

**DETERMINANTS OF SUSTAINABLE WATER AND SANITATION PROJECTS  
IMPLEMENTATION IN KILIFI COUNTY, KENYA**

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**A Research Project Report Submitted in Partial Fulfilment of the Requirements for the  
Award of the Degree of Master of Arts in Project Planning and Management of the  
University of Nairobi**

**2017**

**DECLARATION**

This research project report is my original work and has not been presented for a degree in any other University.

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## **DEDICATION**

I dedicate this work in memory of my late mum Mrs. Peris Wangui who passed on just when I was starting this Masters Degree. I also dedicate this work to my dad Mr. Robert Githinji for his encouragement even while sick; for his moral support during my time of study.

## **ACKNOWLEDGEMENT**

God alone, the source of life and every gift is worthy of praise. His gift of my being is the beginning of every work that I undertake. I thank Him for wisdom, knowledge; understanding and providing me with the means to bring these thoughts together and enable me successfully complete my studies. To my family - my husband Stephen Oluoch, my children Michael, Vivian, Ian, Ritah and Claire who have endured my absence due to the very long hours of my study. I cannot forget my very close friends who have walked with me through this journey with encouragement and contributed ideas to the realization of this work. I remember in a special way Alex, Vellasco, Charles, Jimmy, Helen and Teresa who have been a great inspiration to me and made insightful contributions. I sincerely acknowledge the contribution and co-operation made by my Supervisor Mr. JohnBosco Kisimbii into making this project a success, to Malindi Centre administrator Mr. Stephen Fanaka for assisting me and encouraging me in completion of preparation of this project. My sincere appreciation also goes to the management of Malindi Water and Sewerage Company for their support in allowing me time to study and providing me with the necessary facilities for the realization of this work. Gratitude to my immediate supervisor Isaac and peers at work for holding office for me when I was absent pursuing my studies and also as I prepared this work. I may not be able to mention all who have contributed to this work since it may take as many pages as the work itself. Nevertheless, May God richly bless each and every one of you.

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## ABBREVIATIONS AND ACRONYMS

<b>WHO:</b>	World Health Organization
<b>WB:</b>	World Bank
<b>UNEP:</b>	United Nations Environmental Programme
<b>UNICEF:</b>	United Nations International Children Education Fund
<b>UNDP:</b>	United Nations Development Programme
<b>MDGs:</b>	Millennium Development Goals
<b>GDP:</b>	Gross Domestic Product
<b>LDC:</b>	Least Developed Country
<b>WatSan:</b>	Water and Sanitation
<b>CSR:</b>	Corporate Social Responsibility
<b>NGO:</b>	Non Governmental Organization
<b>MOWASCO:</b>	Mombasa Water and Sanitation Company
<b>MAWASCO:</b>	Malindi Water and Sewerage Company
<b>NWSS:</b>	National Water Services Strategy
<b>TAWASCO:</b>	Tharakanithi Water and Sewerage Company
<b>CBO:</b>	Community Based Organization
<b>UCLAS:</b>	University College of Lands and Architectural Studies

## ABSTRACT

Sustainable water use and management is a step that must be chore in the life of human beings for survival. As a natural resource, water defines to a very huge extent and shape human beings' livelihood. In an ambience of acute water shortage or inadequate water supply, no significant human progression is manifestly expressed insofar as sustainable socio – economic growth is concerned. Therefore, there is a need to study water and sanitation projects suitability due to their importance. The purpose of the study was to examine the determinants of sustainable water and sanitation projects implementation in Kilifi County, Kenya. This study was guided by the following objectives: to examine the extent to which structural facilities influence the implementation of sustainable water and sanitation projects in Kilifi County; to examine the extent to which institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County; to examine the extent to which community participation influences the implementation of sustainable water and sanitation projects in Kilifi County; to examine the extent to which competitive policies and strategies influence the implementation of sustainable water and sanitation projects in Kilifi County; and to examine the extent to which political will influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya. This study adopted a descriptive research design. Target population was 809 respondents constituting the household Heads, MAWASCO employees and NGOs employees. Sample population was 265 and the stratified sampling was applied so that each respondent from each category. The questionnaire was used for data collection. The research instrument was pilot tested in the neighbouring Mombasa County. In the study, 265 questionnaires were allocated to respondents in various strata. Out of the issued 265 questionnaires, only 123 were well filled and therefore made sense for the study. Male respondents, 90 (73.17%), registered the most as compared to their female counterparts, 33 (26.83%). Results indicated that, majority of the respondents (100 who equated to 81.30%) supported the idea that structural facilities have an influence on the implementation of sustainable water and sanitation projects. Also, majority of the respondents (110 who represented 90%) supported the idea that institutional arrangements influence the implementation of sustainable water and sanitation projects. A majority of the respondents indicated that the community performs a major role in the implementation, provision and success of the pro poor water and sanitation services by doing various activities. Moreover, majority of the respondents supported the idea (64 respondents who represented 52%) that competitive policies influence the implementation of water and sanitation projects in the informal settlements. Finally, majority of the respondents (116 who made 95%) supported the idea that politicians have a very magnificent influence of pro poor water and sanitation projects implementation. The researcher suggested that a similar study can be done in any of the 47 counties in the country.

**Keywords:** *Water and Sanitation Projects, Implementation, Sustainable, Structural Facilities, Institutional Arrangements, Community Participation, Competitive Policies and Strategies, and Political.*

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background to the Study**

Studies across the globe have shown that sustainable water use and management is a step that must be chore in the life of human beings for survival (Akhmat and Khan, 2014.). They have also observed that, as a natural resource, water defines to a very huge extent and shape human beings' livelihood. In an ambience of acute water shortage or inadequate water supply, no significant human progression is manifestly expressed insofar as sustainable socio – economic growth is concerned. However, any improvement on populace's access to clean and safe water services and primeval sanitation facilities consequently does have a bearing on poverty alleviation hence improving development levels as productivity begins to sour (WHO, 2014).

UNICEF (2014) emphasizes that access to water and proper sanitation is not only key towards the realization of development but also a fundamental human need and right and as such must proliferate if sustainable livelihoods is anything to be rendered feasible. According to this report, for better development in any part of the economy, there must be sustainable projects implementation that aim at water and sanitation provision to both the poor and the wealth.A similar report done by Brunt and Penolosa (2012) connecting sustainable economic development and sustainable water projects implementation has shown that for a sustainable economic development to be realized there must be sustainable water projects that provide safe drinking water, clean water for domestic chores, abundant water for plants and animals and other life enabling indicators. Actually, the report by the WHO (2017) has indicated that sustainable development is strongly anchored on the providence of life enabling services; central of which is health and water facilities.

A study by Royal (2016) notes that Bangladesh has more issues in the implementation of pro-poor water provision projects in Asia than any other country. The Bangladesh capital city (Dhaka) is the world's fastest growing primate city according to the latest reports, having shown an approximate population of 15 million people, with over 6 million of its people living in the slum areas (Royal, 2016). Podymow et al (2016) have shown that over 6000 slum settlements are spread across this capital city and indeed missing a number of basic needs of which water and sanitation

needs are adversely mentioned. Their high population density and growth rates, together with inadequate and inappropriate water and sanitation facilities, are matched by deteriorating social, economic and environmental conditions including water, land and air pollution. Because complex social dynamics, together with inappropriate or inadequate facilities, and an inefficient governance system, obstruct the pace of WatSan interventions it is very difficult to identify the factors affecting WatSan projects in the slums, as the WatSan service providers tend to implement slum development projects in a piecemeal way (Asthana 1998; Sandhu 1998). However a number of studies have revealed some factors influencing WatSan projects in Dhaka slums. For example Rahman, Atkins and McFarlane, (2014) did a study and found out that, a lack of social cohesion, inadequate and/or unsystematic technological options, and mismanagement and/or lack of guidance/regulation of using such water and sanitation (WatSan) facilities derail the whole process.

South Africa has been having a number of issues surrounding its designing, planning, implementing and managing sustainable water and sanitation projects for her people more specifically in the densely populated slums of Soweto (World Bank, 2014). This has led to a number of documented researches that have shown various factors influencing the sustainable implementation of these WatSan projects. It is observed across Africa that many developing countries have a tendency of assigning policy development consultants that do not have understanding of what happens at the grassroots level (Ahkmat and Khan, 2011). A report by WUP (2013) has shown similar results by indicating that most policies in developing countries (SA included) tend to be mere blueprint of past researches and designs that often fail to address the realistic developmental problems and issues facing citizens. This is also confirmed by Muzondi (2014) who has shown that a number of factors influence the implementation of water and sanitation projects in the poor settlements of the South African countries and these include: structural facilities, weak human resources capacities, weak institutional arrangements, poor community involvement and poor technology employed.

Dar es Salaam in Tanzania is another major city that is greatly hit by water and sanitation menace. Dar es Salaam is Tanzanians' largest city and the main commercial and industrial centre. According to the 2012 Census, Dar es Salaam City has a population of 4.36 million, accounting for 10 percent of the total population in Tanzania (URT, 2013). Available research

indicates that about 80% of Dar es Salaam population lives in informal settlements (Kyessi & Sakijege, 2013). Sanitation provision together with other public services/projects like water provision, waste collection and disposal are still poor in Dar es Salaam. The situation is worse in informal settlements, where unsanitary conditions are a common feature (UCLAS, 2004). Existence of unsanitary conditions in informal settlements where about 80% of the the City population lives, implies that, a large number of people in Dar es Salaam live in a health vulnerable environment. In slums like Keko Machungwa, Ukonga and Majumba sita, studies indicate that the provision of water and sanitation services to the poor is influenced by basic factors like: high rates of population growth without expansion of public services, short supply of skilled personnel, low political commitment, financial constraints, and lack of context specific technology (Okonkwo, 2010;WHO, 2014).

In Kenya, numerous studies have been done to try and come up with measures that are either pointed at reducing the effects of poor water and sanitation phenomena in the slums or mitigate their future impacts. For example, the World Bank published a report in 2015 and noted that, between 60 and 93% of slum households are dependent on water vendors for their water supply. Provision of water is well below Sphere Project recommendations; thus a need for various water projects implementation for the slum dwellers who are incapacitated by acute poverty. In Mathare slum, for example, there are 1,200 people per water point compared to Sphere Standards recommending a maximum of 500 people per hand pump based on a flow of 16.6 litre per minute (Grellety and France, 2013). Furthermore, the high cost of water generally 4-5 times the price per litre charged by Nairobi City Water and Sewerage Company, restricts the amount of water used by a household, increasing the risk of water borne diseases and poor hygiene standards (Umande Trust, 2016). Many residents of informal settlements do not have access or have limited access to household toilet facilities, 68% rely on shared facilities and 6% have no access to facilities at all and often resort to ‘flying toilets’ as has been the case in many slums which pose a serious health hazard to themselves and the neighbouring inhabitants.

Latrine emptying and sewerage removal are handled by small scale operators under unsanitary conditions; . An economic study conducted for Kenya has shown that impacts resulting from poor sanitation and hygiene cost the economy of Kenya 27.4 Billion Kenyan Shillings (KSh.) which is equivalent to (US\$ 324 million) per year, or the equivalent of 0.9% of annual Gross

Domestic Product (GDP). These figures reflect the; serious health impacts associated with poor sanitation and lack of water supply, costs of treating these health problems, loss of productivity that results when individuals are sick and others have to care for them, and time spent to access the vital services. Indeed this situation worsens from one slum to another, with Kibera, Mukuru kwa Njenga, Uhuru Owinyo slum in Mombasa and Kondele in Kisumu being adversely affected.

The world bank report of 2016 has shown that factors like poor water and sanitation projects planning, poor projects implementation, irrelevant objectives and models that don't fit to the community, poor community involvement and participation, poor politics and governance, unplanned urbanisation, scarcity of resources, scarcity of experts, poor structures for such projects and many more have made it difficult for the pro-poor water projects implementation (World Bank, 2013). Another study by UNICEF and UNDP (2015) indicated that in Kenya well intended policies for development are made by the wrong people with either little knowledge of immediate development policies or people who have too much expertise; majority of which is copy and paste from the developed countries that have totally different socio-cultural, cultural and socio-economic operative ways. Another study by Muhele (2013) that focussed on the Factors Influencing Water and Sanitation Practices In Kibera Urban Informal Settlements in Nairobi- Kenya showed that, factors like poor infrastructure, community involvement, poor urban planning, water theft, poor rates of return on water among others significantly influenced the rates of WatSan projects.

