INFLUENCE OF COMMUNITY BASED STRUCTURES ON SUSTAINABILITY OF WATER PROJECTS: A CASE OF BOREHOLE PROJECTS IN MAKUENI COUNTY, KENYA

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2021

DECLARATION

I declare that this is my original work and has not been presented for award of degree or diploma in this or any other University.

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This research project has been submitted for examination with my permission as the University Supervisor.

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DEDICATION

This work is dedicated to my sister Charity Muthoni Muriuki for her unconditional love and support she has extended to me through the years. Thank you.

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ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
CDD	Community Driven Development
CRRT	County Rapid Results Report
KIMAWASCO	Kibwezi Makindu Water and Sanitation Company
MBONWASCO	Mbooni Water and Sanitation Company
MDG	Millennium Development Goal
NACOSTI	National Commission for Science, Technology and Innovation
NGO	Non-Governmental Organization
SDG	Sustainable Development Goal
SPSS	Statistical Package for Social Scientists
UN	United Nations
UNICEF	United Nations International Children Education Fund
USAID	United States Agency for International Development
WASH	Water and Sanitation for Health Project
WEDC	Water Engineering and Development Centre
WHO	World Health Organization
WOWASCO	Wote Water and Sanitation Company

ABSTRACT

For sustainability of water projects in both rural and urban areas in Kenya, community involvement is paramount. Rural populations are the most disadvantaged when it comes to coverage of water and sanitation services. This study investigated the influence of community-based structures on sustainability of community-based water projects in Kenya, focusing on Makueni County. Four objectives of the study: to determine the influence of community-based structure in project identification; to examine the influence of community-based structure in project planning; to determine the influence of community-based structure in project implementation and to assess the influence of community-based structure in project monitoring and evaluation on the sustainability of community-based water projects in Makueni County. Systems theory was used in this study. This study adopted a descriptive survey research design and employed a cross-sectional approach in analyzing quantitative data collected using close ended questionnaires. The total target population was 980 beneficiaries of borehole water projects in Makueni County. By use of Yamane formula and stratified random sampling, a sample of 285 respondents was selected. A questionnaire targeting management committee members who are also beneficiaries was administered to the respondents. An interview guide was used to collect qualitative data from chairpersons of county water service providers in Makueni County. Data analysis was achieved through use of descriptive statistics and content approaches. The descriptive analysis entailed both the mean and the standard deviations. The results were presented in tables followed by pertinent interpretation and discussion. The findings revealed that the independent variables used (community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation) were satisfactory variables in explaining the sustainability of borehole water projects in Kenya's Makueni County. The results revealed that the R-Squared was 0.697, implying that that community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation jointly explained 69.7% of the variations in sustainability of borehole water projects in Kenya's Makueni County. The findings also revealed that community-based structures in project identification had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.190, p=.001<.05), community-based structures in project planning had a positive and significant influence on the Sustainability of Borehole Water Projects in Makueni County (β =.244, p=.000<.05), community-based structures in project implementation had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.285, p=.000<.05). Finally, the results showed that community-based structures in project monitoring and evaluation had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.249, p=.000<.05). The study concluded that residents of Makueni participated in project identification and thus positively influenced water project sustainability in Makueni County as both correlation analysis and descriptive analysis were in agreement. The study also concludes that the local people are involved in stating their problems, suggesting remedies, setting priorities and articulating project interventions. The study also concluded that there is a big difference between project implementers coming with certain interventions and involving the community in decisions that does not change in a big way what exists and where the people are involved in every aspect of the project, from determining the issues to providing solutions. The study recommended that there is need for the County and national government to formulate suitable and relevant policies that will ensure that communities are involved in projects to ensure sustainability. Policies need to cover aspects of planning, identification, resource mobilization and oversight.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The early failures of projects that squander money and set unrealistic expectations have resulted in 30 to 40 percent of developing nation structures not working properly or operating at a significantly reduced capacity (James, 2018). According to polls, 40% of non-profit and community-based groups' activities fail within the first few years when funding is removed, showing that they are not long-term viable (Ceptureanu et al., 2018). Actual study demonstrates that 66.7 percent of efforts in Sub-Saharan African countries like Kenya are not long-term feasible (Oduwo, 2014). In Samburu County, 95% of hunger-relief efforts failed shortly after the financing term ended (Keura & Moronge, 2016).

Community, project outcomes, and outside assistance are all factors that must be considered when looking at a project's feasibility in the long run (Luvenga, Kirui, Oino, & Towett, 2015). When a problem persists over an extended period of time, the community or beneficiary will benefit from a project that is self-sustainable (Luvenga et al., 2015). According to the World Bank and the International Monetary Fund, projects cannot be long-term and sustainable unless group approaches are integrated into the planning and administration of the project (Kumar, 2015). From $325 million in 1996 to $90 billion in 2018, the World Bank has increased its support for community-based development activities. (CBD) (2019, Mausuri and Rao). Using both anecdotal and empirical evidence, community-based solutions have been a resounding success in terms of project outcomes and long-term sustainability (Isham, Narayan & Pritchett, 2016).

Globally, there has been a significant drive to include communities in their own development and, as a result, encourage community-led activities aimed toward their own development rather than forcing projects down their throats that benefit funders and implementers. If any meaningful and sustained growth in community development is to be accomplished, scholars believe that project target beneficiaries must be included in the conception, start, execution, administration, monitoring, and assessment of their programs (Adan, 2017). The use of community-based structures has therefore become a conduit from which demand-based approaches are used to build up the decision-making capabilities of governments towards allocating the facility location, service hours, technology to be utilized and the general nature of the project among other issues (Boonstra, 2016).

Safe drinking water is an issue for more than 1.2 billion people throughout the world. As part of the Sustainable Development Goals (SDGs), which involve making sure a particular number of people have access to safe drinking water and sanitary facilities, global leaders met in Ethiopia in July 2019 to discuss this issue (World Bank, 2018).

UNCEF (2015) reveals that about 3.3 billion individuals or 42% of the world population and 8% in America reside in nations in which it is hard to access sufficient water to both sustain and fulfill the fundamental basic needs. There have been some localities that have not met their MDG target for reducing the number of people who do not have access to clean water by 2016. Developing areas of the world, such as South East Asia and portions of Latin America, are still lacking adequate and clean water sources, according to new research. According to Sabastian and Nathan (2017), this scenario exacerbates the already deteriorating living circumstances of the general people in these locations, limiting the rural economy's social and economic progress. Nonetheless, such strides which are geared at expanding new services are threatened by destabilizing the practical sustainability by encouraging hurried building of infrastructure as opposed to the long term, much required interests in operation and support.

In Africa, like any other continent, Kleemeier (2019) did a study on CBPs water projects in South Africa, the study indicated that 63% of the CBPs do badly in terms of sustainability due to financial embezzlement from the responsible management team and low level of community participation. In Malawi, Kleemeier (2019) pointed that most of the CBPs that were performing better provide Home Based Care using society to formulate a package to orphans including psychological support, paying school fees, buying them clothes, foods, enhancing talents and life skill training to older ones, training on food security tips and providing advocacy to less fortunate in the community. Sustainability of Zambia projects is seemingly less than the anticipation; it is rare to find locally initiated projects uncompleted or significantly behind schedule.

In Tanzania, majority of its urban Centres have grown merging with the outskirt peri-urban areas. These towns include Mwanza, Dodoma and Tanga. In towns like Dar es Salaam, residents with water connections are subjected to water rationing where they get access to water for a few hours and days of the week, this is according to staffs from Dar es Salaam Urban Water and Sewerage Authority. This was due to failure to adequately invest in water resources by the government for the last forty years. African Development Bank has in the past been involved in funding the water supply in the town and doing rehabilitations of the existing water infrastructures. Stacey et al. (2018) adds that, the average

annual supply of water in Tanzania stands at 2800 cubic meters per year, worse still, the condition is worse for towns with higher informal settlements like Tanga, Dar es salaam and Mwanza. Water and sanitation are not available to a third of the city's residents.

Water problems in Kenya have been labeled by the United Nations (UNICEF, 2018). In 58 percent of situations, Kenyans have access to safe drinking water, with 22 percent having water piped to their yard or dwelling, and 30 percent having sufficient sanitation. According to available statistics, water, sanitation, and hygiene are responsible for 50% of all diseases in Kenya (UNICEF, 2017). In Kenya, community involvement in economic development started with projects that targeted communities. As indicated by the 2019 Kenya constitution, meaningful communities' involvement in governance is the key component for public reforms. Community involvement needs transparency, commitment in the process, ideas, acknowledgment of alternatives views, human resources and time. A thoroughly handled involvement contributes consensus and acceptance of the proposal and will facilitate implementation. The Kenyan constitution that was promulgated in 2019 articulates clearly that all citizens should fully engage in activities that have a direct influence to their lives (Maina, 2016).

Community involvement in water projects has several benefits including increased social acceptability, equal benefitting of the projects by the member in the society and also helps stabilize project sustainability. Water is a scarce resource and as such should be well conserved and managed for the benefit of the whole community members (Macharia, 2015). The big question is whether people in communities are never interested in community-based structures in regards to water use or they are always ignored from the process. This makes it necessary to have this study in Makueni County.

Makueni County Rapid Results Report (CRRT) (2015) indicates that only 49% of county funded water projects concluded successfully. Even though there is a slight improvement up to 64% currently, it is noted that low completion rate continues to be a concern. CRRT reported that few projects nearly half of them had negative implications in so far as time, cost and quality was concerned. Consequently, the search for the repercussion of community involvement on water projects in Makueni County is very timely and of paramount importance particularly looking at the low performance with emphasis on decision making of stakeholders, resource mobilization, monitoring and evaluation and the project closure procedures.

1.2 Statement of the Problem

Though it's an essential resource, Kenya does not have enough clean drinking water (Mbui & Wanjohi, 2018). According to Wateraid.org (2018), 41% of Kenya's population depends on unsafe water sources like rivers, traditional wells and water ponds, for domestic water needs. Furthermore, only around 18% of the selected water vendors in the Kenya are able to supply the commodity continuously. Wateraid.org. (2018) stated that more than 35% of Kenyans lack access to clean water. Subsequently, most Kenyans have had to maneuver through the water problem on their own. Communal projects in water are significant machinery in the water supply matrix particularly in villages where the government failed to offer supply of clean drinking water (Macharia, 2015). Participatory development specialists state that projects executed with the involvement of the community and end-users are more likely to be executed resourcefully and sustainably (Mbui & Wanjohi, 2018). In Makueni County there are many projects that have been established but have not benefited the target beneficiaries because many were not even completed, a good example is Ndukuma water project that started in the year 1952 and up to today it has not served the community to the maximum as it ought to. Water projects in Makueni County need to be studied for their sustainability, and community-based structures have been postulated to have a role. Makueni County's water projects were evaluated to see which approach is the most effective in terms of long-term sustainability. According to various experts, establishing sustainability is challenging, especially without the collaboration of stakeholders (Vernon et al., 2015). As a result of these conditions, the goal of this study is to examine how community-based structures impact the long-term viability of water projects in Kenya, with a particular emphasis on Makueni County.

1.3 Purpose of the Study

The study's purpose was to examine the influence of community-based structures on borehole water projects sustainability in Makueni County, Kenya.

1.4 Research Objectives

The study was guided by the following objectives:

i. To establish how community-based structures in project identification influence borehole water project sustainability in Makueni County, Kenya.
ii. To determine how community-based structures in project planning influence the sustainability of borehole water projects in Makueni County, Kenya.

iii. To evaluate how community-based structures in project implementation influence borehole water project sustainability in Makueni County, Kenya.
iv. To establish how community-based structures in project monitoring and evaluation influence the sustainability of borehole water projects in Kenya's Makueni County.

1.5 Research Questions

The study was guided by the following research questions:

i. To what extent do community-based structures in project identification influence sustainability of borehole water projects in Makueni County, Kenya?
ii. To what extent do community-based structures in project planning influence sustainability of borehole water projects in Makueni County, Kenya?
iii. To what extent do community-based structures in project implementation influence sustainability of borehole water projects in Makueni County, Kenya?
iv. To what extent do community-based structures in project monitoring and evaluation influence sustainability of borehole water projects in Makueni County, Kenya?

1.6 Significance of the Study

This study informs the policy makers and empowers project managers to advance planning and execution towards the goal of attaining the project requirements. Some of the benefits that accrue to the community include; community empowerment, health benefits, strengthened local organizations and social-economic benefits. Individuals, especially those living in poorer environments, would benefit from higher supplies of clean water utilized for both household and sanitary purposes, according to data from Water Supply and Sanitation (WS&S) initiatives across the globe (Okun, 2016).

Community-based structures in all the various stages of project development ensured that the communities own the projects and that their needs are met. It was used by donors to assess the sustainability of water projects before implementation. Donors were willing to fund a project that has involved the target communities as this ensured sustainability of the project even after the funding period has expired.

1.7 Delimitation of the Study

The study was undertaken in Makueni County, with a focus on community water projects that have been established there, since the county continues to suffer water issues and has numerous examples

of unfinished community water projects. The researcher acknowledged sustainable initiatives that were completed in 2015, as well as earlier, post-rehabilitation, or freshly dug borehole projects in the county.

1.8 Limitations of the Study

Not all respondents responded to the questionnaire while those who responded for the study were project managers hence the aspect of self-reporting was expected to bring out biasness. Self-reporting bias was minimized by debriefing respondents about how the data was to be used. Due to vastness of the county, there were challenges of administering the questionnaires in all the sub-counties in addition to interviewing targeted respondents who were occupied with official and personal responsibilities. To overcome these challenges the researcher conducted telephone interviews in some of the instances, and in others engaged research assistants to collect data in the far areas. Finally, the data collection instruments could not be 100 percent reliable due to respondent bias. In this case, the instruments' validity and reliability was established.

