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ANALYSIS OF ORGANIZATIONAL FACTORS INFLUENCING SUSTAINABILITY OF COMMUNITY WATER PROJECTS IN GARISSA COUNTY: A CASE OF RAYA WATER PROJECT

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ABSTRACT

The sustainability of Raya water project in Garissa, aimed at distributing water to the residents from Tana River is questionable where its ability to meet demand has drastically decreased, provision of quality water has been affected and the costing of water has increased. In order to maintain sustainability, there was a need for a review of the water project and the determining factors hence a need for this study. This study conducted an analysis of the organizational factors affecting sustainability of community water projects in Garissa County taking a case of Raya Water Project. The study focused on organization related factors such as technical capacity, resource allocation, technology adoption and stakeholder participation. A descriptive research design was adopted where a survey was conducted on project officers, water agency representatives and Community Based Organization (CBO) household representatives. The target population was 12 Raya Water project officers, 165 CBO representatives and 12 water representatives from the Water Resource User's Associations, county and national governments. Data was collected through a structured questionnaire. Therefore, quantitative data was collected and analyzed through descriptive and inferential statistics.

The study findings indicated that the community water projects in Garissa County have a technical capacity to manage the water to a high extent; resources have been allocated to a moderate extent towards management of community water projects; technology has been adopted to manage the water projects to a high extent and stakeholder participation in community water projects is conducted to a moderate extent. The inferential statistics indicated that an improvement in stakeholder participation, technology adoption and resource allocation can significantly improve sustainability of community water projects. However, as at the moment, the current technical expertise is at a moderate extent hence not able to significantly improve sustainability of the water projects. This thus led to the recommendation that in order for the community water projects to improve their sustainability, they need to not only further improve stakeholder participation, technology adoption and resource allocation practices, but also invest towards building their capacity strongly.

Key Words: *Technical Capacity, Resource Allocation, Technology Adoption, Stakeholder Participation*

BACKGROUND OF THE STUDY

Water is a natural resource that is essential for life, ecological systems, and social and economic development (Samuel, Mbabazize & Shukla, 2016). Water initiatives to improve safe rural and urban water supply and sanitation have been implemented by state and non-state actors from all over the world through the years. However, these water infrastructures and water supply systems are not sustainable in most project regions (Tayloret al. 2013). The 2015 agenda for sustainable development by UN which contained Goal 6 of the Sustainable Development Goals (SDG) to guarantee everyone has access to clean water and sanitation. In the previous decade, the international community has made progress toward this goal, although rural areas have lagged behind urban areas (United Nations, 2011). A WHO (2015) report 29 percent of the world's population did not have access to safe drinking water. According to the study, 844 million people in 2015 who did not have access to basic drinking water relied on sources which lasted for more than half an hour. A population's ability to sustain itself is affected by the growth, maintenance, or degradation of a resource or collection of resources (Ochelle, 2012). Even where rural supply systems have been established, many are in disrepair or are ineffective (RWSN, 2012). With over 75% of Kenya's poor residing in rural regions, it is critical to provide sustainable water delivery to these communities. Kenyans continue to have limited access to rural water supplies.

By 2030, the United Nations has established a goal for everyone to have access to safe and inexpensive drinking water (United Nation, 2015). Water and sanitation utilities in Africa operate in a high-cost environment, according to the World Bank. They must also at least partially recoup their operating and maintenance expenditures (O&M). As a result, water rates in this region are higher than in other parts of the world (World Bank, 2010). A UN report documented that more than 40 percent of the people across the globe face challenges related to water scarcity. This is a worrisome proportion that is expected to worsen as global temperatures rise as a result of climate change (UNDP, 2017). Singapore has achieved economic sustainability of its water projects in urban areas due to continual investments in urban water projects, with a non-revenue water proportion of under 5%. (World Bank, 2006). Due to outdated infrastructure, financial constraints, and inadequate governance, Asian emerging countries are having difficulty sustaining urban water projects (Malcolm, et al.2011). In Canada, Livingstone and McPherson (2011) claimed that technological adoption is critical to the long-term viability of water projects because it simplifies operations and maintenance.

The efficient management and maintenance of water delivery systems is critical to the water project's long-term viability. Budgeting enough funds for rural and urban water supply systems is a critical issue for long-term sustainability and proper maintenance, but it is far from the only one (Binder, 2008). According to World Bank research from 2015, non-revenue water statistics are high because urban water projects are not operationally sustainable. According to the analysis, the entire cost of NRW to water utilities worldwide is expected to be $141 billion each year, with a third of that cost occurring in developing countries. Water leakage in distribution networks in developing countries results in the loss of 45 million cubic meters of water each day, enough to serve roughly 200 million people. Accra, Ghana, and its environs have an unsustainable water delivery system. Basically, the residents face issues related to cut-offs, low supplies like once a week as well as inconsistencies (New & Roberts, 2008). In addition, New and Roberts (2013) documented that there is frequent pipeline breaches and leaks, which impact the quality of the water delivered (due to the pipelines being very old, some dating back to the 1930s).