Whittington (2009) did a similar study in the developing countries' capitals in Latin America and Africa (Kenya included) and found out that, a huge percentage of households living in the informal settlements earn an income of less than 150 US dollars monthly. The same families lack piped water connections nor sufficient income to acquire improved service delivery and yet sanitation remains crucially important agenda for public health. Consequently, relevant subsidies must by and large be invested in water supply if sustainable growth is to be rendered feasible. According to (WHO, 2013) improved water supply implies either a household has an individual connection or public standpipes/yard tap, boreholes, protected wells, or rain water collection within a radius of 1km from the homestead etc albeit this is influenced by a number of factors with financial resources being ranked highest and community demands least.

## **1.2 Statement of problem**

In spite of water being a quintessential aspect of life, and poor sanitation being a pedestal for diseases' proclivity, accessibility to improved water supply and sanitation services still eludes many Asian and African countries. Many countries today still grapple with protracted struggle for socio – economic development. As a matter of fact, 50% of the LDCs populations still lack in scale – up strategies toward enhancing sanitation and water supply as approximately over 1.2 billion people still have to contend with using inadequate and unclean water as (WHO, 2015) observes.

This is in part occasioned by inadequate supply of clean drinking water and sanitation services' provision. Anything that disorients a move toward sustainable provision of water and sanitation services would certainly disturb the very essence of humanity's survival. As a consequence, every human being no matter their socio – economic status or stages in development do possess an inalienable right to safe water and in adequate quantities (Informer, 2010).

No doubt water still remains a crucially important non sustainable resource in most developing countries. Adequate, quality and sustainable clean and cost effective water and sanitation projects implementation as already observed remains a major challenge both in the African continent and Asian continent. This has forced a number of governments and other organizations through various initiatives like CSR, charities, community based development initiatives, poverty mitigation and many more come up with strategies that are aimed at implementing projects that are aimed at managing and sustainably controlling the WatSan issue. However, studies in Kenya have indicated that in as much as the government has made numerous efforts to address the issue of WatSan provision, there seems to be very little success with the problem being persistent in the town and getting out of hand in the urban slums like Kibera, Mkuru kwa Njenga and Ruben, Kianduti among others (Muhele, 2013). This has necessitated a number of studies like that done by Muhele (2013), although such a study was carried out in Nairobi's Kibera slums that have a totally different economic and social dynamics as compared to the residents of Kibokoni where the current research shall be carried out.

Kibokoni informal settlement in Malindi area along the Kenya's Coast still has many households striving to acquire adequate supply of clean water and other sanitation oriented services at cost



effective rates. However, there is no single study has been done or documented to try to examine the causes of these water provision projects inadequacy and how these challenges can be addressed. It is in this series of gap that this study will be carried out. Therefore, this study was carried out with the aim of examining the determinants of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

### **1.3 Purpose of the Study**

The purpose of the study was to examine the determinants of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

### **1.4 Objectives of the Study**

This study was guided by the following objectives:

- i. To examine the extent to which structural facilities influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- ii. To examine the extent to which institutional arrangements influence the implementation of sustainability projects in Kilifi County, Kenya.
- iii. To examine the extent to which community participation influence the implementation of sustainability projects in Kilifi County, Kenya.
- iv. To examine the extent to which competitive policies and strategies influence the implementation of sustainability projects in Kilifi County, Kenya.
- v. To examine the extent to which political will influence the implementation of sustainability projects in Kilifi County, Kenya.

### **1.5 Research Questions**

The study was guided by the following questions:

- i. What is the extent to which structural facilities influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya?

- ii. What is the extent to which institutional arrangements influence the implementation of sustainability projects in Kilifi County, Kenya?
- iii. What is the extent to which community participation influence the implementation of sustainability projects in Kilifi County, Kenya?
- iv. What is the extent to which competitive policies and strategies influence the implementation of sustainability projects in Kilifi County, Kenya?
- v. What is the extent to which political will influence the implementation of sustainability projects in Kilifi County, Kenya?

## **1.6 Research Hypotheses**

This study was guided by the following five alternative hypotheses noted as **H<sub>1</sub>**;

- i. **H<sub>1</sub>**: structural facilities influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- ii. **H<sub>1</sub>**: institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- iii. **H<sub>1</sub>**: community participation influences the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- iv. **H<sub>1</sub>**: competitive policies and strategies influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- v. **H<sub>1</sub>**: political will influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.

## **1.7 Significance of the Study**

Firstly, the study is expected to provide an insight as to whether sustainable water and sanitation provision can influence socio – economic development in Kibokoni.

Secondly, since the survey’s point of departure was to assess the factors contributing to the inability to provide sustainable water and sanitation among the urban poor in Malindi town but with specific reference to Kibokoni village, the study is projected as a consequence, to provide

proper baseline information on urban water supply systems and how it does impact urban livelihoods.

Thirdly, the research also intends to increase knowledge base thus providing an intervention strategy to the Civil Society Organizations, policy makers, community, and environmentalists on more feasible sustainable mechanisms to help improve pro – poor water and sanitation services provision.

Last but not least, data obtained in this survey and recommendations drawn therein are expected to be beneficial for further investigation for academic purposes, and added literature to an already existing knowledge base.

### **1.8 Basic Assumptions of the Study**

The study was conducted under the following assumptions;

- i. That the five objectives outlined above were able to hold in the study and have an influence on water and sanitation projects implementation in the county.
- ii. That all respondents responded to the questions and that their responses were representative of what is held by all the informal settlement dwellers.

### **1.9 Delimitations of the Study**

The scope of the survey had both spatial and thematic limitations. Spatially, the study was conducted to assess sustainable water supply and sanitation provision among the low – income urban informal settlement dwellers of Malindi’s Kibokoni village.

Thematically, the study was constrained to assessing the factors affecting water and sanitation service provision among the low – income residents but this was only considered in terms of equitable water and sanitation services distribution in all parts of Malindi town, its adequacy, quality, and accessibility.

The study also focused on the five objectives only and used a questionnaire as the only tool for data collection.

### **1.10 Limitations of the Study**

In a bid to execute the study, several limitations were encountered. One of the major limitation was that inadequate funds had been set aside to carry out this research. At the same time, the operation definition of terms also presented another shortfall since the way I have operationalized my definition of terms may not have reflected what is universally appreciated from the lexicon perspective.

This made it easier for some respondents to stick to their ‘well prepared’ answers. This is because the researcher did not have sufficient knowledge of everything happening in the area to explore more and find out the reality of every scenario. It is believed that, in the event there was more time for field research, the researcher would have been able to make more observations on some of the practices which could be a testimony to the stated hypotheses. Inasmuch as sustainability of the topic in question does encompass environment, technical, financial, social, and institutional frameworks, the survey did not delve much into all the seminal aspects of the study but rather grossly on the financial aspect.

### **1.11 Definition of Significant Terms Used in the Study**

**Community participation**-refers to the involvement of the community in a number of activities that are aimed at providing services meant for its consumption.

**Competitive policies and strategies**- refer to laid down methods of operation that are aimed at putting the water and sanitation projects at an achieving end.

**Political will**-refers to the willingness of the politicians and other leaders to support the implementation of a given projects.

**Informal settlements**- refers to areas inhabited by people with low income and have poorly planned housing system.

**Institutional arrangements**-refers to the way an organization operates as per the set rules and policies.

**Structural facilities**- refer to materials that can be laid down to allow easy providence of water services and include pumps, pipes and many others.

**Water and sanitation projects-** refers to projects that are aimed towards providing water services to the citizens of a given country and at the same time care for the waste disposal and management.

### **1.12 Organization of the Study**

This research project is organized in five chapters.

Chapter one presents the background of the study, problem statement, objectives of the study, research questions, hypothesis of the study, significance of the study, assumptions of the study, limitations of the study, delimitation of the study, definition of significant terms used in the study and finally the organization of the study. Chapter two presents the literature review, the theories of the study, conceptual framework, the literature gap and the summary of the reviewed literature. Chapter three presents the study methodology and includes: the research design, target population, sampling size and sampling procedure, data collection instrument, piloting of the research instrument, validity of the research instrument, reliability of the research instrument, data collection procedure, data analysis technique. Chapter four is made of data analysis and interpretation. Chapter five comprises of summary of the findings, discussions, conclusions, recommendations and suggestions for future study.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviews the selected literature carried out in the past by various writers and researchers in the area of water and sanitation projects implementation in informal settlements across the globe and in the country. It also contains the theories that shall guide the study and later on it has the conceptual framework for the study.

#### **2.2 Rationale of Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements**

Across the developing and less developed countries in Asia, Africa and Latin America, occupants of peri-urban or the slums have been faced with a number challenges; a good number of them due to national government ignorance or due to poor planning (World bank, 2017). In India for example, in the slums in the capital city, 3 people out of 10 die due to various conditions that are related to poor services delivery from either the national government or the city council. Some of these deadly conditions facing the slum dwellers include: insecurity, poor healthcare, poor water services, poor waste disposal and management that later leads on to diseases spread, poor housing and many more (ADB, 2016). This has forced a number of mitigation strategies as enshrined in both the MDGs and SDGs that include the provision of water and sanitation services that fit the levels of income of the slum dwellers (ADB, 2016), provision of mobile healthcare that is dominated by use of generic medicine that is relatively cheap (World bank, 2017), and provision of subsidized education through non-formal education as advocated by NGOs and other bodies (UNICEF, 2015).

In South Africa, as an upgrading plan of the former number one slums in the world (Soweto slum) the government saw the importance of first implementing sustainable water and sanitation projects. This is due to the fact that with clean water, clean environment free of garbage and non-disposed waste diseases can be reduced and consequently the death rates reduced doubling to economic development (AfDB, 2016). In Nigeria the Lagos state has also benefited from combined efforts to implement water and sanitation projects more recently due to the projected benefits of clean water and safe environment (UNICEF, 2016). Clean water and clean

environment free of poor waste disposal is perceived as one way of ensuring that the health of the citizens is protected and ensured.

A report by the World Bank (2016) has shown that the implementation of water and sanitation projects among the refugee camps in Kenya has a direct link with better welfare of the refugees and other people offering the humanitarian services. In this study that was conducted in the Kakuma refugee camp, it was discovered that proper implementation of water and sanitation services reduced the risk of the residents contracting diseases related to water pollution, air pollution etc. Equally, in Likoni peri-urban of Mombasa county, WHO (2016) asserted the importance of implementing safe water and sanitation programmes since most of the infant mortality rates were as a result of water borne diseases between 2010 and 2015.

### **2.3 The Concept of Sustainable Water Projects**

According to African Development Fund (2015) sustainability of water projects is a situation where water provision services cater for the needs of the people currently while taking note of the future needs and satisfaction plans. According to this definition, sustainable water projects are those projects that are able to feed people with the required water (proper quantity, quality and at the best time) while they still maintain the same water to serve the future generation without creating a crisis. UNHABITAT (2014) adds that sustainable water projects are those projects that are implemented to take care of the needs of the citizens currently while taking care of the future needs of the future populations.

According to Muhele (2013), a number of issues and factors surround the implementation of water and sanitation services in the country's informal settlements and indeed the future of these projects is a key factor. The future according to her is the ability of these projects to serve the increasing population effectively and efficiently. GIZ(2015) report has shown that the sustainability of water projects is a fundamental issue in the developing countries. According to this report, sustainability basically focuses on the ability of these projects to continue satisfying the needs of the people currently while they take into consideration the future needs of other people. This means that sustainable water projects should be able to provide safe water to the citizens as they are currently and be able to take care of the population increase in the future by providing the same safe and dependable water.

