CFA institutional

officials should attend to their roles and responsibilities effectively (Figure 5.11). These results were collaborated by the FGD and KII discussions which revealed that the key roles of the CFAs officials (Chairperson, vice-chair, Secretary and Treasurer) were resource mobilization, bookkeeping, participatory monitoring and evaluation, including data collection and entry, leadership, governance, advocacy, conflict management and negotiation. On the other hand, the roles of WRUA officials (Chairperson, vice-chair, Secretary and Treasurer) included presiding over all meetings of the committee and at the general meetings. Vice Chairperson performs any duties of the Chairperson in his/her absence while the Secretary deals with all correspondences of the society among others. The treasurer is responsible to the committee and the member's proper books of account and ensures that all money received and paid by the society is recorded and available for inspection. Discussions further revealed that even though the officials existed in both institutions, they didn't always comply with rules concerning elections as laid out in their governing documents. Some Executive Committees had not called for elections, the leadership had overstayed in office and a majority of the officials absented themselves from meetings and failed on their roles and responsibilities, sometimes without apologies. These findings imply that there is an urgent need for all the officials to attend to all their roles and responsibilities without fail for the institutions to deliver on their mandates.

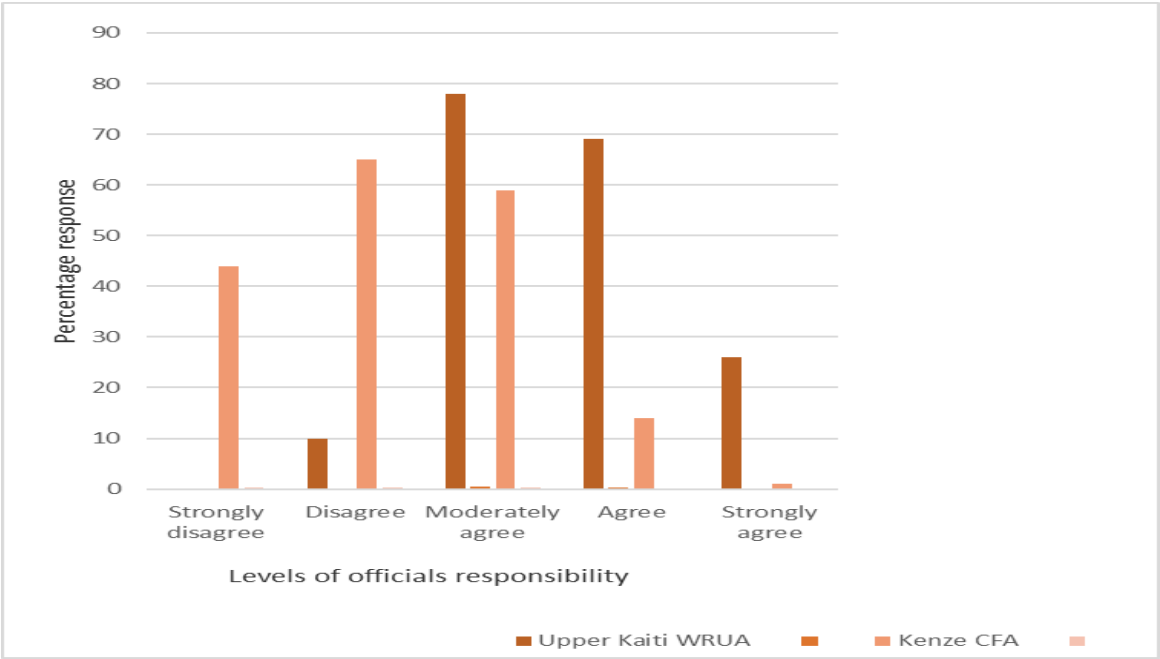

Figure 5.11: Responsibilities of the WRUA and CFA officials

5.7.3 WRUA and CFA Community Participation

According to the results, the WRUA respondents were, more involved in community participation, recording 26% (moderately high) and 50% (highly agree) as compared to 23% (high) and 25% (moderately high) for CFA, as shown in Figure 5.12 below.

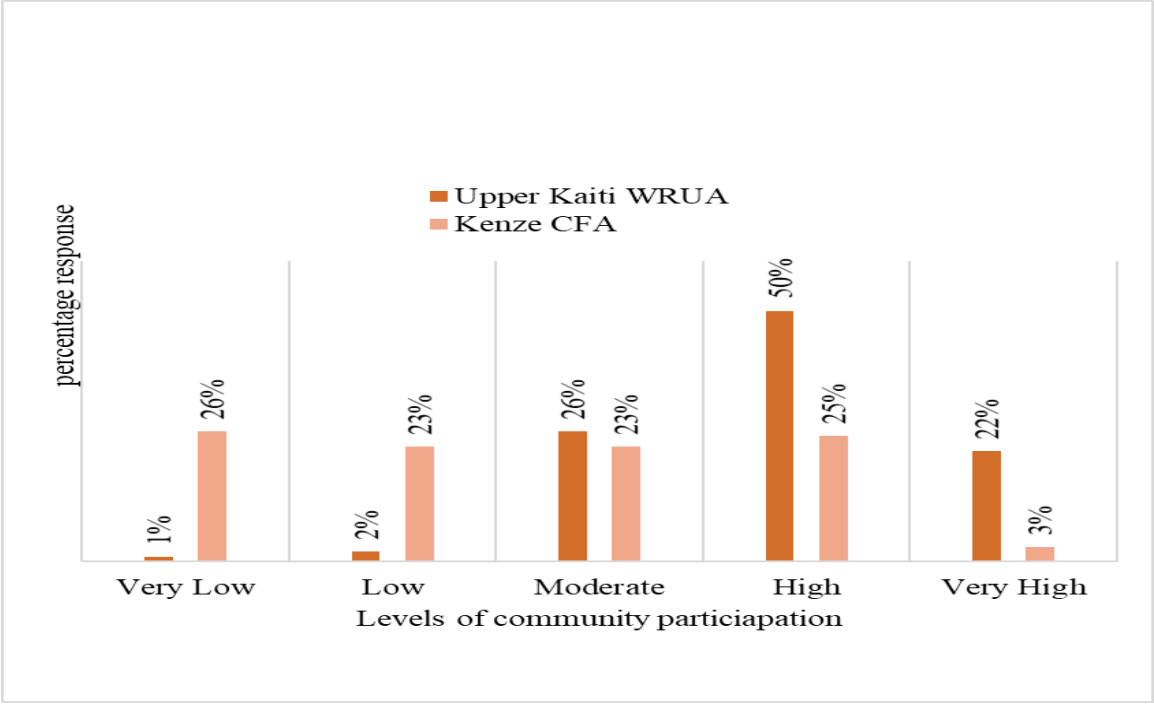

Figure 5.12: Community participation in WRUA and CFA Functions

5.8 Conclusion and Recommendations

5.8.1 Conclusion

Despite the efforts of Community Forest Associations (CFA) and Water Resource Users Associations (WRUA), activities in various catchments around the world; catchment degradation has continued globally. Similarly, in Kenya, the Kilungu catchment area is managed by the Kenze (CFA) and upper Kaiti catchment areas (WRUA). This paper looked into the activities of Kenze CFA and Upper Kaiti WRUA to see how effective they were at carrying out their statutory functions. This was accomplished through the use of an exploratory, descriptive survey. Data was gathered using questionnaires, focus group discussions, interviews with ten key informants, and direct observations. The descriptive method was used. Figures, tables, and percentages were used to present information.

Finally, the study accomplished its goal of examining the CFA and WRUA's effectiveness in carrying out their statutory functions in catchment management. Furthermore, Upper Kaiti WRUA was found to be more effective in all areas, including catchment management activity implementation, discharge of statutory functions, delivery of desired outputs, application of fines and penalties, officials attending to their roles, and community participation.

In contrast, the CFA was found to be insignificantly ineffective in all of the aforementioned aspects of catchment management. Importantly, even though the study objective was met, it was revealed that these did not fully address catchment degradation because the institutions, specifically the CFA, were not empowered to perform all of their activities as required by law, with an emphasis on the timely preparation and implementation of management plans, whereas WRUA members should be given

continued support by both national and county governments, should be properly monitored, and should be adequately capacitated.

5.8.2 Recommendations

Prioritizing a strategy for seizing the opportunities presented by the CFA of being empowered to perform all of its activities as required by law, with a focus on timely preparation and implementation of management plans, as well as WRUA's continuous improvement, is critical.

In addition, there is an urgent need to review the level of CFA and WRUA activity implementation to improve their effectiveness in encouraging true community participation in all of their institutional activities. The study suggests new initiatives to improve CFA and WRUA activities for them to carry out their statutory functions more effectively. Finally, the study recommends developing a new strategy for reviewing CFA and WRUA activities to ensure that they are carrying out their statutory functions effectively.

CHAPTER SIX

CHALLENGES, OPPORTUNITIES AND SUSTAINABILITY OF COMMUNITY FOREST ASSOCIATIONS AND WATER RESOURCE USERS ASSOCIATIONS: A CASE OF KILUNGU CATCHMENT, KENYA

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ABSTRACT

Catchment degradation in Kenya's Kilungu catchment area has continued, despite the involvement of Kenze Community Forest Associations (CFA) and Upper Kaiti Water Resources Users Associations (WRUA). Using an exploratory, descriptive survey, this study intended to analyze the issues faced by CFA and WRUA, available options, and sustainability in catchment management. Household questionnaires, Focus Group Discussions (FGD), Key Informants' Interviews (KII), and direct observations were used to collect data. The study established that Kenze CFA was facing major challenges at a rating of Very High (58%) and Highly (42%) as compared to Upper Kaiti WRUA at Very High (21%) and Highly (49), respectively. The Major challenges for CFA being a non-functional CFA structure, while WRUAs challenges were minor on soft skills. Further, the challenges impacted highly on the outcomes of the CFA performance at a Very High (58%), Highly (42%) and WRUA Very High (21%) and Highly (49%), resulting in increased degradation of the catchment. In terms of opportunities, both institutions had various opportunities although the WRUA had more opportunities at an affirmative (99%) as compared to CFA Yes (54%). The key WRUA opportunity was that of being capacity built and empowered to ensure continuous efficient decision-making and participatory management of the catchment, while the CFA had a supportive policy and law which presented a great opportunity of being enforced.

Further, the WRUA respondents were more positive that the opportunities could improve the catchment at 38% (Moderately), 42% (Highly), and 20% (V. High) as compared to

CFAs at 30% (Moderately), 23% (Highly) and 22% (V. High). Results on Upper Kaiti WRUA and Kenze CFA respondent's perceptions on sustainability revealed that both the WRUA and CFA were functioning well on aspects, of equity and inclusiveness at WRUA rating of Very Highly (55 %), Moderately (88%) and CFA Very Highly (25%), and Moderately (50%), On accountability WRUA had a rating of Very Highly (34 %) and Moderately (88%), while the CFA was rated Very Highly (52%), and Moderately (50%). In terms of WRUA and CFA effectiveness and efficiency, WRUA was rated Very Highly (36 %) Moderately (24), and CFA Very Highly (51%) and Moderately (53%), respectively. Further results indicated that the WRUA highly involved its members in participatory decision-making at moderately (88%) and highly (48%), compared to CFAs, who were rated at zero percentage in the involvement of members in participatory decision-making. On the observance of the rule of law, the WRUA were further rated highly (46%) and moderately (97%), while the CFAs were rated at zero percent. On consensus orientation, WRUAs were again rated highly (56%) and moderately (97%), while the CFAs were rated at zero percent. In conclusion, the study found that CFAs were facing more challenges, had fewer opportunities, and various sustainability issues than the WRUAs who were found to be having fewer challenges, had many opportunities, and were significantly sustainable in all sustainability indicators. These results imply that there is a critical need of addressing the challenges facing CFA and continually improve on the WRUA sustainability aspects as well as ensuring continuous empowerment of both institutions to overcome their myriad challenges, exploit their opportunities and ensure their sustainability. Further, there is a desperate need for a new and effective System for ceaselessly Integrated Kilungu Catchment management.

Keywords: Community Forest Association, Water Resources Users Association, Challenges, opportunities, sustainability, Kilungu catchment.

6.1 Introduction

Concern for the environment, particularly the degradation of the land, water, and air through over-exploitation, pollution, and depletion of natural resources, is reflected in recent legislation (Glazewski, 2000). Globally there has been an increased concern for the environment and catchments, specifically, the degradation of the catchments, land, water, and air through over-exploitation, pollution, and depletion of the natural resource (Glazewski, 2000). Further, the reason behind catchment degradation, even in the presence of Community Forest Associations, according to a study done in Mt. Kenya in Hombe and Gathiuru forest, is because the CFAs are faced with the challenge of inequality, among others (Thenya *et al.,* 2017). Further, Community Forest Associations (CFA) are weak in performing their functions, and as such, the institutions need strengthening to enhance their adaptive capacity (Thenya *et al.,* 2014). They cannot run forests, and therefore they are forced to bring in technical people to help them with the technicalities of forest management (Ongugo *et al.,* 2007).

On the other hand, Water Resource Users Associations also face various challenges. For instance, (Murtinho *et al.,* 2013) reported that external financial support significantly enhanced the capacity of local communities to adapt to water scarcity in Columbia. Past studies reveal that to address the catchment challenges, there have been concerted efforts by several governments and stakeholders, especially in the drylands of Africa, where both statutory and traditional governance plays a major role in water management to engage quickly to reverse the trend (van Koppen *et al.,* 2014).

Locally, Kenya has shifted to decentralized control over water resources amidst the challenge of growing skepticism around the application of Integrated Water Resources Management (IWRM). Kenya has done so by applying the IWRM framework and

associated Dublin principles, paired with a participatory approach to water management (Molle, 2008; Allouche, 2016; Manzungu & Derman, 2016). Further, the Water Governance Centre cites WRUA's water governance capacity as a key challenge impacting negatively on their catchment management (WGC, 2015). According to (Larson & Ribot, 2006) communities that come together to form the Community Forest Associations are not homogenous, and this affects their effectiveness CFAs and WRUAs have been identified as key instruments in improving forest cover and water access and availability, especially in the areas where land degradation and low rainfall have limited the capacity of ecosystems to provide adequate water resources (Moutinho *et al.,* 2013).