The percentage of non-revenue water can reach 51%. (Allen, 2012). Skinner (2009), a report by the International Institute for Environment and Development (IIED), argued that up to US$360 million spent on boreholes and wells in Senegal was squandered due to poor water supply point maintenance. 50,000 water delivery points across Africa are projected to be out of service. Only a third of the water stations built by non-governmental organizations in Senegal are operational, according to the research. This is mainly due to low consultations on the sustainability of the projects after the project donor funding (Habtamu, 2012). In Uganda, the unavailability of rural water projects has increased, with the majority of them having high non-revenue water, up from 21% in 2009/10 to 24% in 2011/12. (GoU, 2012). This was primarily due to deteriorating infrastructure in a number of cities, some of which have outlived their design life and require extensive rehabilitation or replacement. Ethiopia’s rural access to clean water supply increased by 53% between 2007 and 2008, according to the Central Statistical Agency (CSA) of Ethiopia report. It is estimated that slightly less than half of rural households utilize filthy water for drinking or other reasons, posing a significant health risk to communities (RWSEP, 2011). Kenya is considered a ‘water-scarce' country on a national level. This means that the total renewable resource potential (surface and groundwater) falls short of the global benchmark of 1,000 cubic meters per capita. Water per capita has dropped from 1,853 M^3in 1969 to 704 M^3in 2000 over the last 40 years. Water consumption per capita was projected to be around 612 cubic meters in 2005. By 2025, when per capita consumption is predicted to be at 235 cubic meters, the scarcity will have decreased further (IEA, 2007).

In the Kenyan urban centers, there exist low levels of access to clean water as well as poor services in WASH services. Only 9 of Kenya's 88 water service providers provide a reliable water supply (WASREB, 2008). In 2017, water coverage was 55.42 percent, with a 0.83 percent increase over the previous three years. In 2017, only 2% of Kenya's 88 water utilities met the sector's non-revenue water criterion, while only 22% met the water coverage criterion. Around 39% of the time, the operation and maintenance cost recovery target were met, and 42% of the time, the water quality standards were met. The financial viability of the sector is jeopardized by water losses. The present NRW is 42%, indicating that many water projects are not long-term viable. WASREB (Washington State Agricultural Research and Extension Bureau, 2018). Water scarcity, both seasonal and regional, makes it more difficult to enhance water supply. Despite high urban water tariffs (US0.46 per m3 on average in 2007), due to a high level of non-revenue water (average of 47 percent) and high production expenses, cost recovery was poor.

The United Nations' 2030 Agenda for Sustainable Development set a lofty goal for everyone to have access to safe and inexpensive drinking water by 2030. (United Nation, 2015). The National Water Policy (NWP) 2012 demonstrated that the community water projects are not sustainable because of neglect which leads to reduced quality and access. In ASAL areas like Garissa, where there is insufficient densification of water stations, disparities in access to safe water are even more pronounced (NWP, 2012). Article 43 of the Kenyan Constitution (COK) 2010 states that access to safe water and sanitation is a fundamental right. The enactment of the policies as well as increased allocations to the water sector has not necessarily improved access to safe clean water. Raya water project, in Garissa County, began in 2009 as a self-help initiative by the local community to offer portable water for residential, livestock, and small-scale development, with a population of roughly 15.176 people in the lower sections of the county. The intake has been installed, the mainline has been laid, and some distribution pipes have been acquired thus far. It has also begun delivering water to individual members, with water coming from the vast Tana River, some 3.2 kilometers from Garissa County's Raya trading center. Technical capacity, resource allocation for the project, technological acceptance, and stakeholder participation are all issues that have hampered the project's long-term viability. The project's long-term viability has recently been called into doubt, as its capacity to satisfy demand has dwindled, quality water supply has been compromised, and water costs have risen. As a result, this interrogation was necessary.

STATEMENT OF THE PROBLEM

According to a report published by the United Nations Environment Programme in 2010, 40% of the population in emerging economies such as Kenya lacks dependable access to safe drinking water. Despite the numbers, the majority of Kenya's water projects, both rural and urban, are unsustainable due to their incapacity to manage continuous clean water availability. According to Oraro (2012), around 6% of rural water projects become dysfunctional in the first three years after completion due to a variety of factors including project management cycles, resource availability, technological uptake, and legislation. According to WASREB (2014), around 45 million cubic meters of water are lost every day due to water leaks caused by poor infrastructure maintenance. According to statistics from the Athi Water and Services Board Strategic Plan 2017, just 48 percent of individuals in rural regions have access to clean, safe water and better sanitation. Furthermore, community water projects have a billing efficiency of just half of what it should be.

