INFLUENCE OF COMMUNITY EMPOWERMENT ON SUSTAINABILITY OF WATER SUPPLY PROJECTS: CASE OF NG'UURU-GAKIRWE WATER PROJECT THARAKA SOUTH SUB-COUNTY, KENYA

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DECLARATION

This research project report is my original work and has not been presented for an award to any other University.

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This research project report has been submitted for examination with my approval as the University supervisor.

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DEDICATION

This research project is dedicated to my dear husband Calistous Mugendi who was supportive throughout my study, my little son Lucious Mugendi who is the reason I work so hard, and to my parents, sister and brothers for their emotional and spiritual support. I thank them all for always believing in my potential.

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ABBREVIATIONS AND ACRONYMS

Amuka CBO	:	Amuka Community Based Organization
CDTF	:	Community Development Trust Fund
GOK	:	Government of Kenya
GRADIF-K	:	Grassroots Development Initiatives Foundation – Kenya
IFAD	:	International Fund for Agricultural Development
JICA	:	Japan International Corporation Agency
NGOs	:	Non-governmental organizations
NGWP	:	Ng'uuru Gakirwe Water Project
SD	:	Standard Deviation
TNC	:	Tharaka Nithi County
UTaNRMP	:	Upper Tana Natural Resources Management Project
WELL	:	Water and Environmental Health at London and Loughborough
WHO	:	World Health Organization

ABSTRACT

Globally, a huge financial input has been disbursed in the public to augment the livelihood of people in communities. Although there exists substantial investment in water supply infrastructure and piped water supply schemes, sustainability remains a concern to communities. Varied water supply projects in the rural setup fail or stall after a few years of development, owing to substantial issues. This study pursued the assessment of the influence of community empowerment on sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County. The study sought to establish how community financial empowerment initiatives, community participation, capacity building and access to information influence sustainability of water supply projects. The researcher targeted a population of 482 registered household members within Tharaka South Sub-County who were members of Ng'uuru-Gakirwe water project. A sample size of 214 which included 202 general registered beneficiaries' members picked randomly and 12 committee purposively sampled. Using structured questionnaires, a pilot testing was carried out in the neighbouring Rwompo Sub-location to determine the effectiveness of the questionnaires in data collection. Adopting a descriptive research design, data collected was evaluated starting with the demographic data, culminating in an examination of the data collected in regard to the study objectives. It was established that while the number of beneficiary farmers has risen over the years, the water supply facility remains the same decreasing the quantity of water supplied to the recipients this may be unsustainable if the project facilities are not continuously expanded. The results show presence of income boosting initiatives within the community that enhances the ability to enhance members' financial capacity to pay for the water supply. There however exists a need for financial literacy education for the project beneficiaries. The study results show high involvement of the members in implementation, development, and monitoring of the project. Members actively engage in the activities of the project by contributing member fees, attending annual meetings and voting in and out of members. Participation of the members in the project activities has guaranteed the project remains operational for the many years despite the many challenges that it faces. Project members have received economic trainings on organic farming practices and growth of exotic herbs such as carcade, camommila, and lemon grass as a result the members have gained skills that have translated to members' financial empowerment, culminating in the project sustainability. There is however a need to train community members on water maintenance by the project. Committee members have received training on leadership and management of the projects that enable them to play their role in project monitoring and evaluation. Project members are cognisant of the project goals and objectives and have access to information relating to the project progress and performance. Regression analysis was pertinent to the establishment of the role of community empowerment variables on project sustainability. The results depict that all variables in the study are significant and thus Ng'uuru-Gakirwe water project has remained sustainable over the years due to engagement of fractions of each component of community empowerment. The findings show that community participation represents the most noteworthy factor, followed by access to information.
Key recommendation arising from the study is that the government and other development organisation should empower the community financially, with knowledge and skills, allow them access to projects information and include the community in project activities for sustainability of water supply projects. The study recommend further research on influence of environmental conservation on sustainability of water supply projects.

CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

Sustainability entails the aptitude of a project to endure delivering envisioned benefits in the long term (Bamberger and Cheema, 1990). Sustainable water projects are characterized by the maintenance of conditions that ensure the preservation of a adequate and reliable water supply system for extended project durations. While the understanding of the need to put up sustainable water supply initiatives, access to water, which is a primary requisite, has been hampered by the stall and closure of water supply projects, especially after the withdrawal of donor funding. Irrespective of the global acknowledgment for the need for safe water to augment poverty eradication and social-economic development, water supply projects remain alarmingly unsustainable.

According to UNICEF and WHO joint monitoring programme for Water Supply, Sanitation and Hygiene, at least two billion individuals lack access to sufficient and clean water. Africa, on the other hand, suffers the most directly with inadequate access to a sustainable water supply. In some countries, including South Africa and Nigeria, water scarcity is rampant because of the uneven spatial distribution of water resources, necessitating apposite management. In sub-Sahara Africa, approximately 51% of the people have no access to clean, sufficient, and sustainable water supply (Nyakwaka, Muronga, and Muvumbi, 2018). Additionally, more than 14 countries in the region experience water stress all year round, while approximately 11 additional countries are anticipated to experience comparable water stress by the year 2025.

Significant financial, human, and material resources are utilized globally in designing and implementing Community Based Projects. Different non-governmental organizations, including the World Health Organization (WHO), Department for International Development (DFID), Japan International Corporation Agency (JICA), United States Agency for International Development (USAID), and Australian Aid (AusAID), among others, in collaboration with the government and communities, have joined forces in a concerted effort to institute readily available water supply. Despite the efforts, the availability of safe water supply in Kenya is as truncated as 59%. The condition is worse in the rural setup, including locations in Tharaka south sub county, where the

community relies on dried up sandy rivers, springs, boreholes, and unprotected wells among other informal water sources.

Community water supply projects sustainability is a major concern receiving global attention on how to increase the long-term viability considering that funding agencies and policymakers are becoming more reluctant about the efficiency and cost-effectiveness of allocating project resources. Sustainability and performance of community-based project has been recognized as a lead spearheaded by communities in the realization of critical developments. In Bangladesh, participation of the community impacted significantly on enhancing rural water supplies' sustainability (Ashley, 1996). In India, despite the efforts made to transfer rural water supply projects ownership to community members and increasing community involvement in running and management of these facilities, at least 33% of all rural water projects still collapse after three years (WELL, 1998). In Kenya, Sessional Paper No. 1 of 1999 on National Policy for Water Resources Management and Development described communities' roles in running, maintenance, and management of rural water supplies. The paper indicated the importance of community involvement in all project development stages, including planning, implementation, operation, and maintenance, considering the fluctuating economic circumstances and up surging burden to the government.

In Kenya, failure of water supply projects is self-perpetuating, which is associated alienation of beneficiaries making them hostile towards the sustainability of current and future CBPs. Projects that undermine the capacity of local beneficiaries in actuating sustainability of the projects are more or less likely to stall. In Tharaka Nithi County, various community-initiatives implemented are geared towards empowering people through education and economic development. Different non-governmental organizations (NGOs) have worked closely with communities in Tharaka Nithi County, and especially in Tharaka South Sub-County, to successfully institute capacity building and community awareness. For instance, the Grassroots Development Initiatives Foundation - Kenya (GRADIF-K) Foundation and Amuka Community Based Organization (Amuka CBO) engender working with rural communities engaging people in water supply while addressing the water requirements of the local beneficiaries. As such, there is a need to establish community empowerment's role in impacting the sustainability of community-based initiatives focusing on water supply projects.

1.2. Statement of the Problem

Implementation of water supply projects particularly in rural Kenya faces limited funding and is dependent on donor goals which undermine the capacity of local beneficiaries to institute project sustainability in the long run. As such, different water supply projects in Tharaka Nithi County (TNC) have been implemented with the Government of Kenya (GOK) and partnering agencies providing community support grants to support and promote their sustainability. On the other hand, a decrease in funding from the government coupled with withdrawal of donor funding has resulted in stalling of the implemented water supply projects.

Despite relative success in establishment of water supply projects in the last two to three decades, researches have shown that in most countries 30 to 40 per cent of facilities either are non-functional or are operating below their capacity (IRC, 2011). In Kenya, about 30 per cent of the recently completed community rural water supply projects become non-functional in the first three years after completion. In Tharaka South sub county, water supply projects, including the Ek-Aga Irrigation Project in Turima sub-location, Community Development Trust Fund (CDTF) Water Project in Nkondi sub-location, as well as Imetha Water Project in Kithino sub-location have stalled due to paucity of funding, in addition to poor or little community empowerment and engagement.

Most of the water projects in the region that relied of external support for its operation stalled shortly after establishment, Ng'uuru Gakirwe water supply project relies both on internal and external support in the region. The project still faces some challenges such as withdrawal of donor funding that has affected the day to day operation of the project. The project however has been operation for more than 30 years, this prompted the researcher to isolate Ng'uuru-Gakirwe water project, solely developed in Kithino River, to be of value in evaluating the role of community empowerment on its sustainability.

1.3. Purpose of the Study

The purpose of this study was to the determine the influence of community empowerment on sustainability of water supply projects with a focus on Ng'uuru-Gakirwe water project in Tharaka South Sub-County, Tharaka Nithi County.

1.4. Research Objectives of the Study

This study was guided by the following objectives;

i. To determine the influence of community financial empowerment initiatives on sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County.
ii. To establish the influence of community participation in project activities on sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County.
iii. To examine the influence of capacity building on sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County.
iv. To determine the influence of ease of access to information on sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County.

1.5. Research Questions

This study sought to answer the following research questions;

i. How does community financial empowerment initiatives influence sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County?
ii. How does community participation in project activities influence sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County?
iii. How does capacity building influence sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County?
iv. How does ease to access to information influence sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County?

1.6. Significance of the Study

This research study is in line with sustainable development goal number six that concentrates on guaranteeing availability and sustainable management of water and sanitation for all individuals by the year 2030. The study seeks to measure the effect of community empowerment on sustainability of community-based water supply projects. Sustainability of water projects in the local communities is an indispensable facet of leadership accountability. The anticipated findings of this study may be used by community leaders, NGOs, and government to implement community empowerment initiatives to enhance sustainability of community water supply projects.

The research findings may also function as an information resource for government agencies and partners to assist in policy development targeting community empowerment initiatives and establishment of community projects, elaborating on approaches to make them more sustainable. Lastly, this quantitative study is noteworthy to the academic community who would use the findings for inferences in further research and literature.

1.7. Assumptions of the Study

Several assumptions were made in the course of this research. First, the study participants, including community water supply project beneficiaries and committee leaders were assumed to have understood the study goals and answered questionnaires correctly and candidly to the best of their knowledge. Secondly, it was assumed that the participants would give factual and accurate data and that the family units selected were a true depiction of the wider community in the study. Lastly, the study assumed that political interference would not affect the research process.

1.8. Delimitation of the Study

The study was limited to Tharaka South Sub-County situated in Tharaka Nithi County, Kenya. The study location harbors one of the oldest water supply project that is still active. Most projects within the region have stalled after some years of operation. The research considered the import of knowledge and experience harbored by community beneficiaries of Nguru Gakirwe water supply projects in the region to the study objectives.

The study was restricted to collecting data from the registered members of the project in relation to the variables under study that include community financial empowerment, community participation, community capacity building and access to information.

1.9. Limitation of the Study

The study focused on local community registered members of Ng'uuru-Gakirwe water project in Tharaka South Sub-County some of whom may be illiterate and may not understand the questions in the questionnaire. To counter this limitation, the researcher explained the questions in a language they understand to ensure the respondents clearly understood the questions.

Secondly, poor terrain and means of transportation within the region was an impediment, but the researcher sought assistance from residents who had better knowledge of the region to volunteer in the data gathering.

1.10. Definition of Significant Terms used in the Study

Community empowerment– This is the process of enabling the community to have power and ability to control the direction of their lives and their surroundings. It is characterised by community participation, financial capability, access to information and capacity building and

Community participation in project activities – In the project activities, it is the contribution of communal people in the construction of the project structures, decision making, employment, selection of leaders, engaging in the community water supply project meetings and carrying out assessment and evaluation of the project.

Capacity building– Is an aspect of capacity development that entails the process of imparting knowledge, skills, and tools of trade, among other social-economic resources to communities in order to enhance their competence in their production.

Access to Information– This is providing or making project information available to the project beneficiaries. It includes information about the project objectives, programmes implemented by the project and project performance

Financial Empowerment Initiatives - These are initiatives that improve the financial capability of project beneficiaries. It includes income generating initiatives, financial education and saving and asset building initiatives set up to reduce poverty and strengthen the welfare of community members.

Sustainability of water supply project – Is the capability of a water supply project to continue achieving its initial objective in this case to continue satisfying the day-to-day water need of the present community as well as adapt to future water needs of the community.

1.11. Organization of the Study

This investigation is systematized into five chapters, which include chapter one through chapter five. In chapter one, a background information is provided to build the section. The background information elaborates on different key concepts and their relationship with the main goal of the study. Moreover, the chapter shows the aim of the study and associated objectives, as well as research questions. In chapter two, an analysis of previous literature is provided highlighting the

critical variables addressed on the conceptual framework. In addition, the chapter provides an exploration of theoretical framework empirically elucidating the literature gap noted.

In chapter three, the proposed research methods are provided defining the selection and justification of research design, sample selection procedure, including gathering of data and its analysis. Ethical considerations made are, equally addressed in the chapter. Results following the data analysis constituted the fourth chapter presenting the findings and their analysis in tables and figures. Lastly, the fifth chapter entails the discussion of the results, which shaped the development of the conclusions. Recommendations to beneficiaries and policy makers were made thereafter.