The study was carried out in the Kilungu catchment area, which is in Makueni County. Makueni County falls within the Athi River basin catchment. It has nine (9) registered CFAs, namely: Makuli, Nzaui, Kamukima, Nthangu, Kitondo, Mbooni Community Forest Association (MBOCOFOA), Kichapa, Makongo and Kenze, respectively, and sixty-eight (68) registered WRUAs involved in various catchments management within the county. Due to erratic rainfalls, the communities along the Kaiti River collaborated to form a WRUA to manage the river resources and hence Upper Kaiti WRUA, formerly known as Kanzuma was formed in mid-2010. According to the County Government of Makueni (CGM) County Integrated Development Plan (CIDP) (2018), Upper Kaiti WRUA and Kenze CFA. Both the Kenze CFA and Upper Kaiti WRUA memberships were drawn from members of existing Self Help Groups and individual community members that had an interest in Natural Resource conservation. The objective of forming the associations was to get an avenue of engaging in forest and water conservation and deriving benefits from the forest through nature-based enterprises as provided for in the prevailing Water and Forest Act. Currently, the CFA has a membership of 330 members and has an office within the Kilungu forest station where as the Upper Kaiti WRUA has a

membership of 290 active members. The two institutions were both formed in 2013 and are the only institution currently in place managing the entire Kilungu catchment. Additionally, the institutions are the only ones involved in the management of the catchment's various tributaries of Kaiti River, Kikoko, Kisusyo, Isuuni River, Mitungu, Tiva, Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi (County Government of Makueni, 2019).

This study was informed by the fact that, even with the presence of these institutions, the catchment has experienced rampant degradation, which is undermining the limited sustainable water and forest resources base in the country and these calls for vibrant CFA and WRUA activities, having minimal challenges, optimizing their opportunities and sustainable enough to reverse the trend (County Government of Makueni, 2019).

Further, Kilungu catchment is of major economic and ecological importance in the area due to its value as a watershed and catchments area for the above rivers as well as it is a source of various springs, namely Kikoko, Ilima, Kisusyo, which is the source of Kisusyo river and tributaries and wetlands providing water to the community and supporting various livelihood activities. Literature reveals that the catchments population of more than 22,956 people made up of 4,372 households is spread out within the seven forest blocks of Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio, and it's an epicenter of ecological support system for their livelihoods, agreeing with previous studies which found out that the catchment management leads to improvement of environmental quality and food security (Paudel *et al.*, 2014). Additionally, the challenges, opportunities, and sustainability of all the CFAs and WRUAs involved in the various catchment management activities and their contributions to the county is not known (County Government of Makueni, 2019). Again, inadequate data on the challenges, opportunities, and sustainability of the CFA and WRUA within the area

makes it difficult for developers to make informed and transparent decisions on the sustainable utilization of the catchment (County Government of Makueni, 2019).

The study was conducted in Kilungu sub-county in Makueni County, and this was informed by both the institutional and change theory. The institutional theory provided the theoretical lens through which the researcher established the challenges faced by Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs), available opportunities, and assessed the sustainability of the Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) in management of the Kilungu catchment (Baumol *et al.*, 2009, Brunton *et al.*, 2010, Hirsch, 1975, Lai *et al.*, 2006, Roy, 1997). The theory further aided in attending to the deeper and more resilient aspects of CFA and WRUA Challenges, opportunities, and sustainability indicators. On the other hand, the Theory of Change (ToC) was also adopted since it was found to guide the study in making explicit the logic of how proposed CFA and WRUA interventions such as exploiting their opportunities, were expected to produce results by describing through the guided questionnaires what the study intended to achieve (Vogel, 2012). Additionally, one of the key objectives of this study was to assess the sustainability of the Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) in the management of the Kilungu catchment and this was well guided by the theory of change (ToC). This was supported by the fact that the key aspect of the ToC is in its contribution to structuring meaningful measurement of success indicators of institutions such as the CFA and the WRUA (Maru *et al.*, 2018a). The theory also provided an approach to flexible institutional adjustments during the life of desired intervention which ensures sustainability (Maru *et al*., 2018b; Thornton *et al*., 2017). This theory was applied to answer the following specific questions to this study: What are the challenges faced and available opportunities of the Community Forest

Association (CFAs) and Water Resource Users Associations (WRUAs) in the management of the Kilungu catchment? And how is the sustainability of the Community Forest Association (CFA) and Water Resource Users Associations (WRUA) in managing the Kilungu catchment? This paper, therefore, discusses the challenges, available opportunities, and sustainability of the CFA and WRUA by exploring what challenges exist, how they can be addressed, and opportunities seized purposely to ensure the sustainability of the CFA and WRUA contributions to catchment management. The study is further supported by the guiding principle of Agenda 21 adopted in 1992 at the Rio de Janeiro and in the 2002 World Summits on Sustainable Development in South Africa, which gave emphasizes the importance of community management of catchments and services backed by measures to strengthen local institutions such as Water Resources Users Associations and Community Forest Associations in implementing basic service programs (Doe & Khan, 2004).

6.2 Methodology

6.2.1 Study Area Description

The catchment covers an area of 615.1ha, with the plantations covering 253.8ha, as shown in Figure 6.1 below. It is divided into seven (7) forest blocks which further formed the study sample clusters, namely: Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio for ease of management and governed by Kenze Community Forest Association (CFA) and Upper Kaiti Water Resources Users Associations (WRUA). The rainfall received in the catchment is bimodal, with the long rains occurring between March and May and the short rains between October and December. Mean annual rainfall ranges from 800 to 1200mm. The area is endowed with well-drained soils which are extremely shallow and moderately deep to very deep, with an acid, humic top layer. Two of the most important rivers traversing the Kilungu catchment include Kaiti and Kikuu

Rivers. The catchment is also the source of rivulets such as Mwanyani, Katulye, Kyau, Kaiti, Kilumwa, Kwanthi, and Kilome Springs (County Government of Makueni, 2019). There are three major springs in the catchment, which are managed by the two institutions: Kilumwa, Kwanthi, and Kilome water springs which are protected and serve as sources of water to the local communities to as far as 6km. The spring further serves the neighbouring schools, and the Kenya Forest Service uses the water for their tree nursery establishment (KWTA Status Report, 2019). Further, the catchment is surrounded by humans whose activities have led to high rates of catchment degradation, severely reducing water catchment capacity (Ontiri & Robinson 2015).

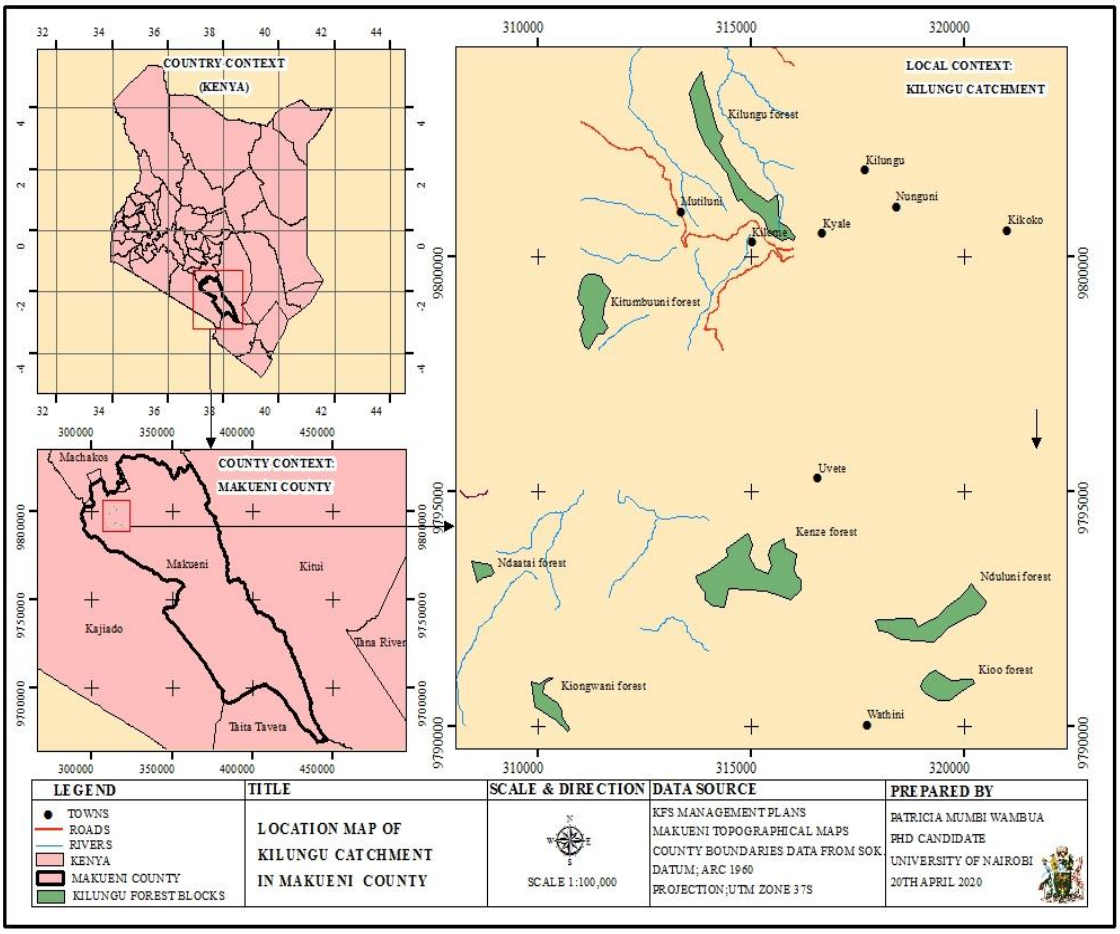

Figure 6.1: Study area

Source: Ministry of Environment and Forestry, 2020.

6.2.2 Sampling and Sample Size

Cluster sampling was used where the entire catchment was divided into seven clusters: - Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. Each cluster represented a block of the catchment. A total sample size of $n = 366$ of the community stakeholders was obtained through Cochran's formula by Horse (2018) and Rucker (2017) as follows based on a total household population of 4372

$$n_o = \frac{Z^2 pq}{(e_p)^2}$$

where; $-n_o$ =Cochran's sample size recommendation; Z = Z value (i.e. 1.96 for 95% confidence level); p =proportion of the population with direct attribute to the sub-catchment governance; e_p = desired level of precision-confidence interval ±7% = (±0.07)) and population proportion= 50%.

Data was collected by equally sharing the 366 household questionnaires targeting the community members within the seven clusters of Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio. Within each cluster, data collection was done within a 5km radius since this is the area with the greatest human-catchment interactions (Okumah *et al.,* 2019). The information was collaborated by focus group discussions, 10 Key Informants Interviews (KII), and direct observations. The collected data was on the CFAs and WRUA's challenges, available opportunities, and sustainability in catchment management. Descriptive analysis was used through cross-tabulation to show the relationship between the two institutions of CFA and the WRUA. Information was presented in figures, tables, and cross-tabulation.

6.3 Results and Discussions

6.3.1 Characteristics Profile of the Respondents

6.3.1.1 Legal Administration Status and Study Population

The Key Informants Interviews (KII) established that for ease of administration and management, and further to assist the study, the area was divided into seven (7) study clusters: The cluster House Holds (HH) sizes were as follows: Kilungu (676), Kitumbuuni (1282), Ndaatai (730), Kiongwani (370), Kenze (379), Nduluni (216) and Kiio (719) making a total of 4,372 households as shown in Figure 6.2 below.

Further, Kenze CFA and Upper Kaiti WRUA were the only associations engaged in the management of the catchment.

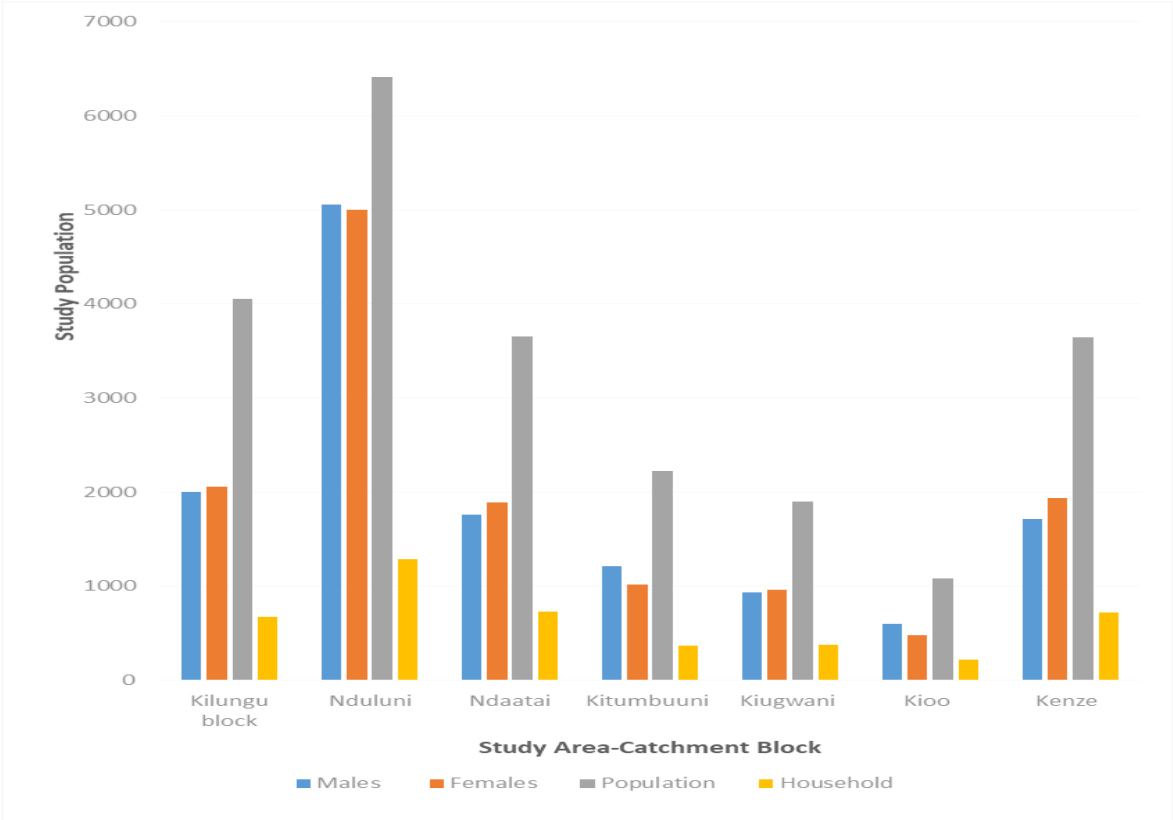

Figure 6.2: Legal and administrative Status of the study area and the study population

6.3.1.2 Respondents' age in years

The results showed that adults between the ages of 36-50 were the majority; Kenze CFA (45%) and Upper Kaiti WRUA (33%), followed by age range 51-65 at Upper Kaiti (32%)

and Kenze CFA (17%), 21-35 at Upper Kaiti (17%) and Kenze CFA (32%), 66- 80 at Upper Kaiti (16%) and Kenze CFA (11%) and 81- 95 at Upper Kaiti (1%) and Kenze CFA (0%) as showed in Figure 6.3 below.