1.9 Assumptions of the Study

This study takes the following assumption; that all the respondents were honest in answering the questions of the research instrument and that the sampled respondents and projects gave experiences that were a representation of other community water project beneficiaries within Makueni county.

1.10 Definition of Significant Terms used in the study

Community-based Structures: This refers to the informal groupings at the community level set up with an objective of establishing a particular task that serve the greater good of the rest of the community members. For the purpose of this study these structures include committees that are involved in decision-making and execution throughout the many phases of a project, such as project identification, planning, implementation, and monitoring and evaluation.

Community-based Structures in Project Identification: In this study project identification involves sensitization of the community on the type of project that is to be undertaken through workshops and public surveys.

Community-based Structures in Project Implementation: In this study it entails training of the implementation team, actualization of construction works and manpower.

Community-based Structure in Project Monitoring and Evaluation: This refers to reporting on project progress through stakeholder meetings, project reports as well as field visits.

Community-based Structures in Project Planning: In this study it entails the process of project strategic planning, project design and appraisal.

Project Sustainability: In this report, project sustainability refers to a project's capacity to consistently meet the future needs of the community after the donor support has come to an end or exit.

1.11 Organization of the Study

This research is divided into five chapters. Chapter one entails the background of the study, problem statement, purpose of the study, research objectives and questions, study importance, study delimitation and limitations, assumptions of the study and definitions of key words. The literature review, theoretical context, conceptual framework, and knowledge gap are all included in Chapter two, while chapter three explains the methodology for data gathering, piloting instruments their validity and reliability as well as data collection and processing procedures. Also mentioned are ethical considerations and the operational definition of variables. Data analysis, presentation and interpretation is in chapter four while the findings, conclusion, recommendation and suggestions for future research are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter comprised of literature on how community-based structures in identification of water project in Makueni County, community-based structures in planning of water project in Makueni County, community-based structures in implementation of water project in Makueni County and community-based structures in monitoring and evaluation influence sustainability of water project in Makueni County. The theories and the conceptual framework of the study were provided in this chapter. Finally, the chapter contained a summary of literature and knowledge gap.

2.2 Sustainability of Water Projects

The word "sustainability" refers to capacity to consistently meet the intended objective over an extended length of time. Despite the fact that its importance is generally recognized, the concept of sustainability remains ill-defined (DeMiglio & Williams, 2016). There was a mixed perception of sustainability among the people participating in a report on fall prevention (Hanson & Salmoni, 2018). Some people thought that sustainability meant the project's overall continuity, while others thought it meant the project's specific elements (DeMiglio et al., 2016). Project sustainability is frequently characterized as a project's capacity to continue providing the anticipated benefits over an extended period of time (Bamberger & Cheema, 2019).

When a development project's significant administrative, financial, and technical help from an external donor expires, the project is deemed sustainable if it continues to provide adequate benefits for a long time (US Agency for International Development, 2021). The continuance of an investment project after the active implementation phase has concluded is defined by several organizations in the rural water sector as "sustainability." A study by the WEDC under the DGD-finance knowledge and research project plans for sustainable hand pump projects in Africa found various definitions of sustainability, but the most common indicate that a sustainable project is one that does not exploit accessible water sources but rather replenishes it naturally (Abrams, 2014).

With the help of foreign donors, organizations throughout the world are able to have access to clean drinking water. While some have succeeded, the vast majority have fallen short. An estimated 66% of Africa's rural population will have access to safe drinking water through a hand pump (RSWN, 2019). The project facilities must be maintained in a condition that ensures regular water supply in order to

achieve sustainability. All users should recall how much fun they had with the water supply for a long time, as well as how cost-effective it was to utilize energy that could be reproduced. Many factors contribute to poor water supply project sustainability rates: lack of ownership; a weak administrative structure; lack of demand; as well as a lack of institutional guidance on water and sanitation service. Inadequate water infrastructure, dismal physical facilities, a lack of awareness among users, and bad services and facility designs have all had an influence on the functioning of rural water supply programs. From a financial, economic, scientific, environmental, and institutional standpoint, this may be addressed (USAID, 2015).

Sustainability has been defined in the context of water and sanitation as a long-term supply of services that is both functional and resilient to change. In his work, he also emphasizes the need of considering non-technical components of technology, as such as social ramifications, economic limits, and environmental harm, in order to be sustainable (Kuhlman & Farringtom, 2019).

Water supply sustainability is grouped into three aspects: people, performance, and location, when considering sustainability considerations and potential indicators. Water supply management, the natural environment, and the history and culture of a region are all intertwined in the concept of sustainability. To further understand these newly discovered environmental indicators, such as water availability, water quality, aquifer changes, water waste, and water pollution, we need to look at these environmental indicators. Examples of sustainability include institutional qualities, the ability of landowners to remedy problems, and the possibility for management improvement in a given area. Finally, even in the face of water shortage and variability, sustainability may be accomplished via personal engagement in management, participation in public forums and meetings, and personal responsibility. It was regarded in terms of ideas and behaviors that would encourage people in the wider water management community to participate more actively in this case, according to their study" (Iribarnegaray & Seghezzo, 2017).

According to Montgomery, Elimelech, and Bartram (2020), three factors should be considered when preparing for the long-term viability of water projects. Societal demand, local funding and cost-effective operations and maintenance, as well as pay back, were among these factors. Successful group demand is achieved by involvement and participation in planning. Despite this, there have been obstacles, such as absence of opportunity, insufficient knowledge, and need for technological options. Local cost recovery and financing are linked to local borrowing and saving, as well as community subsidies characterized by a lack of transparency and accountability. The neglect of rural regions, as

well as uninspired and underpaid local personnel, are some of the issues that complicated operations and maintenance encounter (Montgomery, 2020).

A feeling of ownership does not necessarily indicate a sense of obligation or willingness to manage, according to Harvey and Reed's (2020) field research. In the same publication, the authors make two further assertions. First, they argue that for a community program to be effective, institutions must provide constant support, and second, community capacity development does not imply community readiness to manage and fund a water supply in the long term. The remark implies that imposing a tax on water users, as well as capacity development and training activities, would only provide short-term advantages.

The water industry and government have put forth a lot of effort to guarantee that organizational potential is built via procedures and norms in order to deliver long-term services. There must also be a focus on the improvement of water service providers' technical competence, governance, and data management. There has been a hurdle in funding rural water supply projects due to their failure to recoup expenditures, whether operating or capital maintenance costs, while receiving income from sales. The administration of rural programs should consider project payback. The government is often requested to step in and remedy broken components or infrastructure without considering the Life Cost Cycle Approach (The World Bank, 2017).

2.3 Community-based Structures in Project Identification and Sustainability of Water Projects

Identifying project ideas is key in overcoming problems and fulfilling the development priorities in the framework of target resident objectives. This is because development projects influence the life of local people. Therefore, it is very important to include them in all aspects of the project as the end beneficiaries. They understand the major problems they encounter in the community and so, project ideas and likely remedies must be originated from initiatives by local people (Baum, 2016). Project design ideals outlined by World Vision (2018) include the importance of empowering local communities to define and prioritize development initiatives. They consist of the local people in stating their problems, suggesting remedies, setting priorities and articulating project interventions. There is a big difference between project implementers coming with certain interventions and involving the community in decisions that does not change in a big way what exists and where the people are involved in every aspect of the project, from determining the issues to providing solutions. This indicates that the level of issue identification might vary from passive to active engagement by contacting local residents.

It is clear from the preceding discussion that community-based structures have many different elements. As a result, the phrase "participation" must be given a lot of thought. It must always be qualified by mentioning the kind of involvement. Furthermore, most individuals believe that employing participatory approaches at work implies appreciation for social factors at work, such as gender, age, socioeconomic position, ethnic diversity, handicap, and power, to name a few (Connor, 2016). Projects typically cover visualization, doing the planning and execution. Public involvement may come early or late during the project implementation. Nevertheless, it is suggested that members should participate during the project start stage. Community-based structures should be done when people's ideas and suggestions can still make a significant influence in the designing or implementing the project (World Vision, 2018). A head start is essential, so that choices are still accessible and different groups' concerns may be taken into consideration in the plans (Inter-American Development Bank, 2016). Additionally, contentious issues can be solved before becoming serious and ultimately lead to key battles thus influencing the performance of development projects (Connor, 2016).

2.4 Community-based Structures in Project Planning and Sustainability of Water Projects

Communities should take a direct and key part during this important phase of project life cycle. This suggests that involvement in the planning and suggesting decisions might be defined as 'representative participation'. According to Hickey and Mohan (2019), a large number of individuals are represented by a small number of people in participatory initiatives. During discussion, key issues and views of people should be gathered. More importantly those views that cannot be quantified in economic terms such as rebuilding of water structures, cultural and societal reflections where science can't help in appreciating them (Van Leussen2016; Fischer, 2016). This is exacerbated by the fact that present issues aren't often well defined, and a collective evaluation of the true extent of the problem is sometimes inadequate (Pahl-Wostl, 2018).

According to Garin et al. (2018), research was done in the Herat watershed in southern France to compare the opinions of participants and experts on river basin management plans (RBMP). They discovered that certain questions are overlooked by experts. Experts' issues are not understood by the general public. This may lead to stakeholders opposing plans suggested and this renders project execution difficult.

Equally, Beierle and Konisky (2017) discoveries support the position of integrating communal ideals during the planning process. They assessed cases of Community-based structures among major projects in the North American Great Lakes region. These cases included a bigger number of various project beneficiaries and had discussions on different structures of improving the quality of water as well as planning for the environment. Majority of the cases indicated that decisions pegged on common values helps decide a common vision and needs of the people for action. Furthermore, they realized that in most cases stakeholders' preferences were key in decision making. Therefore, stakeholders hugely shaped the end outcome of projects.

In these discussions' local information, facts and likely resolutions from the public can be collected. Managers face different levels of uncertainties in regards to water resources and in most cases, actions are taken without adequate information of their consequences. Lack of information is the most common cause of skepticism (Ostrom, 2016). Experts may provide this information, as well as observations and views from the local community. Severally, the local knowledge builds the expert opinions, particularly regarding exclusive local circumstances. It helps give immediate information about local settings and assist in discovering errors and remedies that gratify a broader range of interests (Kickert et al., 2016).

In watershed administration, conservative management programmes started in the last 100 years have been ineffective. Experience exhibited that projected that are planned lacking involvement of local people are frequently rejected by them (Pretty & Shah, 2016). Hinchcliffe et al. (2016) studied 23 instances of watershed projects where participatory approach was undertaken across the world in respect to soil and water protection. The key to the success of these programmes was the local knowledge and skills. From the discoveries, majority of the cases emphasized the importance of using local knowledge and other communal solutions to positively influence the environment and society. Benefits of these local interventions included enough supply of domestic water as well as water for irrigation, reduced soil erosion and use of chemical herbicides and pesticides that may lead to pollution of water sources. The researchers stressed the importance of such few cases which proves to well successful.

In the eyes of buyers, operators, shareholders, and the general public, on-time completion of construction projects is the most important criterion for success (Lim and Mohamed, 2016). Time differences, according to Salter and Torbett (2020), are one of the methodologies used in measuring

project efficiency in construction projects. To project managers, the time factor may signal that the project was not finished on time.

Furthermore, according to a 2016 Latham survey, ensuring timely project transfer is one of the most important objectives of construction sector consumers. Participation of the community may drastically minimize the time spent on project implementation. Acceptance of projects by the people in community enables the project activities to run efficiently according to the plans and deliverables.

2.5 Community-based Structures in Project Implementation and Sustainability of Water Projects

Project execution, which involves activities such as acquiring equipment, employing employees, and allocating responsibilities and resources, is the most important stage of the project life cycle. In this stage, resource mobilization takes place, activities identified and control plans activated. This ensures that all milestones are achieved. Therefore, involving the community in this phase is paramount in ensuring the success of the project (Baum, 2016).

Nearly majority of aspects of what Pretty (2016) calls ‘purposeful participation' is visible at this phase particularly where project execution includes creation of minor interest groups for instance youth and women income generation groups. Participation of the local people raises community awareness to the issues that water managers encounter. It also ensures adaptation of good practices. Public empowerment and awareness help increase the community’s understanding of the issues and the need for long term remedies. This helps especially where there is need for behavior change and willingness on the part of the local people to control the problems (World Bank, 2016).

Community-based institutions in the Great Lakes area have shown that educated individuals are more motivated and conscious of their own part in water pollution, according to Beierle and Konisky (2017). As a result, they take better care not to degrade water sources. They are also motivated in making important decisions. Maarleveld and Dangbegnon (2017) argue that since the water structure involves many unexpected variations, constant revision of water administration is needed. As a result, persons who learn how to analyze how they affect water resources play a critical part in resolving issues. Consequently, this encourages revision of water management. Numerous participants have similar and frequently differing interests and views about solving the problems. Even if groups do not succeed in resolving conflicts, communication and improved relationships allow them to appreciate the aims and perspectives of others.

Beierle and Konisky (2017) found similar findings after examining incidents of public involvement in the Great Lakes area. The researchers looked at how effective public participation was in resolving disagreements amongst various groups. The findings revealed that the conflict between interests failed 60% of the time (out of the 20 occurrences with relevant data). They also found that the method in which communication and fairness were decided to be more essential than the content of the mended conflicts, since it enabled them to go forward with their own problems and settle disagreements. Furthermore, the researchers investigated to see if any connections were made along the way that may aid in the settlement of future disagreements. The findings revealed that in 70% of the instances, the strategy incorporated participant connections or resulted in the development of dispute resolution mechanisms. In the majority of situations, participants said that the approach improved positive connections among stakeholders, even though disagreements persisted.