While several studies have looked into the elements that influence community water projects, the contextual and conceptual focus has varied, resulting in research gaps that this study aims to solve. Mwangangi and Wanyoike (2016) interrogated whether factors such as maintenance costs, training and community involvement affected sustainability of water projects whereas Ochelle (2012) looked at elements that affect the long-term viability of community water projects in Kenya. Tafara (2013) looked into the elements that influence the long-term viability of rural community-based water projects in Mtito Andei, Kibwezi Sub-County, with a particular focus on project managers' competency and technology uptake.

OBJECTIVES OF THE STUDY

i. To establish the influence of technical capacity on sustainability of community water projects in Garissa County
ii. To determine the influence of resource allocation on sustainability of community water projects in Garissa County
iii. To establish the influence of technology adoption on sustainability of community water projects in Garissa County
iv. To assess the influence of stakeholder participation on sustainability of community water projects in Garissa County

EMPIRICAL LITERATURE REVIEW

Spaling, Brouwer, and Njoka (2014) looked into the elements that influence the long-term viability of a Kenyan community water delivery project. Water supply, regulatory policy, and management technical capacity were the main topics of discussion. The findings revealed that after ten years, the project is on the verge of failing, with community management flaws and a lack of technical capability in sustainable local water management being two of the primary factors. Macharia, Mbassana, and Oduor (2015) investigated the long-term viability of rural water projects in Naivasha, Kenya, using the Maraigushu water project as a case study. A household survey was used as part of the mixed method research. Members of the water committee were questioned about critical project details, records were inspected, and a physical inspection of the water project was carried out.Stata 10 was used to analyze data. With reference to the conceptual framework that underpins the study's relevance, the extent to which "Sustainability" as the dependent variable is related to "Community participation," "Management factor," and "Technical component" has been demonstrated through the use of ordinal logistic regression. Management and technical aspects of the project were found to be in need of upgrading in order to increase its long-term viability.

Ochelle (2012) looked into the factors that determine the long-term viability of community water projects in Kenya, using the Mulala division of Makueni county as a case study. The major goal of the study was to see how project funding affects the long-term viability of community water projects in semi-arid regions. A descriptive survey design was used in this investigation. The research found that project financing has an impact on the long-term viability of community water initiatives. It was also shown that the committee members who administer the water resources' accountability and openness is a significant aspect that determines the long-term viability of community water projects.
Siborurema, Shukla, and Mbera (2015) conducted research in Rwanda on the effects of project funding on project performance, utilizing a case study of the construction of the Bukomane-Gikoma road in Rwanda's Gatsibo district as a model for all projects with issues similar to those observed in typical projects of this research's emphasis. The study's main goal was to assess the impact of project finance on project outcomes. The target population was split into two groups: project planners and funders, and project managers. Data was gathered through the use of a specially designed questionnaire, document consultation, and interviews. The findings of the study demonstrated that both cost estimation and technical design obstruct project funding policies and delay project implementation.

Mwangi and Wanyoike (2012) conducted research in Nyandarua County to analyze the elements that affect the long-term viability of rural water supply schemes. The study's goal was to see how unaccounted for water affected the long-term viability of rural water supply. A descriptive research design was used for this study. It was aimed for 62 water supply scheme employees, including subordinates, technical workers, finance officers, and management. The study relied on a

census questionnaire. According to the findings, there are a number of issues that can affect the long-term viability of Kenyan water facilities. These elements cover a wide range of topics, including governance, technological resources, and financial resources. Water supply in suitable quantities also improves sustainability, and pipes and fittings require replacement and proper maintenance.

In Mombasa County, Kikuvi (2016) investigated the factors that influence the success of water and sanitation initiatives in informal communities. The study's goal was to figure out what factors influence slum project implementation and how they impact long-term development. The study relied on a descriptive survey design. The study made use of a random sampling procedure. In order to determine the optimal sample size of respondents, simple random sampling was performed. The data was collected using qualitative approaches, including a questionnaire with closed and open-ended questions from staff who were directly involved in the slum programs. The study discovered that involving technical specialists in the monitoring and evaluation of water projects will help the government and private groups achieve their goals and assure the project's long-term viability.