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction

This chapter is an explication of reviews made from previous studies on community empowerment and sustainability of community-based projects. It discusses concepts of community empowerment whose pillars include; financial empowerment initiatives, community participation, access to information and capacity building. The section comprises the theoretical framework and a conceptual framework on which the research is based.

2.2. Sustainability of Water Supply Projects

Sustainable water project finds best strategies to deliver sufficient water without exhausting water sources or have adverse bearing to the environment in the long run; it puts in place measures to ensure easy scaling up as demand increases Walters and Javernick-Will (2015) Similarly, Peter and Nkambule (2012) adds that water supply schemes that are sustainable should provide water to the current population and also consider future generations by ensuring that supply in future is not adversely affected. According to Tortajada (2001) water supply sustainability in Mexico is pegged on initiatives geared towards achieving environmental sustainability. The level of management of environmental conservation has a long run effect on water supply projects sustainability in Mexico. Similarly, Gunawardena (2013) articulates that the achievement of water sustainability in Srilanka hugely relies on the sustainable development goals centered on environmental conservation.

Government and non-governmental organizations are at the forefront in funding water supply projects. According to Nelson-Nuñez and Pizzi (2018), in the undeveloped economies, the government and non-governmental organizations invest frequently water supply projects especially in the rural settings locals have access to water. The efforts in many instances help the people in the short-run, with most of the initiated projects stalling or in other cases completely collapsing after a short period. The initial cost of setting a water supply project up and running is usually very high. However, Walters and Javernick-Will (2015) state that finances to ensure that maintenance of the project is constantly at best level may weigh up on the project implementers and is the leading cause of projects collapse. Therefore, sustainability of water supply schemes is highly dependent on accessibility of funds to maintain the schemes. The highest rates of stalled water supply projects are

in the rural set up, a factor considered to be due to the high poverty levels in the rural set up, hence the residents are unable to raise finances to withstand the maintenance costs. Ibrahim (2017) contends that most government and non-governmental organization initiates come into play to fund entirely new water supply projects or to rejuvenate stalled schemes, making it paramount to the people to set up mechanisms to fund the projects themselves to ensure the projects continue in operation.

Sustainability of water supply projects is highly connected to the technology employed Technology provides new solutions to water supply projects which help the schemes to withstand the test of time Silvius, Schipper and Planko (2012). Reliable technical systems ensure that the implemented schemes use technology which adapt to future changes in technology in a seamless manner. Hegger, Spaargaren, Vliet and Frijns (2011) asserts that in Netherlands investment in the most recent water supply technology innovations is aimed at ensuring that the projects withstand the test of time. However, Lockwood, Bakalian and Wakeman (2003) disagree with this finding by arguing that as much as technology helps in sustainability of water supply projects, in some instances technology results to environmental pollution which could make implemented water projects stall. Choice of technology in the execution of water supply projects is very crucial, and project implementors should be keen that technology adopted does not compromise the environment.

The management team is the leading controller of water supply projects from inception to the period the projects become functional. In Nigeria, the level of water supply in the rural set up is very poor with the started projects collapsing owing to poor management. Though poor technology and other social-economic challenges hinder successful maintenance of water supply in the long run, inappropriate management results in failed water supply projects in most initiated projects in Nigeria (Gbadegesin & Olorunfemi, 2007). Similarly, Hegger, Spaargaren, Van Vliet, and Frijns (2011) argue that appropriate management strategies enhance water supply project sustainability especially in rural set-ups in Netherlands. According to Peter and Nkambule (2012), measures put in place by management from implementation stage have a big bearing to the sustainability of the initiative in the long run. The managements arrange for the carrying out of constant evaluation of the project feasibility and ability to remain feasible in the future. The incorporation of proper evaluation and implementing provisions of the evaluation report by the management ensures that the

water supply project keeps track of the necessary improvements that need to be implemented for the project to remain afloat (Githinji, 2013).

Consumers' responsibility in the maintenance of the water supplied and water supply facilities is crucial in sustainability water supply projects. Water supplied as an economic good fosters a better regulation of water consumption thus augmenting sustainability of the projects (Rogers, De Silva and Bhatia, 2002). Equally, Savenije and Van Der Zaag (2002) argue that the supplying water by the project in a manner that the consumer demand is met at a certain price ensures little wastages by the consumers due to the cost associated with each unit of water consumed. The price that is paid for the consumed units enhances the maintenance of the project with finances available for repairs and expansion of the water supply, culminating in sustainability of the project in the long run. The demand-responsive approach requires sound managerial decisions to ensure high level of service delivery with quality of the water central to success of the strategy considering the expenses that the consumers incur. In analysis of water usage with case studies of Egypt, India, Morocco and Ukraine, Hellegers and Perry (2004) posit that the water supply as an economic good increase the chances of sustainability of the water supply project, the price instils some discipline in the use of the water by the consumers thus minimizing wastages.

2.3. Community Financial Empowerment initiatives and Sustainability of Water Supply Projects

The implementation of financial empowerment initiatives in low-income and rural areas has been used as an approach of alleviating poverty in such focus regions. According to Cislaghi, Gillespie and Mackie (2016), the concept of financial empowerment surrounds instituting improvements on financial security of low-income communities. As a key component of community empowerment, financial empowerment is viewed a primary strategy of enhancing achievement of sustainability of community-based projects, including water supply schemes (Kasri and Moersidik, 2018). In addition, a report from Organisation for Economic Co-operation and Development (OECD) (2009) on strategic financial planning for water supply and sanitation suggest that financial empowerment is vital for successful and effective water supply and sanitation provision all over the world. Holding strategic financial empowerment plans fosters successful implementation of water supply projects.

Consequently, as Ahmad and Talib (2016) summated, financial empowerment initiatives have been described to be facing major challenges, particularly in association with lack of funds to facilitate sustainability of projects, rendering many water supply initiatives to stall. Ansari, Munir and Gregg (2012) argue that financial empowerment initiatives drive members of the community to develop strategies that outlay better understanding of community economic needs, and are enthused to design and implement approaches, such as water supply projects to help reduce economic needs sustainably in relation to water shortages. Equally, Hegger, et al. (2011) contends that consumer-inclusive initiatives in Netherlands are targeting ensuring financial capabilities among the consumers in the water industries for sustainable water supply. Finance generating strategies for the consumers ensure that water supply projects can be sustainably financed by the consumers, shifting the financial burden from the government and donors.

In many rural settings, financial empowerment has been initiated as a set of strategic interventions to facilitate the low-income communities to augment their income by improving their credit scores, decreasing debt level while increasing their savings capacity, and accumulate wealth (Mbah, 2019). Sustainability of community water supply project is deemed as realized following a financial empowerment initiative when community members benefit from entrepreneurship, employment, and improved economic standards resulting from the implemented project. According to Boscheck (2002), the financial empowerment of marginalized communities in the rural set ups of the United Kingdom, precisely Northern Ireland attempts to incorporate use of technology in water management for sustainable supply.

The uniqueness of financial empowerment initiatives is embedded on its characteristic focus on facilitating and sustaining people with low income in rural communities to enable them to participate in the existing community-based projects and financial systems. As a result, they are perceived sustainable based on the level of increase in knowledge and opportunities that foster attributes that are indispensable to the economic security of the beneficiary communities, and their capacity to invest from the initiatives in the future. Steiner and Farmer (2018) assert that community financial empowerment initiatives should not be viewed as a mere act of aiding the community members with finances to set up a project and offer training on the importance of owning and sustaining water supply projects. To Steiner and Farmer (2018), the process of empowering people financially is a very complex undertaking which calls for the government and other stakeholders

involved in the establishment of the project to have a sense of understanding on how communities sustain and prevent collapse while serving its purpose.

Assistance on access to income boosting initiatives benefits helps boost the water supply projects. According to Johnson, Hokanson, Zhang, Czupinski and Tang (2008) financial income generated through the water supply projects by the consumers renders the project feasible thus increasing the chances of existence of the water supply project for a long period. Similarly, Ilahi and Grimard (2000) posit that in Pakistan, use of water supply projects to enhance financial stability among women enhances the general economy with the most successful projects recognized as those that the people can generate income from. Additionally, Monitor, Notes, Outlook and Notes (1996) articulate that water supply for irrigation activities that generate income to the local residents stands the test of time with the consumers persistently striving to ensure consistent supply of the water. The crops irrigated help in income generation thus the finances help in ensuring the farmers meet their water financial obligations and thus operation and maintenance of the project possible due to availability of project's finances consequently enhancing sustainability of the project. Access off finances from the agricultural products also helps in maintenance of family stability for the beneficiaries thus they commit into ensuring that the water supply project is in good condition in order to continue enjoying the benefits that accrue from the agricultural activities through the water supply project.

The access to credit facilities empowers the residents financially, a factor that influences the water supply projects. According to Harvey (2007), with access to financial aid through loans and other credit services farmers benefit more from the water supply projects. The credit facilities provide finances for initial capital to invest in the agri-businesses through the water supply projects, agri-business enhances financial stability of the water supply project beneficiaries an indicator of sustainability of the project. Financial saving initiatives empower the project members to sustain the project through adoption of the best technology and availability of financial pool for project expansion (Mehta, Virjee & Sustainability 2007). The expansion of the project by application of apposite technology provides a better chance for the locals to accumulate more wealth through increased agricultural investments whose proceeds funds the financial obligation for the water supply. As such, the achievement of sustainability of the water supply project is possible.

In other instances, members of water supply project form saving groups for financial stability Harvey (2007). The saving groups may grow into Sacco through which members save some of their proceeds from the agri-business. Such growth through the member's efforts ensure the initial projects, the water supply project is protected financially with the Sacco proceeds channeled towards growing the water supply project thus its sustainability. Additionally, Ilahi and Grimard (2000) assert that the financial strength of the members individually from the dividends helps the members to meet their financial obligations towards the project.

2.4. Community Participation and Sustainability of Water Supply Projects

In the skirmish of ensuring water supply projects sustainability is achieved, community participation is equally important just as other initiatives put in place to contribute in the achievement of sustainability are in the development of sustainable development of any project just as capacity building and community empowerment are. Mbah (2019) in an examination of the vitality of community involvement in achieving sustainability of projects in different countries inclusive of Africa, Asia and America noted among other factors supportive to the sustainability of community projects, community participation was the most fundamental. Hegger, et al. (2011) affirm Mbah (2019) assertions by espousing that in Netherlands the Consumer-inclusive initiatives attempts to empower the community and augment their participation in general activities within their water supply industry. The initiatives ensure the consumers become a key stakeholder in the water supply initiatives as a means of enhancing sustainability of the projects. Similarly, in a study to examine how to enhance sustainability in of water supply projects for clean water in North Gondar in Ethiopia, Admassu, Fantahun and Kumie (2003) established that involvement of community members in providing solutions to activities that involve the running of the water supply projects augmented successful water supply projects and ultimately enable access to clean water in North Gondor.

Government and other foreign developmental agencies are contributing huge amount of money directing them towards establishment and sustenance of the existing water supply projects, most of these funds have ended up being wasted due to lack of community involvement to provide their views on the process of planning, control and management of such projects (Steiner and Farmer, 2018). Steiner and Farmer (2018) further presupposes that many water supply projects last few years after their establishment if the decisions of the communities' members are despised by the

government official due to lack of support from community members which result into less sustainability. Steiner and Farmer (2018) concludes that successful achievement of sustainable water supply projects is therefore determined by the level at which the public are given opportunity to engage in decision making process of planning and running of the water supply scheme since through participation the community members develop sense of belonging hence safeguarding all the processes undertaken to ensure the project is sustained.

In Kenya, the emphasis of community participation in community water projects has been evidently stipulated in the Kenyan Constitution and in the Water Act of 2002 (Achieno and Mwangangi, 2018). Community water projects can only be approved by the government authority on the condition that the proposed project has been approved by the persons occupying at least two-thirds of the project implementation area. There is therefore a need to ensure every member of the society is given a chance to give ideas on matters affecting them before establishing the water supply project. When this is done every individual in the community feels represented in the management of these projects hence embracing the spirit of committing themselves to contribute anything demanded for by the project managers ensuring sustainability of the project is achieved (Kretschmer, Neugebauer, Stoeglehner and Ertl, 2018). Essentially, sharing views in the process of planning, implementing, managing and controlling community projects in the community participation initiative greatly contribute to ultimate achievement of sustainable water supply projects. Similarly, Aga, Noorderhaven and Vallejo (2018) concurs with the intuition cited by Kretschmer et al. (2018) conceding that participation is a form of partnership in which different agendas are achieved in unison after consultations from the partners with the formulated agendas adopted and used in respect to the wish of the partners.

In this regard therefore, public participation is deduced to be the best process through which sustainability of water supply projects is achieved since the agendas being implemented are true reflection of what the community members want making it easy to encourage them to work towards ensuring these water supply project do not collapse. Additionally, Aga, Noorderhaven and Vallejo (2018) point public participation is a form of community empowerment which promotes accountability, proper utilization of the project resources transparency and economic development better project establishment and sustenance. In study to assess cooperative water supply conservancy in China, Qian (2012) determined that including the community in water supply

strategies either through empowerment or in management stimulates water conservancy measures by the community at large thus making water supply project's sustainability worthwhile. Public participation therefore promotes water supply projects sustainability because when there is accountability and proper utilization of resources achieved out of this initiative, the resources are directed towards development of the water supply project established ensuring they do not collapse easily.