Focus Group Discussions (FGD) established that adults between the ages of 36 and 65 dominated the study. This was said to be critical in understanding and explaining the challenges and the opportunities of the CFAs and WRUAs in catchment management due to the experience of the respondents gained over the years in reference to the catchment. Key Informant interview (KII) participants revealed that the age of the household head was among the demographic factors influencing the participation status of the household. There was no upper limit on age but the oldest respondent was 83 years. These results implied that the age structure of the respondents is concentrated at the age group of between 36-65 for both the CFA and WRUA revealing the middle age of the respondents with a total cumulative percent of 77% for CFA and 48% for WRUA.

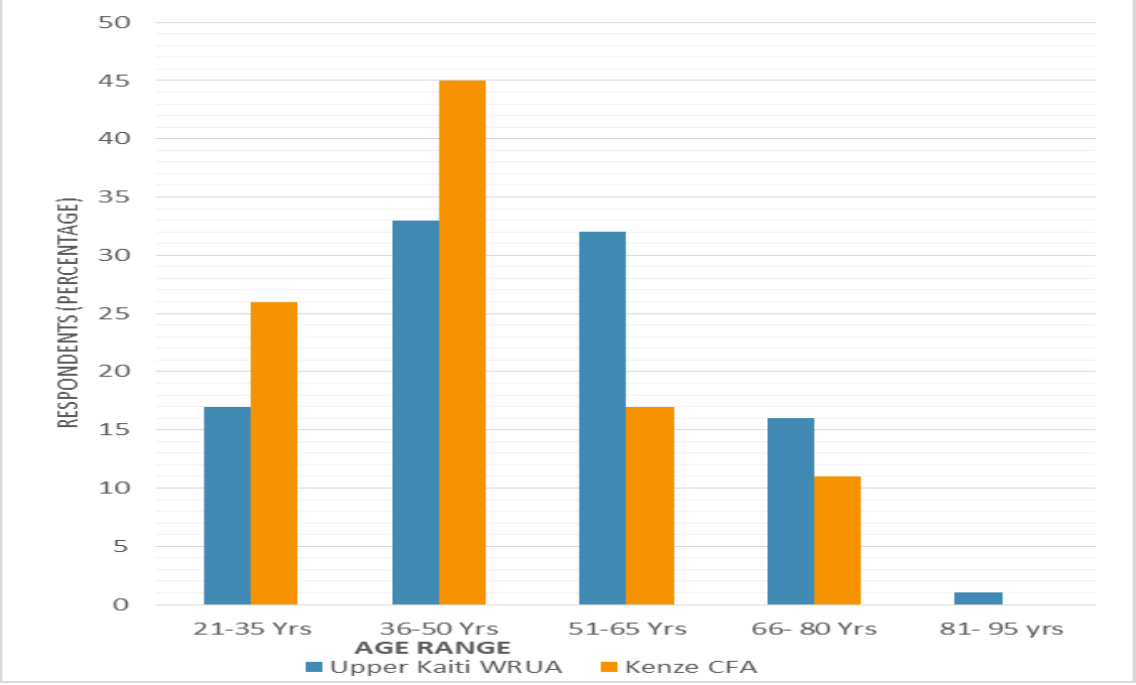

Figure 6.3: Upper Kaiti WRUA and Kenze CFA Respondents age

6.3.1.3 Gender and Education of the Respondents

6.3.1.3.1 Gender of the Respondents

More males participated more in CFA (58%) as compared to females (42%), in contrast with more female WRUA respondents (62%) as opposed to males (38%), (Figure 6.4). The FGD and KII confirmed the high participation of males in CFA was attributed to the fact that the study was touching on challenges about catchment and men assume leadership on issues touching on catchment challenges. Secondly, men culturally, are deemed automatically the head of the family, especially on land use matters, and women solely depend on their spouses and/or male relatives for their livelihood security and survival well-being despite obvious provisions by several Constitutions world over (Ifejika Speranza, 2006; Doss *et al.,* 2012; Lastarria-Cornhiel *et al.,* 2014; Bikketi *et al.,* 2016).

This further agreed with studies done earlier, which confirmed that women share a common set of gender-based disadvantages in natural resources management institutions (Bikketi *et al.,* 2016; Farnworth *et al*., 2012; Ifejika Speranza, 2006). Women tend to have less access than men to productive resources like water, land, livestock, and labour, among others (Bikketi *et al.,* 2016; Ifejika Speranza, 2006; Mackenzie, 1990). The high number of women respondents in the WRUA study was attributed to WRUA mandate on water-related issues and the women being the most affected when water catchment-related degradation occurs, agreeing with previous studies which revealed that involving women equally as men in catchment management activities and institutions such as WRUA and even CFA increases their effectiveness and sustainability (World Bank *et al.,* 2008; Forch *et al.,* 2005). The FGD and the KII discussions added that the institutions should involve both genders equally for effective catchment management. This was in

support of previous findings, which found that it's important to involve equally men and women in catchment management (Ifejika Speranza, Kiteme, Wiesmann, & Jörin J, 2016)

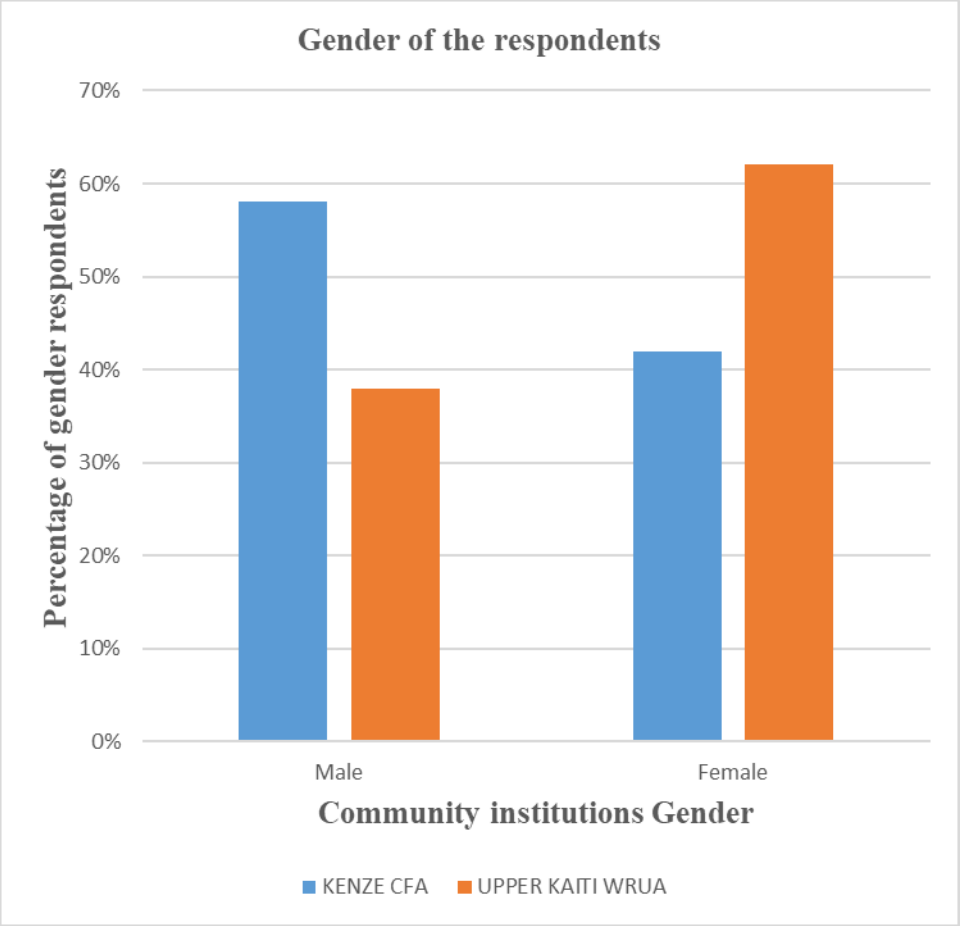

Figure 6.4: Gender of the Upper Kaiti WRUA and Kenze CFA respondents

6.3.1.3.2 Education Level of the Respondents

In terms of the level of education, the Kenze CFA respondents had the highest levels of education with Secondary level (36%), College (28%), and University (3%) as compared to Upper Kaiti WRUAs (25%) Secondary level, College certificate (11%) and none with a University degree respectively, Figure 6.5. Respondents who had attained college and other higher levels of education comprised mostly of the county departmental heads and key respondents interviewed in this study. These findings supported and agreed with Focus Group Discussions (FGD) outcomes which supported the idea that members of the community involved in community work ought to have some level of education to

effectively champion development actions within their area. The results from the FGD agreed with a study on community participation in social forestry in Zathila and Betaga villages in Gazipur, Bangladesh, by Chowdhury (2004) who found that people's level of education influenced their participation in forestry and catchment projects. Further, the results agree with Dankwa's (2004) assertion that contemporary leaders and especially chiefs in Kenya need some level of education for effective resource management and community development. The findings of this study are also similar to that from the Kenya Demographic Health Survey (KNBS & ICF Macro, 2010) in which the majority of the rural population were found to have some primary education. Even though previous studies show education to be a key factor in catchment management, the current study's observation was that education did not largely determine the CFA and WRUA participation in catchment management.

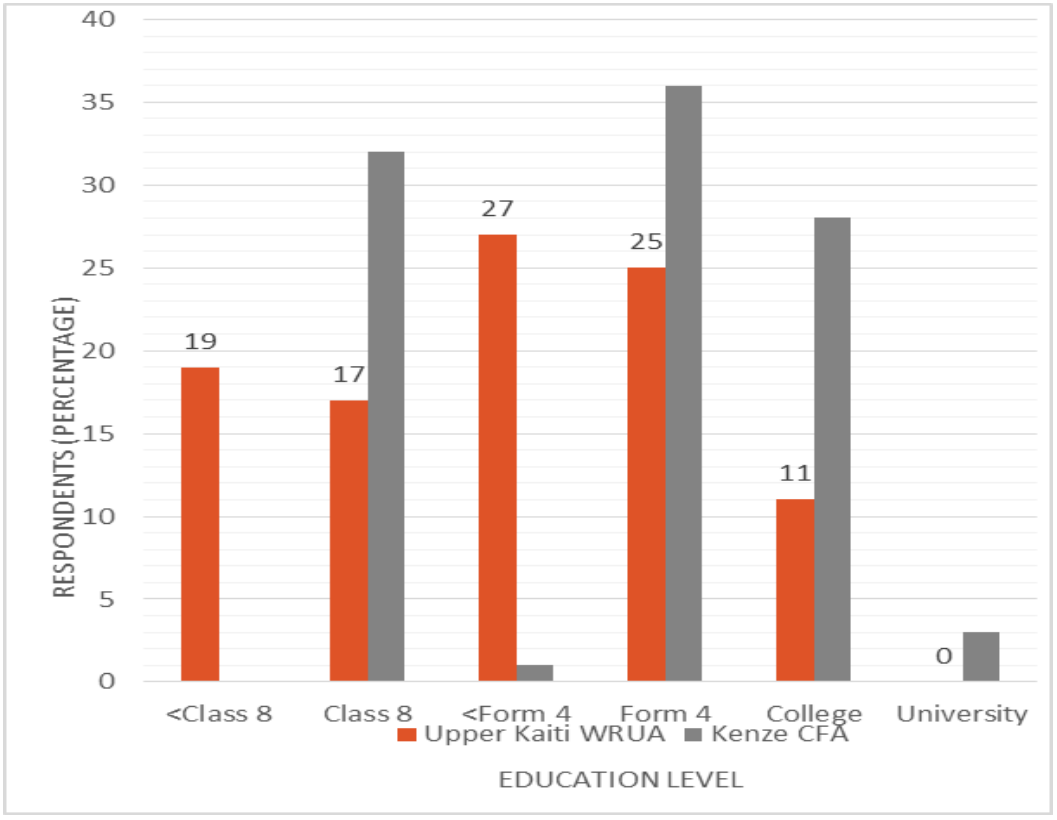

Figure 6.5: Respondents Level of Education

6.3.2 Perceptions on Effects of Upper Kaiti WRUA and Kenze CFA challenges on the management of the Catchment

As shown in Figure 6.6, the level of respondents' perceptions on challenges faced by Upper Kaiti WRUA and Kenze CFA, which have effects on the catchment management, were ranked from Low, Moderate, high, to Very high. Likert scale rank was applied. On cross-tabulation to compare the CFA and WRUA respondents' perception on the matter, the results revealed that Kenze CFA was facing major challenges affecting their governance at very high (58%) and high (42%) as compared to Upper Kaiti WRUA at a very high rating of (21%) and high (49). These were collaborated by the KII responses and FGD who mentioned CFA challenges as; a non-functional CFA structure, inadequate resources, lack of accountability, failure of some members to contribute funds, corruption allegations among the officials, lack of information, inadequate sharing of benefits, and a dictatorial tendency among some of the leaders.

Further, the KII revealed that leadership challenges emanated from a lack of cohesiveness among the CFA members whereby officials were said not to consult members but only imposed decisions and this led to rebellion among the whole CFA institution. These are compared and agreed with previous studies done by Ogungo (2008) who found that CFAs have many challenges. For example, the dictation of the official remained a major challenge in the operation of the CFAs, and similar sentiments were echoed in a study done by Matiku (2013). Further results from KII were summarized by the Makueni County Ecosystem Conservator of Forests (MCECoF), Mr. Wakiaga who collaborating with the FGD confirmed that CFA faces various challenges as mentioned in the discussions. His sentiments further agreed with previous studies done and documented by Thenya *et al.* (2014), who revealed that CFAs face many challenges which influence their outcomes in catchment management.

The MCECoF advised that the government should step in to address and mitigate against the myriad of CFA challenges that hinder the effective discharging of their statutory mandates. He further cited some of the key things the government should do. These include the initiation of community-based income-generating activities and enterprises, capacity building of the officials and members of the CFA through awareness creation, education for sustainable development, seminars, workshops, and creation of catchment resources value addition centers.

On the other hand, KII responses and FGD indicated the WRUA challenges as; dealing with some self-centered persons with personal interests, inadequate facilitation, lack of WRUA capacity to handle community issues, scarcity of resources in terms of finances and logistics due to inadequate funding from the government and other stakeholders biases in resolving conflicts due to diverse interest of the members, convincing the involved parties partly due to their low education levels, failure by management to meet specific targets and uncoordinated WRUA management structure.

