FACTORS INFLUENCING COMMUNITY PARTICIPATION IN RURAL WATER PROJECT DEVELOPMENT: A CASE OF MATETE SUB-COUNTY KAKAMEGA COUNTY

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DECLARATION

This research project is my original work and has not been submitted for any academic award in 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

I dedicate this project to my dear wife, Winnie G. Odongo, my son Ryan O. Sei and my daughter Rehema C. Sei for their support and encouragement that has always inspired me to work hard with determination in life.

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I thank God for the opportunity to successfully complete this research work. I also acknowledge my research supervisor, Dr. John Mbugua, Dr. Lydia Wambugu, Dr. Masinde, Ms. Edith Kimani among other lectures for guidance and supervision during this course. I also applaud the support from my classmates for continuous encouragement during this period.

My appreciation also goes to my employer (World Vision Kenya) for allowing me to attend this course a midst tight implementation schedule. Lastly, I owe my gratitude to the University of Nairobi Library staff who were resourceful in finding relevant reference materials to this research.

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ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank
CBO	Community Based Organization
CP	Community Development
CVI	Content Validity Index
ERS	Economic Recovery Strategy
DGTZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
FGDs	Focus Group Discussion
IRC	International Rescue Committee
ISM	Institutional Support Mechanism
KII	Key Informant Interviews
KIWI	Kenya Integrated WASH Initiative
KNBS	Kenya National Bureau of Statistics
MDGs	Millennium Development Goals
NGOs	Non-Governmental Organizations
O & M	Operation and maintenance
PRSP	Poverty Reduction Strategy
SIDA	Swedish International Development Cooperation Agency
SPSS	Statistical Package for the Social Sciences
UN	United Nations
UNICEF	United Nation Children Education Funds
WB	World Bank
WHO	World Health Organization

ABSTRACT

The purpose of this study was to investigate the specific factors influencing community participation in rural water projects in Matete Sub-County. The research focused on the influence of socio-economics, water technology, community water management and development agency's approaches on community participation in the rural water projects. The research employed descriptive survey design. The study targeted 550 household heads within the Matete Sub-County according to Kenya National Bureau of Statistics 2009 census report. Simple random sampling was used to obtain 226 household heads and 22 water users committee representing 22 water sources among the 23 sources deemed to have been constructed within the last 20 years for the administration of questionnaires and interviews respectively. The data from the field were edited for accuracy, completeness, consistency and analyzed using descriptive statistical tools (Statistical Package for the Social Sciences V.17.0 and Excel). The findings of the research showed that community participation in water project was influenced by socio-economic of the people, development agency' approaches, management of water projects water technologies used. It was found that, the selection of water technologies were, the costly it was to implement, operate and maintenance thus the less community participation. It was also found that the low income level of the community had an influence on their ability of the community to contribute towards implementation, operation and maintenance of community water project in the study area. The management of water project through water user committee could have resulted in limited community participation due to undemocratic means of selecting management committee members and gender disparity in water projects management in this research area. Therefore, it was concluded that: poor social economic factors inadequate management of water project, selection of complexity water technology and lack of community centered development agencies approach did not promoted community involvement thus negatively influence on community participation in the rural water projects this study area. The study, therefore, recommended that, the local community social economic status should be strengthened, community should be empowered with the right skills and knowledge to enable them effectively participated in development projects. Partnership in rural water project implementation should be community centered thus creating synergy among the implementing agencies and the communities. Water technology adopted by the community should be appropriate to their needs. It should be affordability, cost effective to operation and maintenance, thus guaranteeing sustainability. The result of this study may be used by the development agencies, County Governments and communities in selecting and developing contextualized strategies to achieve optimum community participation that will ensure sustainability of rural water projects in Matete Sub-County and the rest of the County. This research was limited to community participation in the rural water project in Matete Sub-County; therefore, the study recommends future studies to focus on other rural areas within Kenya with varied political, cultural and environmental contexts.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Water is one of live saving resources that human being survives without. Moss (2009) emphasized that, water plays a vital role in the survival of living things. A sustainable supply of adequate safe water, sanitation and hygiene services are fundamental for a healthy, productive and dignified life, yet about 2 billion of the world's population is still struggling to achieve these services (WHO, 2010). The MGD's declaration of the year 2000 aimed at reducing by half the World's population without access to sustainable safe drinking water by 2015. This was a stepping stone towards full global water coverage by the year 2025 as set by the Global Water Partnership Framework for Action and the African Water Vision (ADB, 2007).

It was reported by WHO and UNICEF (2010) that 37 of 49 (75 %) countries in Asia-Pacific suffer from low levels of water security thus are currently facing imminent water crisis. As a result around 10% of total burden of diseases are related to consumption of unsafe water and that it costs 3.6 million lives annually (Pruss-Ustun et. al., 2008).

Kenya has been classified as water scarce Country (Birongo and Quyen, 2005) and it is projected that, by 2025, the per capita water availability will have dropped to 235 M^3 as a result of the increase in population. The current water situation in Kenya shows that only 57 % of the population has access to clean and safe water according to Kenya National Water Services Strategy (2007).

Achieving sustainable water supply remains one of the goals of Third World Countries. In Africa, many water projects have been done by the governments, development partners and

the communities though most of them do not last more than five years after commissioning (Water Supply & Sanitation Collaborative Council, 2012).

Community based water management system evolved in 1980's. It emerged as a response to the international crisis of water scarcity and dwindling resources. Water management systems that embraced a participatory approach empowered communities to provide, protect and safeguard their own water resources. In this respect, a community based water management system would be concerned with the community's involvement in the planning, design, implementation, and maintenance of a water project or program. These offered greater chances of effectiveness, efficiency, functionality, sustainability and improvement of livelihood of the projects (Green et. al., 1994).

In Kenya stakeholder participation in community development has been over emphasized in the Constitution and other legislation including the water Act (2002). These have provided a platform for people to participation in communal water project that aims to improve the management and service delivery.

Community participation in rural development has now entered its second decade as a key paradigm for rural development in Kenya (World Vision Kenya, 2010). The rationale has been to fully engage all stakeholders in the rural communities in development, therefore taking initiatives and actions that are stimulated by their own thinking and deliberations for effective control of their development. This required effective co-ordination of local activities to enable people come together to achieve common development goals (Ofuoku, 2011). Schouten and Moriarty (2003) argued that community participation is fundamental to the sustainability of water supply in rural areas, particularly in developing countries. Omosa (2005) also underscored the need to involve local people when designing development interventions as development cannot be defined from outside and imported for implementation.

1.2 Situation in Matete Sub-County

The stakeholders in Matete Sub-County have in the recent years developed water projects with the main aim of improving accessibility to adequate and safe water, this effort have no bored much fruits since only 43% of the households have access to safe water (Joint Monitoring Program report, 2011). Ministry of Water and Irrigation Strategic Plan (2009-2012) stated that, it is time-consuming for women and girls in pursuit of water thus preventing from taking up income generating activities and curtailing girl-child's education respectively. The report shows that, inadequate access to safe water has been due to lack of ownership and unsustainability of water sources which highly depends on factors influencing community participation in this projects. In this view, the study investigated factors influencing community participation in rural water resources developments in Matete Sub-County, Kakamega County.

1.3 Statement of the problem

A Joint Monitoring Program report (2011) indicated that, about 43% of the population access adequate clean water; leaving about 67% of the population with inadequate clean water in Matete Sub-County, despite much investment in water resources in this area.

Despite the efforts advocating for the use of participatory methodology while dealing with community development project (Thakur and Brahmi 2011), the outcome of community participation in project planning and implementation have not been proportional to the budgetary support in rural water projects. The inter agency monitoring report (2012) indicated that, there could be some inherent factors hindering effective community participation in rural water projects in Western Kenya. Therefore this research investigated the specific factors influencing community participation in the water project in Matete Sub-County in Kakamenga County.

1.4 Purpose of the study

The purpose of this study was to investigate factors influencing community participation in rural water project development: a case of Matete Sub-County Kakamega County.

1.5 Objectives of the study

To answer the research question, this study was guided by the following four objectives:

1. To establish how social economic factors influence community participation in the rural water projects in Matete Sub-County Kakamega County.
2. To determine how management of water resources influence community participation in rural water projects in Matete Sub-County Kakamega County.
3. To determine how water technology influence community participation in rural water projects in Matete Sub-County Kakamega County.
4. To establish how development agency's approaches influence community participation in rural water projects in Matete Sub-County Kakamega County.