### **2.3.1 Influence of Structural Facilities and the Implementation of Water and Sanitation Projects**

Previous studies by a number of scholars and researchers have shown a strong link between the availability of hydraulic structures and the presence of water services in various informal settlements across the world. For example, a study done by Ahkbar, Minnery, Hore & Smith (2017) in their study in Dhakar, Bangladesh have outlined three major components of Hydraulic Structures that hinder proper implementation of water projects among the poor community in the slums. They have talked of the water pipes as a challenge, the water pump and water tanks also as other challenges limiting implementation. In this study where over 320 slum dwellers were interviewed and 45 employees of various water and sanitation firms/organization, it was found out that absence of water pipes with better quality limited water supply up to rate of 75% while the absence of designated water pumps influenced negatively to the tune of 70% followed by water tanks that scored 59%.

It is approximated that over 40 million people lack access to improved water supply, of the 240 million people, 110 million have no access to improved sanitation, and only 2% having access to basic sewerage services, making it one of the lowest among the middle-income countries in Indonesia (WHO, 2016). A study by UNICEF (2016) shows that, implementing projects that could give relief to the residents in the slums has proved difficult due to challenges like; poor community participation, poor security, low rates of return, political sideshows, poor infrastructure, poor urban planning, poor water structures and land ownership. Equally, the availability of water in the Soweto slums can be said to be 24% as per the 2015 report published by African Development Fund (African Development Fund, 2015). According to African Development Fund (2015), In Soweto 2 out of 10 homes in the informal settlements are able to access connected water that is not distributed daily since rationing is done four days a week. Some of the reasons as to why there is this crisis is due to poor settlement pattern planning, high prices of water pipes, poor government policies and poor water pricing making the water providence non-sustainable. Water structures influence the implementation and providence of water services to the dwellers of the informal settlements in Nigeria (WHO, 2016), Zimbabwe (Chigonda, 2014) and many other countries in Africa.



Chigonda (2014) shows that in Zambia over 78% of the population in the slums in Harare has no access to clean water and improved sanitation services due to poor water and sanitation projects implementation. Structures have been faulted for this and the structures include poor quality pipes that break from time to time leading to water waste, lack of enough water pumps to pump the water from the source to the storage tanks and homes, and lack of sufficient storage tanks or reservoirs for the water distribution.

Kasala, Burra and Mwankenja(2016) have shown that there is a strong relationship between water infrastructure, structures and presence of improved water and sanitation services. Their study in Tanzania shows that the situation in the capital city is in bad condition and this continues to worsen with time as the population continues to increase. Also, documented evidences indicate that 80% of the population in Dar es Salaam which is the largest city in Tanzania live in low income areas (Kyessi and Sakijege, 2013). Provision of basic sanitation and water provision alongside together with other services such as the collection, management and disposal of water are still poor in the city. The situation is worse in slums, where unsanitary conditions are a common feature (UCLAS, 2014). Existence of unhygienic conditions in informal settlements where such a large City population lives, imply that, a large number of people in Dar es Salaam live are exposed to unhygienic vulnerable environment; demanding for more water and sanitation related projects (UCLAS, 2014). The poor providence of these services include: poor government policies, poor water infrastructure, poor water billing and water theft.

African Centre for Migration and Society (2016) did a comparative study in Soweto and Kibera slums. The study chose its population from the firms charged with the supply of water and collection of waste. The study found out that 80% of the population in these slum dwellers live in a non-sanitized environments with poor water supply schedules. Most of the water supplied is dirt and situations get worse during the rainy seasons where floods carry the waste to people's homes, the water breaks the water pipes-most of which are made of poor quality plastics etc. The study also found out that water pumps and water tanks have an influence in water services providence in the slums where security is always questionable.

Muhele (2013) found out that water structures like the water tanks and water pipes influence the provision of water for better sanitation like hand washing. Cheru (2014) showed that the provision of water and sanitation in slums like Kianduthu and Makongeni has been challenged due to the rates of theft of the structures like the metallic water pipes that are later sold to second hand metal dealers in these slums, water theft, poor political will, poor urban planning, and poor infrastructure. Mbeyu (2015) did a study whereby the research design adopted for this study was a descriptive survey design. Target population was 436 respondents. The sampling size was calculated using the table below by Krejcie & Morgan (1970) to determine the sample size of 205. From the results, over 95% of the employees of MOWASCO felt that financial resources are closely linked to the supply of water to the slums and the implementation of the WS projects in areas like Likoni, Kisauni, Kisumu Ndogo, Bangladeshi/Uhuru Owinyo and many more. This was however overtaken by the issue of rates of returns whereby over 97.5% of the respondents felt that the theft cases, illegal connections, unpaid bills etc. have kept various companies and organizations away from applying for licenses to offer WSS to the people in the slums. Politics scored an average influence since the politicians formulate rules, policies, control resources, allocate resources, mobilize resources and influence the people they lead. This was followed by M&E that seemed not to be welcomed with the respondents. The researcher also mentioned structures like the water and sewage flow pipes, pumps for water and sewage elimination, water reservation tanks etc.

### **2.3.2 Institutional Arrangements and the Implementation of Water and Sanitation Projects in the Informal Settlements**

Institutions are very important in determining the provision of water services in the informal slums across the globe (Eduardo, 2014). Butterworth et al (2014) asserted that institutional arrangements have a strong influence on the provision of water services to the citizens. For example, in the UK water is provided by various institutions that fall under two categories (private institutions and the public institutions). The private institutions are regulated by the government and from time to time are given incentives to provide the services in areas of urgency.

De Carvalho (2013) has found out that institutions have an influence on the integrated urban water services management in South African. The study has found out that the nature of institutions, the magnitude of their investment and the areas where these institutions get their funding from influences the sustainability of water management in the urban centers. According to Golding (2010), regarding sustainable access to water, Africa has been observed to have lowest water and sanitation coverage. Other studies have indicated that on average, out of the three Africans living in the urban centers; more specifically in the slums, 1 is missing water and sanitation services (World Bank, 2015).

According to the World bank (2015), a number of factors like weak institutional arrangements, structural difficulties, poor political support and goodwill, poorly designed competitive policies, inadequate resources (human resources and financial resources) etc. The World Bank (2015) has given a general trend on the performance of projects in the sub-Saharan Africa and has focused in the development oriented projects where water and sanitation projects are very common. However, a number of these projects fail significantly due to a number of reasons that include: adoption of foreign countries models that don't buy the concept of the local needs, the avoidance of basic needs of projects success like community involvement, infrastructural and structural alignments among others. The report has also indicated that majority of the projects in Africa fail due to the issue of poor political will and political subscribed ideas that want the poor to remain poor for easy control and management.

According to Moe and Rheingans' (2016) opinion, there are essentially services strategies that can be embraced to improve water provision in the informal settlements of Africa. Such strategies involve the ownership and operation of water supply systems in what is referred to as institutional arrangements according to this study. These include: public ownership and public ownership, whereby ownership of the water provision infrastructure is owned and managed by a public entity. In this case the national, regional and local government is responsible for the operation of the service system; Public ownership and private operation, which is commonly referred to as the private and public partnerships (PPP). This form of coalition is achievable through leases and concessions or agency contracts in which a municipality has the authority to appoint an agency thus delegate the oppression of infrastructure facilities and the authority to appoint an agency thus delegate the operation of infrastructure facilities and the responsibility of

new investments, which includes passing the commercial risks to the agency; however the assets are owned by a lesser private ownership and operation, leading to full ownership of the infrastructure and operation of the water systems to the private to operate and invest in new assets.

From a local urbanite's perspective, the public ownership and public operation could be regarded as the best option, because the public sector usually has the interests of the citizens at heart and more often subsidizing the costs associated with public services provision especially in the low income areas. It is also mandated by the constitution and law to do so therefore fall within its obligations. This option is poor friendly since it does not exploit the poor consumers because it is not profit driven and thus will enable implementation and providence of water services to all. In as much as these may true, public services are even so considered to be inefficient, corrupt and bureaucratic; requiring a strong economic base to sustain services (Kujinga *et al.*, 2013).

In contrast, if the private ownership and operation option could be adopted, many poor Low income area inhabitants are bound to suffer because the private sector normally would focus on maximizing profits at the expense of service provision. The PPP therefore appears to offer a more sensible option for service provision in the informal settlements since this would strike a balance between the public and private interests, thereby producing better results, ensuring quality and efficacy of the facility (GIZ, 2015).

In a similar study, Ndwiga (2014) focused on an assessment of the provision of water services to informal settlements in Nyeri Municipality Urban Locations has indicated that institutional arrangements and operations significantly influence the provision of water services. In this study, Ndigwa (2014) has shown that institutions' capital assets, recurrent assets, human resources capabilities, returns of investments and many more determine their ability to provide the water services to the people in the slums in Nyeri. He has recommended that PPT initiatives should be adopted for water projects implementation in the slums since this will allow the government be relieved off the burden of providing the vital commodity to its people at huge losses while the private operators shall be able to give better services at subsidized operation costs as supported by the government. UN Water (2015) observed that Huruma slums, Mathare Area one slum in Nairobi, Kondele in Kisumu and Kisumu Ndogo in Mombasa lack better water and sanitation

services since most institutions shy away from investing in such projects in the area due to low rates of returns, insecurity, theft of both water and the water structures like water pumps and water pipes.

### **2.3.3 Community Participation and the Implementation of Water and Sanitation Projects in the Informal Settlements**

Any project implemented across the world is always targeted towards being utilized by the community members so that their lives can be better. This is not different in implementation water and sanitation projects in the informal settlements. According to the WB (2016) the community members play a vital role in the implementation of development projects. Their roles include: providing the natural resources required for projects implementation like land, providence of human resources like expertise and non-skilled labour required for the implementation of the projects, providence of market for the products, security etc.

According to African Centre for Economic Transformation (2014), informal settlements in Africa are the worst hit in relation to water and sanitation provision. Statistically, 1 out of 3 homesteads in the slums strongly lack proper access to clean water while 2 out of 3 homes don't have proper sanitation services; even in the cases where the people are using latrines to dispose the waste. Lack of proper water and sanitation projects implementation has been tied to a number of reasons that include: poor infrastructural development in the non-formal dwellings in Africa, poor government policies towards the urban poor in the slums, poor land ownership practices, poor returns from the water supplied, poor institutional practices, policies and arrangements, poor community involvement and participation and poor governance of natural resources due to corruption and politics.

The community provides a positive environment for projects implementation (Kariuki et al, 2014), it provides the land and labour that are vital resources for projects implementation (Ledant et al. 2013), and they act as the last consumers of the projects products (provide market for the projects output) among others (UNICEF, 2016). Slum dwellers provide the market required for the provision of the water services, the provide land on which the pipes should be laid, they provide the labour that can be used in providing these services, they provide the

security for the water structures and infrastructures but are normally ignored in the implementation process leading to failure of projects (Kariuki et al, 2014).

Ahkbar, Minnery, Hore and Smith (2017) noted that water projects implementation in the informal settlements have been in the declining mode and a number of them have been faced with time overruns or cost overruns due to simple concepts of too much borrowed ideas from developed countries by expert strategists who don't include models that involve the local community that is the final consumer of such projects. For example, in Dhakar Bangladesh, Habitat International failed completely to implement the pro-poor water projects that aimed at serving 30% of the homesteads in the slum by 2015. One of the reasons as to why the project failed is avoidance of bringing all the local people on board who later spread propagandas that the project that was led by some experts from USA and UK was aimed at introducing contaminated water that could in term be used as natural family planning for the slum dwellers. This forced the locals to oppose the projects in various ways including denying the experts land for installations of pumps and tanks, stealing of the already laid down structures, destruction of the implemented projects and demonstrations.

Muhele(2013) has shown a very high rate of agreement on the influence of community participation on the implementation of water and sanitation programmes in the informal settlements. In her study that focused on the factors influencing sanitation practices in Kibera Urban Informal Settlements in Nairobi- Kenya, she has shown that the slum dwellers have the capacity to decide which projects to be implemented, where they should be implemented, at what time, who should be the first beneficiaries and who should be involved. From time to time, chaos have been experienced among the slum dwellers in relation to garbage collection and water hawking (Mbeyu, 2015). For example in areas like Dandora local gangs have been on constant wrangles on who should collect and manage some sections of the dumpsite, and this has extended to Kibera where some areas are designated to some group of local gangs who supply water using carts and collect garbage as a source of living; thus hindering any organized programme to provide such services(Muhele, 2013).