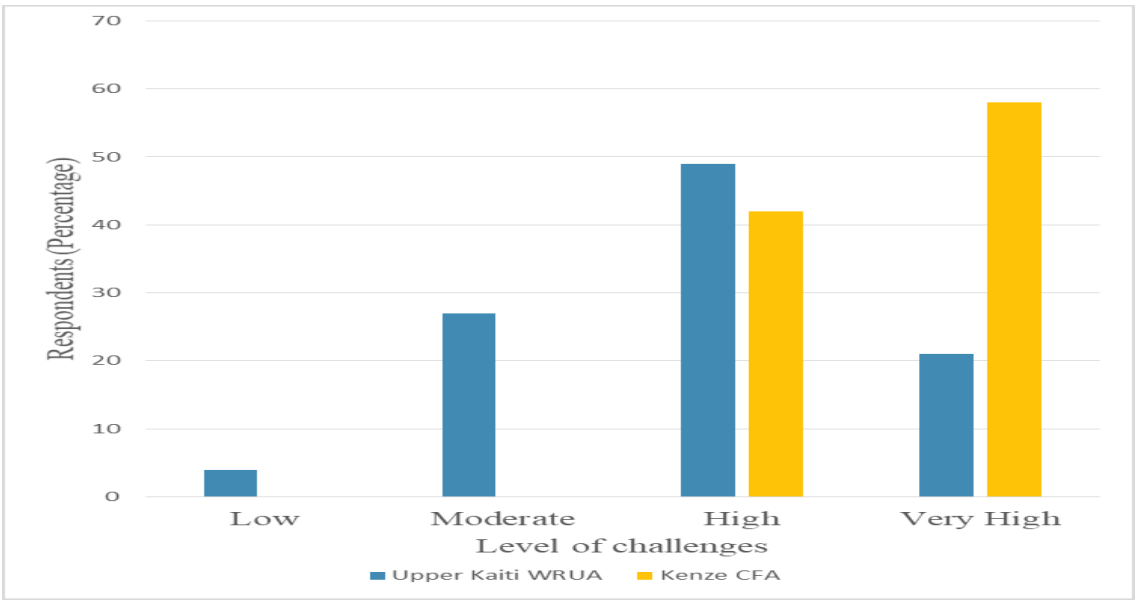

Figure 6.6: CFA and WRUA Level of Challenges

6.3.3 Perceptions on the Extent the Challenges have led to Catchment Degradation

When cross-tabulation was done on the extent the challenges had led to catchment degradation, it was established that the challenges were found to be leading to high degradation of the catchment as they impacted highly on the outcomes of the CFA performance at a very high (58%), highly (42%) and WRUA very high (21%) and highly (49%) as showed in Figure 6.7 This was supported by the KII which revealed that both the WRUA and CFA play a key role in reducing catchment degradation and water resources protection. These results imply that there is an urgent need to address the CFA and WRUA challenges as a matter of priority to reverse the catchment degradation by making the CFA and WRUA sustainable. These findings are in agreement with previous studies by Simon (2012), who found that WRUAs require varied and steady outside support to improve their performance until they reach the sustainability stage. Further, the results agreed with previous studies by Thenya *et al.* (2007) who found that communities had a slow uptake of participation in the management of forests and this enhanced the increased level of catchment degradation.

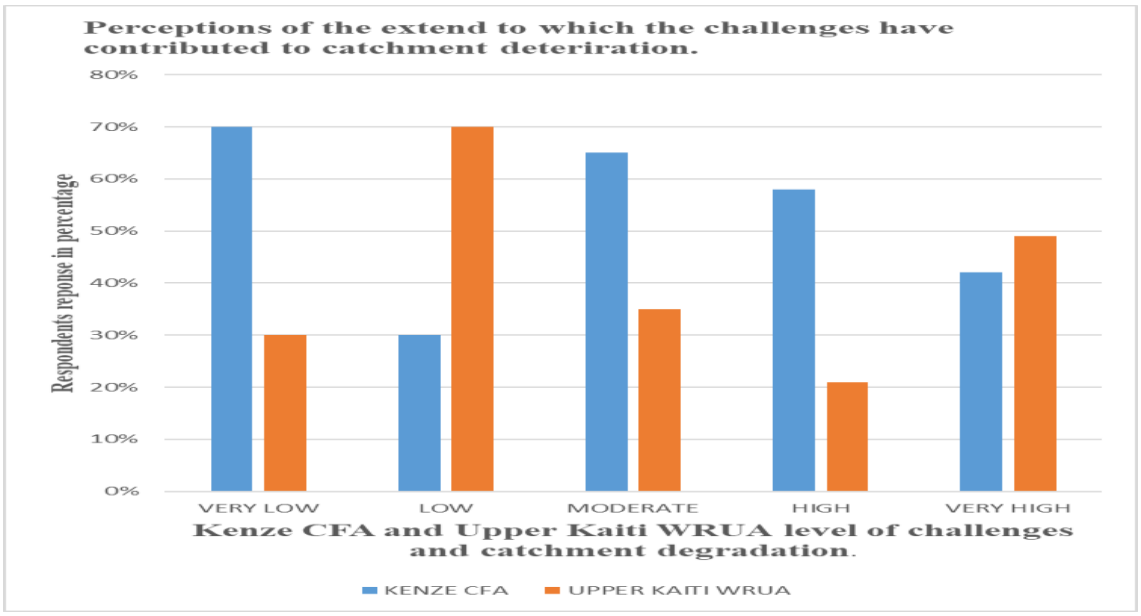

Figure 6.7: Extend of catchment degradation due to challenges

6.3.4 Perceptions on opportunities available to the Upper Kaiti WRUA and Kenze CFA and them extend of improving the catchment

The results of the respondents' perceptions of the opportunities available to the Upper Kaiti WRUA and Kenze CFA, as well as the extent to which the catchment could be improved, revealed that both institutions had a variety of opportunities. However, the WRUA participants cited major opportunities which if explored can improve the catchment at an affirmative yes of 99%as compared to CFA's 54%, as showed in Figure 6.8. Further, the KII supported the position that there existed various opportunities for the WRUA and revealed that the WRUA present a great opportunity to being capacity build and empowered in order to be involved in efficient decision making and participatory management of the catchment.

Focus group discussions further supported that to promote improved performance of the WRUA in sustainability of catchment conservation and protection activities, communities of WRUA members should be given continued support by the government. Further, they should be supported by donor agencies and local leadership. The support should be achieved through; institutional support mechanisms, formation of internal policies, legislation, proper monitoring and continued capacity building for members.

Further, the Water Resource Users Associations were found to provide an opportunity for the involvement of stakeholders and beneficiaries in the corporate management of water resources and resolution of water-related conflicts. Again, they had an opportunity in promotion of water conservation practices as well as in promoting catchment conservation measures to improve water quantities and quality.

Comparably, the CFA opportunities were mentioned as availability of supportive policy and law, cooperation and participation of community members, increasing number of

community members joining Community Forest Association, dependence of community members on forest resources for their livelihood as well as the introduction of income-generating especially through collection of medicinal herbs. Other opportunities mentioned were: harvesting of honey, harvesting of timber or fuel wood, grass harvesting and grazing, collection of forest produce for community-based industries, ecotourism, recreational activities, scientific and educational activities, plantation establishments, carrying out specified forest operations and Continuous capacity building of CFA. This agreed with past studies done by Kinyanjui (2009) who asserted that CFA presents great opportunity of being capacity build and empowered in order to be involved in efficient decision making and participatory management the catchment. The KII cited the training of CFA members on conflict resolution, leadership and management skills, financial management, farm forestry and establishment of botanical gardens for medicinal plants as other key opportunities

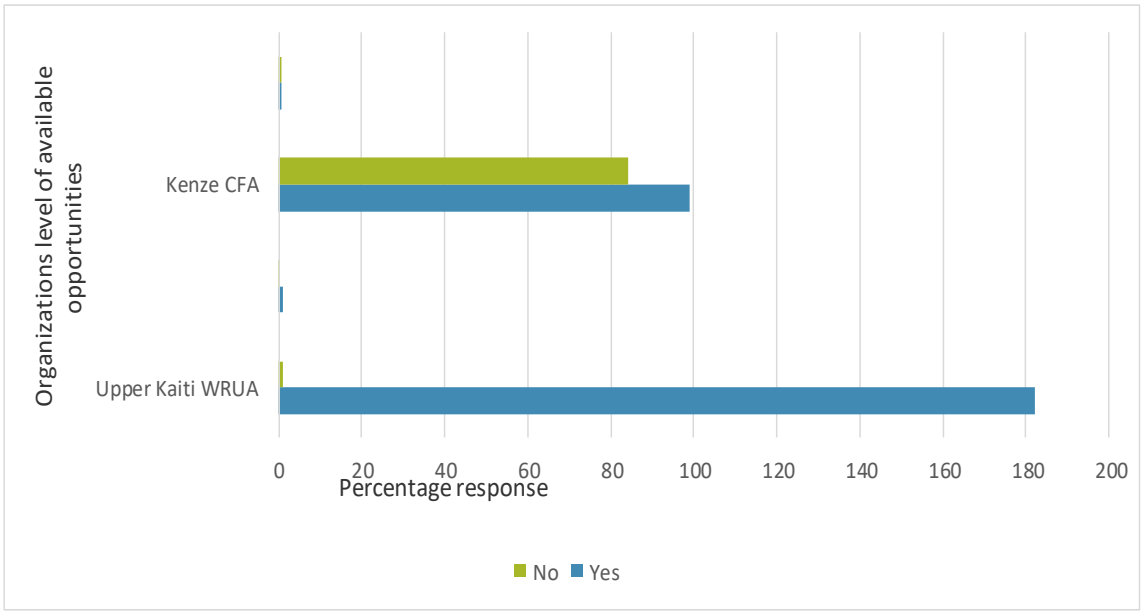

Figure 6.8: Perceptions on opportunities available to the Upper Kaiti WRUA and Kenze CFA

6.3.5 Perceptions on the like hood of the opportunities improving the catchment

In regards to the perceived institutions' available opportunities level of improving the catchment, WRUA respondents were more positive compared to the CFA, respectively. Results showed that, out of all the WRUA respondents, 38% responded (Moderately), 42% (Highly), and 20% (V. highly) as compared to CFA response of 30% (Moderately), 23% (Highly) and 22% (V. highly). This implied that more WRUA members thought that the opportunities improved the catchment and were more likely to implement the same opportunities as shown in Figure 6.9 as opposed to the CFA. This was supported by information gathered from the key informant groups who asserted that implementation of the available opportunities may improve the catchment, implying a strong need for the CFA and WRUA opportunities maximization to enhance the catchment protection. These sentiments agreed with previous studies done by (Kinyanjui, 2009), who revealed that the CFA has opportunities including the opportunity of educating the community on the use and non-use aspects of the Kilungu catchment. Further, these results agreed with previous studies done by Musyoki *et al.* (2013) and Ongugo *et al. (*2007) who found that there exist unexploited opportunities for CFA too.

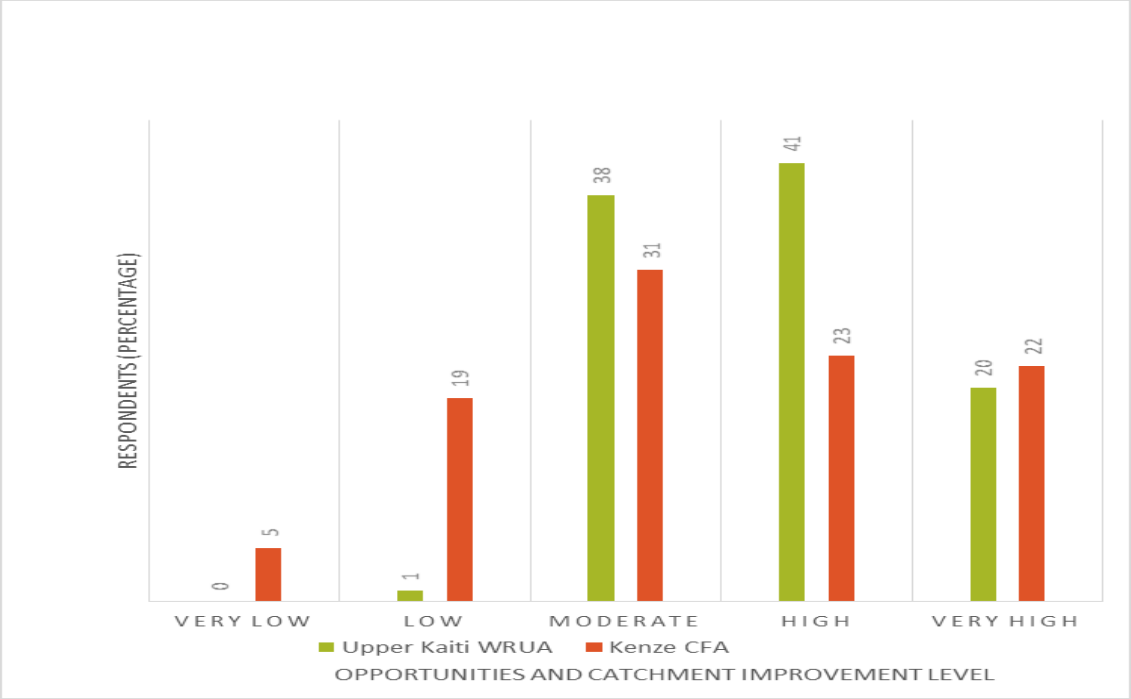

Figure 6.9: Perceptions that Opportunities Improve the Catchment

6.3.6 Perceptions on sustainability indicators of the Upper Kaiti WRUA and Kenze CFA in catchment management

Cross-tabulation between Upper Kaiti WRUA and Kenze CFA respondent's perceptions on their sustainability indicators revealed that both the CFA and WRUA were functioning well even though the WRUA were found better in various sustainability indicators as compared to the CFA. This was evidenced by performance on equity and inclusiveness at a rating of WRUA Very High (55%), Moderate (88%) and CFA Very High (25%), Moderate (50%), accountability at a rating of WRUA Very High (34 %) and Moderate (88%) and CFA Very High (52%), and Moderate (50%) and in effectiveness and efficiency at a rating of WRUA Very High (36 %) Moderate 24 and CFA Very High (51%), Moderate (53%) respectively.

Further, results indicated that the WRUA had better rating on involvement of members in decision making, on observance of the rule of law and consensus orientation. In comparison, the CFA were rated at zero percentage in all the above aspects of

involvement of members in decision making, on observance of the rule of law and consensus orientation portraying a dismal level of sustainability aspects as established in the results. WRUA was found to be more sustainable in involvement of its members in participatory decision making at Moderate (88%) and High (48%) compared to CFA who were rated at zero percentage on involvement of members in participatory decision making. On observance of the rule of law, the WRUA was rated at High (46%) and Moderate (97%) while the CFA was rated at zero percentage. On consensus orientation, WRUA was rated at High (56%) and Moderate (97%) while the CFA was rated at zero percentage as shown in Figure 6.10 below.

Discussions with the KII and FGD further revealed that for sustainable management of the catchment, then the CFA and the WRUAs should get involved in all functions as required by law.

Respondents confirmed that active participation of members in the catchment management activities was a sure way of ensuring the institutions sustainability especially if the members anticipated benefits from the activities and rewards from participation. These results agreed with previous studies by Deji (2007) on local women's associations' participation in rural community development projects in Nigeria who observed that provision of rewards to women's associations highly influenced their participation in development projects and ensured sustainability of the associations. Further discussions revealed some functions indicating their sustainability as: attending CFA meetings, nominating officials, active decision making, participating in scheduled catchment supervision, preventing illegal activities and preventing violation of catchment use rules.