1.6 Research questions

With respect to study objectives, the research was guided by following main research questions:

1. What influence has social economic factors have on community participation in rural water project in Matete Sub-County Kakamega County Kakamega County?
2. What influence does management of water resources have on community participation in rural water projects in Matete Sub-County Kakamega County Kakamega County?
3. What influence has water technology have community participation in rural water projects in Matete Sub-County Kakamega County Kakamega County?

4. What influence has development agency's approaches have on community participation in rural water projects in Matete Sub-County Kakamega County Kakamega County?

1.7 Significance of the study

The findings of this research may help the County Government of Kakamega and the Central Government in policy formulation. It may also assist the development stakeholders in Matete Sub-County in selecting and developing specific strategies for optimization of community participation in rural water projects. The findings of this study may also form a basis for further research geared towards improving engagement in rural development.

1.8 Assumption of the study

This research assumed that, the communities would be willing to participate objectively in the study. It was also assumed that community participation leads to sustainability of community water project. The research also assumed that water is used for domestic purposes. Therefore the study focused on the house-holds heads which uses communal water points.

1.9 Limitation of the study

During this research, there were delayed filling and returning of the questionnaires by the respondents. To address this, the researcher did follow up with the respondents. Since factors influencing community participation in the rural development differ according to the setting, the findings of the study may not be generalized to all regions in Kenya. Nevertheless, the study may provide a framework for identifying and analyzing factors that influence community participation in water development Matete Sub-County.

1.10 Delimitation of the study

The research focused on factors that influenced community participation in the rural water project in the study area over the last 20 years. The research was carried on the households who use communal water projects in Matete Sub-County. The study area covers a surface area of 101.9 KM^2 as shown in the appended area map.

1.11 Definitions of significant terms used in the study

The study used the following significant terms.

Community development is defined as the employment of community structures to address social needs and empower groups of people.

Community participation is defined as involvement by communities as a whole as well as by its individual members in the community project.

Community water project is defined as a project carried out in the community to provide access to adequate, clean and safe water.

Development agency's approaches refer to ways donor agency handle development projects in the rural area.

Empowerment is defined as a social action process that promotes participation of people, organizations, and communities towards the goals of increased individual and community control, political efficacy, improved quality of life, and social justice.

Management of water resources is defined as the approach used by the community in handling and utilizing community water project.

Social economic factors refer to household's economic and social position based on income, education, and occupation that influence their participation in community projects.

Sustainability refers to water supply facilities being maintained in a condition that ensures a reliable and adequate potable water supply over a prolonged period of time.

Water technology refers to the means used by the community to draw water from the source.

1.12 Organization of the study

This study was organized in chapters with; chapter one containing the background of the research, problem statement, purpose of the research, objectives, research questions, justification of the research, significance, assumptions, limitations, delimitation and definition of significant terms used in the study. While chapter two contained introduction of the chapter, literature community participation, theoretical framework, conceptual framework, the knowledge gap and summary of the literature. Chapter three contains research methodology (research design, target population, sampling procedure, research instruments, validity and reliability of the instruments and data analysis). Chapter four focused on data analysis, presentation and interpretations of the findings. Chapter five contains; introduction, the summary of findings, discussions of the findings, conclusions of the study, recommendations of the study and suggested areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction of literature

Chapter two aimed at reviewing the literature on rural development focusing on community participation in rural water resources development projects that guarantee sustainability beyond donor support. The researcher reviewed findings from the previous studies carried out in this field and pointed out the knowledge gap thereafter suggesting the possible solutions for effective community participation. Therefore, conceptualization of key concepts related to factors influencing community participation in rural development.

2.2 Community participation in development

Community participation has been a widespread terminology in development and management all over the World as evidence from the policy guidelines of many countries (Kombo and Kimani, 2011). This has been geared towards tapping the potential of the people in improving their living standards. These have been perceived to be a positive move particularly in the developing Countries where the majority of the population is still living undeveloped rural areas (Toyobo and Muili 2013). Community participation development was introduced in Kenya in 1980`s, to enable the collective responsibility in development agenda (Mwakila, 2008). Thus, community participation has been an important component of community development and reflected a grassroots or bottom- up approach to problem-solving. Therefore rural community development requires collective efforts of every community member.

2.2.1 Concept of community participation

Community participation was defined by Ertsen et al (2007) as active engagement of individuals within a community to solve conditions, influence policies and programs that are geared towards improving the quality of their lives. Reid (2008) explained that the concept of community participation assumes that value accrues to the community members through the acts of participation and association. Therefore, the more community are involved in a decision-making process, the more likely they will develop sense of teamwork and cooperation, thereby increasing their motivation, commitment, and contribution to the process of development (Sanoff, 2006).

The top-down-approach has been associated with many government schemes often meant involved government agency providing professional leadership services and programs without much involvement from the beneficiary community (Ademola and Tackie-ofosu, 2013). This model is structured around the use of professional leadership provided by external resources that plan, implement, and evaluate development programs (Sanoff, 2006).

Down-Top approach has been associated with stronger forms of participation, involving control over decisions, priorities, plans, and implementation, therefore, leading to social and personal empowerment, economic development, and socio-political transformation (Mwakila, 2008).

2.2.2 The degree of community participation

The degrees of community participation in community were defined by Koestler (2008) defined projects as: co-option, compliance, consultation, cooperation, collective action, and co-learning. It was important for the Matete community to understand the levels and modes of community participation in community development process for effective community participation rural water projects (Theron, 2005). These approaches become more relevant when the impact of participation is assessed in relation to a program or project, and the

degree of participation becomes a central feature in this regard (Fokane, 2008). All participation efforts in community development are not equal thus; the extent of participation in the project may vary per project or program (Kakumba and Nsingo, 2008). The topology of participation, therefore, shows increasing degrees of participation from the low end of co-option to the upper end of collective action (Koestler, 2008). The level community participation increases community ownership and capacity thus guaranteed sustainability of the project (Munger et al, 2008).

Community participation discourse described different levels in which beneficiaries of any development initiative should be involved. This can be typically applied in rural water and sanitation projects (Amerasinghe, 2009).

2.2.3 Community participation and sustainability of rural water projects

Community participation approach leads to stakeholders taking a center role in project planning, implementation and monitoring of projects; thus, is a prerequisite for project ownership, successful implementation and sustainability of the projects (Mwakila, 2008). Tedesse (2013) also affirmed the importance of beneficiary's participation in project initiation, implementation, operation and maintenance. This gives them greater opportunity to manage and decide on issues affecting their water supply systems (Jansz, 2011).

In developing countries, a significant number of rural development initiatives fail to deliver benefits to community over the long term due to inadequate understanding of the community involvement and sustainability (Toyobo and Muili 2013). Low rural water supply sustainability levels throughout Sub-Saharan Africa indicate severe limitations of community management approach (Harvey and Reed, 2007).

In Western Kenya many water project were implemented in the last 20 years though very few of them lasted for more than 5 years from the date of initiation.

2.3 Social economic factors and community participation in rural water projects

The high poverty level in the rural Kenya remains one of the biggest challenges facing the Country's development agenda. According to Kenya social policy report (2012), about 46 % of Kenya's population lives below the poverty line. This situation is marred large income disparities between regions and people in the country. This challenges may undermine sustainability of user charges or community contributions among the poor sections of water consumers, especially in the Arid and Semi-Arid Lands regions (MoW&I report, 2007).

Development projects in the communities require resources for implementation and operation of water projects (Munger et al, 2008). In order for rural communities to play an active role in the community development, it is necessary for them to have access resources (Nissen-Pettersen et al, 2006). Weak financial position of local communities not only reduces their capacity to participate in development projects, but also affect their ability to pay for water services (Kakumba and Nsingo, 2008).

Lack of adequate knowledge and skills by the community members due to the high level of illiteracy have limited the scope of community participation in rural water development and thus perpetuating continues lack of safe and clean water within many communities (Kakumba and Nsingo, 2008). Nissen-Pettersen et al (2006) in their study based on rural water projects in Kitui, asserts that gender mainstreaming is important the in management of rural water project to ensure sustainability. Therefore this research would like to understand how socio-economic of the community influence their participation in rural water development.

2.4 Development agency's approaches and community participation in rural projects

According to Botes and Rensburg, (2014) a lot of thought have been going on community participation for the last three decades. Sanof (2006) shown that, to a large extent the

current decade of social movements, non-government organizations (NGOs) and community-based organizations (CBOs), was a manifestation of organized community participation.