Water projects, for example, should allow those who are likely to be impacted by and benefit from them to be included in the planning and design process. In order to ensure that children have a voice in the choices that influence their life, this is why (DelliPriscoli, 2019). This is also from the idea that modern democratic societies should allow its citizens to fully participate in areas influencing their social, economic and political life (Benn, 2016). This participatory technique allows participants to attend, express their thoughts, debate opposing viewpoints, and ultimately agree on the best results for an effective decision-making process.

There's no need to restrict participation concerns to decision-making and subsequently to influencing choices rather than making them the working definition. Participating in implementation activities can give people bargaining power in decision making and more knowledge of what decisions are needed and appropriate. As a result, it's understandable to be worried about involvement in decision-making and execution. There's no need to choose between the two options. Concentrating attention on who is engaging in what sorts of participation and how by concentrating on particular actions and results to which indicators may be connected. When participation is equated with the abstract idea of process, such distributive and qualitative concerns are lost (Cohen & Uphoff, 2016).

2.6 Community-based Structures in Project Monitoring and Evaluation on Sustainability of Water Projects

Following up on a project's progress is a major focus in stage three of the project lifecycle. Diverse project stakeholders may conduct assessments to assess the program's effectiveness and determine whether or not the program's planned goals have been met, and if so, to what extent (Baum, 2016).

Guijt and Gaventa (2018) explain that the idea of project Monitoring and Evaluation is to place the views of community, and particularly the underprivileged, at the center of M&E activities. Project Monitoring & Evaluation involves the community, development stakeholders, policy creators determining how development should be quantified, and results worked upon. It can disclose valued instructions and expand accountability. By increasing participation of people in identifying and scrutinizing change, a distinct picture can be portrayed of what is really on the ground. This also enables people to celebrate successful milestones and draw lessons from failures. It also empowers those involved as they are put in charge and thus helps develop skills.

The same writers then identified four philosophies at the core of Project Monitoring and Evaluation: participation to comprise those most directly influenced, conciliation to reach agreement on how and when to do the monitoring and how the findings of the monitoring exercise may be used to improve and influence various changes in the project.

The project management information system set up to monitor a project's progress may contain information on who is involved in certain types of choices in specific types of implementation activities in development projects. Such information may then be evaluated at the midpoint and conclusion of a project. This is a rather simple task. Project-specific choices and execution activities should be evaluated and appraised on a regular basis (Cohen and Uphoff, 2016). Possibly, combined monitoring and evaluation events ought to be done where all the targeted project beneficiaries and the project employees are involved.

The purpose of most development programs is to modify authorities' and local people's behavior. (Pelletier, 2018) reminds out that Tanzania has several excellent instances of programs where combined monitoring and evaluation with main accountability for communities has had a beneficial impact. Both public involvement and bureaucratic reorientation were aided by information. Through a rigorous Monitoring and Evaluation system, government officials began to perform more successfully once they learned about the true situations at the village level. Furthermore, once local people recognized with some accuracy and in a comparable sense across time and between jurisdictions how effectively they were providing fundamental needs, their collective and individual behavior changed dramatically. While there were material limits and entrenched interests to overcome, these proved to be more pliable than predicted once local people and authorities had access to the same Monitoring and Evaluation data compiled in a manner that gave everyone trust in it and gave it human value.

For success in monitoring and evaluation programs, there should be permanency of personnel involved in the program both from national government and from the donor group (Narayan 1998). It's also critical to maintain the engagement of non-governmental organizations (NGOs) and local communities. Without institutional memory to infer observations and thoughts, no learning course can be particularly efficient. It is preferable to have high-level government assistance at first, although this is not a need as long as the inquiry is acknowledged. For this to work there should be a system of supportive and well committed persons in various vital positions (Korten and Siy, 2016).

A participatory approach should be conceived and implemented so that it is clearly in the interests of intended beneficiaries; otherwise, incentives and group dynamics may defeat the effort. Participation, on the other hand, is not only a technical activity motivated solely by personal gain. In order for involvement to be successful and long-term, it is necessary to establish a feeling of community and shared interests (Hirschman, 2016). Consequently, participatory programs need to integrate normative and social orientations into their strategies and structures (Uphoff, 1992).

2.7 Theoretical Framework

The system theory directs the research. This theory is amongst many that have gained acceptance in diverse fields. Structures theory was proponent of biologist Ludwig. It involves scrutiny of multifaceted fields to understand a problem. System theory looks for all-inclusive patterns in scientific and metaphysical settings. The management tactic to this theory is especially effective for recognizing and leveraging the specific shape that firm’s operation follows.

The idea implies that any approach to issue resolution should be based on an ordered thinking that regards each living person as a subject to influence by numerous elements, both internal and external (Midgley, 200; Kerzner, 2017). Agreement between individuals and their surroundings is an important part of the theory's framework (Mbiti. 2016). Water projects include systematic procedures with several interactions. The impression behind system theory as used in this research is those people, groups, system of governments, institutes and extra organs whether do not happen in seclusion. They exist in a setting with numerous and complex interrelations. Having good knowledge of how a project function within other societal structures is important in approaching the issues of capacity in communities in management of projects (Beata, 2014). Social, political, culture, economy, technology and legal practices determine water project sustainability. Beta and others disclosed that logical thinking on project is an important expertise that is needed by the project managers and team members.

A system theory advanced by Ludwig von Bertalanffy offers an analytical basis that might be applied to explain some of the different factors concerned in projects, (Whitehorse & Tamas, 2016). Some vital concerns in projects, include leadership, culture, and project life cycle, are best described using system theory. Components such as community capacity, community development frameworks and structures, together with other variables not included in this research may cooperate to influence project sustainability.

Water project managers benefit from using system theory ideas in order to establish evidence and see the forms in complex procedures as they work with project teams, according to this study. The structures theory argument implies that project management and development are in accordance with this theory. The phases may show different challenges especially in view of capacities where individuals assume that all the stages have similar characteristics. The "why and what" questions presented in this research might be built on an experiential study that examines the variations in project characteristics and their potential impact on project performance. Besides, as applied to this study the structures theory has been related to the independent variables of the study. The theory postulates that project management is system of processes which include community involvement and participation, use of project management skills, conducting monitoring and evaluation and use of technological advancements to achieve performance. The study is therefore anchored on this theory since it holds projects are about structures and until one system is done you cannot move to another system and successfully accomplish the entire project objective.

The study is also based on Arnstein's Participatory Theory. Arnstein was one of the scholars who hypothesized the participatory theory. In the researcher's ladder of participation, (cited by Naku and Afrane, 2016) clarified and interpreted various forms of capacity building, participation and empowerment. According to Arnstein's model, the participation of stakeholders is the redistribution of power enabling the under-privileged in the society to be deliberately included in socio-economic empowerment processes. Arnstein's ladder progresses from less to more levels of participation that are meaningful participation with some form of empowerment contained at each level. To portray the categorization of social programs based on the degree of engagement in the design of socio-economic projects, Arnstein uses image of a ladder to portray.

At these levels of participation, stakeholders who do have power are accorded some opportunity to express their opinions. However, their opinions are not translated in to action. At the top of Arnstein's ladder, more stakeholder opinions are taken in to consideration during the processes of decision-

making. Partnerships allow passive stakeholders to negotiate with individuals in power, who were previously excluded from decision-making processes. At the top of Arnstein's ladder is delegated authority and stakeholder control, which allows previously excluded parties to participate in decision-making.

2.8 Conceptual Framework

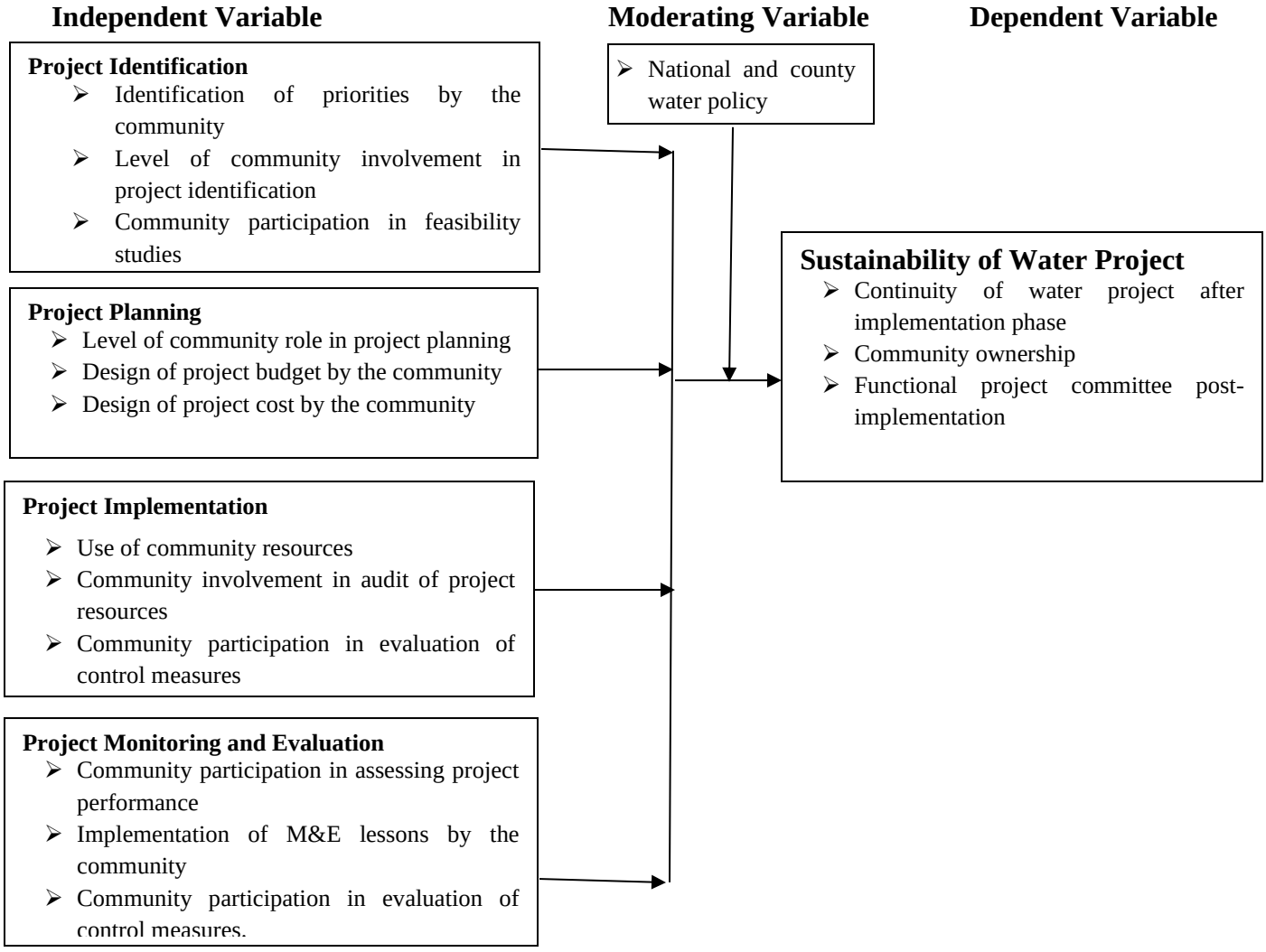

Figure 1 Conceptual Framework

The sustainability of water projects in Makueni County is thought to be influenced directly by community-based processes like as project selection, planning, execution, and monitoring and evaluation. Water projects may be stalled or advanced by national and local government policies.

Table 2.1: Summary of Research Gaps

Author	Focus of study	Key Findings	Knowledge Gaps	Focus of the current study
Lennie (2015)	The long-term sustainability of community development initiatives in Australia, as a result of women's involvement in project monitoring and assessment.	Women as project stakeholders have a major impact on project sustainability, according to the results.	The study only concentrated on women beneficiaries of the development projects; other stakeholders were not considered in the study	This study will fill this gap by including all stakeholders in Makueni borehole water projects
Alfred (2015)	Engagement of all parties in monitoring projects.	The study's findings uncovered that stakeholder involvement in project monitoring improves accountability in organizations	The study is to focus on sustainability of the project	Stakeholder participation will be examined as part of this study's emphasis on long-term sustainability. of water projects.
Golicha (2015).	Project design in Mombasa County, Kenya, with the participation of NGOs that support secondary education programs in Mombasa.	The research discovered that including stakeholders in the development of projects improves the attainment of educational project objectives.	The study is to examine the sustainability component of educational projects in relation to the participation of stakeholders	The study will fill the gap by focusing on sustainability of projects in relation to the participation of stakeholders
Mania-Singer (2017)	Aspects of the school districts that influence the sustainability of the operations of the schools	The finding uncovered that extent to which school develop partnerships with local communities significantly influence the sustainability of their operations	The study did not examine how stakeholders influence the sustainability of the operations of schools	This investigation will focus on the long-term sustainability of water projects in Makueni County.
King'ori (2017)	The effect of SP on the completion of	According to the findings, the implementation of	The study did not examine sustainability of the	This study will fill the gap by examining how

	developments project in the informal settlements.	development projects in informal settlements is greatly aided by the involvement of partners.	development projects in relation to stakeholder participation	stakeholder participation influence sustainability
Hilhorst and Guijt (2018)	Participatory checking and assessment: A procedure to help administration and strengthening at the neighbourhood level: a direction paper.	Accessibility of full information of a project provides passive stakeholders with an informed basis that enable them to effectively express their needs and concerns in relation to the project activities being implemented by a non-profit organization.	The study did not conduct its study in the context of CBP in Kibera informal settlements thus presenting a contextual gap.	Stakeholder engagement is critical to the success of water projects in Makueni, and this research will help address this gap.
Ahenkan et al. (2018)	Partner cooperation in network improvement ventures	The absence of space for passive stakeholders to participate in project implementation activities limits the elevation of responsive, effective, and accountable organizations at the grassroots level, which has a detrimental impact on project long-term sustainability.	The research failed to investigate conduct its study in the context of CBP in Kibera informal settlements thus presenting a contextual gap.	This research will address this void by assessing the impact of stakeholder involvement on water projects in Makueni.
Oreyo, Munyua and Olubandwa (2019)	Effect of Participatory M&E on stakeholder association and quality of projects	Involving passive stakeholders in PM&E enhances good governance in non-profit organizations which increases awareness to the desires of the target beneficiaries, accountability and transparency levels.	The study did not investigate conduct its study in the context of CBP in Kibera informal settlements thus presenting a contextual gap.	This study will fill this gap by examining how stakeholder participation influence sustainability of water projects in Makueni.

