SOCIO-ECONOMIC FACTORS INFLUENCING CHOICES OF SANITATION TECHNOLOGIES IN WAJIR COUNTY, KENYA.

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UNIVERSITY OF NAIROBI

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DEDICATION

To My Husband Mohamed Hassan And Our Children,Fahad,Hafsa,Abdimalik,Ummulkheir And Rayan.For the encouragement,support and being patient enough.I love you all!

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LIST OF ABBREVIATION/ACRONYMS

Eco-San - Ecological sanitation

FAO - Food and Agriculture Organization

UN - United Nations

UNDP - United Nation Development Program

UNEP - United Nations Environment Programme

UNICEF - United Nations Children's Fund

USD - United States Dollar

VIP - Ventilated Improved Pit

WHO - World Health Organization

ABSTRACT

Adequate sanitation and improved hygiene are the most fundamental components of effective public health regime. Residents of rural areas in many developing countries struggle to solve problems of sanitation especially toilets as compared to those in urban areas who tend to have proper and modern sanitation as well as properly managed sewerage technologies. An increasing awareness worldwide on the environmental problems associated with inappropriate sanitation implementation has led to the development of various sanitation facilities founded on different technologies. Despite convincing efforts towards ensuring good health, economic and environmental factors have made adoption of various sanitation technologies difficult. The development of sanitation technologies has been faced by myriads of challenges due to resistance in embracing the project by many residents. The main objective of this research was to analyze the factors influencing the choice of sanitation technologies in Wajir Town. The study employed use of a sanitation ladder helps in identification on options for improving sanitation in different communities. Using a descriptive research design, the study targeted all the households in the entire five villages within Wajir town from which a sample size of 100 respondents was covered. The study collected both quantitative and qualitative data through use of a research questionnaire and an interview guide. The analysis of quantitative data was done by use of descriptive statistics, while content analysis was applied on qualitative data. The study established that households' characteristics determine the choice of sanitation technology in Wajir town. The study further found out that the most common sanitation option used by many residents of Wajir town was bucket toilet. In addition, the findings revealed that household's income, employment status, type of soil and design of a sanitation technology were found to be key determinants in the choice of any type of sanitation facility. The research recommended that there is need to understand the effects of socioeconomic characteristics of the residents, since socio-economic features of individuals are found to serve as main drivers of their demand for improvement of sanitation technologies. The government and locals should devise more ways of creating wealth which can help them to improve their level along the sanitation ladder. There is also need for government, manufacturers, promoters and entrepreneurs to educate and sensitize people on the functions and benefits of a sanitation technology on offer.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

One of the key components of primary human rights is sanitation since it ensures disease prevention and better health (Töykkälä, 2013). Residents of rural areas in many developing countries struggle to solve problems with regards to sanitation especially toilets as compared to those in urban areas who tend to have proper and modern sanitation as well as properly managed sewerage technologies (Oxfam, 2009; Doshi, 2016). Majority of the people lacking proper sanitation technology use unsafe and unhealthy sanitation facilities at home and some are still practicing open defecation (WHO, 2017).

According to United Nations Children's Fund and World Health Organization reports (2015), people are forced to defecate in the open areas, in rivers, near areas where children play or food is prepared. This increases the of risks of transmitting sanitation related diseases. The report further suggested that promotion of simple hygiene education such as hand washing is a cost-effective and simple measure which can help in reducing diarrhoea infection by a margin of up to 45%. Proper hygiene goes with the use of improved facilities to prevent diseases. According to United Nation report of the year (2015), one of the transmission of diarrhea among many developing countries, is through food and water contaminated with faeces. This in turn kills nearly two million children every year, due to the fact that a gram of faeces not treated has capacity of containing up to 1 thousand parasite cysts, ten million viruses and a hundred worm eggs.

According to Werner, Bracken, Mang and Klingel (2004), there exist wide range of sanitation technological options put in place across the globe to solve the challenges of sanitation and they include composting toilets, dehydration toilets, urine processing, biogas digestion / anaerobic treatment, wastewater treatment, vacuum toilets and sewerage, gravity sewerage, small-bore-sewer technologies, solid-liquid separation, urine diversion. The choice of these technologies has been influenced by various factors. For instance, Abarghaz, et. al. (2012) stated that both economic and design of any given sanitation technology are paramount in the choice,

implementation as well as sustainability of such project to provide a better hygiene for the society.