In the earlier days, the donor agencies or the government initiated community projects with minimum involvement of the communities or beneficiaries. They adopted the top-down model which was structured around the use of professional leadership provided by external resources that plan, implement, and evaluate development programs (Mwanzia and Strathdee 2012). Community development Programs using this model typically focus on providing professional leadership to the development process coupled with supportive concrete services. Through the process of residents following the external leadership and accessing, there has been little participation of the local community a situation which resulted into the death of donor funded projects immediately the external support is stop. Mwanzia and Strathdee (2012) ascertains that, the bottom-up model of social development theory emphasis on comprehensive community participation, motivating local communities, expanding learning opportunities, improving local resource management, replicating human development, increasing communication and interchange, and localizing financial access.

The approach used by the development agency determines how the local communities engaged and play their role during the phases of project development Mansuri and (Rao, 2006). In the study carried out in Kitui by Ersten et al (2007) emphasized on a participatory approach taking into account gender and poverty pays off in terms of better functioning water services.

2.5 Management of water projects and community participation in rural projects

Community management refers to the capabilities and willingness of the beneficiaries to take charge and determine the nature of development affecting them (Sanoff, 2006). In

water and sanitation systems, community management means that the community exercises responsibility for decision making and control over the subsequent execution of these decisions during project development. Munger et al (2008) defined community management to mean that community take on the full range of management tasks related to operation and maintenance (setting tariffs and collecting payment, carrying out routine maintenance, and making decisions about system extension).

Therefore community management concerns all issues pertaining to responsibility (ownership), decision making authority, and control over development project and system operations. Community management is widely accepted as the principle management approach for sustainable development of rural water supply in developing countries (Koestler, 2008). Lockwood (2004) identifies common principles of community management which include participation, control, ownership and cost-sharing. The community must participate in the development process which must continue indefinitely, have direct or indirect control making strategic decisions from the design phase to long term operation and maintenance, have legal and perception of ownership of the system and contribute to recurrent costs. Other concepts of community management model include sustainability, operation and maintenance, cost recovery and Institutional Support Mechanism (ISM) (Koestler, 2008).

The theoretical framework that underpins community management include neoliberal perception on reduced state involvement, water as a basic human right, water as an economic good and people first and empowerment approaches (IRC, 2003). They indicated that, community involvement in system construction began in the 1970's, which developed into community participation in decision making and maintenance in the 1980's which then developed into community management in the 1980's and 1990's. Prior to the introduction of community management in the 1980's, most rural water supplies were

supply driven and delivered and managed by government institutions (IRC, 2003). Consequently, sustainability levels were low and it was widely recognized that there was a need to develop more effective mechanisms for management of ongoing water supply operation and maintenance (IRC, 2003).

Increased involvement of the community in development has changed the traditional roles adopted by government and community where governments changed from 'provider'' to 'facilitator'' and community from 'receive'' to 'doer'' (Amerasinghe, 2009). Mansuri and Rao (2006) indicated that the sustainability of community-based initiatives depends crucially on an enabling institutional environment, which requires government commitment, and on accountability of leaders to their community to avoid "supply-driven demand-driven" development.

The models of management which determines the level of community participation in rural water resources defined by LVNWSB in collaboration with SNV (2011) as: Community management model is where water projects are managed through democratically elected water users committee who are fully responsible for all aspects of the water supply including the O&M and financial management (Harvey and Reed, 2007). This kind of management often encourages community participation at various level of project development (Munger et al, 2008). The water committee enables the community to have a major role in the project, to have a sense of ownership over the project. In combined community and Government management, Government still has a part of the responsibility in the daily operation of the community water project. The technician from the Government may still monitor and maintain the water project although the community might pay for the spare parts. During this stage community participation is very low for example, water projects in Garissa and Wajir Counties which are maintained by the County Governments. In public institution management, the management of water projects in done

by a special appointed committee within the institutions (school, church or hospital). These water supplies are in first instance meant for the institution itself, rather than for serving the community. At some locations the water supply might serve the community, but it is often not the main purpose.

2.6 Water technology and community participation in rural water project

The appropriate technology refers to the technology used corresponded to the ability of the community to operate and maintain the installed water infrastructure. In Kenya many rural communities' uses boreholes, shallows, springs, roof water harvesting, piped water and water pans or small dams for their water demand.

The technology chosen has to be friendly and easy to use by the community for them to be able to affectively participate. Okorie et al. (2001), in the study on donor funding and sustainability of rural water supply and sanitation in Kenya found that the lack of appropriate technology for rural water is a major factors attributing to the unsustainability of many rural water supply schemes. Awoke (2012) in his study of challenges of sustainability of rural water supply in Quarit Woreda and Amhara region found out that, selection of appropriate water technology type is essential for the community to be able to operate, maintain and pay for. Where the technology deployed is remote from the users' capacity, their prospects of effective participation is equally remote. ADB (2007) argues that the most common problem in rural water supply services is ensuring continuous supply through effective and efficient operation and maintenance. The availability of the technical persons to operated and maintains rural water resources determined the level of participation in the water projects. Okorie et al. (2001) emphasized that effective operation and maintenance (O & M) of rural water supply systems is crucial element for the sustainability of the water project.

The community management of rural water supply systems on operation and maintenance (O & M) may not be successful, if the cost of water technology is beyond the community's ability with locally available resources (Binder, 2008). The capacity of the rural water operators should relate to the choice of water technology chosen to ensure smooth operation that guarantees sustainability of rural water projects. This has been lacking in many rural area where several water projects have stalled due to insufficient technical capacity to carry out minor and major repairs leading to in accessibility of water by the people. Birongo and Quyen (2005) also state that increased energy cost (requirement) impact on the cost of delivering water services to the people at an affordable price. This problem is also compounded by the fact that people are reluctant to pay for water services hence lack of money to carry out repairs. The selection of the type of water technology may determine the level of community participation in rural water project by all the stakeholders within the community. The technology should take care of the available water resources and the appropriateness by the people.

2.7 Theoretical framework

This section presented relevant theory upon which this research was based on. Rouse (2007) defined a theory as statement that organizes a set of concepts in a meaningful way by explaining the relationship among them. This study was anchored on Social Development theory which advocates for participatory development concept to be adopted in rural development. It was endorsed at Dublin Conference on Water and the Environment 1992 as a set of principles focusing on water managed at the community level and the demand should be consumer driven (Katz and Sara, 2010). Under this approach, rural water projects adopted clear and transparent rules that allow users to select the level of service, technology, and location of facilities that best fit their needs, with a clear understanding of the costs and responsibilities that these options bear.

2.8 Conceptual framework

The conceptual framework is a hypothesized model identifying the concepts under study and their relationship (Mugenda and Mugenda, 2003). It provided the structure or content for the whole study based on literature and personal experience. It also showed the structural relationship between the factors affecting community participation in rural water resources development. This concept explained the efforts of the community in the endavour of finding clean and safe water for domestic and agricultural used in Matete Sub-County. Fig. 1 illustrates the relationship between the independent (socio-economic factors, development agency's approaches, rural water technology, management of rural water projects) and community participation in rural water project. Intervening variable in this research is the political and cultural factors. Government policies and legislation frameworks is also considered as the moderating variable that affects community participation in rural water projects.