2.9 Summary of Literature Review

An extensive literature analysis was provided in this chapter as well as an in-depth look at two key concepts that underlie the research: There are two theories that have been developed: participation theory and wide structures theory. As noted in the section on empirical study assessment, stakeholder involvement is an essential approach for promoting project sustainability. Stakeholder participation initiatives that are important to this study are emphasized in the section on project sustainability. Most importantly, stakeholder involvement ensures that all project participants are satisfied with the initiative's openness, increasing community and stakeholder acceptance. As a result, it's critical to look at the level of stakeholder engagement in Makueni County and how it affects project viability.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this study the research methodology that was followed is discussed. It also discusses the study's research design, target population, and sampling methods used to determine the sample size. It includes parts on the data collection instruments that were used. It demonstrates that research was done to guarantee the quality and reliability of the data collected. It shows how data was collected, analyzed and presented. The chapter also covers the ethical considerations that was adopted and has a table on the operational definition of terms.

3.2 Research Design

Qualitative and quantitative methodologies was used in this research. The long-term sustainability of water projects in Makueni County was studied using a descriptive survey technique. Descriptive survey architecture identifies the present condition of the population under investigation by evaluating and recording objects as they are encountered. Descriptive research, according to Cooper and Schindler (2014), examines and reports on how things happen. It also defines things such as conduct, attitudes, and qualities. Makueni County's water projects was studied using a descriptive technique to gather statistical data on their long-term viability. Data obtained via an interview guide was analyzed based on qualitative design.

3.3 Target Population

As Maxwell (2017) defines it, a target population is the whole community in whom the researcher has an interest and from which the sample participants are selected. The beneficiaries of community borehole water projects in Makueni County were the focus of this research. The study therefore focused on refurbished boreholes that were driven by fuel, solar power, or electricity. In this regard the study targeted 980 community beneficiaries across Makueni’s six sub counties who benefitted from complete and operational borehole water projects in the County. At least five project beneficiaries from each of the 196 complete and operational borehole water projects in Makueni County. From this population, a sample size of beneficiaries to be interviewed for this study was chosen.

Table 3.1: Target population in each of the six Makueni Sub-Counties

Sub-County	Target beneficiaries
Makueni	184
Kaiti	112
Kilome	123
Kibwezi East	231
Kibwezi West	144
Mbooni	186
Total	**980**

Source: Makueni County Government (2021)

3.4 Sample Size and Sampling Procedure

A sample is a portion of a larger population being examined. Sampling is the process of selecting respondents or case participants from a target population to be included in a sample of the target population (Khan 2021).

3.4.1 Sample Size

To determine the sample size, the research was used Yamane's (1967) method with a 95% confidence level assumption.

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

N = population size

e = the level of precision

1 = Constant

$n = 980/ 1+ 980(0.05)^2$

= 284.06≈ 285 water project beneficiaries

Substituting these numbers into the preceding equation yields 285 water project beneficiaries, which was utilized as the study's sample size. The sample size was as shown in Table 3.2.

Table 3.2: Sample Size

Sub-County	Population	Sample Size
Makueni	184	54
Kaiti	112	33
Kilome	123	36
Kibwezi East	231	66
Kibwezi West	144	42
Mbooni	186	54
TOTAL	**980**	**285**

Source: Researcher (2021)

3.4.2 Sampling Technique

The study used stratified sampling method to obtain the subgroups of the respondents in the County to be targeted and use simple random sampling to select the respondent from each water project. The sample size for this research was 285 respondents to whom questionnaires were administered.

3.5 Research Instruments

Primary and secondary data was used in the inquiry. A questionnaire was used to gather primary data. Residents of Makueni County were asked about their attitudes, knowledge, and perceptions about community-based water projects, as well as their long-term sustainability. There was an attempt to ensure that the questionnaire's questioning reflects the research's targeted outcomes.

The interview guide was also used to interview the chairpersons of County water service providers. The three County water service providers are Wote Water and Sanitation Company (WOWASCO), Kibwezi Makindu Water and Sanitation Company (KIMAWASCO), and Mbooni Water and Sanitation Company (MBONWASCO). According to Burns and Burns (2021), obtaining data through an interview is simpler and quicker than using a questionnaire.

In this study, interview schedule was used to enhance quality collection of data to be obtained from the study. The interview schedule was decided by the study's objectives. Secondary data was also gathered from literature sources. A review of previously published literature, such as journal articles, theses, and textbooks, was also extremely beneficial. These sources were examined to get insight into the search for primary data.

3.5.1 Piloting of Research Instruments

The research instrument was pre-tested (also known as piloting) before it was made accessible to the respondents. This ensured that the questions were relevant, clear, and judicious. The questionnaire's clarity and ease of use, as well as the language, structure, and sequencing of the questions, were all assessed during pre-testing. According to Orodho (2021), pilot testing reveals unclear questions, inadequacies in the questionnaire, or their authenticity, which is the degree to which empirical measurements of the idea are appropriately assessed. The survey was pre-tested to ensure that they are suitable for committee members, beneficiaries, and water officials. Pilot testing was carried out by purposefully picking one project in Kibwezi West Sub-County that was removed from the final study and targeted comparable types of respondents as the main study. Five beneficiaries and a sub-county water officer attended the meeting. Questions that were crucial, ambiguous or biased may be eliminated from the questionnaire based on this information. Before actual data was gathered and processed, the data was examined and utilized to generate tables for the report.

3.5.2 Validity of the Instrument

Validity refers to the correctness of the findings, conclusions, or recommendations. Validity is defined by Burns and Burns (2021) as the accuracy and importance of conclusions drawn from research data. It refers to how well the data analysis findings reflect the scenario being investigated. The study instrument's validity was determined by its content validity. The content validity of data generated by a certain instrument is linked to a particular indicator field or the content of a particular notion (Mugenda & Mugenda, 2020). After consulting with the supervisor, another professor, and both program managers, the researcher chose a representative sample of the concept's indicators. Specialists in the subject area, notably the researcher supervisor and lecturers, was contacted when reviewing the research instrument validity. This enabled the instrument to be modified and changed as required, hence increasing its validity.

3.5.3 Reliability of the Instrument

Measurement reliability is described as a measurement's consistency in producing the same results when used in a comparable context and with the same participants. Because a scale may assess consistency but not the most important element it is designed to evaluate, dependability is inferred rather than measured, and reliability does not guarantee validity. The research approach strives to increase the data's dependability, thus it should be addressed early in the process and reflected in the

final result. With a coefficient of 0.8 or above, the test-retest technique was used to determine the instrument's reliability.

3.6 Data Collection Procedure

After receiving a study license from the University of Nairobi and NACOSTI, the researcher sought clearance from Makueni County officials and scheduled interview dates and times. For primary data, a questionnaire is the most common way. A questionnaire is a form containing questions or blank tables that the interviewer or the respondents themselves fill out during an interview, according to Tryon (2017).

Researchers in Makueni County were to seek permission from relevant authorities and schedule interviews after receiving study approvals from both NACOSTI and the University of Nairobi. A questionnaire was the most common method for gathering primary data. A questionnaire, according to Tryon (2017), is a document that comprises of questions or blank tables that the interviewer fills out after obtaining information from the respondents or by the respondents themselves.

3.7 Data Analysis Technique

After collecting data, the researcher ensured that all questionnaires and interviews have been completed, correct, and consistent. The information was coded and the replies were sorted into relevant groupings in order to elicit the crucial pattern. All variables resulting from the research questions and objectives indicated in the questionnaire were entered into a codebook. The subject's responses were reflected in the coding, which were entered into a computer. The SPSS version 24 program was used to examine the data. Analyzing quantitative data, descriptive statistics like mean and standard deviation was employed. Content analysis was used for qualitative data. To display the results, tables and figures will be utilized.

3.8 Ethical Consideration

The study's data was treated with the kind of secrecy that such a project necessitates. Respondents participated in the research voluntarily and were allowed to quit at any moment. Employees of county governments and non-governmental organizations were bound by strict confidentiality rules, and those who violated such were to face serious consequences. To answer respondents' concerns about confidence, the study's purpose was clarified, and they were assured that their data would be handled professionally and that their identities were kept anonymous. Respondents' privacy was safeguarded by excluding their names and other personally identifiable information from the collected data. By

answering the research question, respondents were pushed to analyze their involvement in the data gathering process. Respondents were given the option of opting out of the interviews if they believed the interview affected them in any manner or if they were uncomfortable participating in the research for any reason. Because of the Covid-19 procedures, the researcher tried to use Google forms to administer the surveys and the Google Meet, telephones and Zoom platforms to conduct the interviews.

3.9 Operational Definition of Variables

The independent and dependent variables are the focus of this section. The study's independent variables included project identification, planning, implementation, and monitoring and evaluation. Water project sustainability was the dependent variable. The operational definitions of variables are shown in Table 3.3.

Table 3.3: Operational Definition of Variables

Objective	Variable Type	Indicators	Type of Data	Measure Scale	Analysis Technique
Community-based frameworks in Makueni County have a significant influence on the long-term viability of borehole water projects.	Independent: Project identification Dependent: sustainability of borehole water projects in Makueni County	➢ Sensitization Forums ➢ Workshops ➢ Surveys	Quantitative Qualitative	Ratio scale	Descriptive (Mean and standard deviation) Content
Makueni County borehole water projects' sustainability is influenced by community-based frameworks in project development.	Independent: Project planning Dependent: sustainability of borehole water projects in Makueni County	➢ Strategic plan ➢ Design ➢ Appraisal	Quantitative Qualitative	Ratio Scale	Descriptive (Mean and standard deviation) Content
Sustainability of borehole water projects in Makueni	Independent: Project implementation	➢ Project Control ➢ Recruitment	Quantitative Qualitative	Ratio Scale	Descriptive (Mean and standard deviation)

County may be attributed to community-based structures in their execution.	Dependent: sustainability of borehole water projects in Makueni County	➢ Task allocation			Content
Monitoring and assessing the sustainability of borehole water projects in Makueni County, Kenya, based on community-based structures.	Independent; Project M&E Dependent: sustainability of borehole water projects in Makueni County	➢ Involvement ➢ Sharing M&E reports ➢ Decision Making	Quantitative Qualitative	Ratio scale	Descriptive (Mean and standard deviation) Content

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the findings analysis, presentation and interpretation. The analysis of the data was done using a wide range of statistical approaches that included descriptive statistics and correlation analysis so as to help in the presentation and hence the interpretation of the findings.

4.2 Questionnaire Return Rate

According to Saleh and Bista (2017), instrument return rate refers to the proportion of the research instruments that were fully filled up and returned to the researcher after they have been administered to the respondents. The research administered questionnaires to the sampled 285 respondents. The response was as presented in Table 4.1.

Status	f	Questionnaire Return Rate (%)
Returned	196	68.8
Unreturned	89	31.2
Total	**285**	**100**

Source: Field Data, 2021

Questionnaire return rate results presented in Table 4.1 show that out of the 285 questionnaires administered to the respondents, 196 questionnaires were dully filled and returned to the researcher translating into success rate of 68.8%. Sammut, Griscti and Norman (2021) authorize that return rates of above 50% are suitable for analysis and publication and of 60% and above are extremely good. Based on these assertions, the response rate was above 60% hence very good for the study in making inferences concerning the influence of community-based processes on borehole water project long-term sustainability in Kenya's Makueni County.

4.3 Demographic Information of Respondents

This section is dedicated to respondent’s basic details. The data aided in comprehending the respondents’ details under consideration.

4.3.1 Gender of the Respondents

The gender of the participants was asked. Table 4.2 displays the responses of respondents.

Table 4.2: Gender of the Respondent

Gender	Frequency	Percentage
Male	89	45.4
Female	107	54.6
Total	**196**	**100**

Results in Table 4.2 depicts that majority 107(54.6%) of the respondents were female, compared to 89(45.4%) males. The results imply that most of the workers of water projects in Makueni County are female, an indication that the projects are used to empower women in a society where more men than women are empowered. Previous research has shown that mixed gender teams are more generous and egalitarian, and that teams with a larger percentage of women perform better by building meaningful relationships and creating successful work processes (Graham, Walia & Robinson, 2020).

4.3.2 Size of Households

The next demographic information on respondents was on the number of households. The participants were asked to indicate the size of households for which they were members. Table 4.3 displays the responses of respondents

Table 4.3: Size of Household

Size of household	Frequency	Percentage
1-10	96	49.0
11-20	54	27.5
Above 20	46	23.5
Total	**196**	**100**

The results in Table 4.3 show that most of the respondents 96(49.0%) were from households with between 1-10 family members, 54(27.5%) of the respondents indicated that they were coming from households with between 11-20 members, while 46(23.5%) were from households with more than 20 family members. The results imply that most of the households in Makueni County have many members who are beneficiaries of the borehole water projects being undertaken in the county.

4.3.3 Years Lived in Location by the Respondents

The participants were further asked to indicate the number of years they had stayed in Makueni County. Table 4.4 displays the responses of respondents.