Both economic and design must be targeted for successful sanitation project and provide a better hygiene for the society (Abarghaz, et. al., 2012). Selection of appropriate sanitation technologies can majorly be determined by costs or availability of finance (Lau, 2011). Furthermore, Starovoitova (2012) supported this statement by stating that there is an increasing recognition of the links between poverty and poor sanitation. She further explained that cost of various sanitation designs available within the rural settings in Africa, including Kenya hinder households from having access to safe and reliable toilets, which are vital to provide a barrier to diseases carried in fecal matter.

A report by World Health Organization (2019) indicated that, in the year 2017, an estimate of 45 percent of Africa's population, are still using either unimproved or shared sanitation facilities, and approximately 25% of the population are still practicing open defecation. It further stated that the population that use safely managed sanitation services across the globe account to 45 percent of the world population which is equivalent to 3.4 billion people. An average of 31% of the world's population which is equivalent to 2.4 billion people, were found to use private sanitation technologies with connection to sewer where treatment of wastewater was done. Approximately, 14% of the world's population which was estimated to be about 1 billion people, were found to be using latrines or toilets where disposal of excreta was done in situ. About 74% of the population across the world which was estimated to be about 5.5 billion people, were found to be using at least a simple sanitation facility. Around 2 billion people still lack basic sanitation technologies like latrines or toilets. Out of the 2 billion people, 673 million individuals were still defecating in the open areas for instance, behind bushes, in open water bodies, or in street gutters.

Sanitation coverage in Kenya is estimated to be only 50%, however, approximately 11% of the Kenyan population estimated to be about 6 million people were found not to be accessible to any kind of sanitation facility and they practiced open defecation by train tracks, in plastic bags, fields, rivers, in gutters and/or in buckets (UNICEF 2015 & WHO, 2019). Starovoitova (2012) found out that poverty that exists among many households in Kenya was strongly linked to poor

sanitation. WHO/UNEP/FAO (2016) stated that the sanitation technologies currently in use have been found to be costly, take long time in construction and/or with less provision of enough groundwater protection. Nevertheless, the key evaluating the potentiality of increase in usage of any given sanitation facility is the acceptance rate among the communities, which can be determined by willingness of adoption or investment in the available sanitation technology (Ali, 2012; Boutayeb, 2016).

In Tanzania, there were some common issues and questions regarding the use of the toilets and people's perspectives about different technologies available (Shonde, 2016). Scarcity of water and water pollution are the major problems. (Adhikari, 2012). In addition, Biplob, Sarker and Sarker (2011) explained that majority of population in Bangladesh suffer from different kinds of water and excreta borne diseases that aggravate their poverty situations. . The World Bank determined that the combined financial and economic cost of poor sanitation of the four countries namely Indonesia, Cambodia, Vietnam and Philippines, were $11 billion USD per year (Hutton, Rodriguez, Napitupulu, Thang, & Kov, 2008). Furthermore, a cost-benefit analysis done in the year 2006 revealed that $7.3 billion USD in health-related expenditures would be avoided through the provision of adequate sanitation (Boutayeb, 2006).

1.1.1 Sanitation in Wajir Town

The county of Wajir is among those with the lowermost rates of sanitation access in Kenya. According to latest report by Green Africa Foundation (2017), the local authority collects only 1.2% of garbage generated in Wajir County, while 0.6% is disposed in a garbage pit, 8.3% in public garbage heap and 89.9% is burnt. At least 13.6% of the households have no place for human waste disposal with latrine accounting for only 46%. This could be an indication that Wajir town is prone to diarrhoea outbreak which is third most common illness in children below five years. Several factors which are likely to contribute to this could be that the town lacks a sewerage technology and uses a bucket technology, people depend on few boreholes and many of the community water wells which are not well protected, thus exposing them to contamination.

Wajir town is located in the Wajir County, bordering Ethiopia, Somalia, and other towns in Kenya like Garissa, Mandera, Isiolo and Moyale. It is situated in an area that consist of large aquifers who sources are dry seasonal river basins and perennial rivers. The residents in this town are accessible to sanitation services which can be referred to as infamous stone age technology known as bucket latrine. This sanitation technology was established to be the most viable option used by the then colonial governments in that town since the water table is found to be high to avoid pollution. High population growth coupled with rural urban migration especially pastoralists tend to drop outs due to cyclic droughts and conflicts.