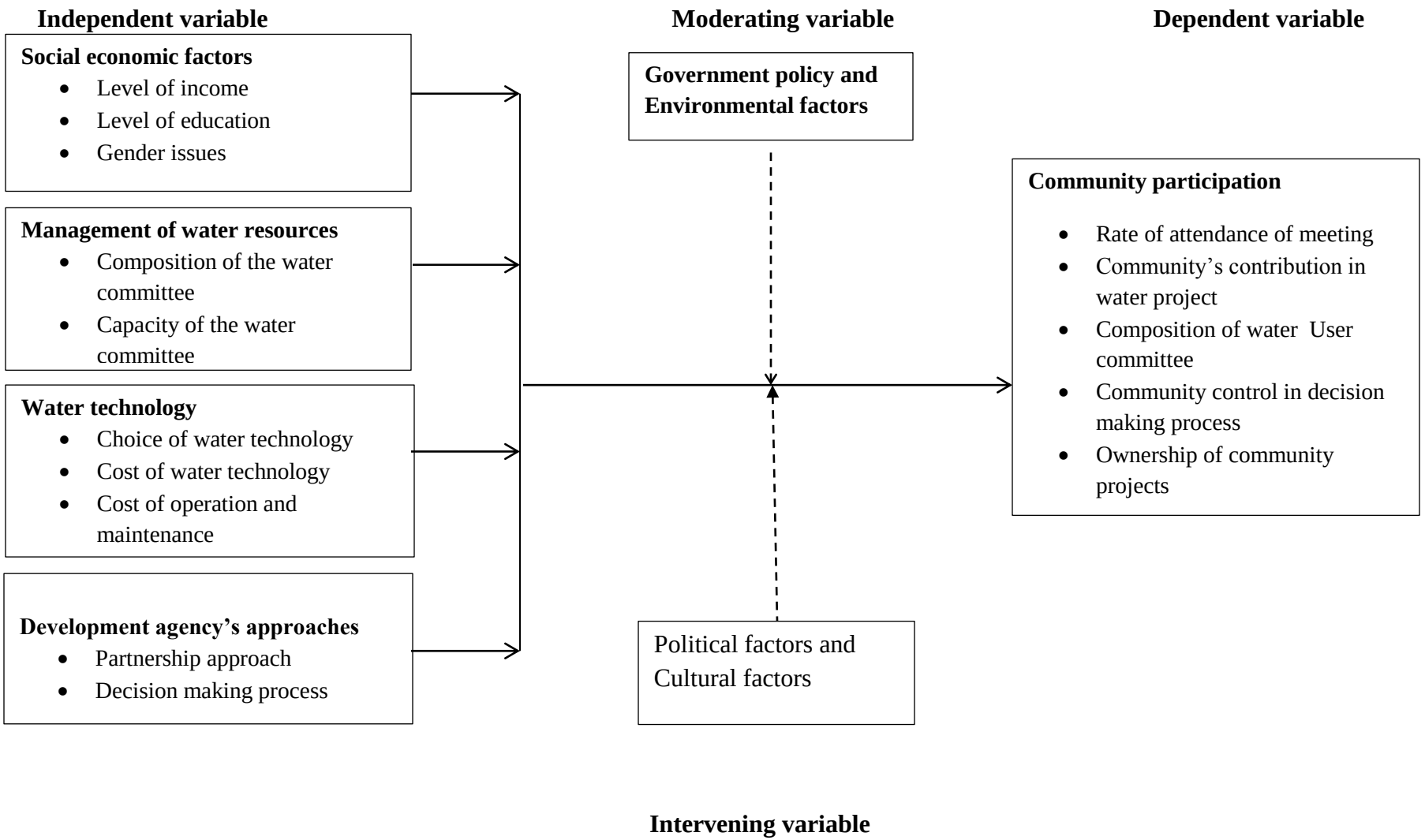

Figure 1: Conceptual framework

2.11 The knowledge gap

The literature reviewed shows that, the rural communities have a limited understanding of the full range of their roles and responsibilities as primary stakeholders in the water sector and this limits their effective and meaningful participation in implementation, monitoring and evaluation of water and sanitation projects (KWAHO/UNDP, 2013). Therefore this research investigated specific factors which influenced community participation on rural water resources developments in Matete Sub- County Kakamega County.

2.12 Summary of the literature

It is acknowledged that research has been done in community development. According to Mwakila (2008) acknowledge that community participation in development is never homogeneous in all areas, therefore cannot be generalized to other area because of their specific nature. Amerasighe (2009) demonstrated that while participation increased a sense of ownership, this alone did not guarantee sustainability. It is also mentioned that not all forms of community participation are beneficial to the project viability. Ofosu and Ladele (2013) found that in some areas, high participation does not necessarily result in effective rural water resource management by the community. Amerasighe (2009) demonstrated that while participation increased a sense of ownership, this alone did not guarantee sustainability.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covered methodology followed during this research. It described the research design, sampling procedure, data collection methods, validity and reliability of the research instruments, data analysis and presentation.

3.2 Research Design

A research design was defined by Kothari (2001) as an arrangement of conditions for collecting, analyzing and interpreting research findings. Orodho (2003) mentioned that research design provides strategies that help develop objectives and interpreted of data that answer the research question. This research employed descriptive survey design to investigate factors influencing community participation in rural water projects in Matete Sub-County Kakamega County.

This design helped collect data from the sampled population and determined the current status of that population with respect to the variables (Mugenda and Mugenda, 2003). Kothari (2004) stated that survey is concerned with conditions that existed in Matete Sub-County therefore, was appropriate for this study. This design described and summarized the data by determining the averages, frequencies, and percentages that allowed interpretation (Jaggi, 2012).

3.3 Target population

The target population was the entire aggregation of respondents that met the designated set of criteria (Burns and Grove 1997). The target population for this research was 550 households head within the Matete Sub-County according to KNBS 2009 census report. The study also focused on 23 water user committees representing the 23 sources in the area

that were developed within the last 20 years (Joint Monitoring Program report 2011). These were the people who deal with and are affected by the availability of water resources in that area.

3.4 Sample size

The sample size for this research was derived from Krejcie and Morgan (1970) formula as shown in appendix 2.

$$s = X^2NP\ (1-P) \div d^2\ (N-1) + X^2P\ (1-P)$$

Where:

s =required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level.

N = the population size.

P = the population proportion (assumed to be .50 for maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

A sample size of 226 household heads and 22 water user committees were obtained from the target population of 550 household heads (KNBS census report, 2009) and 23 projects that were developed in the area within the last 20 years respectively (Joint Monitoring Program, 2011).

3.5 Sampling procedure

The sampling procedure was the step followed in the selection of target population that represented the entire population in order to obtain information that answered the research questions. This research used the simple random sampling procedure to select the 226 household heads and 22 water users committees for the administration of questionnaires within Matete Sub-County. The household heads and the water committees were assigned random numbers ensured that each household head and committee member had an equal

opportunity of being selected to participate in the research. This method was chosen because it was simple, practical, economical provided easy access to the respondents.

3.6 Research instruments

The research instruments are measurement tools used to collect data on the research variables. This research used questionnaires to collect primary data from the household heads and water users committees. The quality of the questionnaires was achieved by validating and testing for reliability of research instrument.

3.6.1 Pre-testing of the research instrument

Pre-testing of the research instrument was conducted by carrying out a pilot study in the study area. The research selected 15% of the sample sizes (40 household heads and 4 water user committees) to fill the questionnaires prior to the actual research begins. This enabled the researcher to get the thinking behind the answers that allowed accurate assessment on whether the questionnaires were understood by respondents, filled out properly and whether the questions were right and whether respondents are able to participate in the survey.

3.6.2 Validity of the instruments

The validity of the research instrument was difined by Bridget & Lewin (2005) as the degree by which the sample size represents the content the research is designed to measure thus reducing error in the measurement. Mugenda & Mugenda (2003) recommended the use of professional experts in a particular field to assess the content validity of a research instrument. During this research, content validity of the questionnaires was achieved by involving three experts in the research area. The instruments were reviewed on relevance, simplicity, clarity and modification done based on the experts' opinions. This enabled the instrument to collect relevant information to answer the research questions.

3.6.3 Reliability of the instruments

Instrument reliability was defined by Bridget and Lewin (2005) as the consistency of measurements. It is normally assessed using the test-retest reliability method. The reliability of the questionnaires was evaluated through Cronbach's Alpha reliability coefficient of internal consistency. Nunnally (1978) established the minimum Alpha coefficient threshold value of 0.6 against which this research was benchmarked. According to the Table 3.1 the Cronbach's alpha was found to be 0.728 (728%) for every objective. Therefore, the questionnaires will be able to produce consistent results should the research be repeated.

Table 3.1: Instrument reliability co-efficient

Cronbach's Alpha	No. of Items
.728	**24**

3.7 Data collection procedure

Field data collection began after obtaining approval from the University of Nairobi, National Commission for Science, Technology and Innovation. In the field, the researcher explained the purpose of the study to the respondents then assured them of confidentiality of their responses and identities.

During this research, relevant literature in this field of study was reviewed to obtain secondary data for the purpose of making conclusion and recommendations. The primary data Matete Sub-County was collected by administering the questionnaire to 226 household heads and 22 water users committees for the administration of questionnaires. The findings recorded for analysis and interpretation.