Participation of the community in the water supply ensures the underserved people are fully involved in giving ideas on how best the water supply could be implemented. This was proven to be true in study to assess community involvement in supply of clean water in Napal (Bhandari and Wickramanayake, 2000). The sense of ownership acquired through community participation puts the members in a position to dedicate their efforts towards ensuring the project thrives as if it were personally owned and thus enhances continuity of the project. Involvement of the members of the community in roll out of the project ensures that the project management team makes use of the community member's expertise further giving the project a connection to the local people who feel the project is for their own good from the onset (Harvey & Reed, 2006). Similarly, Thwala (2010) affirms the assertions by articulating that some of the community members possess great skills pertinent to the water supply project thus helping in ensuring that the best foundation for the project is put in place ensuring that the project stands the test of time. The availability of the community in providing labor at lower prices especially in rural set-ups ensures implementation of the project in an economical manner; the saved finances are used to ensure the best foundation is put in place regarding technology and quality of materials used.

According to Thwala (2010) in a study to establish the effectiveness of involving community in determining success of water supply projects in South Africa, community participation enhances cost sharing aspect of the project. The initial finances in most cases in developing countries come from the government or donors, upon withdrawal of the support from the donor the project suffers if the project does not get an alternative source of funding. Involving the community from the point of inception ensures the members accepts the project as an answer to the collective community needs in a supportive environment thus the members are willing to give financial help to maintain the project culminating in sustainability of the project (Thwala, 2010).

Mobilization of the local resources for the support of the long-run success of the project is only possible if the members of the community feel part of the project through participatory initiatives by the project management team (Dungumaro and Madulu, 2003). Resources mobilization by the members of the community happens in a manner that ensures future availability of the resources thus sustainability of the project through apposite use of the available local resources. Similarly, Carter, Tyrrel and Howsam (1999) assert that the best strategies for application in implementing water supply projects require thorough understanding of the problems existing problems which the management team best achieves by considering the input of the local community members. The members are best positioned to understand the problem they are facing making it possible for the team in charge of the project to make the right decisions for sustainability of the project rather than making decisions based on information from the personal judgments of the project manager thus providing only a short-term solution.

2.5. Community Capacity Building and Sustainability of Water Supply Projects

Since development of the concept of capacity building in the early 1990s as a perspective of international development, governments and other organizations have today incorporated it in their strategy on the best approaches to achieve sustainability of the community projects, which helps in enhancing economic development (Yoseph-Paulus and Hindmarsh, 2018). Since the inception of the term 'capacity building,' different organizations like World Bank, United Nations and Oxfam International have widely used it in the process of empowering communities leading to achievement of project sustainability goals. Etongo, Fagan, Kabonesa and Asaba (2018) view capacity building as a process by which social and economic goals of spreading and improving knowledge and skills are achieved through stimulation to enhance capabilities of enabling environment as a result of systematic coordination between society, people and organizations. Kumbar (2018) therefore holds capacity building should be used as a developed tool for feeding information the relevant stakeholders in the community bounding them into effective communication and accountability.

One of the key goals of development in both government and private sector in developing countries has been achieving sustainable water supply through community empowerment initiative. Studies in Africa have however identified most of water projects to be established by governments although other partner groups have been enthusiastic in funding establishment of water supply projects (Ahmad and Talib, 2016). Despite the government heavy investment in building community

capacity to augment its realization of sustainable water supply goals through huge allocation of funds to ensure different communities are supplied with water for both domestic and agricultural use, most of the supply projects are not sustainable for more than five years (Agbedahin, 2019). According to Agbedahin (2019), capacity building initiatives foster sustainability when the members of a community are imparted with ample trainings, skills, and integrated with the process of planning of the project as well as the execution process in the process of project design and implementation. Similarly, Mackintosh and Colvin (2003) assert that the failure of clean water supply projects in South Africa is a consequence of poor integration of community members in the matters concerning the projects. According to Mackintosh and Colvin (2003), enactment of water supply projects for clean water that are highly regarded by the community and guaranteeing trainings for the community on the management and maintenance of the projects ensure running of the projects for long period. In addition, Hegger et al (2011) articulates that in Netherlands, equipping the consumers with the right training for skill acquisition on water supply innovations presents an opportunity for effective and successful water supply schemes.

Oino, Towett, Kirui, and Luvega (2015) described capacity building is a crucial indicator of sustainability in project planning, implementation and support. Etongo, et al. (2018) described the initiatives associated with capacity building pointing out that it commences with project inception and direct or indirect participation of communities. Similarly, Olawoye (2019) links the activities encompassed in capacity building to the processes in instilling strength, competencies and the necessary inputs through which they can incorporate, sustain and manage the current existing projects and use them to survive in the modern world without much strain. Capacity is built while experience is acquired over time allowing communities to manage projects efficiently following the exit of funding entities. Arguably, Yoseph-Paulus and Hindmarsh (2018) stipulated that community capacity building facilitates communities establish the flexibility, functionality and possibility of organizations to offer sustainable projects in the fast-changing world of today. Such attributes, based on Oino et al. (2015) summations, are garnered through trainings in institutions of higher learning or in workshops and seminars.

Community capacity building, according to Senbeta and Shu (2019), is a pivotal anchor of community empowerment through which community-based projects are implemented and has showed a tremendous support from local and international bodies, particularly the World Bank, and

USAID. Such bodies have maintained that capacity building is an indispensable initiative for ensuring the established projects are sustainable, while being managed and owned by the local members. Capacity building renders people in the community able through knowledge and technical skill to adeptly develop and management water supply projects in the long run. Training of the community members on sound financial management strategies ensures that the members handle their income in a better way thus meeting their financial obligations of the project (Harvey, 2007). Conversely, Ahmad and Talib (2016) concluded that sustainable water supply projects can only be achieved if influencing factors such as budgeting and legal frameworks are consistently reviewed and implemented regularly.

The Vision 2030 Initiative in Kenya aims at empowering community members through capacity building and participation to enhance sustainability of water supply projects established and maintained in all parts of the country as a strategy to increase availability of water for all citizens. Essentially, communities in rural setups are in dire need for knowledge and expertise of coalescing and setting needs-based priorities to strategize on sustainability of projects. Kumbar (2018) affirms community capacity building initiative operates under the principle which gives priority to the activities, acceptable norms and ideas in the community where the project is established considering that the project should be owned and managed by the society either directly or indirectly to achieve sustainability of that particular project.

The core purpose of community capacity building has been helping the community members to know the need of remaining active in sustaining the existent community projects and encourage them to utilize them in order to improve their living standards (Simpson, Wood and Daws, 2003). Moreover, through community capacity building, the government or other donor organization identify the most pressing challenges in that particular locality which need to be addressed in a common action resulting to development of a society that is equipped with skill and working in unity towards achievement of a common goal. On the other hand, Ahmad and Talib (2015a) and Etongo et al. (2018) examined the obligation of capacity building in community empowerment in project sustainability and showed that governments have developed strategies of promoting sustainability of water supply projects. In this regard, the public is charged with the responsibility of team working to pool knowledge and expertise of sustaining the already-established projects, thus creating cohesion which enhances economic stability.

According to Kasri and Moersidik (2018) the achievement of sustainable development through implementation of empowerment sub-domains, such as capacity building in communities may not solely educe sustainable projects due diversity of their ideologies. As such, the importance of community capacity building as a key domain of community empowerment is a subject of sustainability of water supply projects that cannot be overlooked in the rural Kenya. Consequently, it is pertinent to assess the best strategies of achieving capacity building through community-based initiatives for the realization of sustainability in implemented water supply projects. Conclusively, the best practice of community capacity building is that which takes keen considerations of the agendas proposed by the community members and fully supporting them.

2.6. Access to Information and Sustainability of Water Supply Projects

Appropriate channeling of information to the beneficiaries of a project enhances the chances of project success (Christens, 2019). In support of the sentiments, Lungo, Mavole and Martin (2017) argue that projects that stand the stand the test of time demonstrates access to information by the members, management and other supporting agencies. The information access in such projects passes to the concerned persons either vertically or horizontally with the aim of enhancing better performance of the project.

In a study on information and sustainability indicators, Rezende (2016) asserts that access to information promotes the levels of accountability through ease of follow up on how business is conducted in an organization. In addition, the author elucidates that some of the projects initiated in organizations where accountability is not key to daily operations either stall or collapse due to embezzlement of funds. Similarly, Garrido and Wyber (2017) contend that the increased admittance to information through advancement in technology has increased the rate of success of community-initiated projects since the members of the project are able to question the wrong running of the projects based on available information. In support of the sentiments Admassu et al. (2003) posit that availability of information to the beneficiaries of water supply projects in Ethiopia promotes sound decision making at both managerial level and by the community, enabling sound decision making. Long-term and short-term decisions are made on the basis of correct and current decision thus the projects stand a higher chance of survival for a longer period. Rowley and Hartley (2017) affirm the assertions by articulating that 20% of projects initiatives in the rural set-up fail due to poor accountability, a problem that can be reduced through access to the right information

compelling project leaders to be accountable to the informed community members. On the contrary, Lovett, Clarke and Kilmurray (2018) argue that access to information without acting positively based on the information has no constructive impact on projects.

Ease of access to information builds trust between management and other beneficiaries of the project due to the openness in management operations of the project (Ahmad and Talib 2016). According to Brown and Hoque (2016), projects management team operates within an intricate environment where the members of the project should be engaged in project activities through timely delivery of information for successful operations and growth of the project. In support of the assertions, Lovett, Clarke and Kilmurray (2018) asserts that disharmony between managers and the beneficiaries of the project especially in rural setup emanates from misinformation due to lack of access to information which results in collapse of projects in some instances. Equally, in China adoption of technology in water supply offers an opportunity for easier dissemination of information between the project management and other stakeholders for smooth running of the projects (Qian, 2012). According to Gbadegesin and Olorunfemi (2007) some of the failed water supply in rural Nigeria made decisions based on unreliable information due to low admittance to information.

Project managers' decision making is based on the information at hand as at that time or information acquired over a long time (Imran, Salisu, Aslam, Iqbal and Hameed 2019). According to Brown and Hoque (2016), information empowers project managers and the ease of access to the information helps in making better decisions that have a long-term continuity of the project. sentiments from Ahmad and Talib (2016) enforces Brown and Hoque (2016) ideas by espousing that the decisions made by project managers affect the sustainability of the project and access to information informs those decisions, with over 15% collapsed projects resulting from poor decisions by managers.

Enhancing commitment to accountability through ensuring access to information has been identified to be the key aspect that promotes ease of monitoring and evaluating project's performance thus promoting sustainability of the project (Gichohi, Sang & Kosimbei, 2019). According to Gichohi et al. (2019) access to information helps the managers of the community projects to gain the ability to address varied needs of the community members and other relevant stakeholders of the project diligently and professionally leading to avoidance of any conflict within the project management leading to sustainability of the project. Access to information in water supply projects promotes

better monitoring and evaluation of the project's progress through participatory initiatives promoting sustainability of the projects since accountability is promoted within the members of the projects. Muriungi (2015) study on the role of participatory monitoring embedded in the access to information initiative of enhancing transparency among government water supply projects discovered that sustainability of the project under study was dependent on effective indulgence of the project management in promoting participatory monitoring which was rooted on proper execution of access to information among all members of the project.

Besides, Lillian and Mutiso (2019) explored how effective monitoring and evaluating process anchored on adequate provision of relevant information regarding water supply projects influenced the community water projects sustainability in Machakos County using census approach observing water projects in this county involving both inferential and descriptive statistics. The results of the study showed that water projects sustainability was substantially affected by effectiveness of monitoring and evaluating the daily running activities of these projects with the projects whose managers had ensured the members had been exposed to adequate access to information indicating the possibility of remaining functional for a longer period. Fierro, Nelaj, Mwendamseke,Traini and Muggianu (2019) from a study in seven districts of Dodoma in Tanzania which noted that without adequately providing access to information to the water supply project members to enhance proper monitoring and evaluation of project progress in an accountable manner the projects were ultimately going to collapse few years after inauguration.

In a research done by Mendamseke et al. (2016) water supply projects were likely to collapse if no information concerning the running of the project was availed to the community members because the managers would not be held accountable of any mismanagement of the project funds giving the opportunity of running using the funds of the project for personal gains. Embracing the culture of ensuring the community members are offered an opportunity to access relevant information of water supply project enhances project sustainability since the information availed to the members of the community help them to question any cost imposed to them leading to transparency on the project management. Hoque et al. (2019) in a study to explore the impact of transparency in enhancing the sustainability of water supply projects brought forth by access to information among water supply projects in Bangladesh revealed that transparency was a vital tool of attaining sustainability of water supply projects. Contrary, Kiliç, and Kuzey (2017) in research in Turkey realized although access to

information among the members of water supply project led to increased levels of project sustainability due to transparency in the running of these projects, many project managers were reluctant to avail relevant information hampering the sustainability of many water supply projects.

2.7. Theoretical Framework

The definition of a theoretical basis of a research elucidates the social tenets that give a worldview on the solution to unexplained postulates. This study is anchored on empowerment theory that is supported by the participation theory.

2.7.1. Empowerment Theory

The theory of empowerment was described, according to Rappaport (1981), to entail "mechanisms by which people, organizations, and communities gain mastery of their lives." Empowerment concept encapsulates a value orientation and a theoretical perspective entailing working in a community. It carried the weight of understanding the consequences and processes of efforts put in place to influence and impact on decisions, which involve the life of an individual, the functioning of an organization, and/or the quality of life in a community (Ani, Ramlan, Suhaimy, Jaes, Damin, Halim & Ahmad 2018) The understanding of different tenets defining the value of an empowerment approach to institute social and economic change is pertinent to the elucidation of the position of community empowerment in sustainability of community-based schemes. Gilchrist (2019) argues that value positioning of empowerment postulates the aims, goals and approaches towards implementation of change. The theory of empowerment proposes the underlying principles and describes a framework for organizing and processing the knowledgebase of a community.