Just like other parts of northern Kenya, the town of Wajir suffer from loss of livestock due to the prolonged droughts. This in turn becomes a health risk caused by littered animal carcasses with water points. The area has largely no flush toilets and few pit latrines. There exist high water table and sandy soils, where the population is reliant on over 16,000 shallow wells. 70% of the population using open defecation (cat method), 25% (middle class) using bucket toilets and 5% using septic tanks leading to ground water pollution. Pit latrines are not viable in this area coverage due to the presence of high water table. Therefore, Wajir residents solely depend on bucket toilets which tend to be unhygienic since it is made from improvised plastic jerry cans (County Government of Wajir, 2017).

1.2 Problem Statement

Improved hygiene and adequate sanitation are the most fundamental components of effective public health regime. An increasing awareness worldwide on the environmental problems associated with inappropriate sanitation implementation has led to the development of various sanitation facilities founded on different technologies (Casanova, et. al., 2012). Sustainable use of sanitation technologies depends upon basic factors like cost, social acceptance, user friendly technology, ease of operation and maintenance as well as health and hygiene safety (Uwintwari, 2017).

For that reason, many African agencies as well as governments are investigating the role played by the sanitation technologies, as advocated by the many programs on environmental improvements (Kinstedt, 2012). Despite convincing efforts towards ensuring good health,

economic and environmental factors have made adoption of various sanitation technologies difficult. Development of sanitation technologies has been faced by myriads of challenges due to resistance in embracing the project by many residents (Madara, 2012).

Adoption of sanitation is related to many factors and many studies provide details to why a household would or would not want to adopt a toilet. Communities are increasingly aware of the relationship between good health, hygiene and sanitation. Good toilet provides privacy and safety, particularly for women, they also provide comfort and convenience, dignity, less embarrassment for visitors (Casanova, et. al., 2012). Despite all these reason to support development of sanitation there has been challenges in embracing the development of sanitation technology. It is evident that there is no consensus on the factors that influence choice of sanitation technology. There hardly exist researches connected to establishment of the influence of socio-economic factors on sanitation within local Kenyan context. Therefore, it is important to further establish factors that account for choice of sanitation technologies.

This study therefore attempted to answer the question, "Are there socio-economic factors influencing the choice of sanitation technologies in Wajir Town?"

1.3 Research Questions

i. What are the characteristics of the households using sanitation services in Wajir Town?
ii. What are some of the common sanitation technologies in Wajir Town?
iii. Which factors influence household choices of sanitation technologies available in Wajir Town?

1.4 Objective of the study

The main objective of this research was to assess the factors influencing the choice of sanitation technologies in Wajir Town.

The specific objective of the study were as follows:

i. Determine the characteristics of the households using sanitation services in Wajir Town.
ii. To establish the common sanitation options used in Wajir Town.

iii. To find out the socio-economic factors that influence household choice of sanitation technologies available in Wajir Town.

1.5 Significance of the Study

Many people in rural settings are faced with issues of poor sanitation hence this study will be of essence in providing essential information to the people in order to be able to control diseases like cholera, diarrhea and other infectious diseases.

The study will also be of great benefit to scholars and practitioners towards better understanding of sanitation problems. It will help the policy makers in designing appropriate policies towards addressing the problem of poor sanitation in terms of implementation and sustainability.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The chapter presents the literature studies regarding the concepts under study. These include literature on sanitation practices as well as socio-economic factors of sanitation. Finally, the chapter presents a conceptual framework that guides the current research.

2.2 Theoretical Literature

2.2.1 Factors Influencing Choice of Sanitation Technology

Choice of a particular sanitation technology can be influenced by both motivating and de-motivating factors. The social and economic factors for adoption of sanitation practices are complex and varying (Mundia, 2013). Social factors that contribute to choices of sanitation practices involve learning various ways (Alcock, 2009). The factors include social and religious practices, demographic characteristics, income status, and education (Noga & Wolbring, 2012). Also important are environmental factors such as water availability, climate and physiographic factors (Ouma & Okeyo & Onyango, 2018).

Economic factors focus more on availability of income and are considered to be one of the key motivating factors for choice of sanitation technologies. Further, provision of affordable sanitation products and services with more equitable distribution to reach the low-income groups and to enhance access to and demand for goods and services is viewed as critical (Onjala & K'Akumu, 2016; Nath, 2009).

Unemployment, low incomes, poor living conditions, low literacy levels and lack of recreational facilities are perceived as de-motivating factors towards the adoption of sanitation practices (Allison & Larson, 2002).

Cultural beliefs in relation to hygiene, fears and perceptions of sanitation practices are also important in influencing technology choices. Also important are religious leanings which tend to influence communal life. Ineffective promotion and low public awareness, ignorance of people, lack of capacity building, lack of hygiene education and training, negligence of people are said to be de-motivating factors for adoption of sanitation practices (Nath, 2009).