3.8 Data analysis technique

In this research, data from the field was edited for accuracy, completeness and consistency. These data was then analyzed using descriptive statistics. This entailed the use of measures of central tendency. The descriptive statistical tool (Statistical Package for the Social Sciences V.17.0 and Excel) was used during the analysis. The results were presented in tables, percentages, and measure of central tendency for easier interpretation and reporting.

3.10 Ethical consideration

Resnik (2011) stated that ethical consideration in research very important since it promotes knowledge, trust, accountability, mutual respect, fairness and social responsibility, human rights and adherence to the law.

During this study, approval was sought from the University of Nairobi to authorizing the research. Clearance from the National Commission for Science, Technology and Innovation was also obtained, to allow research to be conducted in the field the study.

The research was later cleared by the Kakamega County Director of Education, the Kakamega County Commissioner, local administration and water projects management. The researcher explained the main aim of the study to the respondents and assured them of confidentiality of their responses and identities. The researcher adhered to appropriate behavior in relation to the right of the respondents.

3.11 Operationalization of variables

In this research, the operationalization of variables showed the variables and how each was measured. Table 3.2 showed the operational indicators which were used during the investigation of factors influencing community participation in projects: case of rural water resources development in Matete Sub-County, Kakamega County.

Table 3.2: Operationalization of variables

Objectives/ research question	Type of variables	Indicators	Measurement scale	Method of data collection	Data analysis technique
To establish how social economic factors influence community participation in rural water projects.	**Independent Variable:** Social economic factors **Dependent:** level community participation in water projects	Income level Education levels Gender Rate of attendance of meetings Contribution in meetings. Amount of money contribution towards the project.	Ordinal Ordinal Nominal Ordinal ordinal Ordinal	Questionnaire Questionnaire	Descriptive analysis
To determine how management of water resources influence community participation in rural water projects.	**Independent** Management of community water resources **Dependent** level community participation in water projects	Composition of the water management committee Capacity of the water committee Participatory decision making of water Users Committee	Nominal Nominal Nominal	Questionnaire Questionnaire	Descriptive analysis
To determine how water technology influence community participation in rural water projects.	**Independent** Water technology **Depended level** community	Choice of water technology Level of sustainability of the water technology used Sustainability of the technology	Nominal Nominal Nominal Nominal	Questionnaire Questionnaire	Descriptive analysis

	participation in water projects				
To determine how development agency's approaches influence community participation in rural water projects	**Independent** Development agency's approaches **Depended** community participation in water projects	Partnership approach Decision making process Sense of ownership of water projects	Nominal Nominal Nominal	Questionnaire Questionnaire	Descriptive analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

Presented in this chapter are data analysis, presentation and interpretation of finding. The data presented in this chapter were processed using Statistical Package for Social Sciences (SPSS). The themes answering the research questions were presented and analyzed. The analyzed data was presented in both tables and narrative explained.

4.2 Questionnaire return rate

This was the proportion of the questionnaires returned after they have been issued to the respondents. The study revealed that, out of the 226 house heads and 22 Water User Committees sampled in the study, 204 (90.3%) of the house heads and 20 (87%) of the Water User Committees filled and returned questionnaires for data analysis. According to Mugenda and Mugenda (1999), a response rate of 50% is adequate for analysis therefore; this response rate was excellent for analysis and reporting. Therefore the return rate for the questionnaire was admissible.

4.3 Social-economic factors and community participation

Social economic status as defined by demographic factors was important in this research to understand the gender of the respondents, education level, average household income and the occupation of the community. These would show the community's ability to participate in rural water projects in the research area.

4.3.1 Gender of respondents

The research sought to know the gender of the respondents as shown in Table 4.1. This was important for this study to show the presentation of male and female in the study and also to

indicate their opinion regarding gender roles in community participation in the rural water projects in the study area as presented in Table 4.1.

Table 4.1 Gender of respondents

	Frequency	Percent
Male	84	41
Female	120	59
Total	**(204)**	**(100)**

The research conducted found that, the majority of the respondents were female 120 (59%) were female while male respondents were 84 (41%) were male while as indicated in Table 4.1. This could have been due to the absence of men within the household during the time of the data collection and also due to the fact that women are more involved in water related activities within the households.

4.3.2 Occupation of respondents

The researcher sought to establish the occupation of the respondents as shown in Table 4.2. This was important to establish the economic activities which support the livelihood of the community under the study.

Table 4.2: Occupation of respondents

	Frequency	Percent
Agriculture	174	85
Business service	6	3
Service industry	12	6
Teaching others	12	6
Total	**(204)**	**(100)**

The finding indicated a majority of respondents 174 (85%) derived their livelihood from agricultural activities, 12 (6%) of the respondents were engaged in the service industry, 12 (6%) of the respondents were teaching while 6 (3%) are in business as shown in Table 4.2. This was evidence that the residents in the area majorly rely on farming activities as their major source of livelihood.

4.3.3 Household income of the community

The study sought to establish the household Monthly income was considered as shown in Table 4.3. Therefore, be able to know their ability to contribute towards water project implementation and their ability to pay for water.

Table 4.3: Average monthly household income before tax (Kshs)

	Frequency	**Percent**
Below 2000	30	15
2001-5000	102	50
5001-10000	42	21
10001-20000	6	3
20001-30000	12	6
30001 and above	6	3
Not responded	6	3
Total	**(204)**	**(100)**

The researcher found out that majority of the respondents'102 (50%) household monthly income before tax was between 2001-5000 Kenya shillings, while 30 (15%) of the respondent indicated an income below 2000 Kenya shillings. 42 (21%) of the respondents had an income between

5001-10000 Kenya shillings. 6 (3%) of the respondent had an income between 10001-20000 Kenya shillings, 12 (6%) of the respondents had a monthly income between 20001-30000 Kenya shillings, while 6 (3%) had an income above 30000 as indicated by the respondents respectively. However, 6 (3%) of the respondents did not respond to what their household's monthly income before tax as shown in Table 4.3.

Since, most of the respondents 144 (71%) of the residents had a household's monthly income before tax between 2001-10000 Kenya shillings. This showed that the community had less capability to fund the major water project in the area. The income of the community could not enable them to pay for water charges.

4.3.4 Education level of respondents

The study sought to establish the level of education of the respondents as shown in Table 4.4. This was important in this study to be able to establish the capacity of the community in water project implementation and operation.

Table 4.4: Education level of respondents

	Frequency	**Percent**
Tertiary education	18	9
Upper primary school	66	32
Secondary school	84	41
None/Lower primary school	36	18
Total	**(204)**	**(100)**

The research found out that 36 (18%) of the respondents had either attained lower primary education or had not attended school at all. While 66 (32%) of the respondent had attained primary education. 84 (41%) of the respondents attained secondary education while only 18 (9%)

had attained tertiary education as shown in Table 4.4. From this analysis, a majority of the respondents had some formal knowledge through that could help in understanding aspects of water resources management.

4.4 Management of water project and community participation

Community water project management is very important for the project sustainability. Therefore, the researcher sought to establish how water projects in the study area were managed by the community.

4.4.1 Technical capacity

The researcher sought to know the local artisan's skill on water projects servicing as shown in the Table 4.5. This was important to determine their technical ability to carry out maintenance of water services in the area.

Table 4.5: Artisan's skills technical

	Frequency	**Percent**
None	102	50
Not responded	30	15
operation and maintenance training	6	3
Plumbing	66	32
Total	**(204)**	**(100)**

It was found that 102 (50%) of the respondents indicated that the artisan did not have technical skills on the water project for maintaining while 66 (32%) of the respondents indicated that the artisans had skills in plumbing works. 6 (3%) of the respondents said that the artisans had been trained on operation and maintenance. In the study, 30 (15%) of the respondents did not respond to this question as shown in table 4.5.

Therefore it can be said that, the artisans in the study area have a limited technical capacity to be able to service all the water projects in the area. Therefore, the community has to rely on technician from out thus high cost of operation and maintenance of these water projects.

4.4.2 Appointment of water management committee

The research sought to know how the water management committee was appointed as shown in the data in Table 4.6. This was important to establish whether the democratic process was being followed which as an effect on the water project management.

Table 4.6: Manager of water projects -appointment of water user committee

			Appointment of water user committee		**Total**
			Democratic election	**Undemocratic election**	
Manager of water projects in the community	Community	Count	72	132	204
		% within Manager of water projects in the community	35%	65%	100%
Total		**Count**	**72**	**132**	**(204)**
		% within Manager of water projects in the community	**35**	**65**	**(100)**

It was found that majority 132 (65%) of the respondents indicated that, the appointment of management of the water committees were done through undemocratic means, while 72 (35%) of the respondent said that the water management committees were elected through democratic means as shown in Table 4.6.