According to Rappaport (1984), the American culture takes the concept of empowerment to assume a ubiquitous positive value. The theory postulates that individual determination of personal life and their representative involvement in community endeavors particularly through engaging in community structures, including education programs, religious organizations and voluntary services. Community empowerment relays a psychological tenet of individual influence and control, and relevance of actual social political influence and power. Empowerment gives projects power to sustainability as a multilevel construct by studying the role of people in project management context.

In particular, Rappaport (1981) equates empowerment to a process or a mechanism that community members engage to acquire control over their basic social-economic and political needs. The adoption of community empowerment targets sustaining community-based projects by refining beneficiary role relationships to policy, projects, and people. In concert with this study, the foundation of empowerment in project sustainability entails establishing solutions to community problems with respect to the diversity of local environments as opposed to depending on the centralized lead structure where the paucity of assistance is common. The essence of empowerment is to provide empirical information, the absence of which introduces inadequacies in project sustainability considering poor understanding of the project and its primary needs for continuity in developing solutions to the community.

Keiffer (1981) described empowerment as a process involved in transitioning a people or community from powerlessness to self-sufficiency. The suitability of Keiffer's empowerment theory, as embedded in Rappaport's empowerment theory, in the current study focuses on community-based water supply projects sustainability especially in the rural Kenya where empowerment initiatives are deemed to target the low income farmers. The understanding of empowerment embraced by Keiffer (1984) pointed at the conception of resource allocation enthusing social influence to affect economic and political capacity. In actuality, the understanding of empowerment entails coalescing control over individual lives as a people or a community. As such, economic and political power and influence are related to the accumulated wealth within a community. Individual empowerment, according to Larkin, Cierpial, Stack, Morrison and Griffith (2008), is a developmental process encompassing the entry error characterized by powerlessness and experiences of injustice, advancement era characterized by initiation of mentorship initiatives, incorporation era characterized by enhanced strategic capacity with improved organizational and leadership skills, and commitment era associated with commitment to proactive community leadership and mobilization. The position of project sustainability is built through such four stages, with community empowerment through participative capacity building, leadership, and access to information play a pivotal role.

Kanter (1993) highlights how access to resources, material and/or information, plays a significant role in empowering communities to implement and sustain projects while benefiting meaningfully. Project sustainability is pegged on empowerment, which is accomplished through continuous and

progressive engagement of people for the common good of the project with the intent of enhancing growth. The actuation of both empowerment and sustainability is gradual and develops with time as community members acquire better control of their lives socially, economically, and politically to influence which decisions are considered in running projects.

While the current study targets on community-based projects in a rural setup, the concept of empowerment is regarded as a strategy for facilitating marginalized communities and their members better their economy by rationalizing the social tenet that only the affected people know and understand their needs. Non-governmental organizations function particularly as a lead in targeting approaches to institute structural change that is geared towards a reduction in social, political, and/or economic needs of a community. Empowerment has been associated with measures that are tailored to enhance the dimensions of autonomy and independence in people of a community to allow them to be self-sufficient in self-representation of their interests in a self-guided manner. The current study linked empowerment theory to perceptions of engaging non-profit organizations comprised of the locals in fostering authority while representing own agendas that are community-based, as well as defining own plans and seeking relevant resources (natural, human, or financial) to implement and take responsibility of projects successfully.

Participatory theory participatory theory supports empowerment theory on the constructs of the recognition that poor communities suffer lack of development, yet every member of a community requires being engaged in the development agenda, particularly in the decision making, improvement, execution and sustainability of development projects (Natarajan, 2017). Development of the theory was aided by Maser (1997), who described participation by evoking people engagement in the process of decision making while implementing projects geared towards development. Coughlin, Smith and Fernandez (2017) posit that a thin line differentiating the conceptualization of empowerment and participation is widened by expectations of community members and the outcomes of participatory development. Literally, community participation entails engaging of people in the process of making decisions.

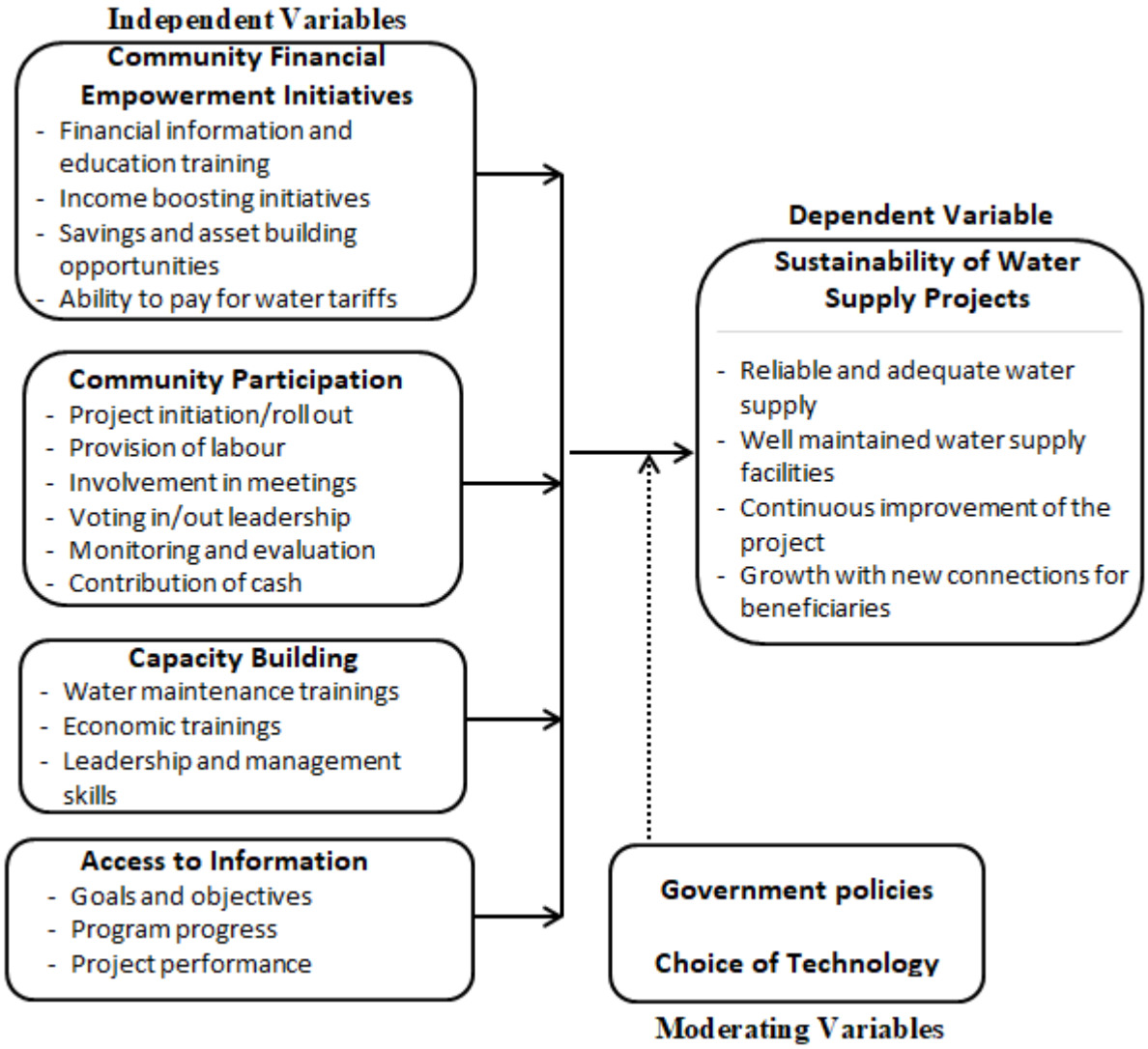
The application of participation and usefulness has been instrumental as opposed to being transformative in community development, which limits its contextualization. Community participation is as an indispensable component engaging a heterogeneous knowledge base. As

postulated in the current study, community participation characterizes communities as small spatial entities, comprised of a large homogenous social unit that share norms, which are important in assessing the level of participation. Moreover, participation reflects on community involvement at diverse levels. In other perspectives, participation entailed involvement of other project shareholders at different stages of project implementation, or on community enablement and the particular roles of marginalized entities in the community. In the current study, the component of decision-making expands community participation as a component of influence in priority setting, decision-making, policy development and allocation of resources. Using the theory, the current study considers community participation to encapsulate methods that local communities engage in taking primary roles and responsibilities in addressing needs that affect them, as well as how and the extent to which authority is distributed based on participation type.

2.8. Conceptual Framework

The following conceptual framework describes the perceived association between the independent variables of community empowerment and the dependent variable, particularly sustainability of water supply projects.

Figure 1: Conceptual Framework



Community empowerment is divided into four dimensions i.e. community financial empowerment initiatives, community participation, community access to information and capacity building. Arrowheads show that community empowerment is perceived to have a direct connection with the sustainability of water supply projects. Government policies and choice of technology act as moderator variables eliciting direct influence on the dependent

variable. Achievement of community financial empowerment initiative has been identified to be dependent on the willingness and ability of government to provide enough funds required for sustaining the community project and the community members ability to pay for water tariffs after the project has been established for the maintenance of the project. Participation activities isolated among community members to actively enhance sustainability of water supply project included engaging in voting leaders who they trust to represent them in the management of the project, attending project meetings and giving out their views concerning establishment of the project and monitoring closely the daily running of the project and supporting project's development through financial contribution.

To achieve sustainability of water supply project through capacity building, offering training on the best ways of maintaining water, creating awareness on the economic significance of water supply project to the community members and training the leaders on the best approaches to incorporate in the management of these projects were the key components to be assessed. Making sure the community members are given full access to information has been directly linked to enhancing achievement of the set projects goals and objectives, improved progress and better performance leading to sustainability of the project. They key features identified to assist in characterizing sustainability of water supply projects were existence of reliable and adequate water supply, availability of well-maintained water supply facilities and constant progress of the project denoting increased beneficiaries marking its growth.

2.9. Summary of Literature Review

The reviewed literature critically analyzed the concepts pertinent to community empowerment in fostering water supply projects sustainability. The cost implications, management and technological needs influence the level of maintenance of water projects, the three factors positioning themselves as major determinants of water project sustainability. Community financial empowerment initiatives determine sustainability by liberating rural-based community members from poverty and enabling them to contribute to the funding of the project. A critical review of community participation depicts water projects sustainability is hugely influenced by the degree of involvement of community members in the project activities. Past literature presents community capacity building

coupled with access to information as key approach to appropriate communication in stimulating community member's active contribution towards sustainability of water projects. Empowerment theory offers the base for consideration in gauging sustainability of water projects. The conceptual framework section closes the chapter by elucidating the interaction of dependent and independent variables under some moderating factors in determining sustainability of water project through community empowerment.

2.10. Knowledge Gap

Table 2. 1: Knowledge Gap

Variable	Citation	Title	Key Findings	Knowledge Gap
Sustainability of water supply projects	Marks, Komives & Davis (2014)	Community participation and water supply sustainability: evidence from handpump projects in rural Ghana.	While involvement of community members in the planning and implementation of projects presented positive sustainability impacts, the depth of community involvement in decision making hampered borehole sustainability.	The roles of community empowerment on sustainability in rural setting have not been isolated. Many sustainability studies have explored project performance rather than sustainability of the projects particularly in Tharaka Nithi County.
	Tadesse, Bosona & Gebresenbet (2013)	Rural water supply management and sustainability: the case of Adama Area, Ethiopia.	Inadequacy of water supply projects was high considering only 15% of community members could get reliable water from the projects, while water from the sources was exposed to contamination from human and animal excreta, and uncontrolled flooding.	
	Schweitzer & Mihelcic (2012)	Assessing sustainability of community management of rural water systems in the developing world.	Only 23% of CBPs presented sustainability potential with 18% impacted by sustainability challenges associated with post-construction and financial durability and accounting transparency, and compliance with user tariffs.	

Variable	Citation	Title	Key Findings	Knowledge Gap
Community participation	Miseda (2014)	Influence of community participation on sustainability of selected njaa marufuku Kenya food security projects in Kisumu west, Kisumu county, Kenya.	Engaging community participation in different phases of project implementation and management enthuse beneficiaries to have a sense of ownership.	Water project management is skewed to project funding agencies considering that many local people have low literacy rates, yet participation is highlighted at a promoter of project sustainability.
	Manikutty (1997)	Community participation: so what? Evidence from a comparative study of two rural water supply and sanitation projects in India	The design of water supply projects, including their implementation need to be tailored to a flexible level to allow exploitation of local knowledge base through community participation.	
Financial empowerment	Wahid, Ahmad, Talib, Shah, Tahir, Jan & Saleem (2017)	Barriers to empowerment: Assessment of community-led local development organizations in Pakistan	The qualitative results showed that financial and political influence impact on community which is an ingredient for project sustainability.	Over dependence on governmental and donor funding characterizes project implementation in many areas. As such, withdrawal of any of the funding parties is evidenced with closure of many projects. There exist a need to establish the influence of community financial empowerment on project sustainability.