Education background and exposure can enable the households to participate fully in the entire phases of sanitation technologies including inception, design, implementation as well as monitoring and evaluation of sanitation programs; upgrading standard of living; and availing basic needs to citizens (UNDP, 2006). Educational factors include training, advocacy, capacity building, social mobilization, access to information and information exchange.

The Availability of water to households can be demotivating factors (Hutton, Haller & Bartram, 2007). While even the lowest income families can usually afford potable water as it is delivered, provision of indoor connections close to the house can be become unaffordable because of the attendant costs that are not considered in sanitation feasibility studies (Duncker,2007).

Sanitation technologies must maintain the integrity of the natural environment. Inadequate and poorly used resources are said to be de-motivating factors (Hogrewe, Joyce & Perez, 2004). Properly maintained water sources and properly maintained excreta disposal sources are said to be motivating factors for adoption of sanitation practices. It must not contribute to contamination of water resources or the creation of health hazard (Bhatia & Falkenmark, 2003).

2.2.2 Sanitation Ladder

The sanitation ladder helps analysts identify options for improving sanitation in different communities. The illustration in Figure 2.1 below shows that at the lowest level of sanitation, households will defecate in bushes, fields, forests, water bodies, and/or any other open spaces, or disposal of human faeces with solid waste. The next level of sanitation is the unimproved sanitation technologies that do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrines without a slab or platform, hanging latrines and bucket latrines.

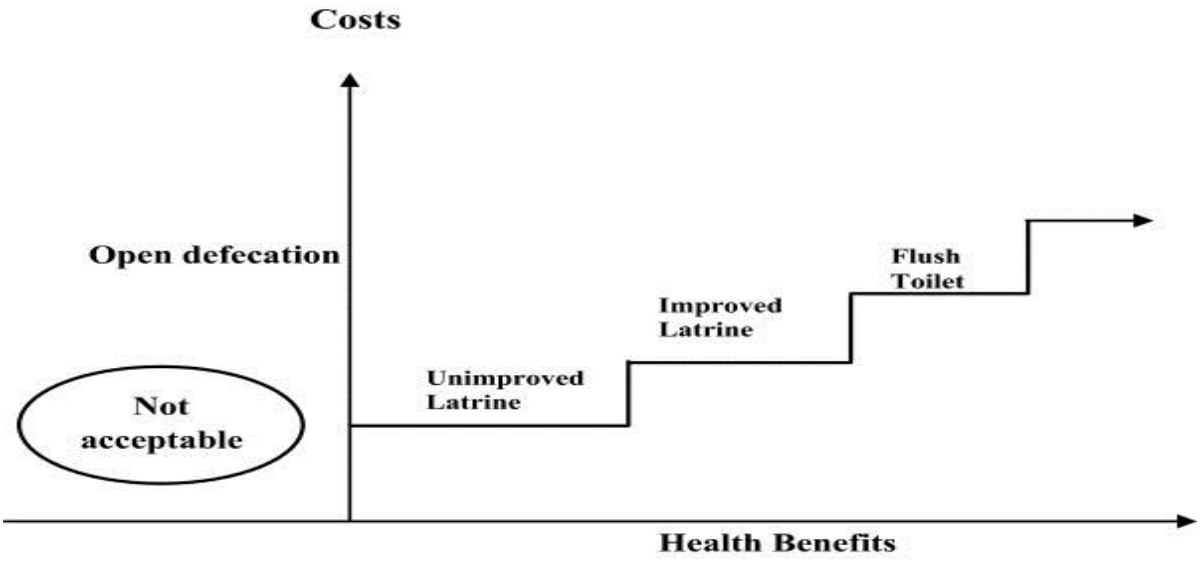

Figure 2.1: The Sanitation Ladder

Source: (Adapted from WHO, 1998)

The next step in the sanitation ladder is the improved facilities, which entail the use of well-ventilated improved pit (VIP) latrine, a household having a pit latrine with slab and/or owning a composting toilet like ecological sanitation (EcoSan) toilets. The final stage in the ladder is the use of septic/flush toilets which ensures hygienic separation of human excreta from human contact. These include piped sewer technology, flush or pour-flush toilet/latrine and use of septic tank technology (Gundry, 2006; Jönsson & Vinnerås, 2004; WHO, 2006). The sanitation ladder hypothesis shows that improvements can be made step by step. The idea that a household can progress up the ladder at different rates can be very appealing to groups. They realize that changes can be made over time, at a pace that is appropriate and manageable to them. Some options are equally good.