#### **2.3.4 Competitive Policies and Strategies' Influence on the Implementation of Water and Sanitation Projects in the Informal Settlements**

WHO (2015) has shown that there are very good strategies outlined by various governments in various parts of the world regarding urban planning and management that are aimed at bettering various urban settlements. However, studies have continued to show that in a number of countries in Asia, sub-Saharan Africa and Latin America, these strategies and policies are well spelt in government gazettes with little implementation. This has led to an influx of slums that lack basic social amenities like medication, sanitation, water and food besides the social crimes that have from time to time endangered the lives of the residents. A number of legal documents have been documented with much policies that regard the dignity of life and basic human rights that include access to basic housing and sanitation. The policies are included in various countries' constitutions, basic acts, municipal acts, municipal regulations and international bodies' regulations like non-governmental organizations (UNICEF, 2016). However, implementation of these strategies and policies in totality especially in Africa has been a dream leading to influx of slum dwellers in the urban centres that lack basic live supporting amenities (WB, 2015).

UN Water (2015) asserts that poor policies regarding water and sanitation services provision to the poor slum dwellers in Manila has led to reduced rates of water and sanitation projects implementation. The report shows that this situation is expected to be worse by 2025 whereby it is expected that out of 10 households, only 3 will be fully supplied with clean water in the slums while only 1 homestead out of the 10 shall be in the position of accessing improved sanitation. This is due to the fact that the policies and strategies adopted for slums upgrading and management have not integrated the local models that address the local problems of the poor people in the slums by use of locally available materials and knowledge.

Similarly, due to rapid urbanization, many urban residents in sub-Saharan Africa live in informal settlements which often lack basic social amenities. As a result, the urban poor often use low cost pit latrines at times sunk close to the nearby wells where they also draw domestic water. Dense population and overcrowding in slums often does not allow for the required distance between wells and pit latrines to be maintained therefore micro-organisms seep through the soil from the

pit latrines to contaminate these water sources exposing the consumers of this water to health risks (UN-HABITAT, 2014). It concludes that most of this urban population lacks basic amenities like water due to poor policies that don't consider the informal settlements first as the policies that aim at planning the more productive points of the urban centres in African cities; more specifically where the wealthy people live. In some cases where these policies and strategic plans have been outlined, both the municipal councils and other relevant bodies have failed to adopt and apply them.

According to Muzondi (2014), most informal settlements in South Africa are faced with innumerable problems ranging from inadequate infrastructure, poor sanitation, water pollution and poor water disposal system. Policies and urban management strategies have been blamed for the growth of slums in SA and poor services provision to the slum dwellers. Mainly construction in these areas is informal and unguided by urban planning, therefore there is no form of formal amenities such as sewage network, electricity, or telephones. Unlike the organized settlements, the informal settlements tend to lack basic services which include policing firefighting and medical services. It can be argued therefore that these poor urban planning policies that have given birth to slums make it difficult to implement great projects that can take care of the slum dwellers.

Informal settlement residents are the majority ranging between 40 % and 70 % of the population in all major urban centers in Kenya (UN-HABITAT, 2014). These settlements are challenged with lack of adequate water and sanitation service provision. The government through the National Water Services Strategy (NWSS) aimed at achieving the millennium development goal number 7 by fast tracking affordable and sustainable access to safe water in the settlements of the urban poor. However, due to poor actualization and application of policies, the millennium development goal 7 was not achieved by the time its deadline came to pass 2 years ago that ended in 2015.

A critical analysis of the constitution of Kenya which was promulgated in 2010 has shown that water and sanitation is among the basic amenities it outlines as the right of its people. Chapter 5, section 43 on economic and social rights, subsection (b) states that "Every person has the right to accessible and adequate housing, and to a reasonable standard of sanitation" (Kenyan



Constitution, 2010). This postulates that this right to access to adequate housing and a reasonable standard of sanitation is enshrined in the constitution; the supreme law of the land. Therefore it is an obligation of the state through its agencies to ensure provision of decent and quality housing with accompanying services such as water and sanitation to all its citizens without discrimination. However, it is evident that despite the fact that there are clear policies and strategies that have been constitutionally laid down in relation to these services providence, the relevant bodies have completely given a dump response towards actualizing these policies.

African Centre for Migration and Society (2016) has outlined a number of ambiguous policies in the Kenyan constitution that have made it difficult to implement the basic services providence projects in the informal settlements in all the urban centres. These policies include: The National Housing Policy in Kenya; Water Act; Environmental Management and Co-ordination Act of 1999; The National Land Policy; Land Act etc. The implementation of these rules, policies, regulations and many more has greatly influenced the implementation of water and sanitation projects in the slums.

### **2.3.5 Political Will and the Implementation of Water and Sanitation Projects in the Informal Settlements in Kenya**

Community projects implementation are greatly influenced by a shared concept that touches on leadership, governance and politics. A number of countries have intertwined leadership with politics and therefore politics has a significant influence on the implementation of community development projects. World Bank (2014) has shown that in Africa all the projects that are run by government are political in nature and for them to be successful they must have blessings of the national or local leaders. It is these leaders who determine the nature of projects to be implemented, which projects and places to be considered first, the sources of financial resources, the amount of financial resources for these projects and the type of people to handle these projects.

Njeru(2015) outlined the importance of politics in the success of projects. This study adopted a descriptive research design and it involved 123 employees of the TAWASCO. The study found a strong correlation value between what politics does in terms of projects site/location decision, projects funds allocation, projects funds mobilization, projects funds embezzlement, human

resources mobilization and distribution and the success of the projects. Ngayu (2014) argues that, politicians and leaders play a significant role in making and executing decisions. This involves efforts by a leader to motivate, mobilize and facilitate participation by others in making important decisions that are related to development projects implementation and continuity in maintenance of these projects. Ngayu continues to show that in order to get decisions approved, easily accepted and implemented; it is paramount to involve others in this process of decision making. Conclusively, politics in Kenya's projects implementation does not only guide group members and communities but also encourages active public participation as well as acknowledging inputs from group members when making decisions and solving problems.

World Bank (2014) indicates that, most urban utilities in cities in Kenya are not strong organizations and do not provide good services in general. Efficient public works companies do exist, but far too many are plagued by government interference, poor leadership and management, lack of autonomy, and a policy environment that hinders their development. Ineffective governance evidently has an impact on prohibiting water infrastructure investment. Governments have failed to meet the needs of the communities in informal settlements. Specifically, corrupt and inefficient water and public works companies represent a major hurdle in efficiently providing services to informal settlements.

Mbeyu (2015) examined the factors influencing the implementation of sustainable water and sanitation projects in Kenya: a case of informal settlement in Mombasa County. The research design adopted for this study was a descriptive survey design. Target population was 436 respondents. The sampling size was calculated using the table below by Krejcie & Morgan (1970) to determine the sample size of 205. From the results, over 95% of the employees of MOWASCO felt that financial resources are closely linked to the supply of water to the slums and the implementation of the WS projects in areas like Likoni, Kisauni, Kisumu Ndogo, Bangladeshi/Uhuru Owinyo and many more. This was however overtaken by the issue of rates of returns whereby over 97.5% of the respondents felt that the theft cases, illegal connections, unpaid bills etc. have kept various companies and organizations away from applying for licenses to offer WSS to the people in the slums. Politics scored an average influence since the politicians formulate rules, policies, control resources, allocate resources, mobilize resources and influence the people they lead.

## **2.4 Theoretical Framework**

This study is guided by the Adaptive Management Theory as outlined by Holling's work of 1978 and it draws from concepts within many different disciplines. Part of adaptive management's philosophical foundations, for example, lie within the field of industrial operations theory (Anderson et al. 2013). According to Anderson et al (2013), adaptive management seeks insights into the behavior of ecosystems that are utilized by humans, and it draws upon theories from ecosystem sciences, economics and social sciences, engineering, and other disciplines. Adaptive management incorporates and integrates concepts such as social learning, operations research, economic values, and political differences with ecosystem monitoring, models, and science.

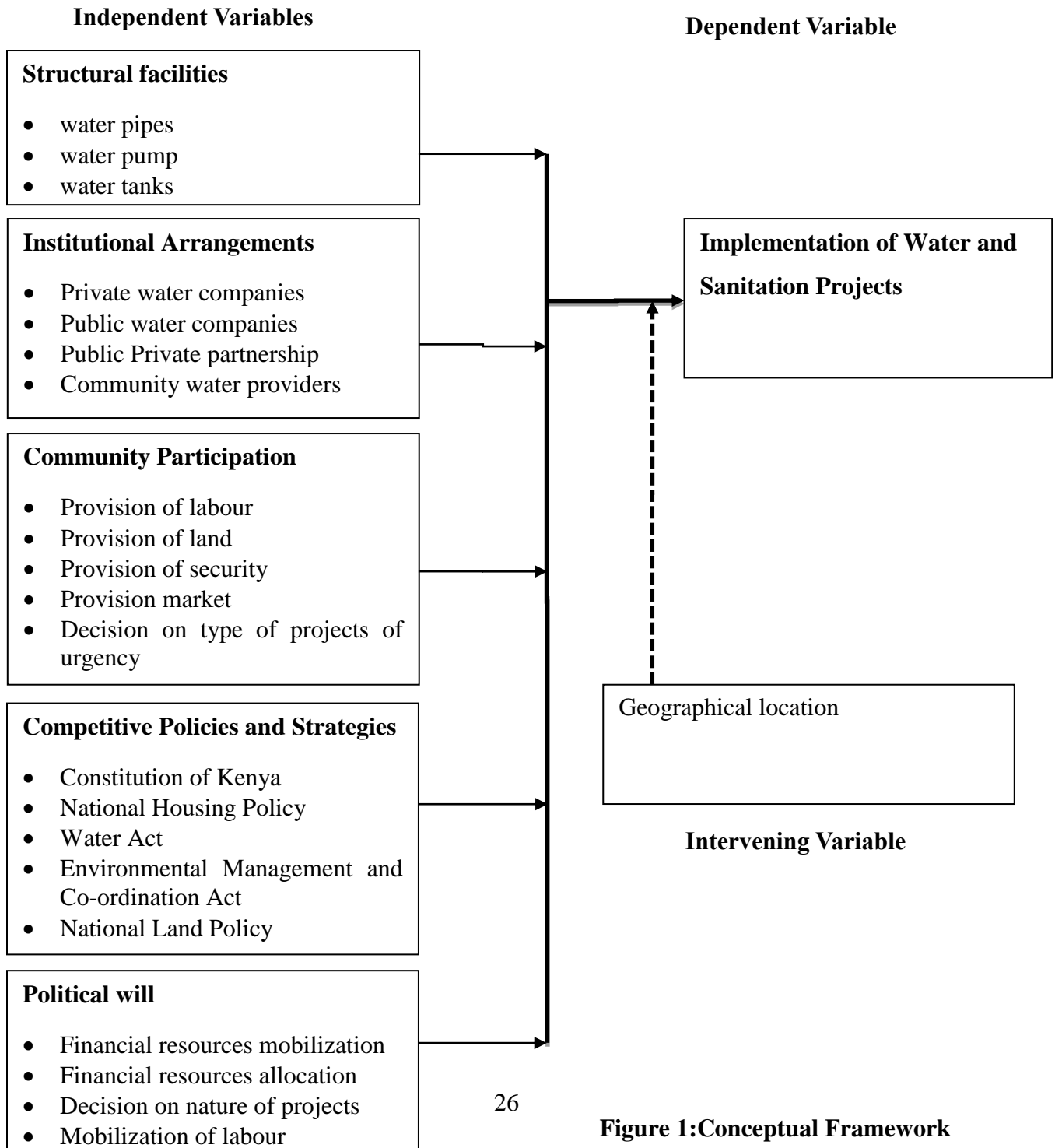
Adaptive management aims to enhance scientific knowledge and thereby reduce uncertainties in the implementation of ecosystem related projects. Such uncertainties may stem from natural variability and stochastic behavior of ecosystems and the interpretation of incomplete data (Parma et al., 1998; Regan et al., 2002), as well as social and economic changes and events (e.g., demographic shifts, changes in prices of materials and consumer/community demands) that affect natural resources systems. Adaptive management aims to create policies that can help organizations, managers, and other stakeholders respond to, and even take advantage of, unanticipated events (Holling, 1978; Walters, 1986). Instead of seeking precise predictions of future conditions, adaptive management recognizes the uncertainties associated with forecasting future outcomes, and calls for consideration of a range of possible future outcomes (Walters, 1986). Management policies are designed to be flexible and are subject to adjustment in an iterative, social learning process (Lee, 1999).