Further, the KII and FGD indicated some other sure indicators of sustainable functioning of CFA and WRUA as: Participation in preparation of catchment management plans, being involved in catchment labor activities such as seedling nurseries, planting and

thinning of trees, control of catchment fires, sensitizing communities on conservation and monitoring the catchment condition. Other indicators were: Monitoring activities carried out by other members and training members in nursery management and water use issues as well as capacity building the members on group dynamics.

The implications of these findings are that the Kenze CFA as it is to date, is not able to contribute effectively to the catchment management. This calls for enhanced Participation, observation of the rule of law, consensus building, consensus orientation, effectiveness, and accountability and efficiency aspects of CFA sustainability for them to ensure catchment management. The Upper Kaiti WRUA too should be continually monitored and reviewed in order to sustainably manage the catchment.

These results agree with Dublin statement (1992) that the ability of nations and societies to develop and prosper is linked directly to their ability to develop, utilise and protect their catchment resources. Further its collaborated by the earlier conferences conclusion that, "since water sustains all life, effective catchment management demands a holistic approach, linking social and economic development with protection of natural ecosystems" (Dublin Statement, 1992). Further, the sustainable use and holistic management of freshwater resources and catchments is the key to achieving the overall goal of sustainable development (Department of Environmental Affairs and Tourism, 1998; Ministerial Declaration of the Hague on Water Security in the 21st Century, 2000; UNESCO 2003).

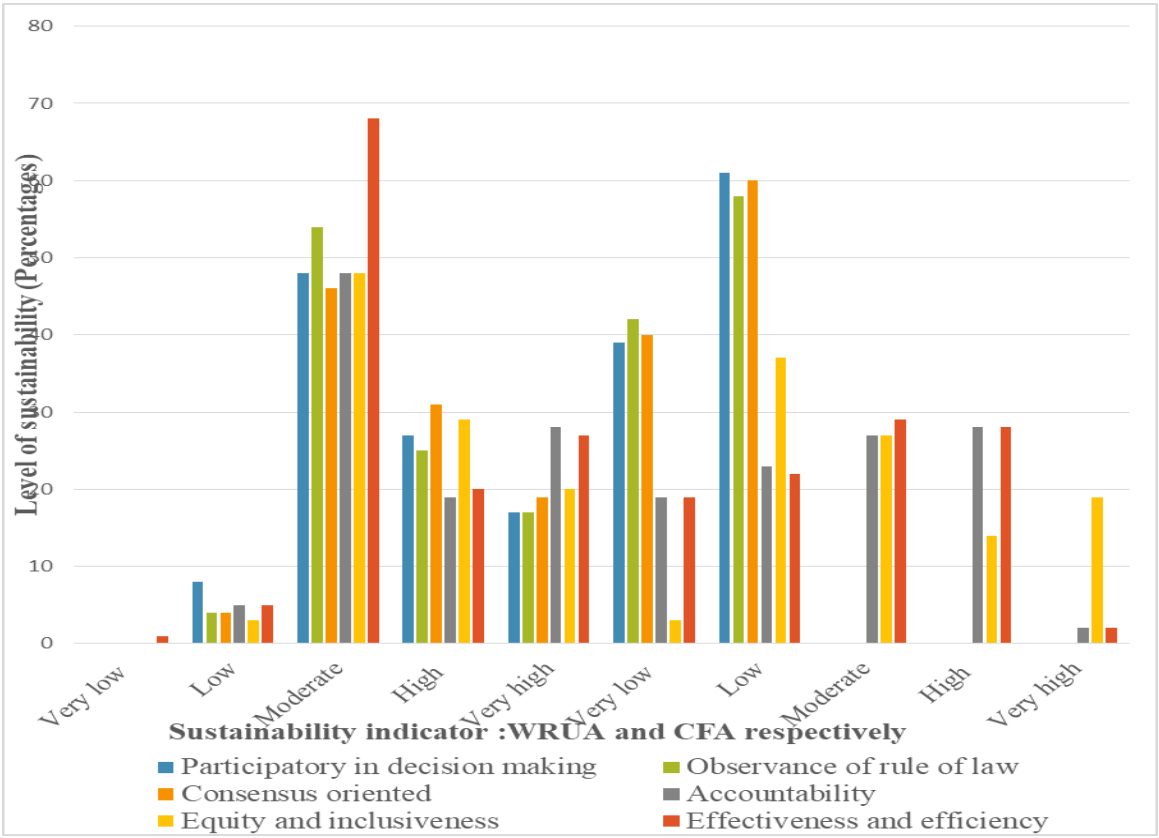

Figure 6.10: Sustainability Indicators

6.4 Conclusion and Recommendations

In conclusion, CFA was facing more challenges that impacted their performance, had fewer opportunities to exploit, and had various sustainability aspects which needed attention compared to the WRUA, which was found to be having fewer challenges, and many opportunities, and was significantly sustainable in all the sustainability indicators.

These findings imply that there is an urgent need to address the CFA challenges, enhance the adoption of their opportunities and address all their sustainability challenges to make them sustainable toward the reversal of the catchment degradation

Policymakers should set standards and guidance for decision-makers to make better and more just decisions on sustainable CFA and WRUA institutions. The standards and guidance should be geared towards making, the two institutions legitimate, transparent, accountable, inclusive, fair, and functional to enhance their contributions to catchment

management. A key approach to attain this priority is through CFA and WRUA support in all aspects of effective sustainable governance structures to ensure their sustainability and effectual sustainable management of the catchment.

The study recommends a new policy framework for the implementation and monitoring of CFA and WRUA sustainability indicators. The study further recommends continuous empowering of the CFA and WRUA to overcome their myriad challenges, exploit their opportunities and ensure their sustainability.

Acknowledgment

The authors are grateful to institutions and individuals who provided data and information for this research. These include the Makueni county WRA office led by Stephen Ngao, WRUA chairman Antony Kimeu, Kaiti WRUA committee members, Makueni KFS office led by Mwanza and Veronica, foresters Kilungu catchment, CFA committee members, research assistants Daniel Ngoka and Muteti and Festus Mutiso for assistance in data collection and analysis. We also thank our colleagues from WMI, who provided insight and expertise that assisted the research.

Compliance with ethical standards

The research was carried out under the Wangari Maathai Institute for Peace and Environmental Studies of the University of Nairobi. Consent of participants in interviews and questionnaire survey was sought before each participant. Permission was sought and granted by National Commission for Science, Technology, and Innovation (NACOSTI).

CHAPTER SEVEN

A SUMMARY OF THE FINDINGS AND GENERAL DISCUSSIONS

7.1 General Discussions

The functions of these particular institutions of Community governance have been examined for managing forests and water resources. However, there is little information available about these groups' effects on the management of water and forest resources, which makes this study relevant. Concerns have grown around the world, particularly about community institutions' roles in catchment, land, water, and air management (Glazewski, 2000). Community institutions' contributions, participation, and involvement are now widely regarded as a successful technique for managing catchments and their resources. Catchment management policies in developing countries, particularly in Africa, have largely ignored the crucial part that community institutions play in managing forests and water resources, even though community institutions are known to improve governance and empower communities to protect forests from fires, illegal grazing, and logging as well as to ensure water catchment protection.

According to past surveys, the majority of Kenyans appear to now favor Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs), both of which are involved in catchment management (Thenya *et al*., 2014). Despite their involvement in catchment management, their contributions have not been compared, particularly in terms of the structure of the CFA and WRUA involved in catchment management, the challenges and opportunities, and the capability of the Community institutions as involved in water and forest management. The fundamental premise of the study is that effective management of catchments, forests, and water resources in Kenya and other parts of the world, as well as for enhanced forest cover, calls for optimal planning and participation by all stakeholders in management. Additionally, catchment-

adjacent communities and community governance organizations play a significant role in catchment resource management since they directly benefit from the resources. Their involvement in catchment management offers empirical support for the hypothesis that the high social-ecological fitness of CFA and WRUA is correlated with successful watershed management outcomes (Bodin *et al*., 2019. It is anticipated that incorporating CFA and WRUA into catchment management will enhance the catchment's natural resource management (Bodin *et al*., 2017). The investigation was conducted in the Kilungu catchment. Some of the county's notable geographical features include the volcanic Chyullu hills, which stretch along the county's southwest border in the Kibwezi East and West sub-counties, the Makongo woodland and picturesque view, the Makuli forest and Nzaui hill, the Mbooni hills, and the Iuani hills in the Kaiti sub-counties (County Government of Makueni, 2019). The Kilungu catchment area is 615.1 hectares, with plantations totaling 253.8 hectares in Makueni County. The Kilungu catchment was used as the main unit of investigation for several reasons. First, even though the catchment was managed by a registered Kaiti Water Resources Association (WRUA) and a registered Kenze Community Forest Association (CFA), its activities, structure, challenges opportunities, and capacity status were not documented, necessitating this additional research.

The seven blocks of Kilungu, Kitumbuuni, Ndaatai, Kiongwani, Kenze, Nduluni, and Kiio that surround the watershed also contain a variety of households. 4,372 households, or more than 22,956 individuals, rely on the catchment for both their direct and indirect means of subsistence. The center of an ecological support system is there (Government of Makueni County, 2019). The goals of this study were limited to evaluating the efficiency with which community forest associations and water resource users' associations fulfilled their legal obligations, looking into the makeup and operations of CFAs and WRUAs,

identifying opportunities and problems for CFAs and WRUAs, and evaluating CFAs and WRUAs' ability to manage the catchment.

Surveys that were both exploratory and descriptive were used for this. To gather quantitative information, household surveys, Key Informant Interviews (KII), and Focus Group Discussions were used (FGD). To collect qualitative data, field notes, interview transcripts, observational techniques, and photographic methods were all used. The results were examined using ANOVA. To determine whether the variables in the study had any correlations, Pearson correlation analysis was utilized. Focus group talks showed that the WRUA was significantly superior in involving its members in active participation in all elements of catchment management, despite the CFA being better known than the WRUA Other studies have lauded community-based forest and catchment management (CBCM) as a strategy for taking small-scale people who live in and around forests' preferences into account (Agrawal & Gibson, 1999). Numerous researchers have claimed that by eliminating the drawbacks of centralized resource management models and functioning as a vehicle to address community-level causes of deforestation, CBCM could enhance national efforts to minimize banned logging (e.g., Kellert *et al*., 2000; Bwalya, 2002; Roe *et al*., 2009; Ayana *et al*., 2017; Roe & others, 2009).

Numerous experts have shown that CBCM can promote long-term growth while also offering substantial social and economic benefits, (Klooster & Masera, 2000 Smith & Scherr, 2002). The establishment of mechanisms for resource protection and management, such as community forest management and water resource user management, has been used to implement community governance in several communities across the world (Thenya, 2015). Participatory forest management is described as "a forest management strategy that intentionally incorporates forest adjacent communities

and additional stakeholders in forest management within a framework that offers value to community livelihoods" in both Kenya and Ethiopia (Kenya Forest Service, 2015). Participatory forest management (PFM) allowed locals in Ethiopia to help achieve the goal of sustainable forest management while also benefiting their livelihoods (Tadesse & Teketay, 2017).

Frameworks for law and policy that support neighborhood-based forest management plans have recently been created. For instance, the 1998 Tanzanian Forest Policy, the 1999 Village Land Act, the 1982 Local Government Act, the 2002 Forest Act, the 1995-2020 Kenyan Forestry Master Plan, and the 2005 Forests Act. Notably, the Community Forest Associations and Water Resource Users Associations (WRUAs) were established as a result of the approval of these policies and legal frameworks (Water Act and Forest Act, 2016). The Proclamation for the Development, Conservation, and Use of Wildlife (541/2007) was issued by Ethiopia.

In addition, Cameroon has the Forestry and Wildlife Act of 1994 in the Republic of Cameroon, and Uganda has the National Forestry and Tree Planting Act of 2003 and the Uganda Forest Policy of 2001. Only two catchments that have benefited from CFA and WRUA empowerment are the restoration of roughly 8.5 hectares of degraded montane forests in Kereita and Eburru Forests, which are a part of the larger Mau Forest Complex. This was achieved by giving CFAs the authority to collaborate closely with KFS to complete aftercare tasks for each freshly planted tree. The Kereita and Eburru woodlands along the Nairobi-Limuru route have fully recovered ten years later, and the locals now make use of several ecological advantages (Kefri, 2017). The Kereita and Eburru outline for participative forest management is the Kereita and Eburru CFA plans of forest management.

Furthermore, the upper Imenti CFA in Mt. Kenya has been successful in ensuring that the communities themselves became change agents, beacons of hope, and even if they don't understand the ecological technicalities of forest management, they at least understand the need for catchment management and attend to the basics of forest protection such as forest patrols and resolving conflicts in forest use, and this has resulted in improved forest protection (Kefri, 2017).

Similarly to this, the Itare-Chemosit SCMP, which was formed in October 2018 and comprised members of the Itare-Chemosit WRUA and the Itare Community Forest associations, provides evidence from the literature that functional WRUAs and CFAs exist. To maintain catchment management, the Kipchorian Water Resource User's Association (WRUA) and the Londiani Forest Community Forestry Association (CFA) also worked together to produce a Participatory Forest Management Plan (PFMP) (Kefri, 2017). As a result, this study looked at the structure and operation of WRUAs and CFAs, investigated the activities and success of CFAs and WRUAs in carrying out their statutory mandates, recognized the challenges that these organizations confront, and proposed remedies.

The distribution of 366 household surveys, interviews with 10 key informants, focus group talks, and direct observations helped to achieve the study's goals. One tactic used was descriptive analysis. Graphs, tables, cross-tabulation, and percentages were utilized to present the data. The investigation was based on change and institutional theory.

In addition to assessing knowledge and awareness of the composition and operation of WRUAs and CFAs, the researcher employed institutional theory to examine the actions and effectiveness of CFAs and WRUAs in fulfilling their legal obligations (Baumol *et al*., 2009, Brunton *et al*., 2010, Hirsch, 1975, Lai *et al.,* 2006, Roy, 1997).

7.1.1 Activities and Effectiveness of Community Institutions Governance in Water and Forest Resources

Catchment degradation has persisted globally despite the efforts and operations of forest and water community governance activities. Related to this, in Kenya, the Kilungu catchment region is managed by the Kenze (CFA) and upper Kaiti catchment areas.