Households tend to have the potential of improving their livelihoods if given a chance of getting better income sources. This can help them move from their old poor sanitation technologies to more improved ones. As the households climb the sanitation ladder they also climb other development ladders. These ranges from the financial inclusion ladder with more access to money services, the health ladder with fewer cases of health issues, good sanitation technologies,

more access to basic nutrition, and the education ladder with more children reaching higher education and professional work (Smith, et. al., 2013).

When households get good source of income this can have great positive impact to residents since most of the households will be alleviated from poverty and can help the county and the country at large to start planning for more long-term investments in the residents as well as their land. In addition, as the household climbs the ladder, they can adopt new ways of sanitation which can be based on their living standards and hence enable them to have a whole new list of choices which come along with change in lifestyle. All in all, the movement up of the sanitation ladder is majorly determined by income levels; the poorest and most rural communities tend to adopt the most unimproved, dirtiest, most hazardous, and most unacceptable sanitation methods.

Gench, et. al. (2010) observed that costs and financing play an important role in planning sanitation schemes and selecting appropriate technologies. They realized that cost aspect is one of the major challenges among the end users especially within rural settings. Starovoitova (2012) identified longevity and durability, local availability of material, comfort and privacy, maintainability, scale ability, social acceptability, and health issues as factors to be considered in sanitation. Other scholars cited poverty to be an obstacle towards good hygiene and this can lead to cases of health hazards (Mayaka, et. al., 2016, Heppleston, 2007, Biplob, et. al, 2011). Despite Kenya's commitment towards ensuring sanitation for all, there have been some problems in the choice of sanitation technology associated with beliefs of some communities and general design of the toilets in Kenya. Furthermore, the factors that are associated to ripple effects of recurrent and largely preventable illnesses upon family life and communities cannot be fully quantified (Simiyu, 2015).

2.3 Empirical Literature

Based on a sample size of 160 respondents Simiyu (2015) sought to establish the determinants of usage of communal sanitation facilities in informal settlements of Kisumu town of Kenya. The research followed an approach of sequential explanatory design. The results show that some factors like inadequate maintenance, gender issues, location/siting, as well as financial issues dictate the use of communal facilities. She recommended that future researchers should focus on

these factors for further sanitation interventions. The focus of her study was on determinants of usage while the present study focus is on choice of sanitation technology. Her study was done in Kisumu town, but the current one is being carried out in Wajir town.

Another study done by Muhele (2016) sought to establish the factors that influence sanitation practices in urban informal settlements of Kibera within Nairobi County. The study relied on a sample size of 96 household heads which were selected randomly. The study followed qualitative approach in data collection and analysis. The instruments utilized were an observation checklist and an interview guide for key informants. The research established that most of the households sourced their water from local vendors. It was further established that majority of the households in Kibera slum used public latrine where they were required to pay for the services. This research focused on the general factors influencing sanitation practices unlike the current study whose focus is on socio-economic factors on choice of sanitation technology. Furthermore, the Muhele's study was carried out in Kibera while the present one will be carried out in Wajir Town.

A study on community dialogue with design which focused on the EcoSan toilet in Kisumu town was done by Mbeche (2010). This study was qualitative and carried out interviews on 91 residents of Kisumu town, including 21 discussants drawn from various focus groups. It was established that the EcoSan technology was a viable and safe option for management of excreta for some households. EcoSan technology was further found to have tangible benefits since it enabled the residents to engage in agricultural activities which in turn led to generation of income. Mbeche's research focused only on design on one technology (EcoSan), but the current study will focus on socio-economic factors to determine the choice of all the available technologies in Wajir town.

Wangui (2016) researched on the influence of socio-cultural and economic factors on the adoption of ecological sanitation facility being a case study of Mathare slum of Ngong town, of Kajiado county in Kenya. The study used systematic sampling technique to select ninety respondents. Qualitative data was collected through observation and photography and a questionnaire was used to gather quantitative data. Data was analyzed using chi-square where it

was established that most of the households were found to share available sanitation facilities. The findings further indicated that the type of sanitation facility used, significantly contributed to the diseases being experienced in Mathare slum of Ngong town.