Adaptive management is intended to increase the ability to fashion timely responses especially in situations where there is new information and in a setting of diverse stakeholder objectives and preferences. It encourages stakeholders to discuss disputes in an orderly fashion while environmental uncertainties are being investigated and better understood. Management decisions are often difficult to change because managers are subject to ordinary human failings, including a tendency to resist recognizing and learning from their own errors. In a bureaucracy, this tendency may be amplified. Adaptive management can help reduce decision-making gridlock by making it clear that decisions are provisional, that there is often no "right" or "wrong" management decision, and that modifications are expected. Adaptive management should help

stakeholders, managers, and elected officials and other decision makers recognize the limits of knowledge and the need to act on imperfect information, thus allowing easy implementation and completion of projects.

## 2.5 Conceptual Framework

The conceptual framework is just a diagram outlining the relationship between the various variables in the research together with their indicators. This conceptual framework has outlined the relationship between the independent and dependent variables plus the intervening variables as shown below.



**Figure 1: Conceptual Framework**

The conceptual framework above has outlined the independent variables together with their indicators. The independent variables are the variables that don't change but influence the dependent variable that is on the right hand side. The dependent variable in this study is the implementation of water and sanitation projects. The study has also outlined one intervening variables. These are determinants of sustainable water and sanitation projects implementation of the poor people but their literature has not been included in the study due to time and length of the study.

## **2.6 Summary of the Chapter**

The chapter has outlined the concepts of water and sanitation projects implementation in the informal settlements, sustainable water projects and has reviewed the literature as per the objectives. The study has also outlined the theories that have been adopted for the study, the conceptual framework and it has shown the literature gap.

## **2.7 Knowledge Gap**

From the available literature, there are a number of determinants of sustainable water and sanitation projects implementation across the globe. However there seems to be a great literature gap when it comes to studies that have been carried out in Kenya and more specifically those focusing on the pro-poor water and sanitation projects implementation. For example, Mbeyu (2015) focused on the water and sanitation projects implementation in the informal settlements in Mombasa County. However, this study has not explained the sustainability concept of these water projects and how this is influenced by factors like structural facilities, institutional arrangements, community participation among others.

In a similar study by Ndwiga (2014) that focused on Nyeri County in assessing of the provision of water services to informal settlements, where he indicated that institutional arrangements and operations significantly influence the provision of water services. In this study, Ndigwa (2014) has shown that institutions' capital assets, recurrent assets, human resources capabilities, returns of investments and many more determine their ability to provide the water services to the people in the slums in Nyeri. However, Ndigwa has only focused on the implementation of the water projects and has not touched on the sustainability part in these projects implementation. Equally

he has done his study in Nyeri that has completely different socio-economic characteristics from the residents of Kibokoni in Kilifi County.

The World Bank and WHO (2017) have also indicated that water and sanitation projects in Kenya are tied to a number of issues where community participation is one of them. However the study has completely ignored the role of strategic plans and policies, the institutional structures, the role of politics and institutional arrangements. This study has also been done in Nairobi's Kibera slum that is totally different from Kibokoni in terms of cultural, economic and geographical orientation.

**Table 2.1 Knowledge Gap**

	Researcher	Focus	Finding	Knowledge gap
1	Mbeyu (2015)	Water and sanitation projects implementation in the informal settlements in Mombasa County.	Factors like financial resources, water experts, water theft, security and housing plans influence the implementation of water projects in the slums	This study has not explained the sustainability concept of these water projects and how this is influenced by factors like structural facilities, institutional arrangements, and community participation among others.
2	Ndwiga (2014)	Focused on Nyeri County in assessing of the provision of water services to informal settlements	He indicated that institutional arrangements and operations significantly influence the provision of water services.  Also, has shown that institutions' capital assets, recurrent assets, human	Has only focused on the implementation of the water projects and has not touched on the sustainability part in these projects implementation.  Equally he has done his

			resources capabilities, returns of investments and many more determine their ability to provide the water services to the people in the slums in Nyeri.	study in Nyeri that has completely different socio-economic characteristics from the residents of Kibokoni in Kilifi County.
3	World Bank and WHO (2017)	Water and sanitation projects implementation in Kibera and Kondele slums in Kenya	Indicated that water and sanitation projects in Kenya are tied to a number of issues where community participation is one of them.	<p>However the study has completely ignored the role of strategic plans and policies, the institutional structures, the role of politics and institutional arrangements.</p> <p>This study has also been done in Nairobi's Kibera slum that is totally different from Kibokoni in terms of cultural, economic and geographical orientation.</p>



## **CHAPTER THREE:**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses the methodology that was used to conduct the study. It describes the research design, target population, sampling procedure and size, research instruments, pilot study, reliability and validity test, data collection procedure, methods of data analysis, ethical consideration and operationalization of the variables.

#### **3.2 Research Design**

This study adopted a descriptive survey research design. Mugenda and Mugenda (2003) describe a descriptive research as a means of gathering information about the characteristics, actions or opinions of a large group of people. The descriptive research design was favored for this study since it is capable of obtaining information from large samples of the population over a short period of time. Also descriptive research design is capable of getting the views, attitudes and opinions of the respondents for better results.

#### **3.3 Target Population**

According to Ngechu (2004), a population is a well-defined or set of people, services, elements, and events, group of things or households that are being investigated. In this study, the researcher held to Ngechu's definition by picking on people and households. In Kilifi County, MAWASCO (Malindi Water and Sewerage Company) is the central company that is in charge of water and sanitation services in the county. The company is from the larger Coast Water Services Board. There are also five non-governmental organizations (though some operating as CBOs) offering the water and sanitation services in the County. There are over 710 households in this slum area though exact statistics of 2009 show a relatively higher number.

The study focused on all the employees of MAWASCO, the employees of the five NGOs and the household heads of the residents of Kibokoni who came from the 710 households as shown in the table 3.1.

**Table 3.1 Target population**

<b>Section</b>	<b>Target Population</b>
MAWASCO employees	52
NGOs employees	47
Household heads	710
<b>Total</b>	<b>809</b>

**Source: Integrated Kilifi County Management Report of 2017**

### **3.4 Sample Size and Sampling Procedure**

This study used the Yamane (1967) and D. Israel (2009) formula as shown below to calculate the sample size at a 95% confidence level:

$n = N / 1 + N (e^2)$ ; Where; n is the sample size, N is the population size, e is the level of precision.

Hence applying the above formula, the sample size was computed as;

N=809:

$n=809/1+809(0.05^2) = 265$  respondents.

In this study, stratified sampling was applied so that each respondent from each category got an equal chance of participating in the study for better results guided by the calculation as shown in table 3.2.

**Table 3.2 Sample Size**

<b>Section</b>	<b>Target Population(N)</b>	<b>sample size(n=Nx0.32)</b>
<b>MAWASCO employees</b>	52	16
<b>NGOs employees</b>	47	15
<b>Household heads</b>	710	235
<b>Total</b>	<b>809</b>	<b>265</b>

### **3.5 Data Collection Instruments**

The questionnaire was used for data collection. The questionnaire was suited for this study because it is very much practical and for sure can be used to collect data from a large number of people within a short time. Also, it is cheap to use questionnaires as compared to interviews. The questionnaires were used to collect data from the MAWASCO employees, the NGOs' employees, and the household heads who were directly involved in one way or the other in water and sanitation projects in the informal settlement. The questionnaires were administered by the researcher and selected enumerators. Closed ended questions were used so as to get data that can easily be analyzed using SPSS given that the number of the target population is fairly large.

#### **3.5.1. Piloting of the Research Instrument**

The research instrument was pilot tested in the neighbouring Mombasa County. 20 questionnaires were allocated to the employees of the MOWASCO and some residents of two slums in Mombasa County (Bangladesh slums and Bangilaa). This allowed the respondents to give views that were used to help in the instrument modification. This was done twice within an interval of two weeks.

#### **3.5.2. Validity of the Research Instrument**

Kothari (2004) refers to validity as the quality that a procedure or instrument or a tool used in research is accurate, correct, true and meaningful. The research shall apply content validity.

In content validity; the instrument is normally exposed to experts who give their opinions for better modification. The instrument was verified by the supervisor and one senior lecturer from Mombasa Campus University of Nairobi.

### **3.5.3. Reliability of the Research Instrument**

Zikmund (2003) says that reliability is concerned with estimates of the degree to which a research instrument yields consistent results after repeated trials. In this study, reliability was determined by a test-retest administered to 20 subjects not included in the sample. The first set of 20 questionnaires were administered to 20 respondents, and later on the same repeated in two weeks' time. The respondents in this test-retest did not make part of the respondents during the actual study.

### **3.6 Data Collection Procedure**

The researcher obtained letters of transmittal from the Open Distance and E-Learning school, University of Nairobi as attached in Appendix 1 and 2. Then she sought permission to collect data from the house hold heads using a letter of introduction attached in Appendix 3. She then involved three research assistants who were trained for two weeks before the actual study. The researcher approached the management of MAWASCO and informed it of the study and later on went ahead to inform the local authorities (Chief, Assistant chief and village chairpersons of Kibokoni). The questionnaire was on a drop and pick later method and those respondents who were literate and could not be reached immediately were emailed the questionnaire.

### **3.7 Data Analysis Technique**

Mugenda and Mugenda (2012) define data analysis as the process of cleaning and summarizing data so that it becomes information that can easily be interpreted and conclusions made to support decision making. The completed questionnaires were edited for completeness and consistency. Quantitative data collected was analyzed by the use of descriptive statistics using SPSS version 20 and presented through percentages, means, frequencies, and cross tabulation. The relationship between the various variables was tested by the use of the Chi-square formula.

### 3.8 Ethical Considerations

Permission was sought by getting a letter of recognition from the University and the authorities in the area were also informed of the study in order to ensure the study followed the principles. The five principles guiding ethics in research were observed. The principles include: scientific merit, equitable selection of subjects, seeking informed consent, confidentiality and avoidance of coercion. Prior to collecting information from the respondents, the researcher explained to them the objectives of the study, and how the findings could help them and the country at large.

### 3.9 Operationalization of the variables

**Table 3.3 Operationalization Table**

<b>Objective</b>	<b>Independent Variable</b>	<b>Indicators</b>	<b>Scale</b>	<b>Types of analysis</b>
i. To examine the extent to which structural facilities influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya; a case of Kibokoni informal settlement.	Structural facilities	<ul style="list-style-type: none"> <li>• Water Pipes</li> <li>• Water Pump</li> <li>• Water Tanks</li> </ul>	Ordinal Scale	Descriptive
ii. To examine the extent to which institutional arrangements influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya; a case of Kibokoni informal settlement.	Institutional Arrangements	<ul style="list-style-type: none"> <li>• Private water companies</li> <li>• Public water companies</li> <li>• Public Private partnership</li> <li>• Community water providers</li> </ul>	Ordinal Scale	Descriptive

<p>iii. To examine the extent to which community participation influences the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya; a case of Kibokoni informal settlement.</p>	<p>Community Participation</p>	<ul style="list-style-type: none"> <li>• Provision of labour</li> <li>• Provision of land</li> <li>• Provision of security</li> <li>• Provision market</li> <li>• Decision on type of projects of urgency</li> </ul>	<p>Ordinal Scale</p>	<p>Descriptive</p>
<p>iv. To examine the extent to which competitive policies and strategies influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya; a case of Kibokoni informal settlement.</p>	<p>Competitive Policies and Strategies</p>	<ul style="list-style-type: none"> <li>• Constitution of Kenya</li> <li>• National Housing Policy</li> <li>• Water Act</li> <li>• Environmental Management and Co-ordination Act</li> <li>• National Land Policy</li> </ul>	<p>Ordinal scale</p>	<p>Descriptive</p>
<p>v. To examine the extent to which political will influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya; a case of Kibokoni informal settlement.</p>	<p>Political will</p>	<ul style="list-style-type: none"> <li>• Financial resources mobilization</li> <li>• Financial resources allocation</li> <li>• Decision on nature of projects</li> <li>• Mobilization of labour</li> </ul>	<p>Ordinal scale</p>	<p>Descriptive</p>

## **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

### **4.1 Introduction**

This chapter is a presentation of the research findings obtained from field responses and data. The chapter has basically focused on the background information of the respondents, data analysis and interpretation.