To assess if Kenze CFA and Upper Kaiti WRUA were effective in carrying out their mandated duties, this study examined their operations. An exploratory, descriptive survey was conducted to accomplish this. Surveys, focus groups, ten-key informant interviews, and direct observations were used to collect the data. The method of description was employed. To convey facts, tables, percentages, and figures were used. This study found that Upper Kaiti WRUA was far superior to CFA in terms of ensuring catchment management. The findings indicate that a strategy must be developed to make the most of the CFA's opportunity to be granted the authority to carry out all of its responsibilities by the law, with a focus on the prompt creation and execution of management plans as well as WRUA's ongoing improvement. It is essential to assess the extent of CFA and WRUA activity implementation to improve their effectiveness in fostering real community participation across all of their institutional activities. The research suggests both new initiatives to improve CFA and WRUA operations as well as the development of a new strategy for monitoring CFA and WRUA activities and functions to assist them in better carrying out their statutory duties.

Significantly, the Kenya Forest Service and other forestry partners collaborate with the local population to implement forest management plans that successfully carry out their activities in the forest with the purpose of continued catchment management (Kefri, 2017). Both forest management plans were made by Section 35 of the Forests Act of 2005, which requires the production of management plans for all State, Local Authority,

and temporary forests. Among the documents taken into consideration are the planned Forest Policy No. 9 of 2005, the KFS Strategic Plan 2009-2010-2013-2014, the Environmental Management and Coordination Act (EMCA), the Wildlife (Conservation and Management) Act, and Cap. 376.

According to the study, the upper Kaiti WRUA's initiatives were more effective at managing the watershed, especially when it came to exchanging information and making recommendations about how to use the water resources in the catchment. It serves as a forum for discussion about impending water-related projects and developments with other WRUA members and the general public. The study determined that the upper Kaiti WRUA's initiatives were more effective at managing the watershed, particularly when it came to exchanging ideas and information about how to use the catchment's water resources. It also offers a venue for discussing impending water-related activities and advancements with other WRUA members and members of the general public who are invited to their events.

Members who lacked the motivation to do their assigned tasks and ineffective leadership were all significant causes. Furthermore, issues like illegal logging and corruption, as well as the marginalization and poverty of communities that depend on catchments and the general public, have all been linked to a lack of accountability and transparency at the highest levels of the Kenya Forest Service leadership, all of which contribute to the degradation of catchments. As a result, the CFA must immediately expand its venture operations, particularly in the field of participatory catchment management. According to Watson (2007), CFA and WRUA activities should include community involvement, cooperative sharing, administration, and preservation of a common watershed resource.

7.1.2 Governance Organizational Structure of Community Institutions in the Water and Forest Sectors

In the last three decades, catchment management approaches all around the world have increasingly included the community's governance structure. Upper Kaiti Water Resource Users Associations govern the Kilungu watershed area in Kenya like the Kenze Community Forest Associations (CFAs) (WRUAs). This study looked into how respondents viewed the catchment management effectiveness and organizational structures of these organizations.

An exploratory, descriptive survey was employed to achieve this. An exploratory, descriptive survey was used to gather information for this purpose and to answer the question: How significant is the governance structure of community institutions in the management of the Kilungu catchment?

The data was gathered using surveys, focus groups, 10 key informant interviews, and direct observations. The descriptive-analytic approach was used. The data underwent both a quantitative and a qualitative examination. The data was organized in Microsoft Excel, which also produced charts and tables. To evaluate qualitative data, field notes, interview transcripts, observation, and photography were all employed. To identify significant variations in the research parameters, the data were subjected to Analysis of Variance (ANOVA) using the Statistical Package for Social Sciences (SPSS version 16). The Pearson Correlation Analysis was used to assess whether there were any relationships between the research parameters. The data was presented using tables, percentages, and figurative components.

The Theory of Change (ToC) guided a definite rationale for how projected CFA and WRUA interventions, such as analyzing the structure of the institutions to improve their effectiveness, developing their prospects to yield results, and illustrating what the study

intended to achieve through guided questionnaires, were projected to yield results (Vogel, 2012). Furthermore, the theory of change was used to develop meaningful success indicators for the two institutions to meet the study's overall goal of assessing community institutions' contributions to forest and water governance, specifically referencing the institution's structure in the Kilungu catchment (Maru *et al*., 2018b).

The results of these studies showed that, in contrast to CFAs, which had a gender imbalance in the structure, the WRUA structure accommodated gender balance because both females and males had equal opportunities to participate in all WRUA structural positions, such as being nominated members of subcommittees and being appointed chairperson. Furthermore, the discovery that women used water resources more frequently than men does support past studies indicating that women are more dubious and concerned about a range of environmental issues than men, including global warming and water pollution (Slovic, 1999, McKnight & Xiao, 2014). WRUA outperformed the CFA structure in terms of gender inclusion and equity, showing no bias against the structural execution of its operations by either gender, indicating that gender discrimination and exclusion were more prevalent in the CFA structure than in the WRUA framework. There were more men than women active in CFA, according to the KII debates, but there was a balance of the two genders in the WRUA, and roles could be filled by any gender.

These findings suggest that measures need to be taken to ensure that men and women participate equally in all institutional structure configurations. Additionally, respondents were more knowledgeable of the CFA structure than they were of the WRUA structure. Focus group discussions (FGD) and key informant interviews revealed that the participants were aware of the Kenze CFA structural design, which they described as a grassroots-level organization starting at the household level and drawing user groups

primarily from the seven blocks of the forest, namely Kilungu, Kitumbuuni, Ndaatai, and Ndaatai (KII). The Upper Kaiti, formerly known as Kanzumu, was founded to unite water users, riparian landowners, and other volunteers to share, manage, and protect all of the water resources in the Kilungu watershed, and they were also aware of this. This study confirmed earlier findings that increasing public knowledge of institutionalized water-saving structural systems enhances public awareness (Lee *et al*., 2011).

The general perception was that the structures of the two institutions were only partially known, which may account for their failure to implement structural activities, even though more respondents knew the CFA structure than the WRUA structure. It was found that the Upper Kaiti WRUA outperformed the CFA in every aspect of catchment management, including the fulfillment of legal obligations, the achievement of intended outcomes, the imposition of fines and penalties, and the presence of representatives at meetings.

This finding contradicts previous research by (Thenya, 2017), who claims that when CFAs are structured and their structure is well understood, they can attend to all of their catchment management activities, discharge their statutory functions, and achieve their structural mandates. Finally, the study findings call for immediate policy changes to ensure a gender balance in all institutional structure arrangements, particularly the CFA structural arrangement. Furthermore, the individual's (r) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management, was significant ($p=0.05$), indicating the need for ongoing awareness creation among all stakeholders on the two institutions' structure and functioning. Finally, increasing CFA structure awareness is critical for improving

governance, leadership, organizational management, and capability. Upper Kaiti WRUA and Kenze CFA should form a new transparent and effective governance structure.

7.1.3 Opportunities and Challenges for Community Institutions' Governance

Despite attempts by the upper Kaiti Water Resources Users Associations and the Kenze Community Forest Associations (CFA), watershed erosion in Kenya's Kilungu catchment area has persisted (WRUA). This study employed an exploratory, descriptive survey to evaluate the opportunities available, the difficulties faced by CFA and WRUA, and the efficiency of CFA and WRUA in catchment management. Data were gathered through focus groups, key informant interviews, household questionnaires, and direct observations.

Although the WRUA and CFA's operations improve catchment management on a global scale, insufficient control of the world's forests and water resources is a big challenge they must overcome and affects the outcomes of their work. The numerous challenges that the institutions face pose a serious risk, and the watershed is degraded as a result of unsustainable resource usage. These findings confirm earlier research by Davis *et al*. (2013) who discovered that catchment deterioration is prevented by high-quality policies and resource-efficient use, which are both products of strong governance institutions. Another important finding was that the upper Kaiti WRUA and the Kenze CFA are both intended to provide a watershed management plan based on ecosystems. Participation in community forest associations also enhances forest management, rural livelihoods, and forest preservation (Lund & Treue, 2008; & Taccon, 2007). The fact that both the upper Kaiti WRUA and the Kenze CFA aim to provide an ecosystem-based watershed management strategy is an additional noteworthy finding. Community forest association membership benefits forest management, rural livelihoods, and forest conservation (Lund

& Treue, 2008; & Taccon, 2007). The majority of CFA in Burkina Faso who were fulfilling their legal commitments were those who directly gained from participation, as found by Coulibaly-Lingani *et al*. (2011) findings, which is also consistent with the present findings.

Dolisca *et al.* (2006) found that those who have benefited from the Forêt des Pins Reserve in Ahiti were more enthusiastic about the social, environmental, and economic catchment management projects. The effectiveness of WRUA and CFA in their respective functions was also found to dramatically minimize catchment degradation and increase the level of protection for water resources. Additional major obstacles that Kenze CFA had to deal with included an ineffective CFA structure, a lack of funding, the requirement for accountability, the failure of some associates to make financial contributions, allegations of official corruption, a lack of knowledge, a lack of benefit sharing, and a propensity for autocracy among the leaders. It was also discovered that improving WRUA and CFA's efficiency is essential for reducing watershed degradation and promoting water resource preservation. The effectiveness of WRUA and CFA in their respective functions was also found to dramatically minimize catchment degradation and increase the level of protection for water resources.

In addition, compared to WRUA, Kenze CFA faced many difficulties, including a dysfunctional CFA structure, insufficient funding, the requirement for accountability, the failure of some associates to make financial contributions, allegations of official corruption, a lack of knowledge, inadequate benefit sharing, and a tendency toward autocracy among the leaders.

It was also shown that improving water resource preservation and reducing watershed degradation depends on the efficiency with which WRUA and CFA carry out their roles.

The Makueni County Ecosystem Conservator of Forests (MCECoF) Mr. Wakiaga, who also contributed to the research, offered recommendations for the government to do to solve and reduce the myriad CFA challenges that prevent them from effectively carrying out their legal duties. The creation of community-based income-generating activities and enterprises, capacity building of officials and CFA members through awareness creation, education for sustainable development, seminars, and workshops, and the creation of community-based income-generating activities and enterprises were among the key initiatives he listed that the government should pursue. His opinions concurred with earlier research conducted and reported by Thenya *et al*. (2014), which showed that CFAs face several challenges that have an impact on their catchment management outcomes. The KII responses and FGD indicate that WRUA challenges include dealing with some self-centered individuals who have self-serving interests, inadequate facilitation, a lack of WRUA capacity to handle community issues, and a lack of financial and logistical resources as a result of insufficient funding from the government and donors. The necessity to persuade the parties due to their poor educational level and prejudice in dispute settlement brought on by the members' diverse interests were some other challenges that WRUA encountered.

Furthermore, it was established that the issues and difficulties were a major factor in the catchment's rapid decline because they significantly impacted both the CFA's and the WRUA's performance. This meant that, to reverse the deterioration of the catchment, it was critical to first address the institutions' issues. The WRUA, in particular, was discovered to have a wide range of opportunities, as opposed to the CFAs, which had fewer opportunities but offered a larger opportunity to be worked on. According to earlier research (Kinyanjui, 2009), CFA offers tremendous opportunities for empowerment and capacity building so that participants may take part in catchment management and make

cost-effective decisions. The KII lists educating CFA members in conflict resolution, leadership and management, financial management, farm forestry, and the creation of botanical gardens for medicinal plants among other significant potentials. The findings have the following implications: for both institutions to successfully navigate their numerous challenges, seize their opportunities, and maintain long-term viability, it is urgently necessary to address the challenges facing CFA and to continuously improve the sustainability aspects of the WRUA. Furthermore, the continued integrated management of the Kilungu Catchment urgently requires a novel and successful strategy.

7.1.4 Community Institutions' Capacity to Manage Forest and Water Resources

Water resource user associations are known globally to contribute to the successful implementation of sub-catchment management plans, as revealed by this study, which also revealed that the upper Kaiti WRUA capacity should be increased to improve the Kilungu catchment conditions (WRUA Impact Assessment Report, 2013). A considerable necessity for the CFA and WRUA to maximize opportunities in command to better safeguard the catchment was implied by information gleaned from important communication groups, which asserted that applying existing possibilities may transform the catchment. According to past studies, the CFA has a variety of capacity options, including educating the neighborhood about the usage and non-use of the Kilungu catchment (Kinyanjui, 2009). These results also confirm past studies conducted by Musyoki *et al.* (2014) and Ongugo *et al*. (2004) that found the CFA has untapped potential. The WRUA and the CFA both outperformed the CFA in terms of accountability, efficacy, efficiency, equity, and inclusiveness. The WRUA exceeded the CFA in terms of member involvement in institutional capacities to manage the catchment sustainably, such as decision-making, adherence to the rule of law, and consensus orientation. The results confirmed the Dublin statement (1992), which claims that a

society's or a nation's capacity for growth and development is closely related to its adherence to the rule of law. Furthermore, it was found that WRUA was more resilient than CFA in terms of member participation in democratic decision-making and adherence to the law (Dublin Statement, 1992).

The results showed that the WRUA and CFA both scored well in terms of equity and inclusion, with the WRUA scoring much higher than the CFA. Again, WRUA received strong marks for accountability. Highly praised for their effectiveness and efficiency were WRUA and CFA. The WRUA adequately involved its members in the decision-making process, in contrast to CFAs, which were thought to have 0% member involvement in participatory decision-making.

The WRUA received high grades for promoting consensus and preserving the rule of law. The study's findings demonstrate that WRUAs are much more sustainable than CFAs in terms of a variety of sustainability issues. WRUAs have fewer issues, and more opportunities, and are significantly more sustainable in all sustainability parameters. Additionally, to ensure holistic catchment management and boost the capacity of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) to manage the Kilungu catchment sustainably, it is crucial to achieve the overarching goal of sustainable development through community governance institutions (Department of Environmental Affairs and Tourism 1998; Ministerial Declaration of the Hague on Water Security in the 21st Century 2000; UNESCO 2003).

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The Upper Kaiti WRUA structure was shown to be superior in terms of gender inclusion and equity, as well as leadership management in this study; nevertheless, the CFA structure was more well-known than the WRUA structure. The overall findings of this study suggested that the Upper Kaiti WRUA structure was superior to the Kenze CFA structure in terms of gender inclusion and equity, as well as leadership management; nevertheless, the CFA structure was more well-known than the WRUA structure. Based on the foregoing, the study's findings advocate for immediate policy changes to ensure gender balance in all institutional structure arrangements, particularly the CFA structural arrangement.

Furthermore, the individual's (p) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management, was significant ($p=0.05$), indicating the importance of ongoing awareness creation among all stakeholders on the two institutions' structure and functioning. Finally, raising CFA structure understanding is crucial for strengthening governance, leadership, organizational management, and competency. Upper Kaiti WRUA and Kenze CFA should collaborate to create a more transparent and effective governance system. Furthermore, even though men outnumbered women in CFA activities, the Upper Kaiti WRUA had a gender balance with virtually equal male and female participation. The Upper Kaiti WRUA was also established to outperform the CFA in all catchment control-related areas, such as the operational enactment of catchment control acts, the occurrence of legislative purposes, and catchment control act enforcement.