Therefore, this implies that community members did not have the opportunity to choose the composition of the water management committees and therefore had little say on who are appointed as the water user committee members. This could have affected the management of water projects in this study area.

4.4.3 Composition of water management committee

The research sought to establish the composition of the water management committees as shown in the data in Table 4.7. This was important to understand the inclusion of gender in water management as it determines the sustainability of water projects.

Table 4.7: Composition of water user committee

		Frequency	Percent
	Female	7	31.8
	Male	15	68.2
	Total	**(22)**	**(100)**

The finding showed that majority 15 (68.2 %) of respondents indicated that there are more male members than 7 (31.8 %) female members in the water management committees according to Table 4.7. This was a clear indication of the existing gender disparity in the management of community water projects as women are not adequately empowered to take up leadership positions and also due to undemocratic means of selecting the water committee members.

4.5 Selection of water technology and community participation

The researcher sought to establish how selection of water technologies used by the community in the study area influence community participation.

4.5.1 Community contribution in project implementation

In the study, the researcher sought to establish how the respondents contributed in the past water project implemented in the study area within the last 20 years as indicated in Table 4.8. This was important to show how the community contributed to their water projects.

Table 4.8: Community contribution in project implementation

	Frequency	Percent
Monetary contribution	6	3
None	138	68
Attending meetings	6	3
Manual labour	54	27
Total	**(204)**	**(100)**

The researcher found out that the majority of the 138 (68%) respondents had not contributed during the implementation of water projects in the last 20 years as shown in Table 4.8. However, 54 (26%) contributed manual labour, 6 (3%) offered monetary contribution while the 6 (3%) of them attended meetings.

The contribution of the people was limited to attending the meetings and manual labor. Low-income levels of the community might have limited their contribution towards the implementation of community water projects in this area.

4.5.2 Water technology used by the community

The researcher sought to establish from the respondents type of water technologies used in the study area as shown in the Table 4.9. This was very important in this study to establish the preferred water technology by the community in this area.

Table 4.9: Type of water technology used

	Frequency	Percent
Others	41	21
Borehole water	30	15
Shallow well	120	59
Pipe water	13	6
Total	**(204)**	**(100)**

The researcher found that majority 120 (59 %) of the respondents indicated that they use shallow wells, while 30 (15%) of them uses borehole water. 13 (6 %) of the respondents was found to be using piped water, while around 41 (21 %) indicated that they use other sources (Rivers and water pans) of water in the area as shown in Table 4.9.

This indicates that, most residents access water from simple water technologies due to less complexity of the technology and affordability. While there are also some people who are still unable to access clean and safe water. A minority of the people especially those near big water schemes are able to access piped water in the area.

4.5.3 Cost of water technology

The researcher sought to establish from the respondents the average cost of implementing various types of water projects in this area as shown in Table 4.10. This was very important to know how much it cost the respondents to implement various water technologies that are there in this study area.

Table 4.10: Cost of water technology

	Frequency	Percent
0.5 million	6	3
1 million	12	6
1.5 million	30	15
2 million	102	50
4 million	6	3
5 million	48	23
Total	**(204)**	**(100)**

The findings of the study show that majority 150 (74%) of respondents indicates that it costs 0.5 - 2 million Kenyan shillings to implement water projects, while 54 (26%) of the respondents indicates that it costs above 4 Million Kenya Shillings to implement water projects as indicated in Table 4.10.

This shows that the more complex the water project was the more it cost to implement. Simple water technology like the shallow well cost relative less than more complex ones like the borehole and pipeline water projects.

4.4.4 Water project breakdown

The study sought to establish the frequency of water breakdown in the study area obtaining the data in Table 4.11 from the respondents. This was important to provide information on the frequency of water project breakdown and frequency of maintenance of these water projects.

Table 4.11: Frequency of water project breakdown

	Frequency	Percent
Every 2 weeks	18	9
2 weeks-1 month	168	82
1 - 2 months	18	9
Total	**(204)**	**(100)**

From the findings, majority 168 (82%) of the respondents indicated that its takes about 2 weeks – 1 month for the water project to break down, while 18 (9%) of the respondents said that it takes between 1-2 Months for breakdown to occur in water projects as shown in Table 4.11.

High frequency of water project breakdown could be associated with poor management of these water projects, inadequate water operation and maintenance skills often associated with shallow wells.

4.5.5 Cost of operation and maintenance of water project

The research sought to establish from the respondents the average cost of operation and maintenance of water project per quarter as in Table 4.12. This information would help show how expensive it is to operate and maintain the water project thus affecting their sustainability.

Table 4.12: Average cost operation and maintenance of water project per quarter

	Frequency	Percent
5000 - 20000 Kshs	180	88
20000 - 50000 Kshs	12	6
Not responded	12	6
Total	**(204)**	**(100)**

The majority of the responded 180 (88%) of respondents indicated that between 5000-20000 Kenyan shillings was spent on cost and operation maintenance of water project per quarter as Table 4.12. while 12 (6%) of respondents indicated that it cost 20000-50000 Kenya shillings for operation and maintenance of the water project per quarter. 12 (6%) of the respondents did not respond to this question. This shown that it is very costly to carryout operation and maintenance of water project in this study area.

4.6 Development agency's approaches and community participation

The research sought to establish the influence of development approaches to community participation in rural water projects in the study area. This was important to know could have encouraged or discouraged community involvement in the water project.

4.6.1 Partnership approach

The research sought to determine the development agency's approach in water project planning and implementation as shown by the qualitative data. This was important since the approach taken determines the level of community involvement in the project development.

From the findings, the majority of the respondents indicated that, in the partnership between donors and the community to plan and implementation of water projects, the donor is the one who largely control the decision. However, some of the respondents indicated that community members controlled the decision making process. Therefore, it can be inferred that, the donors had a greater say in the planning and implementation of water projects as the community were largely sidelined when it comes to the same. This meant that residents could not articulate their ideas and have their voice heard in relation to planning and implementation of water projects.

4.6.2 Water project initiation

The research sought to establish who initiates water projects within the study area as indicated by the data in Table 4.14. The origin of water project idea was very important to determine the involvement of the communities, their ownership and eventually sustainability.

Table 4.14: Initiators of water projects in the community

	Frequency	**Percent**
Community	36	18
Government	107	53
NGO's	49	24
Others	12	6
Total	**(204)**	**(100)**

From the finding, the majority of 107 (53%) of the respondents that most of the water projects were initiated by the government followed by NGOs as indicated by 49 (24%) of the respondents according to Table 4.14. While 36 (18%) of the respondents indicated that the community initiated of some water projects. However, 12 (6%) of the respondents indicated that other forces also initiates water projects in the community which includes church organizations. Therefore, this indicated that a majority of the water projects in the community are initiated by external forces.

4.6.3 Planning and implementation of water projects

This section sought to determine if partnership encouraged community involvement in planning and implementation of water project as shown Table 4.15. This was important to know the role of the community in partnership during water project implementation.

Table 4.15: Planning and implementation of water projects

	Frequency	Percent
Yes	72	35
No	132	65
Total	**(204)**	**(100)**

The researcher found out that there was limited partnership of the community in planning and implementing water projects as indicated by majority 132 (65%) of the respondents as shown in Table 4.15. While 72 (35%) of the respondents indicated there was some level of partnership with donors in planning and implementing water projects. This was an indication that the community partnership engagement was limited to attending meetings, offering manual labour; with limited financial contribution.

4.6.4 Participation in monitoring and evaluation of water projects

The researcher sought to determine if the partnership allowed community participation in monitoring and evaluation of water projects as shown in the data in Table 4.16. This would reveal the role of the community in ensuring that, the quality water projects are done and intended outcome achieved during the project life span.

Table 4.16: Participation in monitoring and evaluation of water projects

			How they participated			Total
			Answering questions	Attending meetings	Not applicable	
Participation in monitoring and evaluation of water development projects in locality	Yes	Count	42	18	0	60
		% within How they participated	100.0%	100.0%	0.0%	29 %
	No	Count	0	0	144	144
		% within How they participated	0.0%	0.0%	100.0%	71%
Total		**Count**	**42**	**18**	**144**	**204**
		% within How they participated	**(100)**	**(100)**	**(100)**	**(100)**

The researcher found out that majority 144 (71%) of the respondents do not participate in monitoring and evaluation of water project in their locality as they are not empowered to undertake in the process as shown in Table 4.16. However, 60 (29%) of the respondents stated to have participated in monitoring and evaluation of water projects in their locality; by either answering residents' questions or attending meetings of the same.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, summary of findings, discussions, conclusions, recommendations and suggestions for further study.