Table 4.4: Years lived in Makueni County

Years	Frequency	Percentage
1-5 years	22	11.2
5-10 years	26	13.3
10-15 years	31	15.8
15-20 years	52	26.5
More than 20 years	65	33.2
Total	**196**	**100**

According to Table 4.4, the vast majority of those who answered the survey questions have stayed in Makueni County for more than 20 years at 65(33.2%), between 15-20 years at 52(26.5%), between 10-15 years at 31(15.8%), 5-10 years at 26(13.3%) and lastly 1-5 years at 22(11.2%). It is therefore evident from the study findings that respondents had lived in the study area for relatively longer period of time and therefore were conversant with the issues of community-based projects in the study area.

4.3.4 Academic Qualifications

The researcher finally asked the respondents to indicate their highest level of academic qualifications. The responses were as shown in Table 4.5.

Table 4.5: Academic Qualifications

Academic Qualifications	Frequency	Percentage
Degree	80	40.8
Diploma	50	25.5
Certificate	40	20.4
Masters	26	13.2
Total	**196**	**100.0**

According to Table 4.5, 80(40.8%) of the respondents had education credentials up to the bachelor's degree level, 50(25.5%) had a diploma, 40(20.4%) had a certificate, and 26(13.2%) had education qualifications up to the master's degree level. The findings show that the respondents in the study area had good academic qualification and therefore were more likely to give informed opinion on the influence of public participation on sustainability of Water Projects. This reflects a group of well-informed responders who can grasp and provide accurate information about the topic at hand.

4.4 Variable analysis

4.5 Descriptive Statistics

Descriptive analysis was used to describe the basic features of the data under study as they provide summaries about the sample and its measures because they provide simple summaries about the sample and the measures. Descriptive analysis simply forms the basis of every quantitative analysis of data and includes the mean and standard deviation (Conradie & Paduri 2014). This section contains descriptive analysis on community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation and sustainability of borehole water projects. The mean was used as a measure of central tendency while standard deviation was used as a measure of dispersion to inform how the responses were dispersed from the mean. The section was subdivided into personal and contextual data and descriptive analysis for independent and dependent variables. The study used a scale of 1–5 for answering the questions to show the extent of agreement or disagreement with each of the statements with respect to the study variables. In the scale, the following keys were used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

4.5.1 Community-Based Structures in Project identification

The first objective of the study was to establish how community-based structures in project identification influence borehole water project sustainability in Makueni County, Kenya. The descriptive statistics on community-based structures in project identification are presented in Table 4.11. The following likert scale was used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

Table 4.6: Descriptive Results on Community-Based Structures in Project identification

Statement	Not at All	Little Extent	Moderate Extent	Large Extent	Very Large Extent	Mean	Std. Dev.
To what extent has community been involved in project conceptualization meeting	14	12	14	55	101	4.107	1.213
To what extent has community been involved in appraisal reports	12	15	24	62	83	3.964	1.187
To what extent has community been involved in feasibility studies	13	9	18	70	86	4.056	1.147

To what extent has community been involved in stakeholder analysis	8	11	18	69	90	4.133	1.063
To what extent has community ideas been considered in project identification	8	1	16	82	89	4.240	0.933
How has the frequency of community involvement in project identification been?	-	6	6	109	75	4.291	0.673
The community is involved in identification and prioritization of their needs	2	8	17	77	92	4.270	0.861
The community's ideas and contributions are considered and incorporated when determining solutions to the water and sanitation needs.	6	8	49	53	80	3.985	1.050
The community is involved in discussions about problems facing them and how to solve the problems.	8	5	17	81	85	4.173	0.982
The community has been involved in designing of solutions to water problems in the County	35	9	10	72	70	3.679	1.451
Overall						**4.090**	**1.056**

The results in Table 4.11 depicts that most of the respondents believed that community is being involved in project conceptualization meeting to a large extent as indicated by mean of 4.107 and standard deviation of 1.213. This implies that the management of the projects in Makueni County involves the community in project conceptualization. The results also show that majority of the respondents were convinced that the community was being involved in appraisal reports to a large extent as depicted by mean and standard deviation of 3.964 and 1.187 respectively. The results further confirms that most of the respondents' agreed community was being involved in feasibility studies to a great extent as indicated by mean=4.056 and standard deviation=1.147.

Moreover, the results reveal that most of the respondents agreed with the fact that the community was being involved in stakeholder analysis to large extent as shown by a mean response of 4.133 and standard deviation of 1.063. Similarly, most of the respondents were of the opinion that the frequency of community involvement in project identification had been done to a large extent as indicated by a mean of 4.291 and 0.673 implying that most of the respondents believed the frequency was to a large extent and their responses did not deviate from the mean response. The results further show that most

of the respondents were convinced that the community is involved in identification and prioritization of their needs to a large extent as depicted by a mean of 4.270 and standard deviation of 0.861.

The results also confirm that majority of the respondents were of the opinion that the community's ideas and contributions are considered and incorporated when determining solutions to the water and sanitation needs in Makueni County to a large extent (Mean=3.985; standard deviation=1.050). Similarly, the results reveal that most of the respondents were of the opinion that the community was being involved in discussions about problems facing them and how to solve the problems to a large extent as shown by a mean response of 4.173 and standard deviation of 0.982. Finally, it is clear from the results that most of the respondents believed the community had been involved in designing of solutions to water problems in the County to a large extent as depicted by a mean of 3.679 and standard deviation of 1.451. In overall most of the respondents believed that all the statements under this variable were to a great extent as depicted by an average mean of 4.090 and 1.056.

The respondents were also asked in an interview to indicate the influence of community-based structures in project identification on performance of water projects in Makueni County. Most of the respondents indicated that:

> *Community-based structures in project identification is key in effectiveness of community-based water projects to ease operations and maintenance for its sustainability. The community management of rural water supply structures on operation and maintenance is not successful when financing resources and frequent supports are not available. Budgeting sufficient funding for rural water supply structures is an important issue for better performance and proper maintenance but not only one. Community-based structures in project identification has been successful in creating community awareness and local capacity than in providing technical support for water assessments, water supply and sanitation. Efforts to encourage the transfer of operation and maintenance to water user associations have had varied results, since the generally low economic proceeds on irrigated agriculture and uncertain land tenure provide little motivation for farmers to make long-term capital investments on water projects.*

4.5.2 Community-Based Structures in Project Planning

The second objective of the study was to determine how community-based structures in project planning influence the sustainability of borehole water projects in Makueni County, Kenya. The descriptive statistics on community-based structures in project planning are presented in Table 4.12.

The following likert scale was used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

Table 4.7: Descriptive Results on Community-Based Structures in Project Planning

Statement	Not at all	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
The community participated in meetings for planning on water projects in Makueni County	8	11	18	69	90	4.133	1.063
The community's ideas and contributions were incorporated in the design of water projects in Makueni County.	7	4	37	57	91	4.128	1.022
The community agreed on the proposed location of the various water kiosks and sanitation blocks within Makueni County.	6	2	16	77	95	4.291	0.896
The community participated in coming up with the cost and budget for the project.	7	6	15	74	94	4.235	0.975
The community mobilized resources (for example money, materials, labour, land etc.) towards realization of the project.	7	1	14	62	112	4.383	0.918
The community was involved in coming up with a plan for measuring performance and impact of the project (monitoring and evaluation plan).	11	5	22	65	93	4.143	1.086
The community was involved in coming up with a plan for implementing water projects in Makueni County.	6	5	11	78	96	4.291	0.918
There has been appointment of leaders from the community	3	5	17	61	110	4.378	0.865
The community has been informed on the objectives of the water project	8	9	46	64	69	3.903	1.065
Overall						**4.209**	**0.979**

From the results in Table 4.12, most of the respondents are in consensus that the community participated in meetings for planning on water projects in Makueni County to a large extent (Mean=4.133; Standard deviation=1.063). Most of the respondents believed that the community's ideas and contributions were incorporated in the design of water projects in Makueni County to a large

extent as shown by (Mean=4.128; Standard deviation=1.022). Further the results show that most of the respondents were convinced that the community agreed on the proposed location of the various water kiosks and sanitation blocks within Makueni County.to a large extent as shown by a mean of 4.291 and standard deviation of 0.896.

The results in addition show that most of the respondents were in agreement with the fact that the community mobilized resources (for example money, materials, labour, land etc.) towards realization of the project to a large extent (Mean=4.383; Standard deviation=0.918). Moreover, most of the respondents believed that the community was involved in coming up with a plan for measuring performance and impact of the project (monitoring and evaluation plan) to a large extent as depicted by a mean of 4.143 and standard deviation of 1.086. Similarly, most of the respondents were convinced that the community was involved in coming up with a plan for implementing water projects in Makueni County to a large extent as shown by a mean and standard deviation of 4.291 and 0.918 respectively. Finally, the results show that most of the respondents were of the opinion that the community has been informed on the objectives of the water project to a large extent as shown by a mean of 3.903 and standard deviation of 1.065.

In addition to the descriptive results presented above, the chairpersons of the County water service providers were interviewed in which that were asked to indicate the influence of community-based structures in project planning on performance of water projects in Makueni County. Their responses were as shown below:

> *The higher the degree of community participation in a project planning, the greater is the need for care in planning at the community level. This also means that communities that accept a higher level of community participation need greater support in their activities from the regional and national offices of the development agency. Two areas where a particularly high level of support is needed are manpower (Skilled) and training. Both areas have been major constraints to progress in the past and with regard to planning at the community and individual project levels, major emphasis is placed here on attention to detail. Experience has shown that great care at the time of planning leads to more successful implementation of projects.*

4.5.3 Community-Based Structures in Project Implementation

The third objective of the study was to evaluate how community-based structures in project implementation influence borehole water project sustainability in Makueni County, Kenya. The descriptive statistics on community-based structures in project implementation are presented in Table

4.13. The following Likert scale was used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

Table 4.8: Descriptive Results on Community-Based Structures in Project Implementation

Statement	Not at all	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
Many community members participate in the implementation of community water projects	8	26	41	57	64	3.730	1.169
Community has a huge role in the implementation of water projects	4	16	40	55	81	3.985	1.064
Community receives updates on the progress of the projects during implementation	11	28	24	63	70	3.781	1.231
Community has physical resources to contribute to sustainability of water projects	10	19	33	57	77	3.878	1.183
Resource contributed by society influence project sustainability	21	5	20	76	74	3.903	1.243
Community has the capacity of implementing decisions for the water projects	13	23	20	55	85	3.898	1.265
Community receives timely communication concerning project implementation	34	10	32	49	71	3.577	1.457
Contribution of resources hinder community's role in project implementation	20	15	12	76	73	3.852	1.282
There are clear roles for community participation in the implementation plans for the water projects in Makueni County	12	24	42	60	58	3.653	1.199
The community has received training on how to operate, manage and maintain the project.	12	13	64	48	58	3.651	1.154
Resources from the community were used to put up the water kiosks, sanitation blocks and stone lined drains.	10	28	47	58	52	3.585	1.174
Overall						**3.772**	**1.220**

On the basis of the results in Table 4.13, most of the respondents indicated that many community members participated in the implementation of community water projects to a large extent as shown by a mean and standard deviation of 3.730 and respecytively1.169. The results further show that most of the respondents believed that community has a huge role in the implementation of water projects to a large extent as shown by a mean of 3.985 and standard deviation of 1.064. Further, most of the respondents were of the opinion that community receive updates on the progress of the projects during implementation to a large extent (Mean=3.781; Standard deviation=1.231).

Additionally, most of the respondents agreed with the fact that resource contributed by society influence project sustainability to a large extent (Mean=3.903; Standard deviation=1.243). Moreover, most of the respondents believed that community receive timely communication concerning project implementation to a large extent as shown by a mean and standard deviation of 3.577 and 1.457 respectively. Additionally, it is clear that most of the respondents believed that there are clear roles for community participation in the implementation plans for the water projects in Makueni County to a large extent (Mean=3.653; Standard deviation=1.199).

Similarly, most of the respondents believed that the community has received training on how to operate, manage and maintain the project as shown by a mean and standard deviation of 3.651 and 1.154 respectively. Finally, a majority of the respondents were convinced that Resources from the community were used to put up the water kiosks, sanitation blocks and stone lined drains as shown by a mean and standard deviation of 3.585 and 1.174 respectively. Overall, the results had an average mean of 3.772 and average standard deviation of 1.220.

The chairpersons of the county water services providers were also interviewed in which they were asked to give their opinion on the influence of community-based structures in project implementation on performance of water projects in Makueni County. The respondents indicated that:

> *The community must understand its options and be willing to take responsibility for the system; The community must be willing to invest in capital and recurrent costs; The community must be empowered to make decisions to control the system; Effective external support must be available from governments, donors, and the private sector (training, technical advice, credit, construction, contractors). Active community participation in project planning and implementation may improve project design through the use of local knowledge; increase project acceptability; produce a more equitable distribution of benefits; promote local resource mobilization; and help ensure project sustainability.*

4.5.4 Community-Based Structures in Project Monitoring and Evaluation

The fourth objective of the study was to establish how community-based structures in project monitoring and evaluation influence the sustainability of borehole water projects in Kenya's Makueni County. The descriptive statistics on community-based structures in project monitoring and evaluation are presented in Table 4.14. The following Likert scale was used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

Table 4.9: Descriptive Results on Community-Based Structures in Project M&E

Statement	Not at all	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
The community participated in assessing project performance	11	18	39	55	73	3.821	1.191
The community has implemented lessons form M&E	7	19	44	77	49	3.724	1.055
Benefits from the project are enjoyed by most community members	16	16	42	49	73	3.750	1.262
Lessons learnt from assessing projects have been implemented	10	20	36	61	69	3.811	1.172
The community has been involved in the audit of the finances from the water project	45	39	26	37	49	3.031	1.522
Participation of the community in monitoring and evaluation enhances performance of the water project	64	24	35	32	41	2.806	1.550
The community has been made aware of the tools used in monitoring and evaluation	14	18	33	49	82	3.852	1.258
There has been constant evaluation of the water project procedures and management	16	11	44	58	67	3.760	1.215
The community has been involved in coming up with strategies to better performance of the water project	15	9	18	89	65	3.918	1.138
Finances from the water project have been managed well	11	8	31	53	93	4.066	1.142
Overall						**3.654**	**1.251**

As depicted by results in Table 4.14, majority of the respondents were of the belief that the community participated in assessing project performance to a large extent as indicated by a mean and standard deviation of 3.821 and 1.191respectively. Additionally, the results show that most of the respondents

believed that the community has implemented lessons from M&E to a large extent as proven by a mean of 3.724 and standard deviation of 1.055. The results also show that a majority of the respondents were convinced that benefits from the project are enjoyed by most community members to a large extent (Mean=3.750; Standard deviation=1.262).