Significantly, the WRUA was found to produce the intended results indicated in the catchment management plans, such as monetary fines and punitive actions, officials carrying out their given roles and responsibilities, and community engagement. Despite the CFA and WRUA's involvement in catchment management, catchment degradation was not fully addressed because the relevant bodies, particularly the CFA, lacked the necessary empowerment to carry out all of their statutory mandated undertakings, with a focus on prudently preparing and implementing the catchment management plan. The study also discovered that the upper Kaiti WRUA's watershed management activities were more successful, especially in terms of knowledge-sharing and recommendations on how to utilize the catchment's water resources. It also serves as a forum for the public and WRUA members to debate upcoming water-related initiatives and advancements. The study discovered that the upper Kaiti WRUA's watershed management activities were more successful, particularly in terms of the exchange of knowledge and proposals on how to use the catchment's water resources. It also serves as a forum for WRUA members and the general public, who are welcome to attend their activities, to discuss impending water initiatives and developments. A lack of passion among the members to fulfill the tasks assigned to them, as well as bad leadership and power struggles, were all contributing factors. The Kenya Forest Service's top leadership has also been connected to illicit logging, corruption, marginalization, and poverty among the general public and communities' dependent on catchments, all of which contribute to catchment degradation. As a result, participatory catchment management CFA effort activities must be urgently expanded.

According to the findings of this study, CFA and WRUA operations should include community participation, collaborative sharing, management, and upkeep of a single watershed resource. The concerns were determined to be a role in the catchment's rapid

deterioration due to their severe implications on the CFA's and even the WRUA's performance. This meant that, to halt the catchment's decline, it was critical to first resolve the concerns with the institutions. The WRUA, for instance, was discovered to have a large variety of opportunities, as opposed to the CFAs, which had fewer opportunities but a better likelihood of being worked on. This was supported by Focus Group Discussions, which argued that CFA provides enormous opportunities for empowerment and capacity building, allowing individuals to participate in catchment management and make cost-effective decisions.

According to the paper, one of the other main prospects for the study is the establishment of botanical gardens for medicinal plants. Other interesting options include teaching CFA members about agricultural forestry, financial management, leadership and management, conflict resolution, and other pertinent topics. The findings imply that for both institutions to overcome their varied challenges, exploit their opportunities, and secure their long-term survival, it is critical to resolve the issues confronting CFA and to constantly improve the WRUA's sustainability features.

It is also critical to create a new, effective structure for ongoing integrated Kilungu Catchment management.

When it comes to institutional capability, both the WRUA and the CFA performed well in terms of equity and inclusion, with the WRUA rating significantly higher than the CFA. WRUA achieved high grades for accountability once again.

WRUA outperformed CFA in terms of both efficacy and efficiency.

Furthermore, WRUA members participated in decision-making to a sufficient extent, as opposed to CFA members, who participated in decision-making at a rate of 0%. The WRUA receives high marks for upholding the rule of law and creating consensus.

The study's findings reveal that WRUAs are far more sustainable overall, whereas CFAs have a greater number of challenges fewer opportunities, and a range of sustainability-related issues. Another requirement for holistic watershed management is to strengthen the ability of Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) to manage the Kilungu catchment sustainably. This is required to attain the ultimate goal of community governance systems for sustainable development.

8.2 Recommendations

According to the recommendations, there is an urgent need to update and obtain the government's and other agencies' assistance to ensure that the WRUA and CFA completely perform their roles and enhance knowledge of the CFA structure.

This research is significant because it will help the Kenze CFA and the Upper Kaiti WRUA build a new governance structure and operating framework. It proposes synchronizing structural governance measures to eliminate broad similarities among jurisdictions. Furthermore, it is necessary to build and maintain a technique of boosting both male and female gender involvement, as well as their direct input to all institutional structure arrangements.

Furthermore, CFA and WRUA workers must be well-trained in organized management, leadership, governance, gender mainstreaming, and, most significantly, organizational sustainability. The research also calls for rapid policy measures to ensure gender equality in all institutional structure arrangements, especially the CFA structural arrangement.

Furthermore, the individual's (p) correlation analysis on CFA and WRUA structure awareness and functioning, as well as the institutions' effectiveness in catchment management, was significant (p=0.05), indicating the importance of ongoing awareness creation among all stakeholders on the two institutions' structure and functioning.

Finally, raising CFA structure understanding is crucial for strengthening governance, leadership, organizational management, and competency. Upper Kaiti WRUA and Kenze CFA should work together to develop a more transparent and efficient governing system. The findings imply that for both institutions to overcome their varied challenges, exploit their opportunities, and secure their long-term survival, it is critical to resolve the issues confronting CFA and to constantly improve the WRUA's sustainability features. A new, effective method to continuously integrated Kilungu Catchment management is also required. Importantly, this study presents empirical evidence that may be utilized to establish strategies for the examination of CFA and WRUA tasks and responsibilities, as well as their future implementation, to guarantee that they carry out their legislative purposes meritoriously.

While the government should ensure continuous monitoring and improvement to preserve the CFA's current level of performance, special emphasis should be placed on the element of cautious planning and implementation of management strategies. The CFA should be given the personnel, organizational, and financial resources it needs to accomplish its job and obligations, particularly those in the legislative spectrum. CFA and WRUA roles and responsibilities, as well as implementation strategies, must be analyzed and evaluated to improve their ability. Furthermore, there is an essential prerequisite to overcoming the CFA's challenges, which is the improvement of methods by which the aforementioned institutions can adopt their chances and deal with all of the challenges they currently face in terms of sustainability, as well as reverse potentially degrading catchment areas. Policymakers should establish guidelines and reference frames for concerned lawmakers to utilize when making choices about the sustainability of CFA and WRUA to improve their impact on catchment management. This will assist legislators in making more objective decisions. Furthermore, making the most of the opportunities afforded by the

WRUA and CFAs in the Kilungu watershed is crucial. The government should intervene to highlight and alleviate the numerous challenges that the CFA faces, as these challenges consistently thwart the operational carrying out of their legislative obligations; and the aspect of sensitizing current and future office bearers and members of the aforementioned institutions, such as the CFA.

In summary, the following are the primary recommendations obtained from the preceding general conclusions and recommendations:

Establishment of a modern, transparent, and efficient governance structure for Kenze CFA and Upper Kaiti WRUA. New initiatives to improve the CFA's and WRUA's operations to better meet their legal obligations. If CFA and WRUA are to overcome their numerous problems, reach their full potential, and ensure their long-term survival, they will need a new policy framework for executing and managing their capacities.

8.3 Areas for Further Research

Gender inclusion in sustainable forest and water governance should be addressed as well, and a framework for implementation and oversight should be developed. Furthermore, more research in this area is required.

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Compliance with ethical standards

The study was done in the University of Nairobi's Department of Earth and Climate Sciences. Each participant was asked for their consent before participating in the questionnaire survey and interview sessions. The researcher received approval from the National Commission for Science, Technology and Innovation (NACOSTI), to conduct the inquiry.

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APPENDICES

APPENDIX I: LOG FRAME

Objective	**Variables** **Independent and Dependent variable**		**Indicators**	**Data Collection Tools**	**Tools of analysis**
To examine how well community forest associations and water resource users' associations performed their assigned tasks.	WRUA and CFA operations. Effectiveness in carrying out their statutory duties.	Contribution to community governance of water resources and forests	A rise in participation in watershed management-related activities by Community Forest Associations (CFAs) and Water Resources Users Associations (WRUAs). An updated governance structure and framework for the Community Forest Association and the Water Resource Users Associations (WRUA) (CFAs) Effective and empowered CFA and WRUA in carrying out their mandated duties. Enhanced collaboration with essential	Surveys (quantitative), interviews and focus group discussions (qualitative), and comparative analysis	Results of comparison analysis, figures, frequency tables, percentages, and descriptive statistics

			stakeholders, community involvement, and collaborations with the national, county, and other agencies.		
To investigate the structure of Community Forest Associations and Water Resource Users Associations.	WRUAs/CFAs governance structure and functioning	Impact on forest and water resources governance	Harmonized institutions governance structures for CFA under the Forests Act and the WRUA under the Water Act to eradicate overlays in their jurisdictions to administer forests and water resources effectively and efficiently. Governmental support towards Kenze CFA and the Kaiti WRUA through capacity building and awareness creation on their structure.	Questionnaires (quantitative), Interviews and FGDs (qualitative), Secondary data review (qualitative) and Comparative analysis.	Descriptive statistics, figures frequency tables, percentages and comparative analysis results.
To recognize the challenges that Community Forest and Water Associations face and the opportunities that	Challenges and Opportunities that exit.	Impact on forest and water resources governance	Enhanced uptake of all CFA and WRUA existing and available opportunities	Questionnaires (quantitative), Interviews and FGDs (qualitative), Secondary data	. Descriptive statistics, figures frequency tables, percentages and comparative analysis results

can be seized in managing the Kilungu catchment.			and minimize challenges.	review (qualitative) and Comparative analysis.	
To assess the Kilungu catchment management capability of the water and forest users organizations.	Sustainability of the Kenze CFA and Kaiti WRUA in Kilungu catchment management	Effects on the supervision of water and forest resources	For improved sustainability of the institutions and efficient operation of the institutions, the Kenze CFA and the Kaiti WRUA matched their strategy and implementation with the policies and priorities of the current administration	Questionnaires (quantitative), Interviews and FGDs (qualitative), Secondary data review (qualitative) and Comparative analysis.	Descriptive statistics, figures frequency tables, percentages and comparative analysis results

APPENDIX II: TIMEFRAME

	Sept to Oct 2017	**Sept to Oct 2017**	**Oct 2017**	**Oct to Nov 2017**	**Dec - June 2018**	**July –Sept 2018**	**July 2022— August 2023**
Topic Choice	■						
Literature review		■					
writing a proposal defense			■				
questionnaire testing in advance				■			
Data collection and analysis					■		
data gathering					■		
Thesis writing						■	
data evaluation						■	
Thesis external examination and defense and certification						■	■

APPENDIX III: A CASE STUDY OF KENYA'S KILUNGU FOREST ILLUSTRATES THE INFLUENCE OF COMMUNITY INSTITUTIONS ON THE MANAGEMENT OF FORESTS AND WATER RESOURCES.

Introduction:

Dear Sir / Lady,

My name is Patricia Mumbi Wambua, and I'm a PhD candidate in environmental management and governance at the University of Nairobi's Wangari Maathai Institute.

In my project, I will evaluate the impacts of community institutions on the management of water and forests using a case study of Kenya's Kilungu Forest. Your answers to this questionnaire will be kept fully private and used only for academic purposes.

We appreciate your insightful reply and help very much.

Instructions: The interviewer is responsible for filling out this section.

General information

Name of a household member	
Sex of respondent	
Age of the respondent	
Education level of the respondent	
Contact	
Date of interview	
Questionnaire number	
Time of interview start	
Time of interview end	
Name of Community Forest Association (CFA) Project area (Sub location)Tick as appropriate	
Kilungu block	

Nduluni and Ndaatai Block	
Kitumbuuni Block	
Kiongwani Block	
Kilo Block	
Kenze surrounding	
County	
Sub-County	

Key Criteria for Scoring: Five-point scale 5 V.Good, 4-Good V. 3 Moderate, 2-Poor 1-V.poor

Circle one.

I. TO DETERMINE THE EXTENT TO WHICH THE CFAS ARE PERFORMING THEIR OBLIGATIONS AS REQUIRED BY LAW.

1. How effective is the community forest association in carrying out its statutory functions? (1 2 3 4 5)

2. To what extent do CFAs carry out their legal responsibilities? (1 2 3 4 5)

3. To what extent do the anticipated outputs address the conservation and protection of the Kilungu catchment? (1 2 3 4 5)

4. To what extent do CFA activities produce desired outcomes? (1 2 3 4 5)

5. To what extent have various measures been put in place to address the CFA challenges? (1 2 3 4

6. Do you agree that more fines and penalties should be imposed on those who violate the CFA's bylaws? (1 2 3 4 5)

7. How much do you believe proper CFA management can improve the Kilungu catchment? (1 2 3 4 5)

8. Are there any advantages to joining CFA? Please provide a list...

9. In your opinion, is the Kilungu catchment better managed now that there is a CFA in place than it was previously? 1.Yes 2.No

10. What should the government do, in your opinion, to strengthen the area's CFAs?
11. How effective, in your opinion, have the CFAs been in the management of the Kilungu catchment? 1. Extremely effective 2. Only moderately effective 3. Ineffectiveness 4. I'm not sure
II. THE COMMUNITY FOREST ASSOCIATION (CFAS)'S STRUCTURE AS IT RELATES TO THE MANAGEMENT OF THE KILUNGU CATCHMENT **scoring standards** **KEY: Rating out of 5:** **5-V.Good, 4-Good, 3 - Modest 2-Poor 1-V. Poor.** **Circle one.**
1) How does the governance model of the Community Forest Associations (CFAs) help management of the Kilungu catchment? (1 2 3 4 5)
2) How well do you understand how the community forest associations (CFAs) in charge of running the Kilungu catchment are organized? (1 2 3 4 5)
3) How well do you understand the role that the present Community Forest Associations (CFAs) play in the management of the Kilungu forest and how that contributes to the catchments increased protection? (1 2 3 4 5)
4) How effectively do the current institutional structures and legal framework protect the long-term viability of forest resources? (1 2 3 4 5)
5) To what extent do you think CFA officials have outlined their duties clearly? (1 2 3 4 5)
6) Do you concur that all CFA participants who are interested have a chance to affect how decisions are made? (1 2 3 4 5)
7) To what extent do you agree that the governance structures of CFAs are effective in improving the Kilungu catchment? (1 2 3 4 5)
8) Do you belong to a chapter of the CFA in your area? 1. Yes, 2. No. Explain your response.
9) Describe the CFA’s relationship with other government agencies.
10) Do you believe CFAs have sufficient capacity to carry out their management functions in the Kilungu catchment? 1. Yes, 2. No. Please explain your response.

III. IN THE KILUNGU CATCHMENT, THE COMMUNITY FOREST ASSOCIATIONS (CFAS) FACE MANAGEMENT CHALLENGES AND OPPORTUNITIES. **Scoring standards KEY: Five-point scale: 5-V.high 4-High. 3. Medium 2-Low 1** **-V. low** **Circle one.**
1). How are community forest governance institutions affected by the difficulties they experience and the opportunities open to them in managing the Kilungu catchment? (1 2 3 4 5)
2) How much do several issues that affect the governance of Community Forest Associations (CFAs) face CFAs? (1 2 3 4 5)
3) What difficulties have the Community institutions encountered when managing the Kilungu catchment?
1) To what extent have the challenges contributed to the degradation of the Kilungu forest catchment? (1 2 3 4 5)
2) To what extent do the challenges influence the outcomes of the CFAs' performance to reverse the degradation? (1 2 3 4 5)
3) To what extent do the opportunities have an impact on the governance of CFAs? (1 2 3 4 5)
4) To what extent do the opportunities influence the outcomes of the CFAs Performa's to address the Kilungu catchment degradation issues? (1 2 3 4 5)
5) What do you consider to be the most significant challenge confronting CFA operations in this area? (1 2 3 4 5)
6) In your opinion, how and by whom should the aforementioned challenge be addressed?
7) What opportunities do you think exist for CFAs in the area, in your opinion?
8) Do you think these opportunities will help or hurt CFAs' ability to manage the Kilungu catchment?