5.2 Summary of findings

The findings of this research are summarized according to the main objectives of the study.

Under the social economic factors that influence community participation in rural water projects in Matete Sub-County Kakamega County. It was found that the majority of the respondents in the research were female. The respondents indicated that, their major economic activity is farming. It was also found that the approximate monthly income for households before tax was between 2000-10000 Kenya shillings as indicated by the majority of the respondents. The respondents indicated that, the majority of them secondary school level and above while (18%) of the respondents had either attained lower primary education or had not attended school at all.

To determine how management of water project influence community participation in rural water projects in Matete Sub-County Kakamega County, it was found that there were water management committee for each water point, though, the committee was dominated by men who were selected through undemocratic means as indicated by the majority of the respondents. It was revealed that majority of the respondents did not have artisans skills that could enable them service water projects.

To determine how technology influence community participation in water project; it was found out that the major type of water project in the area were shallow wells, though some people use water from other sources. It was revealed that, the technology costs between 1.5-2 million Kenya shillings as stated the majority of the respondent. These projects had breakdown frequency of 2

weeks–1 month. Whereas the cost and operation maintenance of most water project per quarter ranged from 5000-20000 Kenya shillings according the majority of the respondents. The majority 138 (68%) respondents also felt that community had limited contribution towards water projects implementation in their area; whereas their effort only focused only on attended meetings and trenching of pipelines. Majority of the respondents indicated that they had attained secondary education and above therefore, had some formal knowledge through that may help in understanding aspects of water resources management.

To establish how development agency's approaches influence community participation in rural water projects in Matete Sub-County Kakamega County, it was found that initiation of water projects in the community were done by external forces (Government, donors, and others which include church initiatives) as indicated by majority of the respondents. However, it was found that, there was limited partnership between donors in community water projects. The community had not control in the decision making during planning, implementation, monitoring and evaluation of water projects in this area, as indicated by majority of the respondents.

5.3 Discussions of the findings

This research sought to investigate how socio-economics, development agency's approaches, management of water resource and water technology influencing community participation in rural water projects in Matete Sub-County. The research treated political factors and cultural factors as intervening variables; while government policies and environmental factors were considered as moderating variables to community participation in water project in the study area.

It was found that social economic of the people determined the ability of community to participation in the water projects in Matete Sub-County. The low-income of the community affected their ability to give monetary contribute towards planning and implementation community water projects in the study area. The community members who have high income levels were able to contribute towards water project implementation than those with lower

income level. This is similar to Sheikh (2014) findings that, socioeconomic determinants have strong relationships with participation of farmers' water management as influenced by the education level and gross farm income. Though, many people in the research area had achieved secondary education and above, but did not have technical skills in water projects. This may have limited their ability to effectively participate in planning, implementation, operation and maintenance of water projects in the study area. Shamiyulla and Ramu (2010) argued that the farmers' literacy level, living standard and economic factors contribute to the success of participatory irrigation management. This is similar to Awortwi (2012) finding, that, levels of participation in social and civic community life are significantly influenced by individual socioeconomic status and other demographic characteristics.

It was also established that inadequate management of water project had a negative influence on community's participation in water projects. Though Boateng and Kendie, (2015) enforce that women participation in leadership positions in community water management is inevitable for sustainable water projects, it was found that water management committees in this area had gender disparity. The majority of water committees were male dominated. The selection of the management committees was also undemocratic done. This affected the participation of the community since they lacked faith in them thus affecting the running of the water projects. This was in contrast with participatory development paradigm is embedded on and associated with people and their aspirations to change their own lives, through democratic development (Barasa and Jelagat, 2013).

The study also established that selection of complex water technology did not promote community participation in water projects. The majority of the water technologies used was costly for the community to be able to implement with their low income levels. The operation and maintenance costs per quarter were also higher that what the communities could be able to afford thus limiting the community participation. This was similar to Gleitsmann (2005), Chifamba

(2013) findings, that, the community's ability to maintain and repair projects is influenced by the costs and level of technology.

Bernard van Heck (2003) state that pressure from the side of implementing institutions and of supporting government or donor agencies to produce visible results quickly leading to quantity of funding and results prevailing over quality. Similarly, it was established that approach used by the development agencies in the study area had negatively influenced community participation in water project development. The community was not actively engaged in planning, implementation, monitoring and evaluation of the running of the water projects despite Kiprotich and Njoroge (2014) emphasizing on importance of community participation in local projects that are initiated by various development agencies. They community in Matete Sub County did not have control over the decisions process on water project implementation, despite Boateng and Kendie, (2015), Waweru (2015) acknowledging rights and responsibility of the community to be involved in planning and implementation of their own development. According to Dungumaro and Madulu (2003), the level of involvement of communities in water projects is still low in most developing countries which affirm the findings in the research area. The project ideas were formulated by the implementing agencies which was contrary to Njogu (2009) recommendation, that institutions mandated with policy formulation should adopt bottom-up decision-making process by embracing public participation in planning issues.

5.4 Conclusions of the study

From the study, the following conclusions arrived at: The respondents established that poor social economic factors had a negative influence on community participation in the rural water projects this study area. This was because communities felt that, they were not socio-economically empowered therefore limiting their ability to contribute towards planning and implementation community water projects in the study area.

It was also established that inadequate management of water project a negative influence on community participation in water projects. Improper constituted water management committee, lack of gender disparity in the management, limited technical skills limited the community in their water projects.

The study also established that selection of complexity of water technology did not promote community participation in water projects. The majority of the water technologies used was costly for the community to be able to implement with their low-income levels. The operation and maintenance costs per quarter were also higher that what the communities could be able to afford thus limiting the community participation.

It was established that approach used by the development agencies in the study area had also hindered effective community participation in water project development. The community was not actively engaged in planning, implementation, monitoring and evaluation of the running of the water projects. They did not have control over the decisions on water project implementation.

5.5 Recommendations

The research revealed that social economics, water management, development agency's approaches and water technologies factors influenced community participation in the rural water projects in Matete Sub-County. The study, therefore, recommended that, the local community social economic status should be strengthened to enable them effectively participated in development projects.

The community should be empowered with the right skills and knowledge to enable them participated in rural water project management thus enhance project sustainability.

The partnership in rural water project implementation should be community centered thus creating synergy among the implementing agencies and the communities.

Water technology adopted by the community should be appropriate to their needs. It should be affordability, cost effective to operation and maintenance, thus guaranteeing sustainability.

The result of this study may be used by the development agencies, County Governments and communities in selecting and developing contextualized strategies to achieve optimum community participation that will ensure sustainability of rural water projects in Matete Sub-County and the rest of the County.

5.6 Suggestion for further studies

This research was limited to community participation in the rural water project in Matete Sub-County; therefore, the study recommends future studies to focus on other rural areas within Kenya with varied political, cultural and environmental contexts.

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APPENDICES

Appendix 1: Letter of transmittal

Isaiah Odhiambo Sei

P.O BOX 50816

Nairobi.

Dear Madam/ Sir;

RE: REQUEST FOR YOUR PARTICIPATION IN M.A. RESEARCH PROJECT

I am a student from the University of Nairobi pursuing a Master of Art in Project Planning and Management. I would like to carry out a research on factors influencing community participation: case study of rural water resources development in Matete Divison in Lugari District.

This study is for academic purpose but will be useful for the stakeholders (community, government, NGOs, CBOs, private and corporate institution involved in development projects in communities) involve in community development.

Your participation in the exercise is voluntary and so you are free to choose to or not participate. But it would be helpful if you could participate fully.

The results of this research will be completely confidential and no personal issues of any respondent will be quoted in the report. Some of the questions i will ask may also be quite personal and i hope they will be okay with you. If, however, you do not feel comfortable answering any questions, please feel free to say so or seek clarification where you do not understand.

Yours faithfully,

Isaiah Odhiambo Sei

L50/60751/2013

Appendix: 2 sampling table

Table for Determining Sample Size from a Given 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.