A research by Wasonga, Okowa and Kioli (2016) was on sociocultural determinants to adoption of safe water, sanitation, and hygiene practices in Nyakach Town of Kisumu County in Kenya. The study employed use of qualitative approach where the data was gathered through focus group discussions and observation of homesteads. The study used content analysis and established that sanitation and hygiene issues are ritualized and bound by taboos. The results also indicated that latrines are majorly constructed by men and sharing the same with in-laws and older children was prohibited. Another study done by Rotowa, Olujimi, Omole and Olajuyigbe (2015) was on socioeconomic factors affecting household's sanitation preferences in Akure, Nigeria. This research followed quantitative approaches and used random sampling technique to pick respondents. The findings revealed that socio-economic factors except gender of household significantly affected the type of sanitation facilities used by households.

Routray, et. al. (2015) sought to establish the socio-cultural and behavioral factors constraining latrine adoption in rural coastal Odisha. The study was an exploratory qualitative research that used qualitative methods. The data was collected through observations and interviews. They used content analysis to analyze the collected primary data. The findings showed that latrines sponsored by government were found to be incomplete. Interests in designing of latrines were observed among male heads as compared to their female counterparts. Furthermore, Hoang and Nguyen (2011) did a study to establish the economic aspects of sanitation in developing countries. This was a desk research which reviewed existing literature. The results revealed that economic expenditure related to poor sanitation was found to be substantial among the developing countries.

The current study delved in establishing factors that influence choice of sanitation practices within Wajir town. This was done based on five categories of factors namely environmental factors, psycho-sociological factors, economic factors, educational factors, and cultural factors as indicated in the conceptual framework (Figure 2.1.).

2.4 The Conceptual Framework

Based on the literature review, the following conceptual framework was developed as indicated in figure 2.2 below.

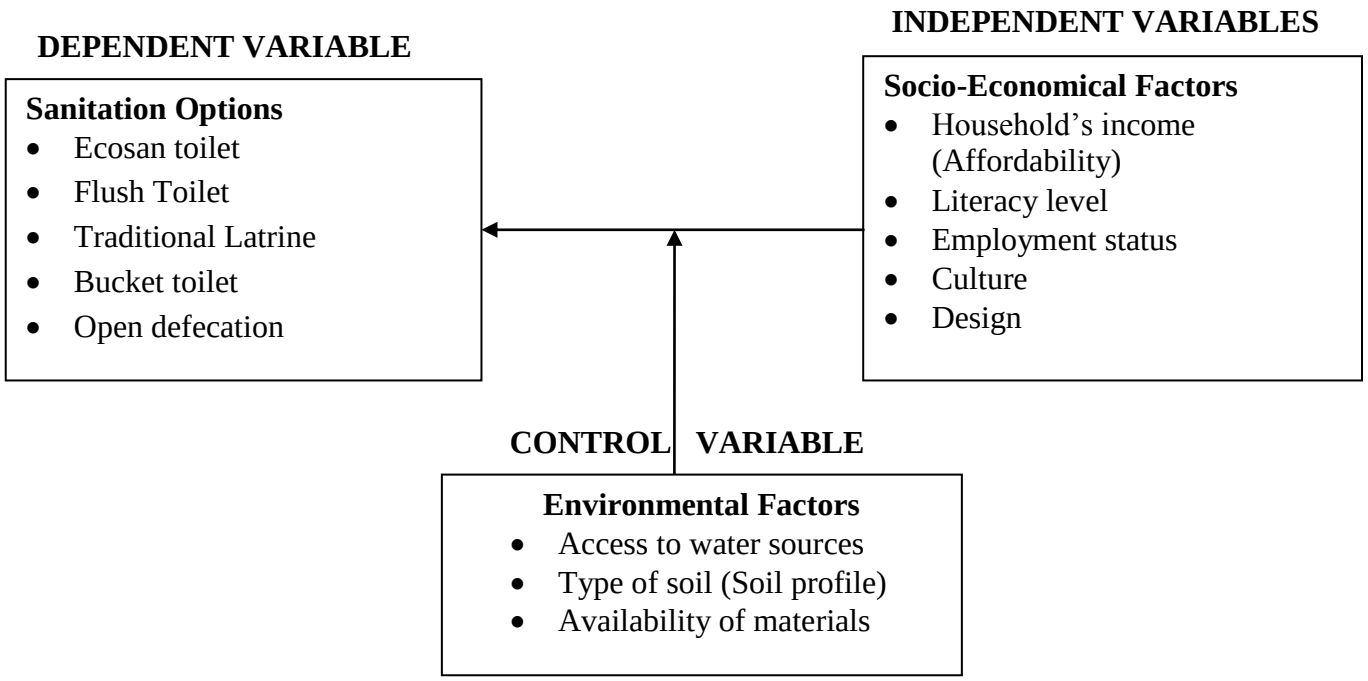

Figure 2.2: Conceptual Framework

Source: Author's Own Conceptualisation (2019)