In MtitoAndei, Kibwezi Sub-County, Kenya, Tafara (2013) investigated the elements that influence the long-term viability of rural community-based water projects. The study's goal was to figure out what elements influence the long-term viability of community-based water projects so that suitable recommendations might be made to improve project viability. A descriptive survey was used for this research. Household heads were the target population. The sampling procedures utilized in the study were a mix of probability and non-probability. The respondents' information was gathered using a questionnaire. In community-based initiatives, the study discovered that efficient management by competent project managers plays a variety of roles. The local community members lacked necessary skills and training in regards to the use of technology through the usage of various ways of payment. The artisans who were entrusted with maintaining the water project lacked the necessary skills and training. The study found that factors such as training affect the long-term viability of rural water supply systems. Mons (2010) researched non-revenue water management practices in poor nations, using Kampala, Uganda as a case study. The study's objectives were to examine the situation of water loss in the system and how to sustainably manage it. A case study of Kampala's water supply was employed as the methodology. According to the study's findings, most water utilities in developing nations have significant NRW, owing to outdated networks, competing interests, a lack of strategy, and a culture of inefficiency.

Boakye and Akpor (2012) studied stakeholder participation in water management using the Msunduzi Catchment Management Forum in South Africa as a case study. The goal of the project was to see how far formerly disadvantaged populations could participate in water management. The research used a qualitative method that included both primary and secondary data sources. The target population consisted of 19 people: members of impoverished community groups, advantaged NGOs, a company, and a municipality. Purposive sampling was used. Primary (semi-structured interviews) and secondary data sources were used to acquire data. The study discovered that public participation is commonly recognized as a crucial component of water resource management and thus sustainability.

Munyao (2013) investigated the effects of water supply and sanitation improvements on the lives of Kenyan slum dwellers. The study's goal was to examine the impact of water price on slum inhabitants' economic standing, the impact of appropriate sanitation, and the impact of clean water on slum dwellers. The study used a descriptive research design. Using basic random sampling, 515 people were chosen as part of the sample. Both qualitative and quantitative data were obtained as primary data. Self-administered questionnaires were used to collect data. The study discovered that community participation, particularly during project implementation, ensures the long-term viability of water and

sanitation projects.

Adhiambo (2012) conducted research in Kibera, Kenya, on the factors that influence the effectiveness of donor-funded development programs. The goal of the study was to uncover the factors that restrict the efficacy of donor-funded initiatives in Kenya, particularly in the Kibera slum, as well as provide insight into what has to be done to improve the funding's effectiveness. The study used a survey research approach. A total of 150 people were chosen to participate in the survey. Because the research was conducted in eight distinct villages, the respondents were stratified by population size. The information for the study was gathered through interviews. Because the interviews were conducted utilizing a standardized questionnaire and interview guide, both qualitative and quantitative data were collected. In terms of stakeholder involvement, the study indicated that more stakeholder involvement was needed, particularly in project design and implementation, in order to increase the likelihood of programs being sustained.

THEORETICAL LITERATURE

Resource-Based Theory

According to Sciarelli (2008), the Resource-Based Theory arose from Penrose's (1959) concept of the firm as a coordinated "bundle" of precious, uncommon, and inimitable resources that the company has at its disposal or access to (from the inside out). According to the Resource Based View/ Theory of the Firm, strategic assets contribute to a firm's competitive advantage, according to Jugdev, Mathur, and Fung (2006). Some of the company's assets (resources) include human resources (individual abilities and knowledge), financial resources (money), physical resources (equipment), social resources (network of connections), and organizational resources (structure, processes, and relationships).

According to Drohan, Foley, and Lynch (2009), sustained competitive advantage (SCA) occurs only when a company executes a value-creating strategy that is not duplicated by other companies at the same time. According to Pesic (2007), the Resource-Based Theory identifies four resource and capability traits that are both predictors of long-term competitive advantage. Resource-based theory, according to Paauwe and Boselie (2002), triggered a shift in strategic management thinking from an outside-in to an inside-out approach. Mahoney (2004) felt that a firm is a collection of resources deemed to add value. A firm can employ both unskilled and skilled workers, as well as clerical, administrative, financial, legal, technical, and management personnel. According to Newbert (2007), these resources can only help a company compete if they are used in a way that makes their potentially valuable services available to the company.

Stakeholder Theory

Stakeholder theory, according to Retolaza and San-Jose (2011), dates back to the Stanford Research Institute in 1963. Stakeholders, according to Freeman (1984), are any group or people that can affect or is affected by the achievement of the firm's objectives. According to Alok and Deepti (2013), Freeman (1984) advocated a managerial approach in which four important stakeholders are identified: company owners, consumers, employees, and suppliers. According to Bal et al. (2013) stakeholders are groups or individuals with vested interests in a project. According to Chinyio and Olomolaiye (2010), stakeholders are critical to a project's success since their unwillingness to consistently support the project's vision or objectives causes many initiatives to fail. As a result, a systematic method to engaging with stakeholders who have a high level of importance in respect to sustainability is required.