IV. TO JUDGE THE CFAS' CAPABILITY IN MANAGING THE KILUNGU CATCHMENT SCORING CRITERIA
IMPORTANT: Getting a one on a scale of five. 4-HIGH, 5-V.HIGH 2 - LOW 1 - V.LOW 3 - MEDIUM
1. What level of management of the Kilungu watershed can the Community Forest Association (CFA) handle?
2. What level of management of the Kilungu catchment can the Water Resource Users Associations (WRUA) handle? (1 2 3 4 5)
3. How much do you believe that the management of the Kilungu catchment has been positively impacted by Community Forest Associations (CFAs)? (1 2 3 4 5)
5. How would you assess the following aspects of good governance that contribute to Community Forest Associations' (CFAs') sustainability in terms of their influence on the sustainability of the Kilungu catchment? i. Engagement (1 2 3 4 5) ii. Compliance with the law: (1 2 3 4 5) iii. Consensus-oriented: (1 2 3 4 5) iv. Fairness and inclusivity: (1 2 3 4 5) v. Effectiveness and efficiency (1 2 3 4 5) Accountability vi (1 2 3 4 5)
6. How sustainable do you think CFAs are for managing the Kilungu catchment? (1 2 3 4 5)
7. How well-equipped are the current institutions and laws to guarantee the Community Forest Associations in the Kilungu catchment's sustainability? (1 2 3 4 5)
8. According to you, what can guarantee CFAs' long-term ability to guarantee the sustainability of the Kilungu catchment?

END-THANKS

THE IMPACT OF COMMUNITY INSTITUTIONS ON FOREST AND WATER GOVERNANCE IN KENYA: A CASE STUDY OF THE KILUNGU FOREST. SECTION B OF THE WRUAS SURVEY: WATER RESOURCE USERS ASSOCIATIONS

Introduction:

Dear Sir/Madame,

I. TO DETERMINE THE EXTENT TO WHICH WATER RESOURCE USERS ASSOCIATIONS (WRUAS) PERFORM THEIR REQUIRED ACTIVITIES **Key scoring criteria: Five-point scale (5) 4-Good with a 5-V. 3 - Modest 2-Poor Poor 1-V. Circle one.**
1. How effective is the Water Resource Users Association in carrying out its statutory mandates? (1 2 3 4 5)
2. To what extent are WRUAs carrying out their legal obligations? (1 2 3 4 5)
3. To what extent do the anticipated outputs address the conservation and protection of the Kilungu catchment? (1 2 3 4 5)
4. To what extent have various measures been implemented to address the WRUA challenges? (1 2 3 4 5)
5. How well do the WRUA's efforts provide the intended effects? (1 2 3 4 5)
6. To what extent do you agree that more fines and penalties should be imposed for those who fail to comply with the WRUAs as required by law? (1 2 3 4 5)
7. How much do you think proper WRUA management can be used to improve the Kilungu catchment? (1 2 3 4 5)
8. Do you belong to a WRUA or know of one in your area? 1. Yes 2. no
9. How do you think the activities of WRUAs influence the management of the Kilungu catchment? 1. In a negative way 2. Under no circumstances
10. What are some of the activities that these WRUAs in your area are involved in?
11. What additional actions do you think the WRUAs ought to take to deal with the management of the Kilungu catchment?

II. THE WATER USERS ASSOCIATION STRUCTURE

Scoring out of Five for KEY:S (5) 4-Good with a 5-V. 3 - Modest 2-Poor Poor 1-V. Circle one.

I. How well-versed are you in the organizational framework of the Water Resources institutions in charge of managing the Kilungu catchment? (1 2 3 4 5)

II. How is an association of the Kilungu catchment improved by the governance structure of the Water Resource Users Associations (WRUAs)? (1 2 3 4 5)

III. How are the Water Resource Users Associations' (WRUAS) governance structures involved in the management of the Kilungu catchment? (1 2 3 4 5)

IV. How well do you comprehend the role that the governance frameworks of the existing community water institutions play in the management of the Kilungu catchment? (1 2 3 4 5)

V. How well do you understand the role played by current local community governance institutions in the management of the Kilungu catchment? (1 2 3 4 5)

VI. How well do you comprehend the role that the governance frameworks of the existing Water Resource Users Associations (WRUAS) play in the management of the Kilungu catchment? (1 2 3 4 5)

VII. How well-suited are the current institutions and legislation to guarantee the future sustainability of water resources? (1 2 3 4 5)

VIII. How well do you believe the WRUA officials have described their roles and responsibilities? How much do you concur that each (WRUA) member has a chance to influence how decisions are made? (1 2 3 4 5).

IX. How effective do you believe the governance systems of the WRUA are towards enhancing the Kilungu catchment? (1 2 3 4 5)To what extent do you agree that WRUAs governance structures are effective in improving the Kilungu catchment (**1 2 3 4 5)**

X. Would you say the existing governance structure of WRUAs has been effective? 1. Yes, 2. No. Explain your answer

XI. Would you say that every member of WRUA is involved in decision-making within

	the WRUA? 1. Yes 2. No, Explain
XII.	Would you say the existing WRUA structure is gender-inclusive? 1. Yes, 2. No
XIII.	What would you recommend to improve the existing governance structure of WRUAs?
XIV.	How well do you comprehend the role that the governance frameworks of the existing Water governance institutions play in the management of the Kilungu catchment? (1 2 3 4 5)
XV.	How well do the current institutional and legal structures ensure the long-term sustainability of water resources? (1 2 3 4 5)
XVI.	How well do you believe WRUA officials have defined their duties and responsibilities? (1 2 3 4 5)
XVII.	To what extent do you agree that all (WRUA) members have an opportunity to influence decision-making? (1 2 3 4 5)To what extent do you agree that the WRUA's governance structures are effective in improving the Kilungu catchment? (1 2 3 4 5)
VIII.	How effective do you believe the current governance structure of WRUAs is? 1. Yes, 2. No. Explain your response.
XIX.	Do you believe that every member of the WRUA is involved in decision-making within the WRUA? 1. Yes 2. No Please explain
XX.	Would you consider the current WRUA structure to be gender-inclusive? 1. Yes, 2. No
XXI.	What recommendations do you have for enhancing the current WRUA governance structure?

III. THE DIFFICULTIES AND OPPORTUNITIES COMMUNITY WATER GOVERNANCE INSTITUTIONS FACE KILUNGU WATERSHED SUPERVISION
Key scoring criteria Percentage out of 5 (5) 5-V.high 4-High. Medium 3 1-V.low CIRCLE ONE 2-Low
1)To what extent are Water Resource Users Associations (WRUAS) confronted with

various challenges; and how do these challenges affect WRUA governance? (1 2 3 4 5) 2)How do the challenges that Water Resource Users Associations (WRUAs) face and the available opportunities affect their effectiveness in managing the Kilungu catchment?
3) What opportunities and problems do the Water governance institutions face in managing the Kilungu water basin? (1 2 3 4 5)
4) How much of the Kilungu water catchment has been degraded as a result of the difficulties? (1 2 3 4 5)
5) To what extent do the challenges influence the outcomes of the WRUA's performance to reverse the degradation? (1 2 3 4 5)
6) To what extent are opportunities available to water resource user associations (WRUAS)? (1 2 3 4 5)
7) To what extent do the opportunities have an impact on the governance of the WRUA? (1 2 3 4 5)
8) How do opportunities influence the WRUA's performance in addressing Kilungu catchment degradation issues? (1 2 3 4 5)
9) What difficulties, in your opinion, exist in the management of the Kilungu catchment that prevents WRUAs from operating effectively?
10) In your perspective, who should take on these difficulties and how?
11) Are there any opportunities for WRUAs to participate in the management of the Kilungu catchment? 1. Yes, 2. If yes, which of these are these?
12) Do you believe the opportunities outnumber the challenges confronting WRUAs? 1. Yes, Please explain your response

IV. TO ANALYZE THE LOCAL COMMUNITY WATER GOVERNANCE CAPABILITY IN MANAGING KILUNGU CATCHMENT **Scoring Standards KEY: Percentage out of 5 (5) 5-V.high 4-High. Medium 3 2-Low 1-V.low**
1. What level of management of the Kilungu catchment can the Water Resource Users Associations (WRUA) handle? (1 2 3 4 5)
2. To what extent do you agree that the management of the Kilungu catchment is impacted favorably by Water Resource Users Associations? (1 2 3 4 5)
3. How well do you think the WRUAs are doing in preserving the Kilungu catchment? (1 2 3 4 5)
4. Please rank the following attributes of good governance based on how they affect the sustainability of the Kilungu watershed. These attributes promote sustainability and capacity in WRUAS. 1. Engagement (1 2 3 4 5) 2. Compliance with the law: (1 2 3 4 5) 3. Consensus-oriented: (1 2 3 4 5) 4. Fairness and inclusivity: (1 2 3 4 5) 5. Effectiveness and efficiency: (1 2 3 4 5) 6. Responsibility (1 2 3 4 5)
5. To what extent do you believe that WRUAs are sustainable in their management of the Kilungu catchment? (1 2 3 4 5)
6. To what degree do the current lawful framework and institutional framework in the Kilungu catchment suffice to guarantee the future viability of water resources? (1 2 3 4 5)
7. In your opinion, what can be done to ensure the long-term viability of WRUAs and the Kilungu catchment? (1 2 3 4 5)

END-THANKS

APPENDIX V: THE INTERVIEW GUIDE FOR KEY INFORMANTS

Hello and good day/evening,

My name is Patricia Mumbi Wambua, and I'm a graduate student at the University of Nairobi's Wangari Maathai Institute working for a Ph.D. in environmental management and governance.

A case study of Kenya's Kilungu Forest will be used in my study to assess the effects of community institutions on the governance of water and forests.

Your responses to this questionnaire will be treated in strict confidence and solely used for academic research. We appreciate your insightful reply and help very much.

Instructions: This section is to be filled by the interviewer

General information

Name of a household member	
Sex of respondent	
Age of the respondent	
Education level of the respondent	
Contact	
Date of interview	
Questionnaire number	
Time of interview start	
Time of interview end	
Community Associations for Water and Forest Governance **Project location (Sub location) the corresponding box**	
Kilungu block	
Nduluni and Ndaatai Block	

Kitumbuuni Block	
Kiongwani Block	
Kilo Block	
Kenze surrounding	
County	
Sub-County	

1. Describe your organization's structure and function in a few sentences.
2. Do you think your company has the resources it needs to fulfill its mission, Technical-wise?
    a. Human resources
    b. In terms of finances and policy? If not, what steps do you believe should be taken?
3. Provide a brief description of your organization's horizontal and vertical coordination: Would you say the current coordination is satisfactory to you? If not, what can be done to improve it? What, in your opinion, have been the most significant achievements in the conservation of the Kilungu catchment? 6. What, in your opinion, have been the most significant achievements in the conservation of the Kilungu catchment?
4. What kind of activities is your organization engaged in in terms of protecting the Kilungu catchment? How do you involve the community in the above activities? What would you say is the role of the local community in the conservation of the Kilungu catchment?
5. Are there community practices that, in your opinion, reduce the viability of CFA AND WRUA effectiveness in the Kilungu catchment? Yes/No.
6. Which are these? If yes to the 5 above, what measures does your organization have in place to address the issue?

7. Does your department have any major plans in ensuring effective community water and forest resources management? Explain
8. What other recommendations would you make in terms of improving water sources and conserving forest resources?

8. Describe the operation of the elaborate community facilities for managing the forest and the water in the Kilungu catchment.

9. List the below activities of the local institutions concerned with water and forests.

10. In managing the Kilungu catchment, what opportunities and problems exist for community governance institutions?

11. Describe how CFA and WRUA have affected the Kilungu catchment.

12. How long have the WRUAs and CFAs overseeing the Kilungu catchment been in existence?

13. Please give a brief explanation of the components of sustainable catchment management that you would want to see. How effectively do community institutions carry out their legal obligations?

14. How are the Kilungu catchment's governing institutions involved?

What challenges face the institutions of the forest and water communities in managing the Kilungu catchment?

15. How would you succinctly describe the issue with both the water and forest community institutions being involved in resource governance?

THANK YOU

APPENDIX VI: A TOOL FOR FOCUS GROUP DISCUSSION

The ten key respondent members were drawn from the Kenya Forest Service (KFS), the Water Resource Management Authority (WRMA), the Kenya Wildlife Service (KWS), the National Environment Management Authority (NEMA), non-governmental organizations (NGO), county government environment officials, agriculture, and other experts involved in natural resource conservation through the use of purposeful sampling.

A conversation was held in Kenya's Kilungu Forest, a case study of the impact of community institutions on the issue of managing water and forest resources.

1. How faithfully do community forest associations and organizations representing users of water resources maintain their legal duties?

2. How are the Water Resource Users Associations (WRUAs) and Community Forest Associations (CFAs) involved in the administration of the Kilungu catchment?

3. What challenges do the Water Resource Users Associations (WRUAs) and Community Forest Associations (CFAs) have in preserving the Kilungu catchment?

4. How sustainably do the Community Forest Association (CFA) and Water Resource Users Associations (WRUA) maintain the Kilungu catchment?

5. What do you think about how the Water Resource Users Associations (WRUAs) and Community Forest Associations (CFAs) operate?

6. Describe the community forest association's organization and operations (CFAs)

7. Describe the Water Resource Users Associations' organization and operations (WRUAs).

8. Do disagreements between or within the government or other stakeholders today or in the past negatively impact the usage and conservation of water resources?

9. Has the use and preservation of forest resources ever been hindered by disputes between/within the government or other stakeholders?

10. Do you think any local practices for using water and forests endanger the long-term viability of these resources? Which one are they, exactly?

11. How do the Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs) face opportunities and challenges in managing the Kilungu Catchment?

12. How are the Water Resource Users Associations (WRUAs) and Community Forest Associations (CFAs) affecting the Kilungu Catchment?

13. What are the benefits of protecting forests and water resources for the community?

14. What actions do you think need to be implemented to stop the depletion of forests and water supplies? Who shall perform the duty?

15. Do you think the Kilungu Catchment will be sustainably managed thanks to the WRUAs and CFAs? Explain…….

16. Describe the sustainability aspects of the Kilungu catchment's Community Forest Associations (CFAs) and Water Resource Users Associations (WRUAs).

THANK YOU