For this study, the independent variables are socio-economic factors which were measured by household's income which represented affordability of a given sanitation option, literacy level, employment status as well as culture. The dependent variable for this study is type of sanitation option available such as EcoSan toilet, traditional latrine, bucket toilet, and open defecation. A household in Wajir town may focus on the sustainability and proper usage of a particular sanitation option. For example, EcoSan toilet might be embraced when it is socially acceptable, has user-friendly technology, ease of operation and maintenance, use of urine as well as presence of health and hygiene safety measures. To add on that, the moderating variables of the current study are environmental factors such as access to clean water, type of soil (soil profile) and availability of materials for constructing the available sanitation technologies.

For instance, a socio-economic factor like household's income can be used to determine the choice of sanitation technology to be used by a particular household due to its affordability. In that, when a household's income increases, chances of them to change from poor to an improved sanitation method also increases. For example, if someone has or gets more income they tend to change their lifestyle for the better and for the case of sanitation; they are likely to move from using the bucket option to flush or septic tank. Education is also likely to influence the choice of sanitation technology being used by a given household since when people are well informed of the best practices as far as sanitation is concerned, they tend to embrace them. In addition, culture can as well dictate the choice of sanitation technology to be used since people living in the same environment tent to behave or copy others in the way of doing things. Majority of the communities living within Wajir town might also be strict followers of their customs, religions, taboos among others and this might influence the choice of sanitation to be used in their households.

Factors related to environmental concerns can also play a critical role in the choice of a given sanitation practice and this study focused on accessibility to water sources, accessibility to good sanitation facility, Distance from the town, type of soil (soil profile). It can be reasoned that distance to the nearest water points have a role to play in the choice and usage of a sanitation technology. Another issue is about the accessibility and availability of the aforementioned sanitation practices. Type of soil and water table level can be key determinants in the choice of sanitation technology since some profiles cannot support digging of pit latrines. The level of water table affects the decision on the choice of sanitation technology, as there is the risk of contaminating the water in case of the use of a pit latrine (Fewtrell, 2005).

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section describes the procedures and methodologies undertaken in the quest to examine the factors that influence the choices of sanitation technologies in Wajir town. Specifically, the chapter covered; research design, target population, description of sample and sampling procedures, description of data collection procedures, as well as description of data analysis procedures.

3.2 Research Design

This study adopted descriptive research design which helped in collecting factual information on the situation being studied. This kind of research design enabled the researcher to collect quantitative data to necessitate the achievement of the research objectives. This was essential in enabling assessment of the socio-economic factors influencing the choice of sanitation technologies in Wajir Town.

According to Kothari (2011), this technique gains its massive efficacy from its ability to be applied both widely and broadly. This design was appropriate because it enabled the collection of a broad category of data (Saunders, Lewis & Thornhill, 2016). This data assisted in description of the patterns of variables under investigation.

3.3 Target Population

Kothari (2011) describes target population as the total of items about which information is sought from. The study targeted all the households in the entire five villages in Wajir town. The town is located in Wajir County which is situated in the North Eastern part of Kenya. The villages under study included Hodhan, Wagberi, God-ade, Barwaqo and Ali Macow found within Wajir town (see table 3.1). The residents of these villages are largely pastoralists dropouts due to cyclic drought and clashes who came to settle in the periphery town.

Table 3.1: Distribution of Target Respondents

Village	Population(N)
Hodhan	21,000
Wagberi	39,600
God-ade	16,000
Barwaqo	30,000
Ali Macow	15,000
Total	**121,600**

Source: Wajir County Data (2018)

3.4 Sample Size and Sampling Technique

Sampling entails any process which a large population is reduced into small and manageable size to be used in coming up with conclusions and recommendations (Shieh, 2010). Therefore, the study used the following formula to determine the sample size (Yamane, 1967; Israel, 2009; Mugenda & Mugenda, 2012; Shieh, 2010).

$$n = \frac{N}{1 + N_e^{\,2}}$$

Where n = Sample size

N = Population size

e = Level of precision or margin of error.

A confidence level of 90%, and hence a margin error of 0.1, will be used.

Therefore:

$$n = \frac{121{,}600}{1 + 121{,}600_{(0.1)^2}}$$

n = 121,600 ÷ [1 + 121,600 (0.01)]

n = 121,600 ÷ 1216.01= 100

n = 100 respondents.