Stakeholders are crucial to a project's success, according to Chinyio and Olomolaiye (2010), because their refusal to constantly support the project's vision or objectives leads to the failure of many efforts. As a result, a systematic approach to connecting with stakeholders who are critical to sustainability is essential. The unique characteristics of projects, as well as their short duration, demand extra efforts to form effective project teams and build trust, both inside the team and between the team and project stakeholders, according to Yang et al. (2010). According to Aaltonenet al. (2008), the most essential part of project stakeholder management is the management of relationships between the project team and its stakeholders. These criteria were mentioned as essential success criteria for stakeholder management, but further quantitative and qualitative research is needed to confirm them. According to Zanjirchi and Moradi (2008), project success is determined by a variety of factors, including organizational goals, stakeholder satisfaction, consumer benefit, and the organization's future potential. The involvement of numerous stakeholders will have a significant impact on the projects' success or failure.

Technology Acceptance Model (TAM)

Davis, in 1989, was a supporter of this view. The goal of the technology acceptance model (TAM) was to explain the factors that impact and affect people's acceptance of new technology. The Technology Adoption Model (TAM) is a commonly used model in the field of information systems, according to Yan et al, (2009), and it provides a theoretical contribution to understanding technology acceptance. TAM discusses the user behaviour which can drive adoption of a new technology based on the benefits expected and its complexity (Davis et al.,1989). TAM claims that two specific variables are essential predictors of users' attitudes toward and actual usage of information technology: perceived utility and perceived ease of use in relation to new information system design elements. Usefulness is described as the belief that utilizing a system will improve one's performance, while ease of use is defined as the belief that the benefits of utilizing a system outweigh the effort required to utilize it (Davis, 1993).

