



## **Determinants of Sustainable Water and Sanitation Projects Implementation in Kilifi County, Kenya**

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**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.

### **Introduction**

#### **1.2 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 wealthy.

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 strogly anchored on the providence of life enabling services; central of which is health and water facilities.

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 diffucult for the pro-poor water projects implementation (World Bank, 2013).

### **1.3 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. 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 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).

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.

### **1.4 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.

### **1.5 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.

### 1.6 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?

### 1.7 Research Hypotheses

This study was guided by the following five alternative hypotheses noted as  $H_1$ :

- i.  $H_1$ : structural facilities influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- ii.  $H_1$ : institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- iii.  $H_1$ : community participation influences the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- iv.  $H_1$ : competitive policies and strategies influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.
- v.  $H_1$ : political will influence the implementation of sustainable water and sanitation projects in Kilifi County, Kenya.

### 1.8 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.

## Literature Review

### 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.

#### **2.4.1 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..

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.

Muhele (2013) found out that water structures like the water tanks and water pipes influence the providence of water for better sanitation like hand washing. Cheru (2014) showed that the providence 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.

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

Institutions are very important in determining the providence 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 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.

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.

#### **2.4.3 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.

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.

#### **2.4.4 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.

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.

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.

#### **2.4.5 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.

## **2.5 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.



## 2.6 Conceptual Framework

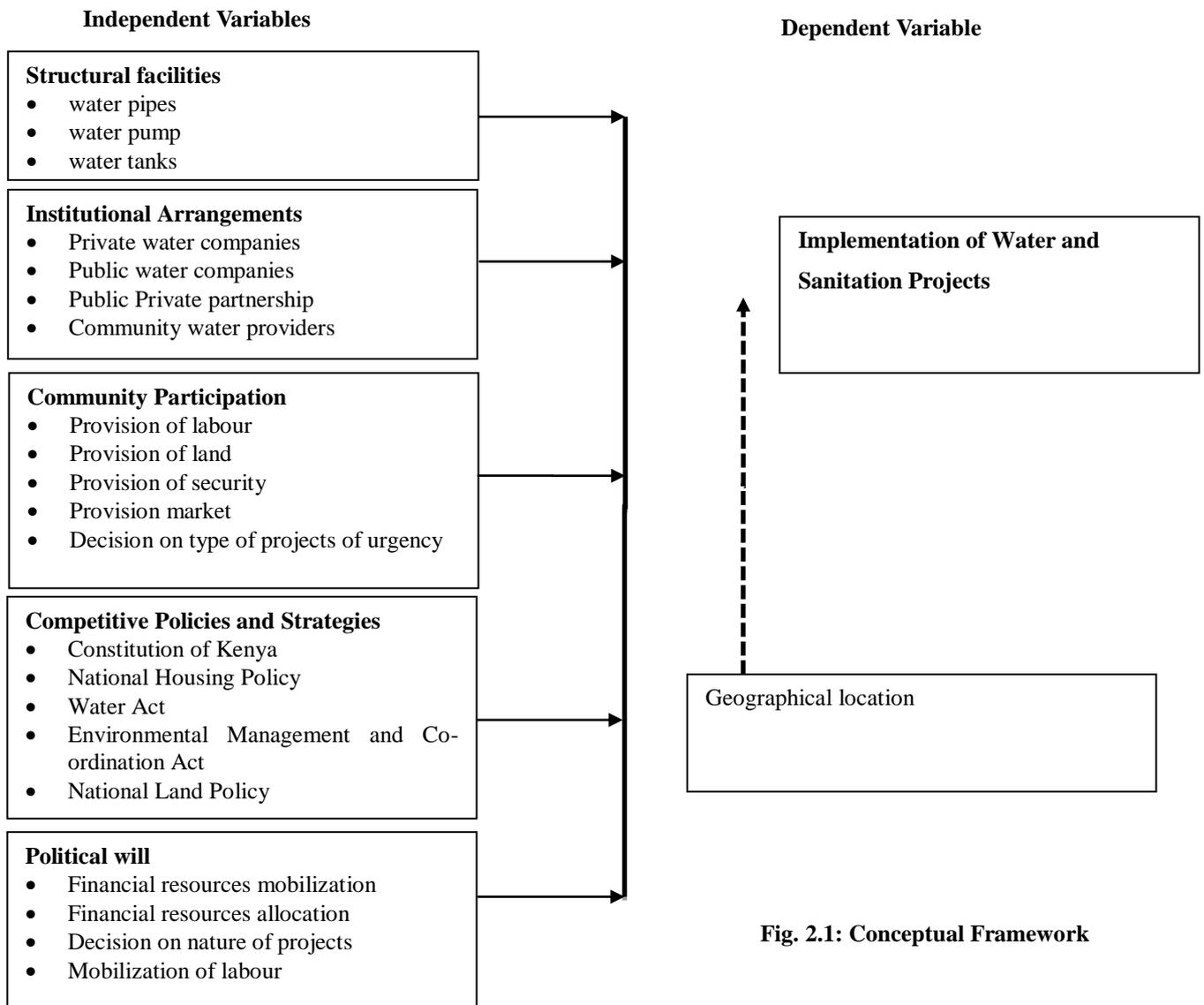


Fig. 2.1: Conceptual Framework

## Research Methodology

### 3.2 Research Design

This study adopted a descriptive survey research design which 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. The target population of this study was 809 constituting respondents who were directly involved in one way or the other in water and sanitation projects in the informal settlement among them 52 employees of Malindi Water & Sewerage Company Ltd., 47 employees of the five NGOs working in the area for example CARITAS Malindi and the household heads of the residents of Kibokoni who came from the 710 households.

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. The questionnaire was suited for data collection and therefore used in 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. The questionnaires were administered by the researcher and selected enumerators. Closed ended questions were used and a Likert scale so as to get data that could easily be analyzed.



### Data Analysis, Presentation and Interpretation

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. **The** 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.

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

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.

##### It was hypothesized that:

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.

Rating the responses on the Likert scale based on what the respondents' thoughts, 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). The data was analyzed using Chi - Square and 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.

#### 4.3 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.

Rating the respondents 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.

It was therefore hypothesized that:

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



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.