In addition, most of the respondents indicated that the community has been involved in the audit of the finances from the water project to a moderate extent as proven by a mean and standard deviation of 3.031 and 1.522 respectively. It is evident that most of the respondents were of the idea that participation of the community in monitoring and evaluation enhances performance of the water project to a little extent (Mean=2.806; Standard deviation=1.550).

Moreover, most of the respondents believed that there has been constant evaluation of the water project procedures and management to a large extent as shown by a mean and standard deviation of 3.760 and 1.215 respectively. Further, it is clear that most of the respondents were convinced that the community has been involved in coming up with strategies to better performance of the water project to a large extent (Mean=3.918; Standard deviation=1.138). Finally, the study found that most of the respondents were of the opinion that finances from the water project have been managed well to a large extent as shown by a mean of 4.066 and standard deviation 1.142.

The chairpersons of water service providers in the county were also asked to give their input on the influence of community-based structures in project monitoring and evaluation on performance of water projects in Makueni County. They indicated that:

> *Community M&E is intended to track, understand, and ultimately improve the quality and reach of services that are provided by CBOs and CWs to communities. While the services being monitored and evaluated are provided at the community level, the M&E activities themselves can be implemented anywhere along the continuum from the community to the international level. M&E offers a tangible way to ensure that your project is accountable, transparent, minimizes collateral damage and actively identifies wasteful processes and poor performance. A good M&E strategy is thus ultimately an assessment of your effectiveness, and as such should be considered an essential facet of your design process.*

4.5.5 Sustainability of Borehole Water Projects

The dependent variable of the study was sustainability of borehole water projects in Kenya's Makueni County. The descriptive statistics on sustainability of borehole water projects are presented in Table

4.15. The following likert scale was used: 1=Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent.

Table 4.10: Descriptive Results on Sustainability

Statement	Not at all	Little extent	Moderate extent	Large extent	Very large extent	Mean	Std. Dev.
There is continuity of the project after implementation phase.	-	10	28	47	111	4.321	0.902
There is community ownership and empowerment	11	17	52	45	71	3.755	1.195
There is functional management committee after implementation phase.	-	7	32	68	89	4.219	0.846
There is sufficient capacity building of management committee in operations and technical aspects of running the project	9	14	42	53	78	3.903	1.144
The County water officers visit regularly and offer technical support when the structure breaks down	-	9	62	44	81	4.005	0.958
The water project gets financial aid for sustainability	5	10	20	62	99	4.224	0.998
There is continuous availability and access of clean water from the project	13	15	25	63	79	3.923	1.201
There is increased number of beneficiaries from the project	-	30	52	34	80	3.837	1.125
Overall						**4.024**	**1.046**

The results in Table 4.15 show that most of the respondents believed that there is continuity of the project after implementation phase to a large extent as shown by a mean of 4.321 and standard deviation of 0.902. The results also show that most of the respondents were of the opinion that there is community ownership and empowerment to a large extent as shown by a mean and standard deviation of 3.755 and 1.192 respectively. Further, the results show that most of the respondents were of the opinion that there is functional management committee after implementation phase to a large extent (Mean=4.219; Standard deviation=0.846).

Moreover, most of the respondents were in agreement that there is sufficient capacity building of management committee in operations and technical aspects of running the project to a large extent as shown by a mean and standard deviation of 3.903 and 1.144 respectively. The results also show that majority of the respondents were convinced that the County water officers visit regularly and offer

technical support when the structure breaks down as shown by (Mean=4.005; Standard deviation=0.958).

Similarly, most of the respondents were of the opinion that the water project gets financial aid for sustainability to a large extent as shown by a mean and standard deviation of 4.224 and 0.998 respectively. A majority of the respondents were convinced that there is continuous availability and access of clean water from the project to a large extent (Mean=3.923; Standard deviation=1.201). Finally, the results reveal that most of the respondents were convinced that there is increased number of beneficiaries from the project to a large extent as depicted by a mean of 3.837 and standard deviation of 1.125.

In an interview the chairpersons of county water service providers were asked to indicate the interventions measure that could be put in place for enhancing performance of water projects through community-based structures. Most of them indicated that:

> *Some of the strategies that can be used to enhance water projects in this County may include factors of performance and sustainability such as; government funding, staff management, modern technology, Social cultural factors. Other Factors include institutional arrangements, technological advancements, natural environment, community and social aspects, financing, maintenance, training of staff, and capacity building, Various researchers have integrated two or more of these factors in sustainability of the water supply projects for example, found out that sustainable management of water resources is dependent on economic factors, financing, and legal regulatory frameworks. Additionally, representation of a community member in the water management committee has influence on the performance and sustainability of water projects. Hence, this empowers him/her towards participation in the decisions pertaining to the installation of the water projects. Thus, it was found his/her representation is a factor contributing towards performance and sustainability of the water projects.*

4.6 Regression Analysis

Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. For the case of this study regression analysis was conducted to establish the statistical significance and relationship between the independent variables (community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-

based structures in project monitoring and evaluation) and the dependent variable which is sustainability of borehole water projects.

Wan (2013) observed that regression analysis helped in generating an equation that describes the statistical relationship between one or more predictor variables and the response variable. Linear regressions were done for each of the independent variables to ascertain their relationship with sustainability of borehole water projects in Makueni County. Multiple regression analysis was also conducted to ascertain the overall effect of the study variables on the sustainability of borehole water projects. In the interpretation and understanding of the results of regression analysis, R squared was used to check on how well the model fitted the data. The coefficient of determination, R^2 was used in this study as a useful tool because it gives the proportion of the variance of one variable that is predictable from the other variable. It is a measure that allows the determination of how certain variables can be in making predictions from a certain model. The coefficient of determination is the ratio of the explained variation to the total variation. The regression analysis results were presented using regression model summary tables, analysis of Variance (ANOVA) table and beta coefficients tables.

4.6.1 Influence of Community-Based Structures in Project identification on Sustainability

A regression analysis was conducted determine the statistical influence of community-based structures in project identification on sustainability of borehole water projects. The regression model on community-based structures in project identification and sustainability of water projects is presented in Table 4.16.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.681a	0.464	0.462	0.54123

a Predictors: (Constant), Community-Based Structures in Project identification

From the model summary in Table 4.16, the results show a coefficient of determination (R squared) of 0.464 at 95% significance level. This implies that community-based structures in project identification as an independent variable can explain 46.4% of the variation in sustainability of borehole water projects in Makueni County. The remaining 53.6% of the variation in sustainability of borehole water projects in the county can be explained by other factors which were not part of the current model. Table 4.17 shows the analysis of variance (ANOVA) results.

Table 4.12: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	49.281	1	49.281	168.233	.000[b]
	Residual	56.829	194	0.293		
	Total	106.111	195			

a. Dependent Variable: Sustainability

b. Predictors: (Constant), Community-Based Structures in Project identification

Based on the ANOVA results in Table 4.17, the model was statistically significant in explaining the influence of community-based structures in project identification on sustainability of borehole water projects in Makueni County and it is indicated by a p-value of 0.000<0.05. Table 4.18 shoes that regression coefficient results.

Table 4.13: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.814	0.172		10.549	0.000
	Community-Based Structures in Project identification	0.561	0.043	0.681	12.97	0.000

a. Dependent Variable: Sustainability

Y= 1.814+ 0.681X_1

Where:

Y= Sustainability of Borehole Water Projects

X_1= Community-Based Structures in Project identification

The regression coefficient results in Table 4.18 show that there was a positive and statistically significant relationship between community-based structures in project identification and sustainability of borehole water projects (β=.681, p=.000<.05). This implies that a unit improvement in community-based structures in project identification leads to an improvement in sustainability of borehole water projects in Makueni County by 0.681 units. The findings were consistent with the assertions by World Vision (2018) that community-based structures should be done when people's ideas and suggestions can still make a significant influence in the designing or implementing the

project A head start is essential, so that choices are still accessible and different groups' concerns may be taken into consideration in the plans (Inter-American Development Bank, 2016).

4.6.2 Influence of Community-Based Structures in Project Planning on Sustainability

The second objective sought to determine how community-based structures in project planning influence the sustainability of borehole water projects in Makueni County, Kenya. Therefore, a regression analysis was conducted determine the statistical influence of community-based structures in project planning on sustainability of borehole water projects. The regression model on community-based structures in project planning and sustainability of water projects is presented in Table 4.19.

Table 4.14: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.737a	0.544	0.541	0.49964

a Predictors: (Constant), Community-Based Structures in Project Planning

Results in Table 4.19, revealed that there was a coefficient of determination (R squared) of 0.544 at 95% significance level. This implies that community-based structures in project planning as an independent variable explains 54.4% of the variation in the sustainability of borehole water projects in Makueni County. The remaining 45.6% of the variation in sustainability of borehole water projects in the county can be explained by other factors which were not part of the current model. Table 4.20 shows the analysis of variance (ANOVA) results.

Table 4.15: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	57.681	1	57.681	231.058	.000[b]
	Residual	48.43	194	0.25		
	Total	106.111	195			

a. Dependent Variable: Sustainability
b. Predictors: (Constant), Community-Based Structures in Project Planning

Based on the ANOVA results in Table 4.20, the model used in this study to link the two variables was statistically significant in explaining the influence of community-based structures in project planning on sustainability of borehole water projects in Makueni County as depicted by a p-value of 0.000<0.05. Table 4.21 shows that regression coefficient results.

Table 4.16: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.149	0.190		6.045	0.000
	Community-Based Structures in Project Planning	0.723	0.048	0.737	15.201	0.000

a. Dependent Variable: Sustainability

Y= 1.149+ 0.737X_2

Where:

Y= Sustainability of Borehole Water Projects

X_2= Community-Based Structures in Project Planning

The regression coefficient results in Table 4.21 show that there existed a positive and statistically significant relationship between community-based structures in project planning and sustainability of borehole water projects (β=.737, p=.000<.05). This implies that a unit improvement in community-based structures in project planning will lead to an improvement in sustainability of borehole water projects in Makueni County by 0.737 units. This is consistent with the argument by Equally, Beierle and Konisky (2017) that a bigger number of various project beneficiaries and had discussions on different structures of improving the quality of water as well as planning for the environment. Majority of the cases indicated that decisions pegged on common values helps decide a common vision and needs of the people for action. Furthermore, they realized that in most cases stakeholders' preferences were key in decision making. Therefore, stakeholders hugely shaped the end outcome of projects.

4.6.3 Influence of Community-Based Structures in Project Implementation on Sustainability

The third objective of this study was to evaluate how community-based structures in project implementation influence borehole water project sustainability in Makueni County, Kenya. A regression analysis was conducted determine the statistical influence of community-based structures in project implementation. The regression model on community-based structures in project implementation and sustainability of water projects is presented in Table 4.22.

Table 4.17: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755a	0.570	0.567	0.48524

a Predictors: (Constant), Community-Based Structures in Project Implementation

Results in Table 4.22, revealed a coefficient of determination (R squared) of 0.570 at 95% significance level. This implies that community-based structures in project implementation as an independent variable explains 57.0% of the variation in the sustainability of borehole water projects in Makueni County. The remaining 43.0% of the variation in sustainability of borehole water projects in the county can be explained by other factors which were not part of the current model. Table 4.23 shows the analysis of variance (ANOVA) results.

Table 4.18: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	60.431	1	60.431	256.649	.000[b]
	Residual	45.68	194	0.235		
	Total	106.111	195			

a. Dependent Variable: Sustainability
b. Predictors: (Constant), Community-Based Structures in Project Implementation

Based on the ANOVA results in Table 4.23, the model used in this study to link the two variables was statistically significant in explaining the influence of community-based structures in project implementation on sustainability of borehole water projects in Makueni County as depicted by a p-value of 0.000<0.05. Table 4.24 shows that regression coefficient results.

Table 4.19: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.030	0.188		5.483	0.000
	Community-Based Structures in Project Implementation	0.725	0.045	0.755	16.02	0.000

a. Dependent Variable: Sustainability

Y= 1.030+ 0.755X_3

Where:

Y= Sustainability of Borehole Water Projects

X_3= Community-Based Structures in Project Implementation

The regression coefficient results in Table 4.24 shows that community-based structures in project implementation positively and significantly influences sustainability of borehole water projects in Makueni County, Kenya (β=.755, p=.000<.05). This implies that a unit improvement in community-based structures in project implementation results into to an improvement in sustainability of borehole water projects in Makueni County by 0.755 units. The findings are in support of the conclusion by Beierle and Konisky (2017) that the method in which communication and fairness were decided to be more essential than the content of the mended conflicts, since it enabled them to go forward with their own problems and settle disagreements. Furthermore, the researchers investigated to see if any connections were made along the way that may aid in the settlement of future disagreements.

4.6.4 Influence of Community-Based Structures in Project M&E on Sustainability

The fourth objective of this study was to establish how community-based structures in project monitoring and evaluation influence the sustainability of borehole water projects in Kenya's Makueni County. A regression analysis was conducted determine the statistical influence of community-based structures in project monitoring and evaluation. The regression model is presented in Table 4.25.