CONCEPTUAL FRAMEWORK

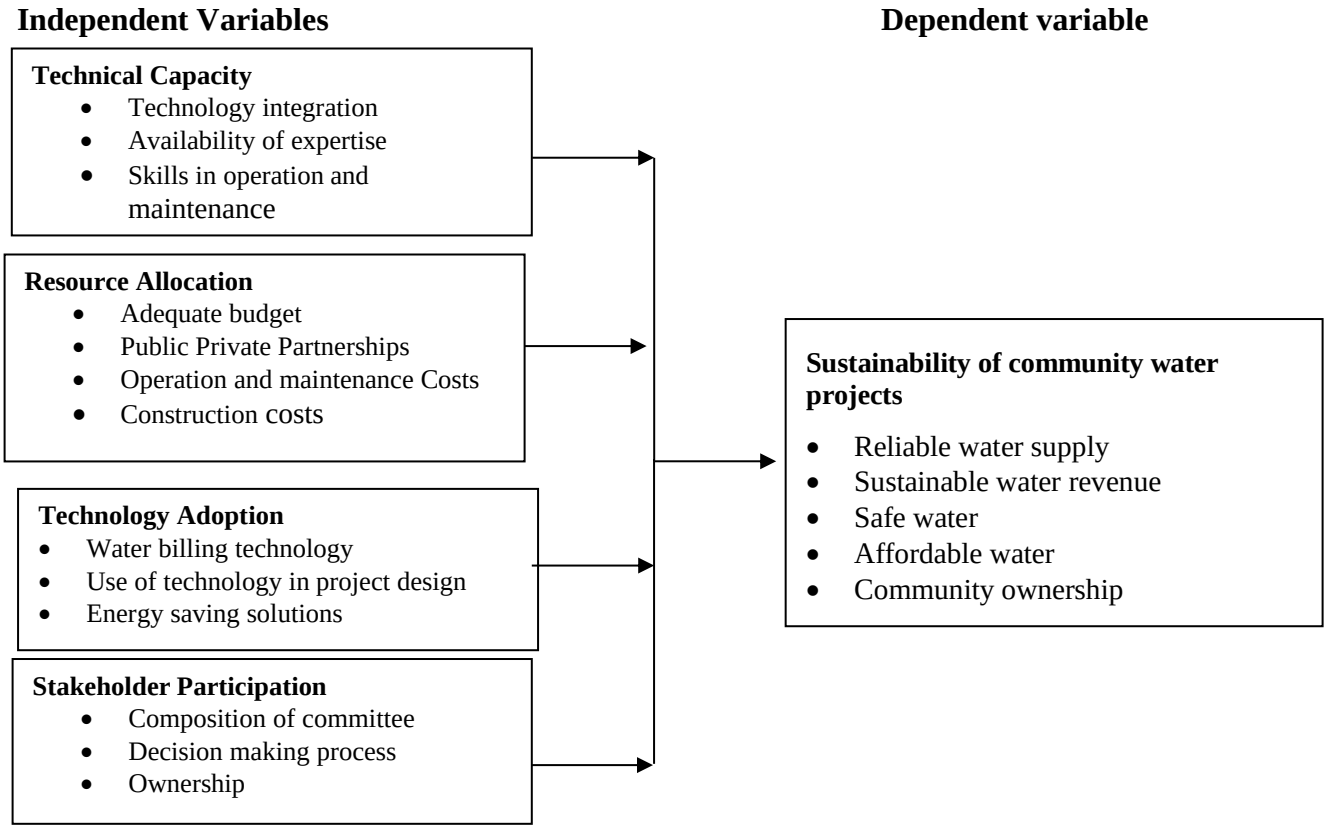

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

Through a descriptive technique, the study used a quantitative research methodology. Closed ended questions were utilized to acquire quantitative data that was utilized to investigate relationships between variables using inferential statistics in this methodology. The research took place in Garissa County, Kenya. Project officers, water agency officials, and CBO household representatives were targeted. The Raya Water Project comprised 12 project officers and 165 community-based organization (CBO) representatives. In addition, 12 water representatives from the Water Resource User's Associations, county, and national governments were also interviewed as part of the study.

A total of 189 people were therefore targeted by the study. Prior to analysis, the data was cleaned by verifying for logical consistency and removing any extraneous information. To convert responses to numbers, coding was done. After that, the quantitative data was examined using quantitative methodologies. The quantitative data was evaluated using descriptive statistics that is percentages, frequency, mean, and standard deviation using the Statistical Package for Social Sciences (SPSS V 21). The findings were presented using frequency tables, graphs, and pie charts for easy comparison. To determine the association between variables, multiple regression analysis was used. The multiple regression model that was utilized is as follows:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e}$$

Where:

- **Y** = Sustainability of Community of Water Projects
- $\mathbf{X_1}$= Technical Capacity
- $\mathbf{X_2}$= Resource Allocation
- $\mathbf{X_3}$ = Technology Adoption
- $\mathbf{X_4}$ = Stakeholder Participation
- **β**= coefficient of independent variables
- ***e***= Error term meaning other factors that affect sustainability of water projects other than the four
- **α**= constant

RESEARCH FINDINGS AND DISCUSSIONS

This study targeted and issued out 189 questionnaires to the project officers, water agency officials, CBO household representatives as well as the Water Resource User's Associations, county, and national governments officials. Out of the number, a total of 119 questionnaires were well responded to giving a response rate of 63% as shown in Figure 3. This response rate is satisfactory given the argument by Lewis *et al* (2007) that a response rate above 50% is satisfactory to be used in generalizing study findings.

Demographic Characteristics

This part presents the description of the population based on the gathered information. The research asked the respondents to indicate their highest education level and the number of years served in water related projects. The results in Table 1 indicated that the respondents were well distributed across various education levels with the majority (25%) having secondary level of education. Those with a college certificate and above were half the entire respondent's rate. It was also indicated that majority of the respondents, 65%, had worked in water projects for a period between 5 and 10 years which demonstrated a high institutional knowhow to give reliable information.

Table 1 Demographic Characteristics

Demographic Factor	Category	Frequency	Percentage
Level of Education	No Formal Education	4	3%
	Primary	26	22%
	Secondary	30	25%
	College	18	15%
	University	42	35%
Work Experience	Less than 5 Years	23	19%
	5 to 10 Years	77	65%
	More than 10 Years	19	16%

Descriptive Findings and Analysis

Description of Technical Capacity in Community Water Projects

The first objective of the study was to establish the influence of technical capacity on sustainability of community water projects in Garissa County. The descriptive findings in Table 2 indicated that the water project officers at Raya are equipped in operation and maintenance (M = 4.06), technology has been integrated to ensure effective management of the project (M = 4.00), there exist IT experts in management of the project (M = 3.94) and that the staff have knowledge on water management (M = 4.02). It was also established that the CBO members have been trained on project management practices (M = 3.87). However, the participation of other services providers in offering technical expertise in management of the water project was moderately conducted (M = 3.03). Additionally, the local government offered expertise in management of the water project to a moderate extent (M = 3.16). Overall, there was technical capacity to manage the water to a high extent (M = 3.73).

Table 2 Description of Technical Capacity in Community Water Projects

Statement	Mean	Standard Deviation
The water project officers at Raya are equipped in operation and maintenance	4.06	1.20
Technology has been integrated to ensure effective management of the project	4.00	1.10
There exist IT experts in management of the project	3.94	1.04
The staff have knowledge on water management	4.02	1.25
The CBO members have been trained on project management practices	3.87	1.24
Other services providers participate in offering technical expertise in management of the water project	3.03	1.48
The local government offers expertise in management of the water project	3.16	1.49

Description of Resource Allocation in Community Water Projects

The second objective of the study was to determine the influence of resource allocation on sustainability of community water projects in Garissa County. The descriptive findings in Table 3 indicated that there is adequate budget allocated towards management of the water project (M = 3.83), there exist Public Private Partnerships to aid in management of the project (M = 3.61) and there exists a sustainable financial plan to manage the water project (M = 3.99). It was also indicated that the operation and maintenance as well as repair and maintenance costs are sustainable to a low extent (M = 2.34; 2.19). Overall, resources have been allocated to a moderate extent towards management of community water projects (M = 3.19).