Variable	Citation	Title	Key Findings	Knowledge Gap
Access to information	Gichohi, Sang & Kosimbei (2019)	Towards Sustainable Water Supply: Enhancing Project Accountability Practices in Water Supply Projects Within Nairobi City County's Informal Settlement Areas	The authors identified that accountability through ease of access to project information has a positive influence on community empowerment promoting project monitoring and evaluation, and transparency.	Means of data record and archiving are limited in the rural setup, rendering access to information obsolete
Capacity building	Ameyaw & PC Chan (2016)	Critical success factors for public-private partnership in water supply projects	Successful implementation of a community water supply project is pegged on the achievement of capacity building and participation.	Implementation of initiatives that identify with capacity building, one of the key project critical success factor, is limited considering the unavailability of financial resources in low-income areas.
	Ameyaw & Chan (2015)	Implementing PPP Water Supply Projects in Ghana: A Model of CSFs	The critical success factor groups identified towards project sustainability included enhanced capacity building, strengthened social support and commitment of partners	

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section encompasses an in-depth account of how the study was carried out. The research study relied on primary data to examine water supply projects sustainability. An organised explanation of the research design, study population, sample size and sampling procedures, data collection instruments, validity and reliability of data collection instruments, data collection procedures, data analysis strategies and the ethical considerations is provided in the section below.

3.2 Research Design

A descriptive survey research design was adopted in this study, questionnaires were administered to study participants with the aim of demonstrating the relationships between variables. According to Lambert and Lambert (2012), a descriptive design is very useful when researchers want to get information directly from those experiencing the phenomenon. The choice of this design was steered by the need to recognize the association between community empowerment and sustainability in the long-term development of water supply projects in the rural Kenya. As described by Hammersley (2017), the study traversed from the consensus on the community empowerment factors influencing community water supply projects sustainability.

3.3 Target Population

The total population in the current research was the 482 registered household members (NGWP Registry, 2019) within Tharaka South Sub-County who rely on water supply from Ng'uuru-Gakirwe water project. The target population, also, included 12 project management committee members considering their role in providing crucial information pertinent to the water supply project they manage in relation to the general project beneficiaries.

Table 3. 1: Target Population

Phase	Registered household members	Project management committee	Total
Phase 1	112	4	116
Phase 2	167	4	171
Phase 3	191	4	195
Total Respondents	**470**	**12**	**482**

3.4 Sample Size and Sampling Procedures

The appropriate choice of a sample size relied on the sampling procedure which was considered in the selection. Equally, an apposite sample size determined the degree of accuracy of the data collected.

3.4.1 Sample Size

A sample size describes the sum of objects or individuals chosen to represent the entire population under study (Patten and Newhart 2017). The sample size was arrived at using the table from Krejcin and Morgan (1970) as demonstrated in Appendix V. 214 beneficiaries out of 482 registered beneficiary members of Ng'uuru-Gakirwe water supply project were used to represent all the other member households.

3.4.2 Sampling Procedures

The researcher used stratified proportionate random sampling in selection of study participants. Stratified random sampling entailed engaging groupings in the population that was heterogeneous to develop a homogenous sample set. The aim of stratified random sampling is to attain the best representation from several sub-groups in the population. Participants were grouped into 3 stratums, which encompassed the 3 project phases. The sample included 12 out of 12 project management committee members to increase the chances of availability. They were purposively sampled to provide crucial information relevant to the management of the water supply project. Purposive sampling technique allows a researcher to collect required data in line with the study objectives (Mugenda and Mugenda, 2003). In line with Kothari (2004) suppositions, simple random sampling was applied in selecting the other registered household respondents from each stratum to ensure representativeness.

Table 3. 2: Sample size per strata

		Sample size= (116/482*214) =52		
Phase	**Target Population**	**Registered household members**	**Project management committee**	**Total**
Phase 1	116	48	4	52
Phase 2	171	72	4	76
Phase 3	195	82	4	86
Total	**482**	**202**	**12**	**214**

The study 214 participants were from the three phases of the water supply project and included 202 registered household members and 12 participants from the project committee to constitute a representative sample of all the project beneficiaries.

3.5 Data Collection Instruments

Questionnaires represented the primary tool for collecting raw data. According to Quinlan et al. (2019), a questionnaire is a simple tool for research that contains a series of questions designed to gather data from the participants. Semi-structured questionnaires were distributed to committee members and member households of Ng'uuru-Gakirwe water supply project. These questionnaires captured both socio-economic and demographic information like gender, age, education level and occupation. The degree to which the study variables affected sustainability of the water supply project was investigated using Likert scale. The questionnaires included open-ended question to provide qualitative evidence to support the quantitative data collected using close-ended questions. The use of questionnaires was pertinent to this study because they helped in collecting fast-hand data which was easily analyzed through convenient coding. It also allowed the large sample size to be covered in a cheap and fast manner.

3.5.1 Pilot Testing of the Instruments

Pilot testing allows a researcher to assess the usability of the research questions, and their reproducibility in a different study population harboring comparable attributes to the study population (Kumar, 2005). A pilot study was carried out in the nearby Rwompo sub location to test the research instruments. 21 questionnaires which represented 10% of the sample size were administered to randomly selected pilot survey respondents in accordance with Connelly, 2008. The respondents were requested to answer the questions devoid of a prior

debriefing and answer the same questions after debriefing. This was to evaluate the presence of variations in the provided responses. The responses were used to isolate and correct questions that were unclear and addressed suggestions from the pilot respondents.

3.5.2 Validity of the Instrument

Questionnaire validity is the potential of a questionnaire to gather the information that it was developed to collect (Kai, Kitano, Nagamatsu, Kuchiki and Onodera, 2017). The validity of the questionnaires was achieved by giving the research supervisor to read through the questions and a feedback on whether the questions were adequately capturing the details of the topic under study were acted upon. During the piloting of the questionnaires, the gaps that existed which made the instrument not collect the right data were filled so that during the definite exercise of collecting data, the questionnaire captured the right content.

3.5.3 Reliability of the Instruments

An instrument is considered reliable if the outcome attained by the measurement instrument remaining consistent in the measurement of the intended feature (Kai et al. 2017). Using the split-half technique, Cronbach Alpha coefficient was exploited to test reliability of the survey questionnaire. This involved awarding score to each of the two halves of every respondent separately and calculating a correlation coefficient of the obtained scores for each section of the questionnaire. A correlation coefficient of 0.77 was obtained which was above the recommended 0.7 (Van Norman and Parker, 2018).

3.6 Data Collection Procedure

The findings of the research study were dependent on primary data collected via survey questionnaires from committee members and beneficiary households of the Ng'uuru-Gakirwe water supply project. With authorization from the University of Nairobi, the researcher obtained a research permit from the National Council for Science, Technology and Innovation (NACOSTI). The researcher visited the research site had discussions with the project committee chairperson on what the research would entail. An introduction letter was issued to each participant and thereafter, an informed consent form together with the questionnaire was issued to the participant to be signed concomitantly with the filling of the questionnaires. In majority of the cases, the researcher waited for the respondent to fill the questionnaire and

consequently collected the questionnaire for analysis. However, there a few cases where the researcher distributed the questionnaires and picked the questionnaire later.

3.7 Data Analysis Techniques

The filled questionnaires were sorted to eliminate those that were unfilled or incompletely filled. Secondly, data was combed and filled in associative tables to assess and eliminate missing data. Data was coded appropriately using the SPSS (Statistical Package for Social Scientists) software, to allow for statistical analysis. The collected data was subjected to descriptive statistical analysis to isolate the association between community empowerment variables and sustainability of water supply projects in the rural setting. Data was presented in frequency and relational tables, as well as statement count scores.

3.8 Operationalization of Variables

The concept of variable operationalization involves the assignment of meaning to research elements under study by defining the necessary operations to measure quantities and/or qualities. In this study, the independent and dependent variable were represented by various factors as illustrated in Table 3.8 below.

Table 3. 3: Operationalization of Variables

Objective	Variable	Indicator	Measurement Scale	Data Collection Tool	Type of Analysis
Sustainability of Water Supply Projects	**Dependent Variable**	• Reliability and adequacy of water supply • Level of well-maintained water supply facilities • Level of continuous improvement of the project • Growth in terms of new connections for beneficiaries	Nominal Ordinal	Questionnaire	Descriptive content analysis Multiple Regression
To determine the influence of community financial empowerment initiatives on sustainability of water supply projects	**Independent Variable** Community financial empowerment initiatives;	• Ability to pay for water tariffs as a result of Income boosting activities • Access to training on Financial information and education • Access to savings and asset building opportunities	Nominal Ordinal	Questionnaire	Descriptive content analysis Multiple Regression
To investigate the influence of community participation in project activities on sustainability of water supply projects	**Independent Variable** Community participation;	• Involvement in project rollout; • Involvement in Project employment • Involvement in meetings; • Involvement in selection of leaders; • Involvement in project monitoring and evaluation; • Involvement in financial contribution	Nominal Ordinal	Questionnaire	Descriptive content analysis Multiple Regression

To determine the influence of capacity building on sustainability of water supply projects	**Independent Variable** Capacity building;	• Access to water maintenance trainings; • Access to in economic/agricultural trainings; • Access to leadership and management skill training	Nominal Ordinal	Questionnaire	Descriptive content analysis Multiple Regression
To determine the ease of access to information on sustainability of water supply projects	**Independent Variable** Access to information;	• Access to information on project goals and objectives; • Access to information on project program progress; • Access to information on project performance	Nominal Ordinal	Questionnaire	Descriptive content analysis Multiple Regression

3.9 Ethical Considerations

Importance of ensuring both dignity and security of study participants is treated with utmost respect and care during all the stages of research in the collection, analysis and presentation processes is core to ethics. Therefore, the researcher first sought consent for carrying research from the university review board. The researcher then got a research permit from NACOSTI. Since this research involved responses from human participants, it was necessary to obtain consent from them by disseminating informed consent forms, which the study participants were required to sign after reading and understanding its content before indulging in the actual data collection process. Permission from the relevant administrators in the locality where this research was conducted was sought as well. Lastly, each participant was marked by a pseudonym during the process of analyzing data to maintain confidentiality of their responses.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1. Introduction

This chapter presents results of data collected in the research study. The chapter contains the return rate of questionnaires, demographic information of the study participants, key study findings and inferential statistics on the influence of various empowerment factors on sustainability of Ng'uuru-Gakirwe water supply project in Tharaka Nithi County.

4.2. Questionnaire Return Rate

In the research study, 214 questionnaires were distributed to participants. Out of the 214 questionnaires, 23 (20 questionnaires from beneficiaries and 3 questionnaires from committee members) were either not returned or were incomplete and were not included in the analysis. As such, 191 questionnaires were considered in the evaluation indicating an 89.25% response rate. The response rate was deemed adequate as it was above 70% (Steeh, Kirgis, Cannon and Dewitt, 2001).

4.3. Demographic Characteristics of Respondents

The demographic analysis on the data collected entailed sex, age, education level, occupation, project phase and number of years as beneficiary.

4.3.1. Distribution of respondents by Gender

The study inquired of the gender distribution of respondents. The distribution was as shown in Table 4.1 below.

Table 4. 1: Sex of respondent

	Frequency				Percent
Sex of respondent	**Phase 1**	**Phase 2**	**Phase 3**	**Total**	**%**
Male	29	37	50	116	60.7
Female	13	32	30	75	39.3
Total	**42**	**69**	**80**	**191**	**100.0**

Out of the 191 respondents in the study, the number of men stood at 116 (60.7%) compared to 75 (39.3%) of women. The distribution of gender is slightly skewed towards male however the

disparity can be explained by the fact that the head of the household which is mostly male is registered on the water project on behalf of the family.

4.3.2. Distribution of respondents by Age

The research also inquired of the age category of the responding registered project beneficiaries.

Table 4. 2: Age distribution of study participants by percentage

	Phase 1	Phase 2	Phase 3	Total	Percent %
18 – 29 Years	-	-	-	0	0.0
30 – 39 Years	8	4	3	15	7.9
40 – 49 Years	8	14	11	33	17.3
50 – 59 Years	14	29	43	86	45.0
Above 60 Years	12	22	23	57	29.8
Total	**42**	**69**	**80**	**191**	**100.0**

7.9% (15) of the respondents age ranged between 30-39 years, 33 (17.3%) respondents were aged between 40-49 years, 86 (45%) respondents were between the age of 50-59 years, while 29.8% were above 60 years. Project beneficiaries aged between 50 and 59 years accounted for most respondents at 45.0% as most of the members registered at the early years of inception of the project. Noticeably, there were no respondents under the age bracket of 18-29 years.

4.3.3. Distribution of respondents by Highest Level of Education

The study also inquired on respondents' highest level of education. Education level may present a yardstick for measuring the sustainability of water supply projects.

Table 4. 3: Distribution of education level of participants

Education Level	Phase 1	Phase 2	Phase 3	Total	Percent %
Primary School	11	23	17	51	26.7
Secondary School	6	12	19	37	19.4
Certificate	2	11	15	28	14.7
Diploma	4	7	13	24	10.5
Under-Graduate	3	6	9	18	9.4
Post-Graduate	2	1	2	5	2.6
Others	14	9	5	28	16.8
Total	**42**	**69**	**80**	**191**	**100.0**

26.7% (51) of the participants have primary education while 16.8% (28) did not have basic education, a situation that changed over time due to increase in literacy level in the region. All the committee members had some form of formal education, which was necessary for adept management and lead of the water supply project.

4.3.4. Distribution of respondents by Occupation

Table 4. 4: Occupation of participants by percentage

Occupation	Phase 1	Phase 2	Phase 3	Total	Percent %
Farmer/ Livestock Keeping	33	56	58	147	77.0
Wage Laborer	9	11	15	35	18.3
Unemployed	0	2	7	9	4.7
Total	**42**	**69**	**80**	**191**	**100.0%**

Majority of the respondents 147 (77.0%) were engaged in farming, either crop or livestock keeping showing the need for water to perform these activities. 35 respondents (18.32%) were engaged in waged labour while 9 respondents (4.7%) of the respondents were unemployed. Among them could be the aged who are 60 years and above.