### **4.2 Questionnaire Return Rate**

In the study, 265 questionnaires were allocated to respondents in various strata. Out of the issued 265 questionnaires, only 123 were well filled and therefore made sense for the study. This represented 46.41% of the total questionnaire. The major reason for such a relatively low return rate is that a higher number of questionnaires from the household heads had numerous deficits; owing to the fact that majority of the people of Kibokoni are not literate. Also the time for data collection was a bit limited, making response rate low. However, Kothari (2004) argues that in a social sciences and descriptive studies, when the target population is less than 10,000 a response rate of 30% can give a trend of facts that are under investigation.

**Table 4.1 Response rate**

<b>Questionnaires</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Returned</b>	<b>123</b>	<b>46.41</b>
<b>Unreturned</b>	<b>142</b>	<b>53.59</b>
<b>Distributed</b>	<b>265</b>	<b>100.0</b>

### **4.3 Demographic characteristics of the respondents**

This section captures the responses by gender, age, as well as the highest education levels.

**Table 4.2 Respondents' information**

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Gender</b>		
Male	9073.17	
Female	3326.83	
<b>Period of involvement in WSS</b>		
Below 1 year.	30	24.39
1 to2 yrs.	60	48.78
2 to 3 yrs.	27	21.95
Above 4 yrs.	6	4.88
<b>Education Levels</b>		
Secondary Level	20	16.26
Diploma	21	17.07
Degree	20	16.26
Others	62	50.41

As presented in table 4.2, male respondents, 90 (73.17%), registered the most as compared to their female counterparts, 33 (26.83%). This is due to the fact that majority of the men in Kilifi county are the ones who have relatively higher education than their female counterparts. Also, jobs in either the county or any other organisation are dominated by the male gender; besides the men being the heads of the homes. It follows then, from the findings, that the males make the dominant gender across the study areas surveyed.

In relation to the period the respondents have come across the water and sanitation projects for the poor in Kibokoni area, it was established that a majority of the respondents (48.78 %) have interacted with the projects for between 1 to 2 years now. This was followed by those who have had the knowledge of these water projects for less than one year now, as indicated by 24.39% of the respondents. Only 21.95% and 4.88% of the respondents were found to have had over three years of informal settlement water projects implementation. The 1-2 years is practically



explained in the county strategic plan where water provision to the Kibokoni people changed from the former CWB to the MAWASCO that is under the county government.

As illustrated in table 4.2, a majority, 50.41% of respondents indicated having attained other levels of education, followed by 17.07% having attained diploma level of education with those who have a degree and certificate education taking 16.26% percentage representation each. The trend in the education pattern can be justified since other forms of education could mean that the residents from the households dominated the study as the sample population indicates. Majority of the slum dwellers are not better educated.

#### **4.4 Structural Facilities and the Implementation of Water and Sanitation Projects in the Informal Settlements**

Various questions were asked in relation to the structural facilities and their influence on the implementation of sanitation projects in the informal settlements and this attracted a number of responses indicated as follows:

In relation to the first question that asked whether the respondents supported the idea that facilities have an influence on the implementation of pro-poor water and sanitation projects in the informal settlements, majority of the respondents (100 who equated to 81.30%) supported the idea. However, 18.7% of the respondents who represented 23 respondents did not support the idea.

In order to establish influence of structural facilities and the implementation of water and sanitation projects, respondents were asked to indicate the extent to which they agreed or disagreed with a number of statements on a rating scale. Responses were given on a five-point Likert scale, where 5=Strongly Agree, 4=Agree, 3=Neutral/weakly agree, 2=Disagree and 1=Strongly Disagree. The scores of 'strongly disagree' have a statement score of between 0 to 30%, 'disagree' has been taken to represent a statement with percentage score of 31% to 50%. The score of 'neutral' has been taken to represent a statement agreed upon to a moderate extent, equivalent to a percentage score of 51% to 68%. The score of 'agree' and 'strongly agree' have been taken to represent a statement agreed upon to a large extent, equivalent to a mean score of 69% to 90% and 91% to 100 respectively. Table 4.3 presents the results.

**Table 4.3 Rating of Structural Facilities and the Implementation of Water and Sanitation Projects**

Information sought	Level of Agreement					Percentage
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1 Water pipes insufficiency makes it difficult in implementing the pro-poor water projects in this area.	6	18	10	63	26	73.82
2 Scarcity of allocation of water pumps makes it difficult in implementing the pre-poor water projects in this area.	3	9	16	55	40	71.71
3 Water tanks inadequacy makes it difficult to implementing the pre-poor water projects in this area.	1	6	21	40	55	83.08

As table 4.3 presents, a higher percentage/majority of respondents agreed with the ideas that: Water pipes insufficiency makes it difficult in implementing the pro-poor water projects in this area (73.82); Scarcity of allocation of water pumps makes it difficult in implementing the water projects in this area (71.71); and water tanks inadequacy makes it difficult to implementing the pre-poor water projects in this area (83.08).

H<sub>1</sub>: structural facilities influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

H<sub>0</sub>: structural facilities influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya

**Table 4.4 Testing Hypothesis of Structural Facilities vs. Sustainable Water and Sanitation Projects Implementation**

<b>f</b>	<b>f<sub>e</sub></b>	<b>(f- f<sub>e</sub>)</b>	<b>(f- f<sub>e</sub>)<sup>2</sup></b>	<b>((f- f<sub>e</sub>))<sup>2</sup>/ f<sub>e</sub></b>
6	24.6	-18.6	345.96	14.06
18	24.6	-6.6	43.56	43.56
10	24.6	-14.6	213.16	8.66
63	24.6	38.4	1474.56	59.94
26	24.6	1.4	1.96	0.07
				$\sum ((f- f_e))^2 / f_e = 126.29$

$\chi^2_c = 126.29 > \chi^2_{0.05} = \infty$  at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 126.29 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Consequently, structural facilities influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

#### **4.5 Institutional Arrangements and the Implementation of Water and Sanitation Projects in the Informal Settlements**

Respondents were asked a question on whether they thought that institutional arrangements influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya and responses indicated that; majority of the respondents (110 who represented 90%) supported the idea while the remaining 10% did not support the idea.

In order to establish influence Institutional Arrangements have on the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements, respondents were asked to indicate the extent to which they agreed or disagreed with a number of statements on a rating

scale. Responses were given on a five-point Likert scale, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1= Strongly Disagree. The scores of ‘strongly disagree’ has statement scores of between 0 to 30%, ‘disagree’ has been taken to represent a statement agreed upon to an equivalent to a percentage score of 31% to 50%. The score of ‘neutral’ has been taken to represent a statement agreed upon to a moderate extent, equivalent to a percentage score of 51% to 68%. The score of ‘agree’ and ‘strongly agree’ have been taken to represent a statement agreed upon to a large extent, equivalent to a mean score of 69% to 90% and 91% to 100 respectively. Table 4.5 presents the results.

**Table 4.5 Rating the Institutional Arrangements and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements**

Information sought	Level of Agreement					Percentage
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. Private water companies have an influence water services to the residents of Kibokoni informal settlements	0	6	10	65	42	83.25
2. Public water companies an influence in providing water services to the residents of Kibokoni informal settlements	1	2	11	45	64	87.47
3. Public Private partnership has influence in providing water services to the residents of Kibokoni informal settlements	0	4	4	70	45	85.36
4. Community water providers have an influence in providing water services to the residents of Kibokoni informal settlements	3	4	7	62	47	84.39

As table 4.5 presents, a higher percentage of over 80% of the respondents agreed that institutional arrangements have an influence in water and sanitation projects implementation in Kibokoni area. This is supported by the average score of the various institutional arrangement statements as follows: Private water companies have an influence in providing water services to the residents of Kibokoni informal settlements (83.25%); Public Private partnership has influence in providing water services to the residents of Kibokoni informal settlements (85.36%); Community water providers have an influence in providing water services to the residents of Kibokoni informal settlements (84.39%); Public water companies have an influence in providing water services to the residents of Kibokoni informal settlements (87.47%) and many more.

**Table 4.6 Testing of the Second Hypothesis Institutional Arrangements Influence the Implementation of Sustainable Water and Sanitation Projects**

H<sub>1</sub>: institutional arrangements influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

H<sub>0</sub>: institutional arrangements don't influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya

f	f <sub>e</sub>	(f- f <sub>e</sub> )	(f- f <sub>e</sub> ) <sup>2</sup>	((f- f <sub>e</sub> ) <sup>2</sup> / f <sub>e</sub> )
1	24.6	-23.6	556.96	22.6
2	24.6	-22.6	510.76	20.7
11	24.6	-13.6	184.96	7.9
45	24.6	20.4	416.16	16.9
64	24.6	39.4	1152.36	63.1
				$\sum ((f- f_e)^2 / f_e = 131.2$

$\chi^2_c = 131.2 > \chi^2_{0.05} = 9$  t 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 131.2 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Consequently, institutional arrangements influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

#### **4.6 Community Participation and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements**

Respondents were asked a number of questions in relation to Community Participation and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements in Kenya.

In relation to the first question that asked the respondents whether they thought that community participation influences the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya, majority of the respondents (91.8%) supported the idea.

In order to establish influence of community participation on the implementation of pro-poor water and sanitation projects in the informal settlements across the study areas, respondents were asked to indicate the extent to which they agreed or disagreed with a number of statements on a rating scale. Responses were given on a five-point Likert scale, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1= Strongly Disagree. The scores of 'strongly disagree' has a statement scores of between 0 to 30%, 'disagree' has been taken to represent a statement agreed upon to an equivalent to a percentage score of 31% to 50%. The score of 'neutral' has been taken to represent a statement agreed upon to a moderate extent, equivalent to a percentage score of 51% to 68%. The score of 'agree' and 'strongly agree' have been taken to represent a statement agreed upon to a large extent, equivalent to a mean score of 69% to 90% and 91% to 100 respectively. Table 4.7 presents the results.

**Table 4.7: Rating the Response on the Influence of Community Participation in implementation of Water & Sanitation Projects in the Informal Settlements**

Information sought	Level of Agreement					Percentage
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
The community has been effective in: -						
1. Provision of labour for water projects implementation in this area.	4	6	10	50	53	74.95
2. Provision of land for water projects implementation in this area.	9	5	17	60	32	76.42
3. Provision of security for water projects implementation in this area.	11	12	5	65	30	74.79
4. Provision of market for water projects implementation in this area.	5	2	27	49	40	79.02
5. Decision making on type of projects of urgency to be implemented in this area	6	18	10	63	26	73.82

As table 4.7 presents, a majority of the respondents indicated that the community performs a major role in the implementation, provision and success of the pro poor water and sanitation services by doing various activities like: provision of labour for water projects implementation (74.95%); provision of land for water projects implementation (76.42%); provision of security for water projects implementation (74.79%); provision of market for water projects implementation (79.02%); and decision making on type of projects of urgency to be implemented 73.82%.

**Table 4.8 Testing of the Third Hypothesis on Community Participation's influence on the Implementation of Sustainable Water and Sanitation Projects**

H<sub>1</sub>: community participation influences the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

H<sub>0</sub>: community participation doesn't influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya

f	f <sub>e</sub>	(f- f <sub>e</sub> )	(f- f <sub>e</sub> ) <sup>2</sup>	((f- f <sub>e</sub> )) <sup>2</sup> / f <sub>e</sub>
9	24.6	-15.6	243.36	9.8
5	24.6	-19.6	384.16	15.6
17	24.6	-7.6	57.76	2.3
60	24.6	35.4	1253.16	50.9
32	24.6	7.4	54.76	2.2
				$\sum ((f- f_e))^2 / f_e = 80.8$

$\chi^2_C = 80.8 > \chi^2_{\alpha} = 9.488$  4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 80.8 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Consequently, community participation influences the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

#### **4.7 Competitive Policies and Strategies' Influence on the Implementation of Water and Sanitation Projects in the Informal Settlements**

Respondents were asked a number of questions in relation to competitive policies and strategies' influence on the implementation of water and sanitation projects in the informal settlements and results were as follows:

In the first question where the respondents were required to indicate whether they supported the idea that there are a number of competitive policies and strategies that have been outlined to address the implementation of pro-poor water and sanitation projects in the informal settlements, majority of the respondents supported the idea (64 respondents who represented 52%). However,



compared to the number of the respondents who did not support the idea (48%), it can be argued that the issue of strategies and policies for pro poor water provision still has a challenge.