Table 3 Description of Resource Allocation in Community Water Projects

Statement	Mean	Standard Deviation
There is adequate budget allocated towards management of the water project	3.83	1.26
There exist Public Private Partnerships to aid in management of the project	3.61	1.11
The operation and maintenance costs are sustainable	2.34	1.26
Repair and construction costs of the project are sustainable	2.19	1.27
There exists a sustainable financial plan to manage the water project	3.99	1.07
Average	**3.19**	**1.20**

Description of Technology Adoption in Community Water Projects

The third objective of the study was to establish the influence of technology adoption on sustainability of community water projects in Garissa County. The descriptive findings in Table 4 indicate that the water project management has adopted water billing technology to enhance efficiency in billing (M = 3.50) and that there is continuous training to enhance the technological expertise of the project members (M = 4.06). However, the water project management has adopted energy saving solutions such as solar panels to cut on costs, uses technology in project design to enhance accuracy as well as adopted financial management systems to budget to enhance efficiency to a moderate extent (M = 3.48; 3.18 and 3.35) respectively. Overall, technology has been adopted to manage the water projects to a high extent (M = 3.52).

Table 4 Description of Technology Adoption in Community Water Projects

Statement	Mean	Standard Deviation
The water project management has adopted water billing technology to enhance efficiency in billing	3.50	1.33
The water project management has adopted energy saving solutions such as solar panels to cut on costs	3.48	1.21
The water project management uses technology in project design to enhance accuracy	3.18	1.35
The water project management has adopted financial management systems to budget to enhance efficiency	3.35	1.44
There is continuous training to enhance the technological expertise of the project members	4.06	0.95
Average	**3.52**	**1.25**

Description of Stakeholder Participation in Community Water Projects

The fourth objective was to assess the influence of stakeholder participation on sustainability of community water projects in Garissa County. The descriptive findings in Table 5 indicated that the composition of the project management committee is participatory (M = 3.59), the decision-making process is participatory (M = 3.60), the project is fully owned by the community (M = 4.08), the project planning process is participatory (M = 3.85). However, project implementation and management are participatory to a moderate extent (M = 3.21). Overall, it was established that stakeholder participation in community water projects is conducted to a moderate extent (M = 3.67).

Table 5 Description of Stakeholder Participation in Community Water Projects

Statement	Mean	Standard Deviation
The composition of the project management committee is participatory	3.59	1.07
The decision-making process is participatory	3.60	1.18
The project is fully owned by the community	4.08	1.02
The project planning process is participatory	3.85	1.34
Project implementation and management is participatory	3.21	1.40
Average	**3.67**	**1.20**

Description of Sustainability of Community Water Projects

The study described the Sustainability of Community Water Projects. The results in Table 6 indicated that the water from the project is safe for domestic and livestock use (M = 3.94). However, the project produces sustainable water supply as expected to a moderate extent (M = 3.46), the project gives a sustainable water revenue to a moderate extent (M = 3.42),

the water billing is affordable to members and the community to a ow extent (M = 2.47) and there is sustainability in project ownership by the community to a moderate extent (M = 3.49). Overall, the sustainability of Community Water Projects is to a moderate extent (M = 3.36).

Table 6 Description of Sustainability of Community Water Projects

Statement	Mean	Standard Deviation
There project produces sustainable water supply as expected	3.46	1.14
The project gives a sustainable water revenue	3.42	1.37
The water from the project is safe for domestic and livestock use	3.94	1.24
The water billing is affordable to members and the community	2.47	0.50
There is sustainability in project ownership by the community	3.49	1.13
Average	**3.36**	**1.08**

Regression Analysis

A multivariate regression model was used to determine the relationship between the study variables. The findings indicated coefficient of determination, model fitness and model coefficients as discussed in the subsections. A coefficient of determination is also called the R-square and it shows the percentage of the variation in the dependent variable accounted by the independent variables. The findings in Table 7 indicated that organizational factors investigated (Stakeholder Participation, Technology Adoption, Resource Allocation, Technical Capacity) explain up to 74.6% of the variation in sustainability of community water projects (R-square = 0.746). This demonstrates their importance.

Table 7 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.864	0.746	0.737	0.40591
Predictors: (Constant), Stakeholder Participation, Technology Adoption, Resource Allocation, Technical Capacity			

The regression model fitness was also established and presented in Table 8. The findings in the Table indicate that the regression model linking independent variables organizational factors investigated (Stakeholder Participation, Technology Adoption, Resource Allocation, Technical Capacity) to dependent variable (sustainability of community water projects) was significant (Sig = 0.000, < 0.05). This therefore implies that the four variables can be used to predict significantly. The model fit well and was hence significant.