4.3.5. Distribution of respondents by Project phase

In order to understand the beneficiary diversity in sustaining the water supply project, the beneficiaries were distributed in phases.

Table 4. 5: Distribution of respondents by Project phase

	Frequency			Percent
Project Phase	Beneficiary Members	Committee members	Total	%
Phase 1	40	2	42	22.0
Phase 2	66	3	69	36.1
Phase 3	76	4	80	41.9
Total	**182**	**9**	**191**	**100.0**

The largest number of respondents 80 (41.9%) was accumulated in Phase 3, followed by 69 participants (36.13%) in the Phase 2. The number of members registered in the project increases as the project expands.

4.4. Project Sustainability

The study inquired from management of the main sources of finance for the project. The project relied on donations and members contributions to run the project. The project had however gone for more than five years without receiving support from donors or the government and was relying on members contributions to run its operations. In the last five years at least 200 members had met their annual contributions obligations to the project.

All (100%) participants confirmed to have benefited from piped water supply. On the other hand, 46 beneficiaries (21.6%) informed that their house holds also benefited from water harvesting facilities in addition to the piped water supply. The study inquired of the frequency of piped water supply from the project.

Table 4. 6: Frequency of Water Supply

Frequency of water supply	Frequency	Percent
Once a week	98	51.3
Twice in a week	53	27.7
Thrice a week	23	12.0
More than thrice a week	17	8.9
Total	**191**	**100.0**

Majority of respondents 98 (51.3%) get water once a week followed by 53 respondents who get water twice a week. Only 17 (8.9%) respondents receive water more than thrice a week. The findings show skewness in frequency of water supply to registered households. This could be associated to geographical location of the households in respect to the location of water supply infrastructure.

The study also seeks to establish the level of member satisfaction on various parameters of sustainability of water supply projects which are attributes of sustainable water projects. Respondents were requested to rate the statements in a scale of 1-5 where: 1 Strongly Disagree (SD), 2- Disagree(D), 3 – neutral(N), 4-agree(A) and 5-strongly agree (SA).

Table 4. 7: Project Sustainability

Project Sustainability	SD (1)	D (2)	N (3)	A (4)	SA (5)	Mean	SD
Member can raise annual fee of water charged to his/her household	20 (10.5%)	10 (5.2%)	0(0.0%)	61(31.9%)	100(52.4%)	4.10	1.29
Member is satisfied with the frequency of water supply	102 (53.4%)	51 (26.7%)	5 (2.6%)	23 (12.0%)	10(5.2%	1.89	1.23
Water supply from the project is reliable for day to day use	89 (46.5%)	53 (27.7%)	3 (1.6%)	35 (18.3%)	11 (5.8%)	2.09	1.31
There has been growth in water project in terms of increase in number of water connections for members	25 (13.1%)	12 (6.3%)	14 (7.3%)	33 (17.3%)	107 (56.0%)	3.97	1.44
There has been expansion in project water supply facilities	99 (51.8%)	28 (14.7%)	14 (7.3%)	33 (17.3%)	17(8.9%)	2.17	1.43
Mean						**2.84**	**1.34**

Most of the respondents agree that they can raise the annual fee for water charged to the individual households. This is represented by a mean of 4.10. This is key to project sustainability as the project relies on member contributions and donations to run the project operations.

Majority of respondents 102 (53.4%) and 51 (26.7%) are not satisfied with the frequency of at which they receive water from Ng'uuru-Gakirwe water project thus a mean of 1.89. Tharaka South Sub-County is a semi-arid area and water is a scarce resource, as a result water is rationed among the beneficiaries. Most of the beneficiaries feel that the supply of water is not reliable to satisfy their day to day water requirement (Mean 2.09). The inconsistence in the supply of water makes it hard for the farmers to fully engage in farming which is the main occupation of the members. This consequently limits their financial capability limiting the sustainability of the project.

140 (73.3%) respondents strongly agree or agree that there has been growth in the water project in terms of increase in number of water connections for members. However, 66.5% (127) refute that there has been expansion of the water supply facilities and 109 (57.1%) respondents refute that the

water facilities are well maintained to serve the intended purpose. As a result, the supply quantity will decrease further due to the increased number of connected members without continuous expansion of the facility, meaning in the future some members will not receive any water at all from the project. According to Peter and Nkambule (2012) water supply schemes that are sustainable should provide water to the current population and also consider future generations by ensuring scaling up of the supply as demand increases; assertions which render current project under study non-sustainable due to its inability to meet future demands occasioned by lack of facility scaling up.

4.5. Community Financial Empowerment Initiatives and Sustainability of Water Supply Projects

The first study objective was to examine the influence that financial empowerment initiatives have on sustainability water supply projects in the area of study. The study inquired of the amount the participants paid annually to access the water facilities. Piped water supplied was charged KSh. 1,100 or KSh. 2,500 annually cumulatively depending on the type of connection. The study inquired on presence and access of financial empowerment initiatives.

Table 4. 8: Financial Empowerment Initiatives

Financial Empowerment Initiatives	Exploiting Income generating Initiatives		Access to Financial Education		Access to Savings and Asset Building Opportunities	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Yes	126	66	64	33.5	118	61.8
No	65	34	127	66.5	73	38.2
Total	**191**	**100**	**191**	**100**	**191**	**100**

All 191 (100%) respondents confirmed that there were income boosting initiatives in specific Meru herbs initiative. Meru Herbs initiative involved sensitization of members on how to grow exotic herbs by organic farming and later buying the herbs from the farmers. The study findings show that 126 (66%) are exploiting the income generating initiative implemented by the project, while 65 (34%) of the respondents where not exploiting this initiative. The main reason for non-exploitation of the initiative was demotivation of the members due to the limited quantity of herbs that an individual could sell to Meru herbs. The study further inquired on the degree to which the respondents thought that the Income boosting initiatives had enabled the respondents to meet water supply obligations.

Majority of the respondents 131 (66.5%) affirm that they have not received any formal or informal financial education. This shows that there is a need for financial literacy education for the project beneficiaries. Majority of respondents 118 (61.8%) confirmed that they have access to savings and asset building opportunities. They were members of either Meru herbs Sacco or a different local saving group.

The study further inquired on the degree to which the respondents thought that the community empowerment initiatives had enabled the respondents to meet water supply obligations. Respondents were requested to rate the statements in a scale of 1-5 where: 1 Strongly Disagree (SD), 2- Disagree(D), 3 – neutral(N), 4-agree(A) and 5-strongly agree (SA).

Community Financial Empowerment Initiatives	**SD (1)**	**D (2)**	**N (3)**	**A (4)**	**SA (5)**	**Mean**	**SD**
Income boosting initiatives had enabled the respondents to meet water supply obligations.	9 (4.7%)	56 (29.3%)	3 (1.6%)	93 (48.7%)	30 (15.7%)	**3.41**	**1.19**
Financial education had enabled them to meet their water supply obligation	68 (35.6%)	59 (30.9%)	4 (2.1%)	46 (24.1%)	14 (7.3%)	**2.37**	**1.37**
Access to savings and asset building initiatives had enabled them to meet their water supply obligations	26 (13.6)	47 (24.6%)	6 (0.0%)	79 (43.5%)	33 (18.3%)	**3.24**	**1.36**
Mean						**3.01**	**1.31**

The findings indicate that (64.4%) 123 participants strongly agreed/agreed that the income boosting initiatives that involved growing of exotic herbs under Meru herbs initiative had enabled them to meet their water supply obligations. This is represented by a mean of 3.41 with a standard deviation of 1.19. The findings agreed with Ilahi and Grimard (2000) assertion that the financial strength of the individual members helps the members to meet their financial obligations towards the project and thus promote sustainability of the project.

Notably, only 60 (31.4%) respondents agreed that financial education had enabled them to meet their water supply obligation. This is represented by a mean of 2.37 with a standard deviation of 1.37. This can be explained as most of the respondents had not received any formal or informal financial education.

The findings indicate 112 (58.7%) respondents are affirmative that the access to savings and asset building opportunities have enabled them to meet their water supply obligations. These findings are consistent with Harvey (2007) who states that access of saving groups by members of water supply project enhances financial stability of members thus promoting project sustainability.

4.6. Community Participation in Project Activities and Sustainability of Water Supply Projects

The second study objective was to examine how community participation in project activities influences water supply projects sustainability in the area of study. To achieve this the participants were asked to gauge the level at which they are involved in the water supply project in terms of project implementation, continuous project improvement and monitoring and evaluation of the project.

4.6.1. Community Participation in implementation of the project

The study inquired of the level of community involvement in the implementation and monitoring and evaluation of the project.

Table 4. 9: Community Participation

Community Participation	SD (1)	D (2)	N (3)	A (4)	SA (5)	Mean	SD
Involvement in roll out of water project construction	16 (8.4%)	19 (9.9%)	0 (0.0%)	23 (12.0) %	133 (69.6%)	4.25	1.34
Involvement in setting water service charges	16 (8.4%)	24 (12.6%)	1 (0.5%)	70 (36.6%)	80 (41.9%)	3.91	1.29
Involvement in project labour	154 (80.6%)	6 (3.1%)	0 (0.0%)	0 (0.0%)	31 (16.2%	1.68	1.47
Involvement in meetings	13(6.8%)	25(13.1%)	7(3.7%)	2(1.9%)	144(75.4%)	4.25	1.37
Inspection of project facilities	70 (36.6%)	60 (31.4%)	8 (4.2%)	11(5.8%)	42 (22%)	2.45	1.55
Involvement in voting in and out of leaders	12 (6.3%)	28 (14.7%)	6 (3.1%)	12 (6.3%)	133 (69.6%)	4.18	1.36
Mean						**3.63**	**1.43**

In the water supply project under study, most respondents (mean 4.25, SD 1.34) were involved in the rollout and development of project-related programs. More than half of the participants 150 (78.5%) strongly agreed or agreed on being involved in setting water service charges and this was reflective on the ability of the respondents to contribute cash towards running of the project activities. Deductions from the study also show low involvement of respondents in provision of labour either by temporary or permanent jobs (Mean 1.68, SD 1.47). This could be explained by the need for the project to minimize costs and thus few direct employment opportunities from the project.

76.4% (146) of the respondents confirmed (strongly agreed or agreed) being involved in meetings such as the annual general meeting. 75.9 % of respondents strongly agreed or agreed to take part in voting in and out of committee representatives. Notably, there is low involvement of the of community project beneficiaries in monitoring in inspection of project facilities to check conformity with achieving the intended purpose. This role is played by the project management committee on behalf of the project.

4.7. Capacity Building and Sustainability of Water Supply Projects

The third study objective was to examine how capacity building of project beneficiaries influences sustainability water supply projects in the area of study.

The participants were requested to indicate whether they had acquired formal or informal economic trainings to help boost their skills in farming, water maintenance training and Leadership and management trainings.

Table 4. 10: Access to Capacity Building Opportunities

	Economic Trainings		Water Maintenance Training		Leadership and Management Trainings	
Capacity Building	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	172	90.1	90	47.1	6	66.7
No	19	9.9	101	52.9	3	33.3
Total	**191**	**100**	**191**	**100**	**9**	**100**

Majority of respondents 172 (90.1%) confirmed to have received economic trainings, particularly growing of organic cash crops and fruit trees. The project was noted to engage less in training on water maintenance as evidenced by only 47.1% of the respondents affirming to have received

formal or informal water maintenance training. The study also inquired of the level to which the respondents believed that the water maintenance training promoted their skill development in maintenance of the water supply project. The results indicate that (66.6%) of the project committee members have received trainings on management and operations of the project.

The study also explored the extent to which the capacity building enhanced sustainability of water supply projects. Respondents were requested to rate the statements in a scale of 1-5 where: 1 Strongly Disagree (SD), 2- Disagree (D), 3 – neutral (N), 4-agree (A) and 5-strongly agree (SA).

Table 4. 11: Capacity Building and Project Sustainability

Capacity Building	SD (1)	D (2)	NS (3)	A (4)	SA (5)	Mean	SD
Economic trainings enabled respondents to generate income and meet project financial obligations in the project	5 (2.6%)	14(7.3%)	11(5.8%)	113 (59.2%)	48 (25.1%)	3.97	0.91
Water maintenance training promoted skill development water supply project maintenance	40 (20.9%)	65 (34%)	3 (1.6%)	34 (17.8%)	49 (25.7%)	2.93	1.54
Leadership and management trainings enabled project management committee to manage and operate the project	1 (11.1%)	2 (22.2%)	0 (0.0%)	4 (44.4%)	2 (22.2%)	3.44	1.34
Mean						**3.45**	**1.27**

The results indicate that most respondents (Mean 3.97, SD 0.91) were affirmative that the economic trainings enabled them generate income and meet their financial obligations in the project. Only 83 (43.5%) respondents are affirmative that water maintenance training promoted their skill development in maintenance of the water supply project (Mean 2.93, SD 1.54). A significant number of respondents 105 (54.9%) disagreed that water maintenance training promoted their skill development in maintenance of the water supply project. The results indicate that 66.6% respondents strongly agreed or agreed that the leadership and management trainings had enabled them carry out their responsibilities in management and operation of the project. Leadership and

management skills are crucial in operation of the project especially in inspection of project facilities which is part of the role of the committee.

4.8. Ease of Access to Information and Sustainability of Water Supply Projects

The study explored the influence of information access on project sustainability of the Ng'uuru-Gakirwe water supply initiative. Respondents were requested to rate the statements in a scale of 1-5 where: 1 Strongly Disagree (SD), 2- Disagree(D), 3 – neutral(N), 4-agree(A) and 5-strongly agree (SA).