Krejcie and Morgan (1970)

Appendix 3: House hold survey questionnaire

SECTION A: PROJECT IDENTIFICATION INFORMATION

Bio information

1. Names of respondent_____I.D NO: _____

2. Gender Male [ ] Female [ ]

3. Marital Status: Single [ ] Married [ ] Divorced [ ] Separated, [ ] Widowed [ ]

4. Village _____ Sub location_____

Location_____ Division_____

5. Name of the Water project_____ Year of Establishment _____

SECTION B: SOCIO-ECONOMIC CHARACTERISTICS

(To be answered by a person above 18 years in a household, preferably a household head)

6. **(**a) Are you a resident of the village named above?

Yes [ ] No [ ]

(b) If yes, how long have you lived here,

0-7 years [ ] 7-14 years [ ] 14-21 years [ ] 21 years and above [ ]

7. What is the highest level of education you have completed?

None/ Lower primary school [ ] Upper primary school level [ ] Secondary School level [ ]

Tertiary education [ ] Degree and above [ ]

9. (a) What is your occupation?

Agriculture [ ] Business Service [ ] Services [ ]

Labor [ ] Teaching Others [ ] Others [ ]

(b) What is your major source of family income?

10. What is the approximate Monthly (Kshs) income of your household before taxation?

Below 2000 [ ] 2001-5000 [ ] 5001-10000 [ ]

10001-20000 [ ] 20001-30000 [ ] 30001 and above [ ]

SECTION C: Management of community water resources and community participation in rural water projects.

11. (a) Have ever participated in design, implementation, monitoring and evaluation of any water development projects in your locality?

Yes [ ] No [ ]

(b) If yes, how did you participate?

.....

.....

12. Do you think that the development projects undertaken in your locality have been implemented through participation of all community members?

Yes [ ] No [ ]

(b) If yes, how were people involved?

……

……

13. How was the idea about water project generated?

No.	Opinion of the community on the water project	Yes	No
1	The idea came from the community members		
2	The idea came from the government		
3	The idea came from the NGOs		
4	I am not aware		

14. What form of contribution did the community give during project implementation?

Monetary contribution [ ] Manual labour [ ] Technical support [ ] Other [ ]

15. (a) Who manages water projects in this community?

Local government [ ] Community [ ] donors [ ] others [ ]

15. How is water management appointed in this community?

Democratic election [ ] undemocratic election [ ]

16 What is the composition of the water committee in terms of gender?

Male……Female……

17. How often do you attend the community water project meetings?

……

Section D. Water technology influence community participation in rural water projects and community participation in rural water development Project

18. What type of water technology do you use?

Spring water [ ] Borehole water [ ] Shallow well [ ] Pipe water [ ] Others [ ]

What is the cost of implementation of this water project?

……

……

18. (a) How frequent does the water project break down?

Every two weeks [ ] two weeks-One month [ ] 1-2 Months [ ] after every 3-6 Months [ ]

(b) What is the average cost of operation and maintenance of this water project per quarter?

Below 5000 Kshs [ ] 5000-20000 Kshs [ ] 20000-50000 [ ] 50000 Kshs and above[ ]

19. Are there trained experts in the area who can service the water project?

Yes [ ] No [ ]

Section E. development agency's approaches influence community participation in rural water projects

20. Who initiate water projects in this community?

……

21. (a) Is there partnership between community and the donor during planning and implementation of water projects in this area?

Yes [ ] No [ ]

(b) If yes. How has the control of the decision making in the project?

The donor [ ] Government [ ] water users committee [ ] Don't Know[ ]

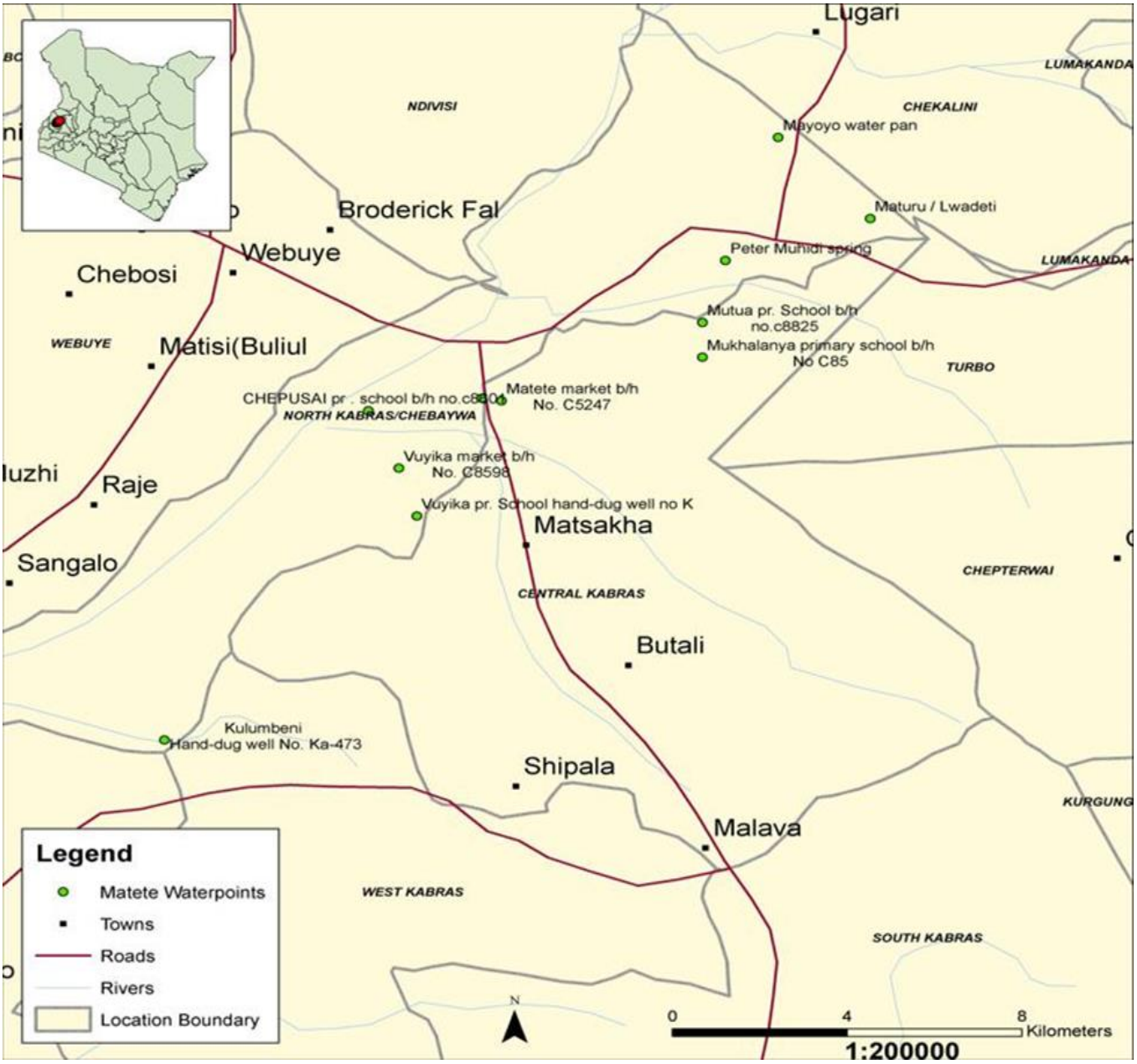
22. In a scale of 1-5 please rate the opinion of the community on the donor.

1-Very low opinion 2-low opinion 3 moderate opinion 4-high opinion 5-very high opinion

No.	**Opinion of the community on the donor**	**1**	**2**	**3**	**4**	**5**
1.	Are communities actively involved in project planning and implementation of water project?					
2.	Does the opinion of the community taken in planning, implementation and operation water project?					
3.	Do donors have absolute decision in every aspect of the project implementation and operation?					
5.	Does the community have a sense of ownership of the water projects?					

6. Does the donor approach to water project development encourage community participation?

Appendix 4: Map of the project area



Appendix 5: Project research schedule

	2015	2016			
Activities/Duration	**November**	**April**	**May**	**June**	**July**
Proposal development					
Presentation of proposal					
Pre-test of research instrument					
Field data collection and data entry					
Data analysis and interpretations					
Final report writing					
Final research project presentation					

Appendix 6: Research project budget

S/NO.	Project activities	Project cost (Kshs)
1	Proposal development	5000
2	Pre-test of research instrument	10000
3	Field data collection and data entry	25000
4	Production of final research report	10000
5	**Total cost**	**50,000**