In order to establish influence of competitive policies and strategies' influence on the implementation of water and sanitation projects in the informal settlements across the study areas, respondents were asked to indicate the extent to which they agreed or disagreed with a number of statements on a rating scale. Responses were given on a five-point Likert scale, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1= Strongly Disagree. The scores of 'strongly disagree' has a statement scores of between 0 to 30%, 'disagree' has been taken to represent a statement agreed upon to an equivalent to a percentage score of 31% to 50%. The score of 'neutral' has been taken to represent a statement agreed upon to a moderate extent, equivalent to a percentage score of 51% to 68%. The score of 'agree' and 'strongly agree' have been taken to represent a statement agreed upon to a large extent, equivalent to a mean score of 69% to 90% and 91% to 100 respectively.

**Table 4.9 Rating of Competitive Policies and Strategies and the Implementation of Water and Sanitation Projects in the Informal Settlements**

Information sought	Level of Agreement					Percentage
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. Constitution of Kenya has outlined policies and rules that have influence on the implementation of water projects in the county	9	12	10	57	35	75.77
2. National housing policy has an influence on the implementation of the water and sanitation projects in the Kibokoni Informal Settlement	2	0	20	49	52	84.22
3. Water act determines the rate of water and sanitation services provision to the people of Kibokoni	0	0	0	100	23	83.73
4. Environmental management and co-ordination act determines the success of the water and sanitation projects in Kibokoni area.	17	2	5	70	29	74.95
5. National land policy has an influence on water and sanitation projects implementation in Kibokoni area	3	7	4	61	48	83.41

A higher percentage of the respondents agreed that there are policies that are either contained in the Kenyan constitution or Acts of parliament or County Government Acts that significantly determine the provisions of water and sanitation services to Informal Settlement dwellers. In

relation to the statement that read, ‘Constitution of Kenya has outlined policies and rules that have influence the implementation of water projects in the county,’ a percentage score of 75.77% was achieved. This was also realized by the remaining responses where statements like: National housing policy has an influence on the implementation of the water and sanitation projects in the Kibokoni Informal Settlement attracted a percentage score of 84.22%; Water Act determines the rate of water and sanitation services provision to the people of Kibokoni attracted a score of 83.73%; Environmental management and co-ordination act determines the success of the water and sanitation projects in the Kibokoni area attracted a score of 74.95%; and, finally National land policy has an influence on water and sanitation projects implementation in Kibokoni area attracted a mean of 83.41%.

**Table 4.10: Testing Hypothesis about Competitive Policies and Strategies' Influence on the Implementation of Sustainable Water and Sanitation Projects**

H<sub>1</sub>: competitive policies and strategies influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

H<sub>0</sub>: competitive policies and strategies do not influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya

<b>f</b>	<b>f<sub>e</sub></b>	<b>(f- f<sub>e</sub>)</b>	<b>(f- f<sub>e</sub>)<sup>2</sup></b>	<b>((f- f<sub>e</sub>))<sup>2</sup>/ f<sub>e</sub></b>
9	24.6	-15.6	243.36	9.8
12	24.6	-12.6	158.76	6.45
10	24.6	-14.6	213.16	8.6
57	24.6	32.4	1049.76	42.6
35	24.6	10.4	108.16	4.4
				$\sum ((f- f_e))^2 / f_e = 111.85$

$\chi^2_c = 111.85 > \chi^2_{0.05} = \infty$  at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 111.85 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Consequently, competitive policies and

strategies influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

#### **4.8 Political Will and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements**

Respondents were asked a number of questions in relation to political will and the implementation of pro-poor water and sanitation projects in the informal settlements and the results were as follows:

In relation to the question that required the respondents to show whether they supported the idea that political will of the politicians and local leaders influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya or not, responses were as follows; Majority of the respondents (116 who made 95%) supported the idea that politicians have a very magnificent influence of pro poor water and sanitation projects implementation.

In order to establish influence of political will and the implementation of pro-poor water and sanitation projects in the informal settlements, respondents were asked to indicate the extent to which they agreed or disagreed with a number of statements on a rating scale. Responses were given on a five-point Likert scale, where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1= Strongly Disagree. The scores of ‘strongly disagree’ has a statement score of between 0 to 30%, ‘disagree’ has been taken to represent a statement agreed upon to an equivalent to a percentage score of 31% to 50%. The score of ‘neutral’ has been taken to represent a statement agreed upon to a moderate extent, equivalent to a percentage score of 51% to 68%. The score of ‘agree’ and ‘strongly agree’ have been taken to represent a statement agreed upon to a large extent, equivalent to a mean score of 69% to 90% and 91% to 100 respectively.

**Table 4.11 Rating Political Will and the Implementation of Pro-Poor Water and Sanitation Projects**

Information sought	Level of Agreement					Percentage
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Politicians and local leaders have been involved in doing the following activities:						
1. Financial resources mobilization for water projects implementation	2	1	15	60	45	83.57
2. Financial resources allocation for water projects implementation.	1	5	11	54	52	84.55
3. Decision on nature of projects for water projects implementation	4	9	5	62	43	81.30
4. Mobilization of labour for water projects implementation	11	10	13	56	33	74.63

On average, the respondents agreed that: financial resources mobilization for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (83.57); financial resources allocation for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (84.55); decision on nature of projects for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (81.30); and, mobilization of labour for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (74.63%).

**Table 4.12: Testing of the Fifth Hypothesis about Political Will's Influence on the Implementation of Sustainable Water and Sanitation Projects**

H<sub>1</sub>: political will influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

H<sub>0</sub>: political will doesn't influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

f	f <sub>e</sub>	(f- f <sub>e</sub> )	(f- f <sub>e</sub> ) <sup>2</sup>	((f- f <sub>e</sub> )) <sup>2</sup> / f <sub>e</sub>
1	24.6	-23.6	556.96	22.6
5	24.6	-19.6	384.16	15.6
11	24.6	-13.6	184.96	7.5
54	24.6	29.4	864.36	35.1
52	24.6	27.4	750.76	30.5
				$\sum ((f- f_e))^2 / f_e = 111.3$

$\chi^2_c = 111.3 > \chi^2_{0.05} = 9$  at 4 degrees of freedom and 5% level of confidence.

Since the calculated chi-square value of 111.3 is greater than the critical chi-square value at 5% level of confidence, we accept the alternative hypothesis. Consequently, political will influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, Kenya.

## **CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter presents the summary of the research findings, the discussions as per the objectives, conclusions and recommendations. Also included are suggestions for future studies.

### **5.2 Summary of findings**

From the field data obtained, data analyzed and presented, a number of issues were as follows:

In relation to objective one that sought to examine the extent to which structural facilities influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, majority of the respondents (100 who equated to 81.30%) supported the idea that structural facilities have an influence on the implementation of sustainable water and sanitation projects. On a likert rating scale, a higher percentage/majority of respondents agreed with the ideas that: Water pipes insufficiency makes it difficult in implementing the pro-poor water projects in this area (73.82); Scarcity of allocation of water pumps makes it difficult in implementing the pre-poor water projects in this area (71.71); and water tanks inadequacy makes it difficult to implementing the pre-poor water projects in this area (83.08). When the hypothesis was tested, the alternative hypothesis was favored due to the fact that the calculated chi-square value (126.29) was greater than the critical chi-square value at 4 degrees of freedom.

In relation to the second objective that sought to examine the extent to which institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents (110 who represented 90%) supported the idea that institutional arrangements influence the implementation of sustainable water and sanitation projects. On a rating scale, a higher percentage of over 80% of the respondents agreed that institutional arrangements have an influence in water and sanitation projects implementation in Kibokoni area. This is supported by the average score of the various institutional arrangement statements in examples where private water companies have an influence in providing water services to the residents of Kibokoni informal settlements statement attracted a score of 83.25% etc. When the hypothesis was tested, the calculated chi-square value of 131.2 was greater than

the critical chi-square value at 5% level of confidence, hence the researcher accept the alternative hypothesis.

In relation to the third objective that sought to examine the extent to which community participation influences the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents (91.8%) supported the idea. A majority of the respondents indicated that the community performs a major role in the implementation, provision and success of the pro poor water and sanitation services by doing various activities like: provision of labour for water projects implementation (74.95%); provision of land for water projects implementation (76.42%); provision of security for water projects implementation (74.79%); provision of market for water projects implementation (79.02%); and decision making on type of projects of urgency to be implemented 73.82%. Since the calculated chi-square value of 80.8 was found to be greater than the critical chi-square value at 5% level of confidence during the hypothesis calculation, the alternative hypothesis was accepted.

In relation to the fourth objective that sought to examine the extent to which competitive policies and strategies influence the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents supported the idea (64 respondents who represented 52%) that competitive policies influence the implementation of water and sanitation projects in the informal settlements. On a rating scale, higher percentage of the respondents agreed that there are policies that are either contained in the Kenyan constitution or Acts of parliament or County Government Acts that significantly determine the provisions of water and sanitation services to Informal Settlement dwellers. In relation to the statement that read, 'Constitution of Kenya has outlined policies and rules that have influence the implementation of water projects in the county,' a percentage score of 75.77% was achieved for example. Since the calculated chi-square value of 111.85 was greater than the critical chi-square value at 5% level of confidence, we accepted the alternative hypothesis.

In relation to the fifth and final objective that sought to examine the extent to which political will influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, majority of the respondents (116 who made 95%) supported the idea that politicians have a very magnificent influence of pro poor water and sanitation projects



implementation. On a rating scale, on average the respondents agreed that: financial resources mobilization for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (83.57); financial resources allocation for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (84.55)etc. Since the calculated chi-square value of 111.3 was greater than the critical chi-square value at 5% level of confidence, the researcher accepted the alternative hypothesis

### **5.3 Discussions of the Study Findings**

In relation to objective one that sought to examine the extent to which structural facilities influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, majority of the respondents (100 who equated to 81.30%) supported the idea that structural facilities have an influence on the implementation of sustainable water and sanitation projects. When the hypothesis was tested, the alternative hypothesis was favored due to the fact that the calculated chi-square value (126.29) was greater than the critical chi-square value at 4 degrees of freedom. Therefore, indicating a significant relationship between the structural facilities and the implementation of water and sanitation projects. Asserting to this is the WHO (2016) report that indicates, water structures influence the implementation and providence of water services to the dwellers of the informal settlements in Nigeria. Also, Chigonda (2014) shows that, in Zambia over 78% of the population in the slums in Harare has no access to clean water and improved sanitation services due to poor water and sanitation projects implementation. Structures have been faulted for this and the structures include poor quality pipes that break from time to time leading to water waste, lack of enough water pumps to pump the water from the source to the storage tanks and homes, and lack of sufficient storage tanks or reservoirs for the water distribution.

In relation to the second objective that sought to examine the extent to which institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents (110 who represented 90%) supported the idea that institutional arrangements influence the implementation of sustainable water and sanitation projects. On a rating scale, a higher percentage of over 80% of the respondents agreed that

institutional arrangements have an influence in water and sanitation projects implementation in Kibokoni area. Asserting to this is Eduardo (2014) who argued that institutions are very important in determining the providence of water services in the informal slums across the globe Butterworth et al (2014) also asserted that institutional arrangements have a strong influence on the providence of water services to the citizens. For example, in the UK water is provided by various institutions that fall under two categories (private institutions and the public institutions). The private institutions are regulated by the government and from time to time are given incentives to provide the services in areas of urgency.