Table 4. 12: Ease of access to project information

Access to Information	SD (1)	D (2)	NS (3)	A (4)	SA (5)	Mean	SD
Information on goals and objectives	23 (12%)	17 (8.9%)	3 (1.6%)	109 (57.1%)	39 (20.4%)	3.65	1.24
Information on project progress	28 (14.7%)	6 (3.1%)	7 (3.7%)	78 (40.8%)	72 (37.7%)	3.84	1.35
Information on project performance	10 (5.2%)	35 (18.3%)	1 (0.5%)	77 (40.3%)	68 (35.6%)	3.83	1.24
Mean						**3.77**	**1.28**

The results indicate that 148 (77.5%) respondents agreed or strongly agreed to understanding of the project goals and objectives. In addition, 150 (78.5%) respondents agreed or strongly agreed to have easily accessed information on the project progress as were 145 (75.9%) who were able to access information on project performance. Essentially, the findings point out that there is ease in access to information of the project by the project beneficiaries (Mean 3.77, SD 1.28).

4.9. Inferential Statistics

Inferential statistics make extrapolations about populations using the sample data from the population A regression analysis between the independent and the dependent variables was done to measure the relationship between community empowerment factors and water supply project sustainability.

4.9.1. Regression Analysis

The link between community empowerment and project sustainability was examined using a multivariate regression model. The resultant regression model was as illustrated below:

Table 4. 13: Regression analysis of factors influencing project sustainability

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		
		B	Std. Error	Beta	T	Sig.	Zero-order	Partial	Part
1	(Constant)	1.343	.076		17.757	.000			
	Financial Empowerment Initiatives	.036	.018	.121	2.003	.047	.568	.146	.092
	Community Participation	.147	.040	.376	3.720	.000	.757	.264	.170
	Capacity Building	.049	.025	.162	1.989	.048	.688	.145	.091
	Access to Information	.057	.020	.215	2.780	.006	.690	.200	.127

a. Dependent Variable: Project Sustainability

From the analysis, the regression equation was as stipulated below:

$$Y_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

Where Y_{it} is the dependent variable (Sustainability of the water supply project); X_1 represents community financial empowerment initiatives; X_2 represents community participation; X_3 represents capacity building; X_4 stands for access to information and β_0 is a Constant. The coefficients in the model are represented *by* β_1 β_2 β_3 and β_4 .

The regression equation obtained in the current study is;

Project sustainability (Y) = 0.036 (Financial empowerment) + 0.147 (Community participation) + 0.049 (Capacity building) + 0.057 (Access to information) + 1.343

The equation shows that if all other independent variables are held constant, increase in one unit of financial empowerment will result to a 0.036 unit increase in project sustainability, increase in one unit of community participation will result to a 0.147 unit increase in project sustainability, increase in one unit of capacity building will result to a 0.049 unit increase in project sustainability and increase in one unit of access to information will result to a 0.057 unit increase in project sustainability.

A significance of 95% was used to examine the influence of independent variables on the dependent variable. All the variables had a p-value of less than 0.05 indicating that they were statistically significant and therefore there exist a relationship between community empowerment factors and project sustainability. Community participation was the most significant factor with a p value of .000 followed by community access to information whose p value was .006 and financial empowerment with a p value of .047. The least significant factor was capacity building whose p value was 0.048.

Table 4. 14: Regression Analysis Statistics

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.783[a]	.613	.605	.18405

a. Predictors: (Constant), Financial Empowerment Initiatives, Community Participation, Access to Information, Capacity Building

The model has a coefficient of determination (R^2) of 0.613. This indicates that 61.3% of project sustainability is explained by the linear regression and the independent variables (Community empowerment). The evidence in the analysis points coefficient correlation of 78.3 indicating a strong positive linear relationship between community empowerment and project sustainability. This implies that a rise in community empowerment instigates a proportionate upsurge in sustainability of the water supply project. As such, implementation of community financial empowerment initiatives, coupled with increased community participation, ease in access to project information and capacity building enhance water supply projects sustainability.

4.10. Discussion on the Findings of the Study

The findings on influence of financial empowerment initiatives on sustainability of water supply projects reveal that income generating initiatives enhances financial capability of project beneficiaries who in turn can meet their project obligations which involved contribution of cash towards the running of the project thus enhancing project sustainability. The results agree with Sheate, 2010 who states that in the existence of poverty sustainability of a project would fail. The research results indicate that most members of the water project have not received financial education on various way to raise funds and saving strategies, a factor that Ilahi and Grimard (2000) associate with failed water supply projects by stating that lack of financial management knowledge in people within the rural areas contributes immensely to some of the failed projects. The reviewed literature affirms the current findings with Kasri and Moersidik (2018) asserting that financial initiatives are viewed as a primary strategy of enhancing achievement of sustainability of community-based projects, including water supply schemes.

The study results showed that community project beneficiaries are constantly involved in various stages of the project. This may be the reason the project has remained in operation for more than 30 years. The results concur with Kumar (2002) who argues that participation is a key factor in empowering community into self-reliance. Similarly, Smith (2008) contends that stronger forms of participation, involving community stakeholders in decision making and implementation of plans, assisted groups to achieve collective goals.

Capacity building is notion that seeks to enhance the community and project leadership with skills and knowledge required to ensure the project benefits are felt in the long-term. The study revealed that majority of that respondents had received economic trainings to help boost their skills in farming which is the main occupation of the project beneficiaries. The economic trainings enabled the members generate income and meet their financial obligations in the project thus enhancing sustainability of the project. This agrees with Olawoye (2019) who noted that capacity building instil strength, competencies and the necessary inputs, through which they can incorporate, sustain and manage the current existing projects and use them to survive in the modern world without much strain. The study also revealed there is a need to conduct water maintenance trainings for the project beneficiaries. Transfer of knowledge is key in establishment and strengthening of local organization (Hjorth & Leonard-Barton, 2003).

The study revealed that ease in access of information by project members to some extent enabled the beneficiaries to check accountability of the management .This finding is similar to Rezende (2016) that asserts that access to information promotes the degree of responsibility of the management through ease of follow up on how business is conducted in an organization. Initiation of water supply projects without ensuring maximum accountability contributes to a large extent to failed projects in the rural set-ups due to embezzlement of the project funds

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the summary of findings, discussions and conclusions drawn from the findings. The chapter also highlights the recommendations that aim in providing insights in water supply projects sustainability and potential areas for further study in the future.

5.2. Summary of Findings

The aim of the study was to determine the influence that community empowerment has in sustainability of the water supply projects so that to suggest the best approach in incorporating community empowerment into water supply projects especially in rural set-ups for sustainability of the projects. The focus of the study was on Ng'uuru-Gakirwe water project in Tharaka South Sub-County in Tharaka Nithi County. The study population was the registered members of the project including both the project beneficiary and the project committee members. Descriptive research design was adopted in the study where primary data was collected using survey questionnaires distributed to the study participants. In the study, 60.7% of the respodents were male while 39.3% were female. 45% of the project beneficiaries were aged between 50 and 59 years. 26.7% of the respondents had attained primary school education level as the highest level of education followed by 16.8% who did not have basic education.

The first study objective sought to examine the influence of financial empowerment initiatives on sustainability of water supply projects. Ng'uuru-Gakirwe Water Project is financed mostly by donations and registered members contributions and thus inadequate finances by the members can hamper the growth of the water supply project. The study results show that 100% of respondents are aware presence of income boosting activities in specific Meru herbs which is implemented by the project within the community. Through this initiative farmers grow and sell organic crops and exotic herbs including carcade, camommila, and lemon grass. This initiative is meant to improve the financial capability of members enabling them to meet their financial obligation of paying for the supply of the water project. Despite all participants confirming presence of income boosting initiatives, only 66% were exploiting the initiative. 34% were not exploiting the initiative due to

demotivating factors such as limited quantity of herbs that an individual could sell to Meru herbs. 64.4% of the respondents confirmed that the income boosting initiative had enabled them to meet their water supply obligations. Limited farmer's income limits a farmer's financial capability. The effect is limited project finances that leads to untimely repairs of the water project facilities as depicted in the results.

Most of the respondents 66.5% had not received any formal and informal financial education on various ways to raise funds and savings. Consequently, only 31.4% of the respondents affirmed that financial education had enabled them to meet their water supply obligation. This shows that there is a need for financial literacy education for the project beneficiaries. Further the results showed that 61.8% of the respondents had access to savings and asset building opportunities (loans). As a result, this enabled 58.7% of the respondents to meet their water supply obligations.

The second study objective was to examine the influence of community participation on sustainability of water supply projects. Involvement of the community in the project activities stimulates a sense of ownership in the members thus augmenting effective contributions towards the project hence sustainability. The current study results show that most of the project registered members are actively involved in the implementation of the project ranging from roll out of the project, participating in setting water service charges. A few members are unable to participate in terms of cash contributions toward the project and thus limits the project ability to expand the size of the facility in order to serve the increasing number of members connected to the facility. Deductions from the study show low involvement of project registered members in provision of labour. This could be explained by the need for the project to minimize costs.

The results also show that most of the respondents have been actively involved in project monitoring and evaluation which includes, attendance of meetings and voting in and out of committee representatives. According to the findings of the study, the only undoing of the community members in participating in the activities of the project is low involvement of the project members in inspection of the project facilities. Project members however are involved in voting in and out or committee representatives that carry out monitoring and evaluation of the project.

The third study objective was to examine the influence of capacity building on sustainability of water supply projects. Capacity building is a vital aspect to people involved in project planning, implementation and continuous operation of a project. The training of the management and beneficiaries of a project to impact skills in running and maintenance of the project encompass the success level of the project in the long run.

The current study shows that beneficiaries of the project have received economic training through partnership with Meru Herbs Company on the best practices of organic farming including how to grow carcade and camomilla. Most of the members that manage to pay for the annual water supply subscription are supported by income derived from organic farming.

The study results show that little efforts on training the community members on water maintenance and operation of the project. Only 47.1% have received water maintenance training and consequently only 43.5% of the respondents agree that these trainings have promoted their skill development in proper maintenance of water supplied from the project. Project management committee have received leadership and management trainings and thus have skills on how to manage and operate the project.

The fourth study objective was to examine the influence of Community access to information on sustainability of water supply projects. Access to information by the members and management team is a crucial factor in ensuring a project stands the test of time. The results of the analyzed data in the current study show that the ease in access to information by the community members and the management is high. Most of the members and management committee have acquaintance to information on the project progress and performance, aiding in timely intervention strategies to stop failure of the project. Although the education level of most of the members is low hindering full examination of the accountability of the management team, free acquaintance to information has helped to some extent in ensuring accountability of the management.

5.3. Conclusion

The study concluded that community empowerment influences sustainability of water supply projects in Tharaka South Sub-County, Tharaka Nithi County. First, it was deduced that community financial empowerment initiative influenced sustainability of the water supply project under study. Through income boosting initiative implemented by the project i.e. Meru Herbs, members are able to contribute cash toward the project. Project members' contributions was the main income for the project and thus was vital in achieving sustainability of the water supply project.

Secondly, it was noted that participation of the community in project activities played a significant role in enhancing the sustainability of water supply projects in Tharaka South Sub-County. Through participative engagement of beneficiaries, the members contributed to the water supply project sustainability by providing insights in major decision-making, setting water service charges, participation in meetings and voting of committee members, factors that motivated them to fully support the project.

Further, the study findings revealed that capacity building, which was achieved through provision of economic training initiatives and training the project leaders on the best leadership skills largely contributed to water projects sustainability. The study also revealed a need for training the project members on the economic value embedded on maintenance of water from the project.

Lastly, ease of access to information was noted to be a crucial consideration, which the initiators of the project needed to embrace to achieve sustainability of those projects. The analyzed results denoted the majority of the members of Ng'uuru-Gakirwe water project had been informed of the project's goals and objective and the project's progress and performance. This is a a source of motivation to beneficiaries by integrating them as part of the project they support and provide a basis for monitoring and evaluation of the project.

5.4. Recommendations

From the study findings it is recommended that;
The government and donors should embark on strategies that ensure financial empowerment of the community members to ensure the community members can finance the project on their own to augment sustainability. These should include income boosting initiatives exploitable by the community. Financial education should also be offered to project beneficiaries to sensitize them on various ways to raise funds and proper management of the funds which include savings.

Initiators of water supply projects should encourage community involvement in all the project phases as any decision making on a community project affect the community directly. Community participation encourages the community to take ownership of the project and thus promote project sustainability.

Initiators of the project should invest in improving community members knowledge and skills on operation and management of the project as well as management resources from the project to enable continuity of the project in the long run.

Lastly, informing the community members on the project's goals and objectives and continuous updating them on any achievement and improvement realized in the project should be prioritized by the project initiators since ease of access to information is a form of empowerment which greatly promote sustainability.

5.5. Areas for Further Research

From the evaluation of the study findings, there is a need to carry out research on;

1. The influence of environmental conservation awareness on sustainability of water supply projects.
2. Reduction of water wastages as a strategy to avoid overstretching of the natural water resources should be made with cross-inspection of the effect of the same to sustainability of water supply projects.

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APPENDICES

Appendix I. Cover Letter – Request for Participation

Stella Wangui Chege

University of Nairobi

Nairobi

4th November 2019

Dear Prospective Participant,

My name is Stella Wangui Chege, a Masters student from University of Nairobi. I am currently conducting a research project to determine the Influence of Community Empowerment on Sustainability of Water Supply Projects: A Case of Ng'uuru-Gakirwe Water Project in Tharaka South Sub-County.