Table 4.20: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.695a	0.483	0.48	0.53193

a Predictors: (Constant), Community-Based Structures in Project Monitoring and Evaluation

On the basis of the model summary results in Table 4.25, the coefficient of determination (R squared) was 0.483 at 95% significance level. This implies that community-based structures in project monitoring and evaluation as an independent variable explains 48.3% of the variation in the sustainability of borehole water projects in Makueni County. The remaining 51.7% of the variation in sustainability of borehole water projects in the county can be explained by other factors which were not part of the current model. Table 4.26 shows the analysis of variance (ANOVA) results.

Table 4.21: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	51.218	1	51.218	181.011	.000[b]
	Residual	54.893	194	0.283		
	Total	106.111	195			

a. Dependent Variable: Sustainability

b. Predictors: (Constant), Community-Based Structures in Project Monitoring and Evaluation

Based on the ANOVA results in Table 4.26, the model used in this study to link the two variables was statistically significant in explaining the influence of community-based structures in project monitoring and evaluation on sustainability of borehole water projects in Makueni County as depicted by a p-value of 0.000<0.05. Table 4.27 shows that regression coefficient results.

Table 4.22: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.351	0.2		6.768	0.000
	Community-Based Structures in Project Monitoring and Evaluation	0.665	0.049	0.695	13.454	0.000

a. Dependent Variable: Sustainability

Y= 1.351+ 0.695X_4

Where:

Y= Sustainability of Borehole Water Projects

X_4= Community-Based Structures in Project Monitoring and Evaluation

The regression coefficient results in Table 4.27 shows that community-based structures in project monitoring and evaluation positively and significantly influences sustainability of borehole water projects in Makueni County, Kenya (β=.695, p=.000<.05). This implies that a unit improvement in Community-Based Structures in Project Monitoring and Evaluation will result into to an improvement in sustainability of borehole water projects in Makueni County by 0.695 units. The results are in agreement with the assertion by Guijt and Gaventa (2018) that the idea of project Monitoring and Evaluation is to place the views of community, and particularly the underprivileged, at the center of

M&E activities. Project Monitoring & Evaluation involves the community, development stakeholders, policy creators determining how development should be quantified, and results worked upon. It can disclose valued instructions and expand accountability.

4.6.5 Multiple Linear Regression Analysis

The overall regression analysis was conducted between all the independent variables (community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation) and the dependent variable (sustainability of borehole water projects). Multiple regression analysis helps in generating an equation that describes the statistical relationship between more predictor variables and the response variable (Mugenda & Mugenda, 2003).

Model Summary for the Combined Effect

In the study, multiple regressions were done because the study had four independent variables. In the interpretation and understanding the result of regression analysis, ANOVA was used to check how well the model fitted the data. The coefficient of determination, R squared was used in this study as a useful tool because it gives the proportion of the variance of one variable that is predictable from the other variable. The coefficient of determination is such that $0<R^2< 100$, and denotes the strength of the linear relationship between independent variables and dependent variable. Table 4.28 shows the model summary for the combined effect.

Table 4.23: Overall Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835a	0.697	0.691	0.40995

a Predictors: (Constant), Community-Based Structures in Project Monitoring and Evaluation, Community-Based Structures in Project identification, Community-Based Structures in Project Planning, Community-Based Structures in Project Implementation

The model summary results in Table 4.28 for the combined effect shows that the independent variables used (community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation) were satisfactory variables in explaining the sustainability of borehole water projects in Kenya's Makueni County. This is supported by coefficient of determination also known as the R squared of 0.697. This implies that that community-based structures in project

identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation jointly explain 69.7% of the variations in sustainability of borehole water projects in Kenya's Makueni County. The remaining 30.3% of the variation in sustainability of borehole water projects in Kenya's Makueni County can be explained by other factors which were not part of the current study.

ANOVA Analysis for the Overall Model

Table 4.29 provides the results on the overall analysis of the variance (ANOVA).

Table 4.24: Overall Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	74.011	4	18.503	110.095	.000[b]
1	Residual	32.1	191	0.168		
	Total	106.111	195			

a. Dependent Variable: Sustainability

b. Predictors: (Constant), Community-Based Structures in Project Monitoring and Evaluation, Community-Based Structures in Project identification, Community-Based Structures in Project Planning, Community-Based Structures in Project Implementation.

Table 4.29 indicate that the overall model was statistically significant in explaining the relationship between community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation, community-based structures in project monitoring and evaluation and the dependent variable (sustainability of borehole water projects). Further, the results imply that community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation and community-based structures in project monitoring & evaluation) and the dependent variable are good predictors of sustainability of borehole water projects in Makueni County. This was supported by an F statistic of 110.095 and the reported p-value of 0.000<.05. It was therefore concluded that the independent variables used in this study which were; community-based structures in project identification, community-based structures in project planning, community-based structures in project implementation and community-based structures in project monitoring & evaluation had significant combined effects on the sustainability of borehole water projects in Makueni County.

Regression Coefficients Analysis of Overall Model

The regression coefficients of the overall model are presented in Table 4.30.

Table 4.25: Multiple Regression of Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.380	0.176		2.158	0.032
	Community-Based Structures in Project identification	0.156	0.047	0.190	3.300	0.001
	Community-Based Structures in Project Planning	0.240	0.063	0.244	3.776	0.000
	Community-Based Structures in Project Implementation	0.274	0.064	0.285	4.313	0.000
	Community-Based Structures in Project Monitoring and Evaluation	0.238	0.053	0.249	4.500	0.000

a. Dependent Variable: Sustainability

The regression model therefore became;

$$\mathbf{Y = 0.380 + 0.190X_1 + 0.244X_2 + 0.285X_3 + 0.249X_4}$$

Where:

Y = Sustainability of Borehole Water Projects

X_1= Community-Based Structures in Project identification

X_2 = Community-Based Structures in Project Planning

X_3 = Community-Based Structures in Project Implementation

X_4= Community-Based Structures in Project Monitoring and Evaluation

Regression coefficients in Table 4.30 show that community-based structures in project identification had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.190, p=.001<.05). This was supported by a calculated t-statistic of 3.300 that was greater than the critical t-statistic of 1.96 further confirming the significance. The implication of this is that, a unit improvement in community-based structures in project identification leads to an improvement in

sustainability of borehole water projects in Makueni County by 0.190 units. The regressing results also indicate that community-based structures in project planning had a positive and significant influence on the Sustainability of Borehole Water Projects in Makueni County (β =.244, p=.000<.05). This was also supported by a calculated t-statistic of 3.776 that was greater than the critical t-statistic of 1.96 further confirming the significance. This implies that, a unit improvement in community-based structures in project planning leads to an improvement in sustainability of borehole water projects in Makueni County by 0.244 units.

The study further revealed that community-based structures in project implementation had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.285, p=.000<.05). This was supported by a calculated t-statistic of 4.313 that was greater than the critical t-statistic of 1.96 further confirming the significance. The implication of this is that, a unit improvement in community-based structures in project implementation leads to an improvement in sustainability of borehole water projects in Makueni County by 0.285 units. Finally, the results show that community-based structures in project monitoring and evaluation had a positive and significant influence on the sustainability of borehole water projects in Makueni County (β =.249, p=.000<.05). This was supported by a calculated t-statistic of 4.500 that was greater than the critical t-statistic of 1.96 further confirming the significance. The implication of this is that, a unit improvement in community-based structures in project monitoring and evaluation leads to an improvement in sustainability of borehole water projects in Makueni County by 0.249 units. These results are in agreement with the conclusion by Boonstra (2016) that the use of community-based structures has become significant and a conduit from which demand-based approaches are used to build up the decision-making capabilities of governments towards allocating the facility location, service hours, technology to be utilized and the general nature of the project among other issues.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, results and conclusions are summarized and a contribution to the body of knowledge in terms of contribution and suggestions on the areas of future research. The summary of findings section summarizes the most important findings for each study goal, where each study objective's research conclusion is based on these findings. Finally, the chapter gives suggestions based on the results, as well as emergent policy challenges and information gaps that should be investigated further.

5.2 Summary of Findings

The study sought to determine the influence of community-based structures on borehole water project sustainability in Kenya's Makueni County.

5.2.1 Community-based Structures in Project Identification and Sustainability

The first objective sought to establish how community-structured structures in project identification influence borehole water project sustainability in Makueni County, Kenya. The study found that most of the respondents reported to have been involved in project conceptualization meeting to a large extent as indicated by mean of 4.107 and standard deviation of 1.213. The results also showed that most of the respondent’s agreed community was being involved in feasibility studies to a great extent as indicated by mean=4.056 and standard deviation=1.147. Moreover, the study found that most of the respondents agreed with the fact that the community was being involved in stakeholder analysis to large extent as shown by a mean response of 4.133 and standard deviation of 1.063. Similarly, most of the respondents were of then opinion that the frequency of community involvement in project identification had been done to a large extent as indicated by a mean of 4.291 and 0.673 implying that most of the respondents believed the frequency was to a large extent and their responses did not deviate from the mean response. The results further showed that most of the respondents were convinced that the community is involved in identification and prioritization of their needs to a large extent as depicted by a mean of 4.270 and standard deviation of 0.861.

Additionally, regression analysis results revealed that community-based structures in project identification as an independent variable was able to explain 46.4% of the variation in sustainability of borehole water projects in Makueni County. The result also showed that there was a positive and statistically significant relationship between community-based structures in project identification and

sustainability of borehole water projects (β=.681, p=.000<.05). This implies that a unit improvement in community-based structures in project identification leads to an improvement in sustainability of borehole water projects in Makueni County by 0.681 units.

5.2.2 Community-based Structures in Project Planning and Sustainability

The second objective was to examine how community-based frameworks in project design influenced the long-term sustainability of borehole water projects in Makueni County, Kenya. Level of community role in project planning, design of project budget by the community influence project planning at very large extent while design of project cost by the community was at large extent. The results revealed that most of the respondents are in consensus that the community participated in meetings for planning on water projects in Makueni County to a large extent (Mean=4.133; Standard deviation=1.063). Most of the respondents believed that the community's ideas and contributions were incorporated in the design of water projects in Makueni County to a large extent as shown by (Mean=4.128; Standard deviation=1.022). Further the results showed that most of the respondents were convinced that the community agreed on the proposed location of the various water kiosks and sanitation blocks within Makueni County.to a large extent as shown by a mean of 4.291 and standard deviation of 0.896.

The results in addition show that most of the respondents were in agreement with the fact that the community mobilized resources (for example money, materials, labour, land etc.) towards realization of the project to a large extent (Mean=4.383; Standard deviation=0.918). Moreover, most of the respondents believed that the community was involved in coming up with a plan for measuring performance and impact of the project (monitoring and evaluation plan) to a large extent as depicted by a mean of 4.143 and standard deviation of 1.086. Similarly, most of the respondents were convinced that the community was involved in coming up with a plan for implementing water projects in Makueni County to a large extent as shown by a mean and standard deviation of 4.291 and 0.918 respectively. Finally, the results show that most of the respondents were of the opinion that the community has been informed on the objectives of the water project to a large extent as shown by a mean of 3.903 and standard deviation of 1.065.

Regression analysis results revealed that community-based structures in project planning as an independent variable explains 54.4% of the variation in the sustainability of borehole water projects in Makueni County. The remaining 45.6% of the variation in sustainability of borehole water projects in the county can be explained by other factors which were not part of the current model. Regression

coefficient results revealed that there existed a positive and statistically significant relationship between community-based structures in project planning and sustainability of borehole water projects (β=.737, p=.000<.05). This implies that a unit improvement in community-based structures in project planning will lead to an improvement in sustainability of borehole water projects in Makueni County by 0.737 units. This is consistent with the argument by Equally, Beierle and Konisky (2017) that a bigger number of various project beneficiaries and had discussions on different structures of improving the quality of water as well as planning for the environment.

5.2.3 Community-based Structures in Project Implementation and Sustainability

The third objective is to examine how community-based structures in Makueni County, Kenya, impact the long-term viability of borehole water efforts. Use of community resources influence community-based structures in project implementation to a large extent. Community involved in audit of project resources and community involved in audit of project resources influence community-based structures in project implementation to a very large extent. The descriptive results revealed that most of the respondents indicated that many community members participate in the implementation of community water projects to a large extent as shown by a mean and standard deviation of 3.730 and respecytively1.169. The results further showed that most of the respondents believed that community has a huge role in the implementation of water projects to a large extent as shown by a mean of 3.985 and standard deviation of 1.064. Further, most of the respondents were of the opinion that community receive updates on the progress of the projects during implementation to a large extent. Additionally, most of the respondents indicated that resource contributed by society influence project sustainability to a large extent. Moreover, most of the respondents believed that community receive timely communication concerning project implementation to a large extent. Additionally, it is clear that most of the respondents believed that there are clear roles for community participation in the implementation plans for the water projects in Makueni County to a large extent.

The regression analysis results revealed that community-based structures in project implementation as an independent variable was able to explains 57.0% of the variation in the sustainability of borehole water projects in Makueni County. Regression coefficient results showed that community-based structures in project implementation positively and significantly influences sustainability of borehole water projects in Makueni County, Kenya (β=.755, p=.000<.05). This implies that a unit improvement in community-based structures in project implementation results into to an improvement in sustainability of borehole water projects in Makueni County by 0.755 units.

5.2.4 Community-based Structures in Project Monitoring and Evaluation on Sustainability

The study's fourth goal was to see how community-based monitoring and assessment affected the long-term viability of borehole water projects in Makueni County, Kenya. Community participation in assessing project performance and community participation in evaluation control measures influence community-based structures in project implementation to a large extent. Implementation of M& E lessons by the community influence community-based structures in project implementation to a very large extent. Descriptive statistics results revealed that majority of the respondents were of the belief that the community participated in assessing project performance to a large extent. Additionally, the results show that most of the respondents believed that the community has implemented lessons from M&E to a large extent. The results also show that a majority of the respondents were convinced that benefits from the project are enjoyed by most community members to a large extent.