#### **4.4 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 where majority of the respondents (91.8%) supported the idea.

By rating the responses, 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%. It was hypothesized that:

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

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

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

The fourth objective was to examine the extent to which competitive policies and strategies' influence the implementation of water and sanitation projects in the informal settlements and results and a 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.

Rating the responses of Competitive Policies and Strategies and the Implementation of Water and Sanitation Projects in the Informal Settlements 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%.

It was hypothesized that:

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

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.

#### **4.6 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 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 likert 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); 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%).

It was hypothesized that:

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.

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.

### **Summary of Findings, Discussions, Conclusions and Recommendations**

Based on the study objectives and data analysis, the following are the main research 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.

The study sought to examine the extent to which institutional arrangements influence the implementation of sustainable water and sanitation projects in Kilifi County. The study revealed that a 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.

The study also examined the extent to which community participation influences the implementation of sustainable water and sanitation projects in Kilifi County where the majority of the respondents (91.8%) supported the idea. They 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.

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.

Lastly, the final objective 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 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.

## **5.2 Conclusion of the Study Findings**

Conclusions of this study are guided by the study objectives. From the findings, it is evident 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 findings conclude 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 study 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.

## **5.3 Recommendation**

Based on the findings, the researcher recommends for adequate, durable and cost effective water tanks 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 Watsan projects implementation in the informal settlements.

The researcher recommends for well-coordinated institutional arrangements which clearly define roles and the levels of each part that enters in the water and sanitation services providence shall operate to. 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.

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#### **Author's Biography**

Priscillah Wamucii Githinji was born and raised in Malindi in a wonderful family of five. She is currently the Deputy Technical Manager of Malindi Water & Sewerage Company Ltd with a Diploma in Water Engineering from Technical University of Kenya, Bachelor in Development Studies from Mount Kenya University and is about to graduate with a Masters Degree in Project Planning and Management from the University of Nairobi . Having 20 years experience in Management of Water Utilities, Planning and design of water supplies, Resource mobilisation and Operation & Maintenance of water utility systems. The mother three biological and two adopted children has risen through the ranks to become a full fledged manager in water utilities and is currently the Kenya national chair of Non Revenue Water Task Group of Peer to Peer implementation forum under the Water Service Providers Association (WASPA).

At Malindi Water & Sewerage Company Ltd. her core responsibilities include Liaising with Development Partners on all Investments in the Organisation; Project Manager of Development Projects which includes Overseeing the Development and implementation of Water & Sanitation projects, Operations and Maintenance; GIS, New connections, Metering, water quality surveillance, supervising the District Metered Area Managers and assisting the Technical Manager in overseeing all operations of the Technical Department.

She enjoys passing time getting together with her family, listening to music, singing in church choir and is currently the chairperson of the renowned St. Anthony Cathedral Choir of the Catholic Diocese of Malindi.