In this research, we intend to hold interviews with beneficiary households and project representatives (Project management committee members) and use quantitative survey questionnaires to investigate how community empowerment influences sustainability of Ng'uuru-Gakirwe Water Project. I will be administering questionnaires to beneficiary households and project representatives of the water supply project to examine the extent of financial empowerment initiatives, community participation, capacity building and access to information in the project and their role in sustaining the water supply project.

Your participation will be on a voluntary basis and information obtained will be used in confidence and only used for academic purpose. If you have any questions or concerns regarding the study or participation modalities, feel free to contact me.

Yours Faithfully

Stella Chege

MA Project planning and management

E-mail: chegestella4@gmail.com

Appendix II. Informed Consent Form

Please read the terms and conditions of participation carefully and sign at the bottom of the form.

i. I willingly agree to participate in this research project and understand that I can withdraw at any time without consequences of any manner.
ii. I understand that participation entails responding to questions in the questionnaire on influence of community empowerment on sustainability of water supply projects, particularly the Ng'uuru-Gakirwe water supply project in Tharaka South Sub-County, Tharaka Nithi County.
iii. I understand that there will be no direct benefits associated with participating in this research.
iv. I understand that all of my responses will confidential and my personal and membership identity will be anonymous in all the results of this research study.
v. I understand that masked excerpts from the questionnaire responses provided may be quoted in this study, published papers, conference presentation, etc.
vi. I understand that I may freely contact the researcher involved in this study for further information and to seek clarifications on the questions addressed in the questionnaire.

I have read and understood the contents of this consent and voluntarily agree to participate in this research.

…… ……/…….20….

Signature of Participant **Date**

…… ……/…….20….

Signature of Researcher **Date**

Appendix III. Survey Questionnaire for Beneficiary Households

Kindly take a few minutes to respond to the questions addressed in this questionnaire. Information collected is purely for academic research purposes and will be treated with utmost confidentiality.

PART 1: DEMOGRAPHIC INFORMATION

a) What is your gender?

i. Male ☐
ii. Female ☐

b) What is your age?

☐ 18 – 29 Years ☐ 40 – 49 Years ☐ above 60 Years
☐ 30 – 39 Years ☐ 50 – 59 Years

c) What is your highest education level?

☐ Primary school ☐Certificate ☐Undergraduate

☐ Secondary school ☐Diploma ☐Post-graduate

☐ Other _____ (Specify)

d) What is your occupation?

☐ Farmer/ livestock keeping ☐ Wage laborer ☐ Unemployed

e) Which Phase do you belong to in Nguuru Ng'uuru Gakirwe water project?
☐ Phase 1 ☐ Phase 2 ☐ Phase 3

f) How long have you been a beneficiary of the Ng'uuru-Gakirwe water supply project in Tharaka South Sub-County? _____ Years

PART 2: COMMUNITY FINANCIAL EMPOWERMENT

i. Do you still have access of water supply from NGWP?

☐ Yes Specify…….

☐ No

ii. Do you have access to water supply free of charge?

☐ Yes
☐ No _____

iii. If No, how much do you/ did you pay to obtain the facilities. KSh_____

iv. Are there any Income boosting initiatives implemented in this area by the project?

☐ Yes Specify _____
☐ No

v. If yes, are you exploiting the Income boosting initiatives implemented in this area?

☐ Yes
☐ No Specify _____

vi. Have you received formal/informal financial education (e.g. various ways to raise funds, saving etc)?
☐ Yes
☐ No

vii. Are you a member of any Sacco or any local saving group?

☐ Yes Specify _____
☐ No

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Financial empowerment Statements	**1**	**2**	**3**	**4**	**5**
viii. Income boosting initiative/(s) have enabled me to meet water supply obligations.					
ix. Financial information and education have enabled me to meet water supply obligations.					
x. I have access to savings and asset building opportunities that enable me to meet water supply obligations.					

PART 3: COMMUNITY PARTICIPATION IN PROJECT ACTIVITIES

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Community Participation Statements	**1**	**2**	**3**	**4**	**5**
Project Initiation/Roll out					
i. I am/was involved in the decision of water project construction /Expansion/ roll out of new programmes in the project.					
ii. I am involved in setting the annual water service charges.					
iii. Provision of labour: I have been/ am an employee of the project either on a temporary/ permanent basis.					
iv. Involvement in meetings: I have attended the project's continuous meeting or annual general meeting.					
v. Monitoring and Evaluation: I have been involved in continuous inspection of project facilities and review of its performance.					
vi. Voting in/out leadership- I Participate in selection of leaders in the water committee.					
vii. Contribution of cash: I contribute annual project membership fee and other additional fees as requested by the project.					

PART 4: CAPACITY BUILDING

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Capacity building	**1**	**2**	**3**	**4**	**5**
i. **Water maintenance training:** I have participated in training programs that promote skill development in maintenance of the water supply project.					
ii. **Economic training:** I have received economic training such as growing of organic cash crops that enables me generate income and thus meet my obligations in the project.					

PART 5: ACCESS TO INFORMATION

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Access to information Statements	**1**	**2**	**3**	**4**	**5**
Goals and objectives: I have clarity of the project goals and objectives.					
Programme progress: I get regular feedback about progress of various programmes implemented by the project from water committee.					
Project performance: You are fully aware of the overall project performance including both success and challenges faced by the project.					

PART 6: PROJECT SUSTAINABILITY

Beneficiary

i. I have access to piped water.
☐ Yes ☐ No

ii. Other than piped water supply, have you benefited from any of the following facilities from the project?

☐ Borehole ☐ Water pan/dam ☐ Water harvesting facilities/ tanks

☐ Other ……

iii. What is the frequency of water supply?
☐ Once a week ☐ Twice in a week ☐ Thrice a week
☐ More than thrice a week

Select from the 5 – Point Likert Scale where: 1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

		1	**2**	**3**	**4**	**5**
i.	I am satisfied with the frequency of water supply.					
ii.	Water supply from the project is reliable for day to day use.					
iii.	Water facilities are well maintained and serve the intended purpose.					
iv.	Repair and maintenance is done on a timely basis.					
v.	I am able to raise annual cost of water charged on your household.					
vi.	There has been growth in water project in terms of increase in number of water connections for members.					
vii.	There has been continuous improvement of the project in terms of expansion of the water supply facilities.					

Thank you for your Participation

Appendix IV. Survey Questionnaire for Committee members

PART 1: DEMOGRAPHIC INFORMATION

a) What is your gender?
   i. Male ☐
   ii. Female ☐
   iii. Prefer not say ☐

b) What is your age?
   ☐ 18 – 29 Years ☐ 40 – 49 Years ☐ Above 60 Years
   ☐ 30 – 39 Years ☐ 50 – 59 Years

c) What is your highest education level?
   ☐ Primary school level ☐Certificate level ☐Undergraduate Level
   ☐ Secondary school level ☐Diploma Level ☐Post-graduate Level
   ☐ Other _____ (Specify)

g) Which Phase do you belong to in Nguuru Ng'uuru Gakirwe water project?
   ☐ Phase 1 ☐ Phase 2 ☐ Phase 3

d) How long have you been a beneficiary of the Ng'uuru-Gakirwe water supply project in Tharaka South Sub-County?
   _____ Years

e) What is your occupation?
   ☐ Farmer/ livestock keeping ☐ Wage laborer ☐ Unemployed

PART 2: PROJECT INFORMATION

i. What were the sources of finance during the project inception?

   _____

ii. Has the project benefited from donor/government funding?
   ☐ Yes
   ☐ No

iii. Does the project continue to receive funding from its donor/government for operation and maintenance?
   ☐ Yes
   ☐ No

iv. If No, for how long has the water supply project been without donor/government funding?
   ☐ 0 - 1 Year
   ☐ 2 – 5 Years
   ☐ Over 5 Years

v. How many of members have paid annual fees for the last 5 years (proportion of total members)?

vi. How many of members have had their water disconnected in the last 5 years due to unpaid annual subscriptions (proportion of total members)?

vii. Are there other programmes that the community benefit from other than piped water supply,
☐ Yes Specify…….
☐ No

PART 3: COMMUNITY FINANCIAL EMPOWERMENT

i. Which facility(s) have you benefited from, in the water project?
☐ Piped water ☐ Borehole
☐ Water pan/dam ☐ Rainwater harvesting system/ tanks
Other ……..

ii. Do you have access to the facility(s) free of charge?
☐ Yes
☐ No _____

iii. If No, how much do they pay to obtain the facilities? KSh_____

iv. Are there any Income boosting initiatives implemented in this area by the project?
☐ Yes Specify _____
☐ No

v. If yes, are you exploiting the Income boosting initiatives implemented in this area?
☐ Yes
☐ No Specify _____

xi. Have you received formal/informal financial education (e.g. various ways to raise funds, saving etc)
☐ Yes
☐ No

xii. Are you a member of any Sacco or any local saving group?
☐ Yes Specify _____
☐ No

Select from the 5 – Point Likert Scale where:
1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Financial empowerment Statements	**1**	**2**	**3**	**4**	**5**
i. Income boosting initiative/(s) have enabled me to meet water supply obligations.					
ii. Financial information and education have enabled me to meet water supply obligations.					
iii. I have access to savings and asset building opportunities that enable me to meet water supply obligations.					

PART 4: COMMUNITY PARTICIPATION IN PROJECT ACTIVITIES

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Community Participation Statements	**1**	**2**	**3**	**4**	**5**
Project Initiation/Roll out					
i. I am/was involved in the decision of water project construction and implementation.					
ii. I am involved in decisions to roll out of new programmes in the project/ expansion of the project.					
iii. I am involved in setting the annual water service charges.					
iv. I am involved in making decisions on amount of additional contributions to support the project operations/ new programmes.					
v. **Provision of labour:** I have been/ am an employee of the project either on a temporary/ permanent basis.					
vi. **Involvement in meetings:** I have attended the project's continuous meeting or annual general meeting.					
vii. **Monitoring and Evaluation:** I have been involved in continuous inspection of project facilities and review of its performance.					
viii. **Voting in/out leadership:** I Participate in selection of leaders in the water committee.					
ix. **Contribution of cash:** I contribute annual project membership fee and other additional fees as requested by the project.					

PART 5: CAPACITY BUILDING

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Capacity building	**1**	**2**	**3**	**4**	**5**
i. **Water maintenance training**– I have participated in training programs that promote skill development in maintenance of the water supply project					
ii. **Economic training** I have received economic training such as growing of organic cash crops that enables me generate income and thus meet my financial obligations in the project.					
iii. **Leadership and management skills:** I have received trainings on management and operation of the project that have enabled me to carry out my responsibilities in management and operation of the project					

PART 6: EASE IN ACCESS TO INFORMATION

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

Access to information Statements	**1**	**2**	**3**	**4**	**5**
Goals and objectives: I have clarity of the project goals and objectives					
Programme progress: I get regular feedback about progress of various programmes implemented by the project from water committee					
Project performance: I am fully aware of the overall project performance including both success and challenges faced by the project					

Part 7: Sustainability of Water Supply Projects in Tharaka South Sub-County, Tharaka Nithi County.

Select from the 5 – Point Likert Scale where:

1 = Strongly Disagree 2 = Disagree 3 = Neither Agree nor Disagree 4 = Agree 5 = Strongly Agree

		1	2	3	4	5
i.	I am satisfied with the frequency of water supply					
ii.	Water supply from the project is reliable for day to day use					
iii.	Water facilities are well maintained and serve the intended purpose					
iv.	Repair and maintenance is done on a timely basis					
v.	I am able to raise annual cost of water charged on your household?					
vi.	There has been growth in water project in terms of increase in number of water connections for members					
vii.	There has been continuous improvement of the project in terms of expansion of the water supply facilities					
viii.	Other than piped water supply, the community has benefited from other programmes from the project					
ix.	Annual fees collected from households are enough to pay for operation and maintenance of water systems?					

Thank you for your Participation

Appendix V: Table for Determining Sample Size for a Finite Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Appendix V: NACOSTI License

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RESEARCH LICENSE

This is to Certify that Miss.. Stella Chege of University of Nairobi, has been licensed to conduct research in Tharaka-Nithi on the topic: INFLUENCE OF COMMUNITY EMPOWERMENT ON SUSTAINABILITY OF WATER SUPPLY PROJECTS: CASE OF NG'UURU GAKIRWE PROJECT IN KITHINO SUB-LOCATION, THARAKA NITHI COUNTY, KENYA. for the period ending : 22/November/2020.

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Appendix VI: Research Recommendation Letter

UNIVERSITY OF NAIROBI
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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

REF: UON/ODeL/NLC/31/420

15th November, 2019

TO WHOM IT MAY CONCERN

RE: STELLA WANGUI CHEGE - REG NO: L50/10072/2018

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 Masters of Art in Project Planning and Management.

She is proceeding for research entitled **"Influence of Community Empowerment on Sustainability of Water Supply Projects: A Case of Ng'uuru-Gakirwe Water Project in Kithino Sub- Location, Tharaka Nithi County"**

Any assistance given to her will be highly appreciated.

UNIVERSITY OF NAIROBI ODEL CAMPUS
NAIROBI LEARNING CENTRE

CAREN AWILLY
CENTRE ORGANIZER
NAIROBI LEARNING CENTRE

INFLUENCE OF COMMUNITY EMPOWERMENT ON SUSTAINABILITY OF WATER SUPPLY PROJECTS: CASE OF NG'UURU-GAKIRWE WATER PROJECT IN KITHINO SUB-LOCATION, THARAKA NITHI COUNTY, KENYA.

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