In addition, most of the respondents indicated that the community has been involved in the audit of the finances from the water project to a moderate extent as proven by a mean and standard deviation of 3.031 and 1.522 respectively. It is evident that most of the respondents were of the idea that participation of the community in monitoring and evaluation enhances performance of the water project to a little extent (Mean=2.806; Standard deviation=1.550). Moreover, most of the respondents believed that there has been constant evaluation of the water project procedures and management to a large extent as shown by a mean and standard deviation of 3.760 and 1.215 respectively. Further, it is clear that most of the respondents were convinced that the community has been involved in coming up with strategies to better performance of the water project to a large extent (Mean=3.918; Standard deviation=1.138). Finally, the study found that most of the respondents were of the opinion that finances from the water project have been managed well to a large extent as shown by a mean of 4.066 and standard deviation 1.142.

The regression analysis results revealed that community-based structures in project monitoring and evaluation as an independent variable was able to explains 48.3% of the variation in the sustainability of borehole water projects in Makueni County. Regression coefficient revealed that community-based structures in project monitoring and evaluation positively and significantly influences sustainability of borehole water projects in Makueni County, Kenya (β=.695, p=.000<.05). This implies that a unit improvement in Community-Based Structures in Project Monitoring and Evaluation will result into to an improvement in sustainability of borehole water projects in Makueni County by 0.695 units. The results are in agreement with the assertion by Guijt and Gaventa (2018) that the idea of project

Monitoring and Evaluation is to place the views of community, and particularly the underprivileged, at the center of M&E activities.

5.3 Conclusion

The study concludes that residents of Makueni participated in project identification and thus positively influenced water project sustainability in Makueni County as both correlation analysis and descriptive analysis were in agreement. The study also concludes that the local people were involved in stating their problems, suggesting remedies, setting priorities and articulating project interventions. The study concludes that there exists a positive and statistically significant relationship between community-based structures in project identification and sustainability of borehole water projects. Therefore, community-based structures in project identification are very important in ensuring sustainability of borehole water projects and should be included in all aspects of the project. They understand the major problems they encounter in the community and so, project ideas and likely remedies must be originated from initiatives by local people.

Secondly, the study concludes that community-based structures in project planning have positive and statistically significant influence on the sustainability of borehole water projects in Makueni County. Additionally, there is need to use local knowledge and other communal solutions to positively influence the environment and society through involving them in project planning. The benefits of involving the local community in planning of these water projects includes enough supply of domestic water as well as water for irrigation, reduced soil erosion and use of chemical herbicides and pesticides that may lead to pollution of water sources. This study emphasizes on the importance of involving the local community in planning the water projects which proves to be successful in ensuring sustainability of the projects. The study further concludes that, there is a big difference between project implementers coming with certain interventions and involving the community in planning decisions that does not change in a big way what exists and where the people are involved in every aspect of the project, from determining the issues to providing solutions.

Thirdly, the study concludes that community-based structures in project implementation positively and significantly influences sustainability of borehole water projects in Makueni County, Kenya. Therefore, it is important that project managers wake up to the realization that a unit improvement in community-based structures in project implementation will always contribute to an improvement in sustainability of borehole water projects. The study in addition concludes that participation of the local community in the implementation of water projects boosts community awareness to the issues that

water managers encounter and this influences level of implementation and sustainability of the projects. Public empowerment and awareness help increase the community's understanding of the issues and the need for long term remedies that ensures successful implementation of the projects and this helps especially where there is need for behavior change and willingness on the part of the local people to control the problems.

Finally, the study concludes that the residents of Makueni participated in project monitoring and evaluation and thus positively influenced the water project sustainability in Makueni County as both correlation analysis and descriptive analysis were in agreement. Based on the findings, it suffices to conclude that for Project Monitoring & Evaluation to result into sustainability of the water borehole projects, there is need to involve the community, development stakeholders, policy creators in determining how development should be quantified, and results worked upon. Thus, by increasing participation of local community in identifying and scrutinizing change, a distinct picture can be portrayed of what is really on the ground. This also enables the community to celebrate successful milestones and draw lessons from failures and it also empowers those involved as they are put in charge and thus helps develop skills.

5.4 Recommendations

This study's recommendations are based on the study's goals and conclusion:

5.4.1 Recommendations for Policy and Practice

i. The Community-based structures involvement in project identification is essential as it ensures local community's ideas and suggestions are taken into consideration so as to make a significant influence on project ownership by the community and in turn ensures the projects continue benefiting the community even after the donor exit. Community engagement should be emphasized before any donor initiative is executed, and project participants should be educated about the project's relevance and actively participate in the development of the project's goals, vision, and purpose to guarantee its long-term viability.

ii. There is need to ensure timely project transfer through proper planning since this is one of the most important objectives of development projects such borehole water project. Timely involvement of the community-based structures in planning the project may drastically minimize the time spent on project implementation and ensure sustainability of the project. In additional, involvement in planning ensures acceptance of projects and also enables the

community know their expected contribution into the project earlier in advance so as to ensure timely completion of the project according to allocated resources, set plans and deliverables.

iii. Project implementors must make deliberate effort to involve the community-based structures in their implementation, this ensures that community members are empowered to know how such a project should be run and such will be able to run it on their own with little or no supervision when the project implementors exit. This level of involvement will ensure the project will continue to serve the community under their leadership sustainably.

iv. During the implementation phase, project implementers should ensure that community-based structures are engaged in project monitoring and evaluation. This will enable the community determine at any given time if the project continue to meet its objectives, monitoring and evaluation might also enable the target beneficiaries determine when such a project needs an upgrade so as to continue being useful and relevant.

5.4.2 Suggestions for further research

i. Comparative studies in other similar Kenyan enterprises are essential to compare results and provide empirical data that can be used to improve project sustainability.

ii. Primary data was employed when carrying out the research; secondary sources of data can be utilized as an alternative. This can then approve or object the findings of the current study. The study used multiple linear regression and correlation analysis; future research might add more kinds of analytic techniques such as component analysis, granger causality, cluster analysis, and discriminant analysis.

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APPENDICES

Appendix I: Letter of Transmittal

Cyprian Gachii Muriuki

L50/12426/2018

University of Nairobi,

P. O Box 30197, Nairobi.

To whom it may concern;

Dear Sir/ Madam,

REF: PARTICIPATION IN ACADEMIC RESEARCH

I am a master's student from the University of Nairobi, and I have identified you as a respondent. Please attached get the questionnaire which is solely structured for collecting data on the "***Influence of Community-based Structures on Sustainability of Water Projects in Makueni County, Kenya***". All responses are private and will be solely used for academic purposes.

This research will be carried out in partial fulfillment of the requirements for the award of the degree of Masters of Arts Degree in Project Planning and Management. I will be glad if you fill and return the completed questionnaire at a suitable time.

Thank you.

Cyprian Gachii Muriuki

Appendix II: Introductory Letter

UNIVERSITY OF NAIROBI
OPEN, DISTANCE AND e-LEARNING CAMPUS
SCHOOL OF OPEN AND DISTANCE LEARNING
DEPARTMENT OF OPEN LEARNING
NAIROBI LEARNING CAMPUS

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
N A I R O B I

19th July, 2021

REF: UON/ODeL//NLC/29/075

TO WHOM IT MAY CONCERN

RE: CYPRIAN GACHII MURIUKI – REG.NO. L50/12426/2018

This is to confirm that the above named is a student at the University of Nairobi, Open Distance and e-Learning Campus, School of Open and Distance Learning , Department of Open Learning pursuing a Master of Arts course in Project Planning and Management.

He is proceeding for research entitled, **"Influence of Community Based Structures on Sustainability of Water Projects in Kenya: A Case of Borehole Projects in Makueni"**

Any assistance accorded to him will be highly appreciated.

19 JUL 2021

CARREN AWIILLY
CENTRE ORGANIZER,
NAIROBI LEARNING CENTRE

Appendix III: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **786335**

Date of Issue: **14/October/2021**

RESEARCH LICENSE

This is to Certify that Mr.. Cyprian Muriuki of University of Nairobi, has been licensed to conduct research in Makueni on the topic: INFLUENCE OF COMMUNITY BASED STRUCTURES ON SUSTAINABILITY OF WATER PROJECTS IN KENYA: A CASE OF BOREHOLE PROJECTS IN MAKUENI COUNTY for the period ending : 14/October/2022.

License No: **NACOSTI/P/21/13406**

786335

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix IV: Research Questionnaire

PART A: BACKGROUND INFORMATION

1. What is your gender?

Male [ ] Female [ ]

2. No of households?

1-10 [ ]

11-20 [ ]

Above [ ]

3. How long have you lived in your area?

1-5 years [ ]

5-10 years [ ]

10-15 years [ ]

15-20 years [ ]

More than 20 years [ ]

4. What is your highest level of education?

Certificate [ ] Diploma [ ] Degree [ ] Master [ ]

Part B: Community-based Structures in Project Identification

5. These are statements on community-based structures in project identification among water projects in Makueni County. Use a Likert scale which ranges from 1 -5 where 1= Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent to rate the extent of your agreement with each statement

Statement	1	2	3	4	5
To what extent has community been involved in project conceptualization meeting					
To what extent has community been involved in appraisal reports					
To what extent has community been involved in feasibility studies					
To what extent has community been involved in stakeholder analysis					
To what extent has community ideas been considered in project identification					
How has the frequency of community involvement in project identification been?					
The community is involved in identification and prioritization of their needs					
The community's ideas and contributions are considered and incorporated when determining solutions to the water and sanitation needs.					
The community is involved in discussions about problems facing them and how to solve the problems.					
The community has been involved in designing of solutions to water problems in the County					

Part C: Community-based Structures in Project Planning

6. These are statements on community-based structures in project planning among water projects in Makueni County. Use a Likert scale which ranges from 1 -5 where 1= Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent to rate the extent of your agreement with each statement

Statement	1	2	3	4	5
The community participated in meetings for planning on water projects in Makueni County					
The community's ideas and contributions were incorporated in the design of water projects in Makueni County.					
The community agreed on the proposed location of the various water kiosks and sanitation blocks within Makueni County.					
The community participated in coming up with the cost and budget for the project.					
The community mobilized resources (for example money, materials, labour, land etc.) towards realization of the project.					
The community was involved in coming up with a plan for measuring performance and impact of the project (monitoring and evaluation plan).					
The community was involved in coming up with a plan for implementing water projects in Makueni County.					
There has been appointment of leaders from the community					
The community has been informed on the objectives of the water project					

Part D: Community-based Structures in Project Implementation

7 These are statements on community-based structures in project implementation among water projects in Makueni County. Use a Likert scale which ranges from 1 -5 where 1= Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent to rate the extent of your agreement with each statement.

Statement	**1**	**2**	**3**	**4**	**5**
Many community members participate in the implementation of community water projects					
Community has a huge role in the implementation of water projects					
Community receives updates on the progress of the projects during implementation					
Community has physical resources to contribute to sustainability of water projects					
Resource contributed by society influence project sustainability					
Community has the capacity of implementing decisions for the water projects					
Community receives timely communication concerning project implementation					
Contribution of resources hinder community's role in project implementation					
There are clear roles for community participation in the implementation plans for the water projects in Makueni County					
The community has received training on how to operate, manage and maintain the project.					
Resources from the community were used to put up the water kiosks, sanitation blocks and stone lined drains.					

Part E: Community-based Structures in Project Monitoring and Evaluation

8. These are statements on community-based structures in project monitoring and evaluation among water projects in Makueni County. Use a Likert scale which ranges from 1 -5 where 1= Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent to rate the extent of your agreement with each statement.

Statement	**1**	**2**	**3**	**4**	**5**
The community participated in assessing project performance.					
The community has implemented lessons from M&E.					
Benefits from the project are enjoyed by most community members.					
Lessons learnt from assessing projects have been implemented.					
The community has been involved in the audit of the finances from the water project.					
Participation of the community in monitoring and evaluation enhances performance of the water project.					
The community has been made aware of the tools used in monitoring and evaluation.					
There has been constant evaluation of the water project procedures and management.					
The community has been involved in coming up with strategies to better performance of the water project.					
Finances from the water project have been managed well.					

Part F: Sustainability of Water Projects in Makueni County, Kenya

9) The following statements relates on sustainability of community based water projects. To what extent are they reflected in your community based water projects?

Use a Likert scale which ranges from 1 -5 where 1= Not at all; 2 = Little Extent; 3= Moderate Extent; 4= Large Extent and 5= Very Large Extent to rate the extent of your agreement with each statement

Statements	**5**	**4**	**3**	**2**	**1**
There is continuity of the project after implementation phase.					
There is community ownership and empowerment					
There is functional management committee after implementation phase.					
There is sufficient capacity building of management committee in operations and technical aspects of running the project					
The County water officers visit regularly and offer technical support when the structure breaks down					
The water project gets financial aid for sustainability					
There is continuous availability and access of clean water from the project					
There is increased number of beneficiaries from the project					

THANK YOU FOR YOUR TIME!

Appendix V: Interview Guide

1. What is your gender?

2. What position do you hold?

Prompt……..

3. How long have you worked in your current position?

Prompt…….

4. What is your highest level of education?

Prompt……..

5. What is the influence of community-based structures in project identification on performance of water projects in Makueni County?

Prompt……...

6. What is the influence of community-based structures in project planning on performance of water projects in Makueni County?

Prompt…….

7. What is the influence of community-based structures in project implementation on performance of water projects in Makueni County?

Prompt……..

8. What is the influence of community-based structures in project monitoring and evaluation on performance of water projects in Makueni County?

Prompt…….

9. What interventions measure can be put in place for enhancing performance of water projects through community-based structures?

Prompt……..