Table 8 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	55.15	4	13.788	83.683	.000
Residual	18.783	114	0.165		
Total	73.933	118			
Dependent Variable: Sustainability of Community Water Projects					
Predictors: (Constant), Stakeholder Participation, Technology Adoption, Resource Allocation, Technical Capacity					

The regression model coefficients were used to achieve the research objectives. The findings are presented in Table 9. The study findings indicated that resource allocation has a positive and significant influence on sustainability of community water projects (Beta = 0.575, Sig = 0.000, < 0.05). The findings imply that a unit improvement in resource allocation can significantly improve sustainability of community water projects. A study by Mwangi and Wanyoike (2012) also showed that improving technological resources and financial resources allocation in community projects improves sustainability. The study findings further showed that technology adoption has a positive and significant influence on sustainability of community water projects (Beta = 0.149, Sig = 0.033, < 0.05). The findings imply that a unit improvement in technology adoption can significantly improve sustainability of community water projects. A related study by Mons (2010) showed that most water utilities can enhance their sustainability through technology adoption.

It was also established that stakeholder participation has a positive and significant influence on sustainability of community water projects (Beta = 0.291, Sig = 0.001, < 0.05). The findings imply that a unit improvement in stakeholder participation can significantly improve sustainability of community water projects. This agrees with Munyao (2013) who also discovered that community participation, particularly during project implementation, ensures the long-term viability of water and sanitation projects. It was however demonstrated that technical capacity has a positive but not significant influence on sustainability of community water projects (Beta = 0.013, Sig = 0.881, < 0.05). The findings imply that even though a unit improvement in technical capacity can improve sustainability of community water projects, it's not important to mean that the current adoption rate is low to significantly enhance sustainability. A study by Macharia, Mbassana, and Oduor (2015) similarly showed that the management and technical aspects of the community water projects in Naivasha were found to be in need of upgrading in order to increase its long-term viability.

Table 10 Model Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	-0.139	0.216		-0.646	0.52
Technical Capacity	0.013	0.086	0.014	0.15	0.881
Resource Allocation	0.575	0.066	0.566	8.685	0.000
Technology Adoption	0.149	0.069	0.137	2.157	0.033
Stakeholder Participation	0.291	0.082	0.279	3.529	0.001
Dependent Variable: Sustainability of community water projects					

CONCLUSIONS

The study concludes that increasing the technical capacity of the community project management team as well as members by equipping the water project officers in operation and maintenance, integrating technology to ensure effective management of the project, using IT experts in management of the project, training CBO members on project management practices as well as allowing for participation of other services providers and also government officers in offering technical expertise in management of the water project, could increase the sustainability of the community water projects. It was also concluded that increasing resource allocation by allocating an adequate budget allocated towards management of the water project, implementing Public Private Partnerships to aid in management of the project, putting in place a sustainable financial plan to manage the water project and having sustainable operation and maintenance as well as repair and maintenance costs could increase the sustainability of the community water projects.

Another conclusion by the study is that increasing technology adoption through adopting water billing technology to enhance efficiency in billing, continuous training to enhance the technological expertise of the project members, adopting energy saving solutions such as solar panels to cut on costs, uses technology in project design to enhance accuracy and adopting financial management systems to budget to enhance efficiency could increase the sustainability of the community water projects. It was also concluded that increasing stakeholder participation through composing a participatory project management committee, ensuring the decision-making process and project planning phases is participatory and handing over the project to be fully owned by the community could increase the sustainability of the community water projects.

RECOMMENDATIONS FOR POLICY

Given the study findings, there was a need to enhance the technical capacity of the community project management team as well as members by equipping the water project officers in operation and maintenance, integrating technology to ensure effective management of the project, using IT experts in management of the project, training CBO members on project management practices as well as allowing for participation of other services providers and also government officers in

offering technical expertise in management of the water project. There was also a need to improve the resource allocation process by allocating an adequate budget allocated towards management of the water project, implementing Public Private Partnerships to aid in management of the project, putting in place a sustainable financial plan to manage the water project and having sustainable operation and maintenance as well as repair and maintenance costs so as to increase the sustainability of the community water projects.

Another recommendation of the study is that there was a need to embrace technology in management of the water projects through adopting water billing technology to enhance efficiency in billing, continuous training to enhance the technological expertise of the project members, adopting energy saving solutions such as solar panels to cut on costs, uses technology in project design to enhance accuracy and adopting financial management systems to budget to enhance efficiency so as to increase the sustainability of the community water projects. The study also recommends the management of the community water projects to ensure there is stakeholder participation through composing a participatory project management committee, ensuring the decision-making process and project planning phases is participatory and handing over the project to be fully owned by the community so as to further increase the sustainability of the community water projects.

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CONFLICT OF INTEREST

No conflict of interest was recorded by the scholars.

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