In relation to the third objective that sought to examine the extent to which community participation influences the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents (91.8%) supported the idea. A majority of the respondents indicated that the community performs a major role in the implementation, provision and success of the pro poor water and sanitation services by doing various activities like: provision of labour for water projects implementation (74.95%); provision of land for water projects implementation (76.42%); provision of security for water projects implementation (74.79%); provision of market for water projects implementation (79.02%); and decision making on type of projects of urgency to be implemented 73.82%.According to the WB (2016) the community members play a vital role in the implementation of development projects. Their roles include: providing the natural resources required for projects implementation like land, providence of human resources like expertise and non-skilled labour required for the implementation of the projects, providence of market for the products, security etc. Muhele (2013) has also shown a very high rate of agreement on the influence of community participation on the implementation of water and sanitation programmes in the informal settlements.

In relation to the fourth objective that sought to examine the extent to which competitive policies and strategies influence the implementation of sustainable water and sanitation projects in Kilifi County, majority of the respondents supported the idea (64 respondents who represented 52%) that competitive policies influence the implementation of water and sanitation projects in the informal settlements. Since the calculated chi-square value of 111.85 was greater than the critical chi-square value at 5% level of confidence, we accepted the alternative hypothesis. In agreement to this is the UN Water (2015) that asserts, poor policies regarding water and sanitation services

provision to the poor slum dwellers in Manila has led to reduced rates of water and sanitation projects implementation. The report shows that this situation is expected to be worse by 2025 whereby it is expected that out of 10 households, only 3 will be fully supplied with clean water in the slums while only 1 homestead out of the 10 shall be in the position of accessing improved sanitation. This is due to the fact that the policies and strategies adopted for slums upgrading and management have not integrated the local models that address the local problems of the poor people in the slums by use of locally available materials and knowledge.

In relation to the fifth and final objective that sought to examine the extent to which political will influence the implementation of sustainable water and sanitation projects implementation in Kilifi County, majority of the respondents (116 who made 95%) supported the idea that politicians have a very magnificent influence of pro poor water and sanitation projects implementation. On a rating scale, on average the respondents agreed that: financial resources mobilization for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (83.57); financial resources allocation for water projects implementation by politicians and other local leaders influence the implementation of water and sanitation projects (84.55) etc. Asserting to this is the World Bank (2014) showing that in Africa all the projects that are run by government are political in nature and for them to be successful they must have blessings of the national or local leaders. It is these leaders who determine the nature of projects to be implemented, which projects and places to be considered first, the sources of financial resources, the amount of financial resources for these projects and the type of people to handle these projects.

#### **5.4 Conclusion of the Study Findings**

Based on the results obtained from the field and the literature reviewed, the researcher concludes that:

Structural facilities that include the water pumps, water pipes, water tanks etc. have an influence on the implementation of water and sanitation projects in the informal settlements. Equally the researcher based on the findings concludes that the institutional arrangements that include the private water companies, public companies and the community water providers influence the implementation of water and sanitation projects in the informal settlements.

The researcher also concludes that institutional policies, political good will and community participation have a significant influence on the implementation of water projects meant for the poor in the informal settlements. The community performs a number of roles that include the provision of land, labour, market while better strategies guide the implantation of these projects and the politicians either decide the priority of projects, the amount of funds to be allocated or the or sources of funds.

### **5.5 Recommendation**

Based on the findings, the researcher recommends for adequate water tanks that are durable and cost effective for easy provision of water services to the poor in the informal settlements. Also, the researcher recommends for high quality water pipes and modern water pumps that integrate modern technology for sustainable water and sanitation projects implementation in the informal settlements.

The researcher recommends for well-coordinated institutional arrangements which define the levels of each part that enters in the water and sanitation services providence shall operate to. This shall help in differentiating roles of each individual organisation thus enabling easy providence of water and sanitation services.

Also the researcher recommends for all the players (the community, politicians and water strategists) to be brought on board so that local models of water projects implementation can be designed and implemented with everyone being made to feel as a member. When all the parties involved work in harmony, the projects can easily be implemented.

### **5.6 Suggestions for Future Studies**

If any, very few studies have focused on the sustainability of water projects implementation by the recently water devolved units run by the county governments. In fact there is a very magnificent deficit in finding literature in sustainable water project implementation by county governments. Therefore a similar study can be done in any of the 47 counties in the country.

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## APPENDICES

### APPENDIX 1: Letter of Transmittal - Malindi Water & Sewerage Company Ltd.



UNIVERSITY OF NAIROBI  
ODEL CAMPUS  
SCHOOL OF OPEN AND DISTANCE LEARNING  
DEPARTMENT OF OPEN AND DISTANCE LEARNING

MALINDI LEARNING CENTRE

TEL: 0727-578175/0713-094703

TO;  
MALINDI WATER & SEWERAGE COMPANY LTD  
P.O. BOX 410-80200  
MALINDI, KENYA

14<sup>TH</sup> JUNE 2017

Dear Sir/Madam,

**RE: DATA COLLECTION-**

PRISCILLA WAMUCII GITHINJI of student ID Number L50/85431/2016 is undertaking Master of Arts in Project Planning and Management course at the University of Nairobi in Malindi. As part of the requirement for her program, she is required to undertake a research on “**Determinants of Sustainable Water and Sanitation Projects Implementation in Kilifi County, Kenya**”. She wants to collect data and your organization has been selected to participate in this research study as a source of significant respondents.

Kindly note that this research is purely for academic purposes, we will appreciate any assistance given to her.

UNIVERSITY OF NAIROBI  
MALINDI EXTRA MURAL CENTER  
P. O. Box 5309-80200, MALINDI  
CENTER ADMINISTRATOR  
Date: 14/06/2017 Sign:

**STEPHEN FANAKA NDURYA**  
ADMINISTRATOR-  
MALINDI LEARNING CENTRE

**APPENDIX 2: Letter of Transmittal - CARITAS Malindi**



**UNIVERSITY OF NAIROBI  
ODEL CAMPUS  
SCHOOL OF OPEN AND DISTANCE LEARNING  
DEPARTMENT OF OPEN AND DISTANCE LEARNING**

**MALINDI LEARNING CENTRE**

**TEL: 0727-578175/0713-094703**

TO;  
CARITAS  
P.O. BOX 1573-80200  
MALINDI, KENYA

14<sup>TH</sup> JUNE 2017

Dear Sir/Madam,

**RE: DATA COLLECTION-**

PRISCILLAH WAMUCII GITHINJI of student ID Number L50/85431/2016 is undertaking Master of Arts in Project Planning and Management course at the University of Nairobi in Malindi. As part of the requirement for her program, she is required to undertake a research on “**Determinants of Sustainable Water and Sanitation Projects Implementation in Kilifi County, Kenya**”. She wants to collect data and your organization has been selected to participate in this research study as a source of significant respondents.

Kindly note that this research is purely for academic purposes; we will appreciate any assistance given to her.

**UNIVERSITY OF NAIROBI  
MALINDI EXTRA MURAL CENTER  
P. O. BOX 5309-80200, MALINDI  
CENTER ADMINISTRATOR**

Date: 14/06/2017 Sign:

**STEPHEN FANAKA NDURYA**

**ADMINISTRATOR-  
MALINDI LEARNING CENTRE**

### **APPENDIX 3: Letter of Transmittal - Self Introduction**

Priscillah Wamucii Githinji

P.O Box 757

80200- Malindi

Dear participant,

My name is Priscillah Wamucii Githinji and I am a student undertaking a Master of Project Planning and Development research at The University of Nairobi. To fulfill the completion of this course, I am carrying out a study on Determinants of Sustainable Water and sanitation projects implementation in Kilifi County in Kenya. I am inviting you to participate in this research study by completing the attached questionnaire.

If you choose to participate in this research, please answer all questions as honestly as possible. Participation is strictly voluntary and you may decline to participate at any time. In order to ensure that all the information will remain confidential, you do not have to include your name. The data collected will be for academic purposes only.

Thanking you.

Yours faithfully,

Priscillah Wamucii Githinji

## APPENDIX 4: Research Questionnaire

### SECTION A: BASIC INFORMATION

#### Background Information

1. Your gender:                      Male                       Female

2. Your work experience (**for the employed only**)

Below 1 Year       2-4yrs       5-9 Years       10 - 14 years       Over- 15 years

3. What is your highest education level? (**Tick as applicable**)

Primary certificate  Secondary certificate  Diploma/certificate  Bachelors' degree

Postgraduate degree  others (specify).....

4. For how long have you been involved in dealing directly with water and sanitation services to the people in the informal settlements?

Below 1 Year       1-2yrs       2-3 Years       3 - 4 years       Over- 5 years

### SECTION B: QUESTIONS AS PER THE OBJECTIVES

#### A). Structural Facilities and the Implementation of Pro-Poor Water and Sanitation

##### Projects in the Informal Settlements in Kenya

5. a) Do you support the idea that structural facilities have an influence on the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya?

Yes                      ( )

No                      ( )

6. Indicate the extent to which you agree or disagree with the following statement in relation to structural arrangements and the implementation of pro-poor water projects in Kibokoni area. Use a scale of 1-5 where: (**Greatly disagree=1, disagree=2, weakly agree=3, agree=4, greatly agree=5**).

Statement	1	2	3	4	5
1. Water pipes insufficiency makes it difficult in implementing the pro-poor water projects in this area.					
2. Scarcity of allocation of water pumps makes it difficult in implementing the pre-poor water projects in this area.					
3. Water tanks inadequacy makes it difficult to implementing the pre-poor water projects in this area.					

**B). Institutional Arrangements and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements in Kenya**

7. Do you think that institutional arrangements influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya?

Yes ( )

No ( )

8. Indicate the extent to which you agree or disagree with the following statements? Use a scale of 1-5 where: 5= **strongly agree**, 4= **agree**, 3=**weakly agree**, 2= **disagree**, 1 = **strongly disagree**

**disagree**

Statement	1	2	3	4	5
1. Private water companies have been efficient in providing water services to the residents of Kibokoni informal settlements					
2. Public water companies have been efficient in providing water services to the residents of Kibokoni informal settlements					
3. Public Private partnership has been efficient method used in providing water services to the residents of Kibokoni informal settlements					
4. Community water providers have been efficient in providing water services to the residents of Kibokoni informal settlements					

**C: Community Participation and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements in Kenya**

9. Do you think that community participation influences the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya?

10. Indicate the extent to which you agree or disagree with the following statements? Use a scale of 1-5 where: 5= **strongly agree**, 4= **agree**, 3=**weakly agree**, 2= **disagree**, 1 = **strongly disagree**

<b>The community has been effective in:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1. Provision of labour for water projects implementation in this area.					
2. Provision of land for water projects implementation in this area.					
3. Provision of security for water projects implementation in this area.					
4. Provision of market for water projects implementation in this area.					
5. Decision making on type of projects of urgency to be implemented in this area					

**D: competitive policies and strategies influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya**

11. Do you support the idea that there a number of competitive policies and strategies that have been outlined to address the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya?

Yes ( )

No ( )

12. Indicate the extent to which you agree or disagree with the following statements? Use a scale of 1-5 where

**5= strongly agree, 4= agree, 3=weakly agree, 2= disagree, 1 = strongly disagree**

Statement	1	2	3	4	5
1. Constitution of Kenya has outlined policies and rules that have influence the implementation of water projects in the county					
2. National housing policy has an influence on the implementation of the water and sanitation projects in the Kibokoni slums					
3. Water act determines the rate of water and sanitation services provision to the people of Kibokoni					
4. Environmental management and co-ordination act determines the success of the water and sanitation projects in the Kibokoni area					
5. National land policy has an influence on water and sanitation projects implementation in Kibokoni area					



**E Political Will and the Implementation of Pro-Poor Water and Sanitation Projects in the Informal Settlements in Kenya**

13. Do you support the idea that political will of the politicians and local leaders influence the implementation of pro-poor water and sanitation projects in the informal settlements in Kenya?

Yes ( )

No ( )

14. Indicate the extent to which you agree or disagree with the following statements? Use a scale of 1-5 where

**5= strongly agree, 4= agree, 3=weakly agree, 2= disagree, 1 = strongly disagree**

<b>Politicians and local leaders have been involved in doing the following activities in Kibokoni thus influencing projects implementation:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1. Financial resources mobilization for water projects implementation					
2. Financial resources allocation for water projects implementation					
3. Decision on nature of projects for water projects implementation					
4. Mobilization of labour for water projects implementation					

**THANK YOU FOR PARTICIPATING**