This sample size deemed fit since it was found to be manageable in responding to research questionnaire. Therefore, the current study employed use of stratified sampling technique to pick the respondents in households from the six (5) villages in Wajir town as indicated in Table 3.1, where each village was taken as a stratum. This sampling technique was believed to be representative as it helped in ensuring that the identified groups or objects equally had the information required for data analysis as recommended by Shieh (2010).

3.5 Data Collection

The data collection instrument helps in investigating the objectives of the research by getting responses from respondents (Saunders, Lewis & Thornhill, 2016). The common instruments used to collect data in social sciences include questionnaires, interview schedules, standardized tests and observational forms (Zikmund, *et. al.*, 2013). This study therefore collected both quantitative and qualitative data through use of a study questionnaire and an interview guide respectively, as this were the best ways to get the respondents opinions.

The data needs breakdown the data collection methods utilized by the study, and the type of data collected namely quantitative and qualitative primary data, the source of data as well as data collection instruments

Table 3.2: Data Needs Table

Research Question	Data Need	Data Source	Type of Data	Data Collection Tool
Determine the characteristics of the households using sanitation services in Wajir Town.	• Religion • Age of household head • Marital status • Type of house • Household size • Duration of stay in the premises.	Households in Wajir town	Quantitative (Primary Data)	Questionnaire
To establish the common sanitation technologies in Wajir Town.	• Ecosan toilet • Flush toilet • Traditional Latrine	Households in Wajir town	Quantitative	Questionnaire Interview

	• Bucket toilet • Open defecation		Qualitative (Primary Data)	guide
To find out the socio-economic factors that influence household choice of sanitation technologies available in Wajir Town.	• Household's income (Affordability) • Literacy level • Employment status • Culture • Ownership status for the dwelling i.e. tenant or owner.	Households in Wajir town	Quantitative Qualitative (Primary Data)	Questionnaire Interview guide

Source: Author (2019)

3.6 Data Presentation and Analysis

Data obtained from the field was converted into useful information using quantitative and qualitative descriptions. Data was analyzed using descriptive statistics which was used to estimate the magnitude of the variables under study and through content. This was presented in the form of frequency percentage tables, means, standard deviations, and graphs.

CHAPTER FOUR
PRESENTATION, DISCUSSION AND INTERPRETATION OF FINDINGS

4.1 Introduction

The aim of this study was to assess the factors influencing the choice of sanitation technologies in villages of Wajir Town. Specifically, the study established the characteristics of the households using sanitation services within Wajir Town; the common sanitation technologies in Wajir Town; and the socio-economic factors that influence household choice of sanitation technologies available in Wajir Town. Therefore, the chapter comprises of the following sections: response rate, household characteristics, sanitation practices as well as factors considered in choice of sanitation.

The qualitative data was gathered through interviews conducted on 5 interviewees purposely picked from the general sample to respond to questions in the interview guide. The study selected 1 informant from each of the five villages of Wajir namely, Hodhan, Wagberi, God-ade, Barwaqo and Ali Macow who included area chief, a local school teacher, a business lady, public health officer and a county administrator. The recorded data underwent transcription and description through a pragmatic process based on thematic content analysis. This was done in line with topical issues under investigation.

4.2 Response Rate

Initially, the study was expected to collect data from a hundred (100) households residing in the five villages of Wajir town. Nevertheless, data was gathered from ninety-six (96) households who responded and returned the research questionnaire. This formed an overwhelming response rate of 96%, while the remaining four (4) questionnaires with a representation of 4%, were either not filled properly or were not returned as illustrated in Table 4.1. The reason for non-response was due to the short time given by the researcher to respond to the questionnaire. Nonetheless, the response rate of this study deemed it fit for analysis.

Table 4.1: Distribution of Response Rate

Responses	Count	Frequency (%)
Responded	96	96.0
Not responded	04	4.0
Total	**100**	**100**

Source: Research Data

4.3 Households Characteristics

The first objective of the study was to determine the characteristics of the households using sanitation services in Wajir Town. Household characteristics under study comprised of age of respondents, the religion which they belong to, highest education achievements, respondent's profession, type of housing, size of household, as well as period of stay.

4.3.1 Age of the Respondents

The respondents were asked to indicate their age in years and the results are as given in table 4.2. To determine the age of the respondents, the study categorized them into various age groups that ranged from 18 years to over 55 years.

Table 4.2: Age Brackets of the Respondents

Age in Years	Count	Percent (%)
18 – 25 Years	2	2.1
26 – 35 Years	19	19.8
36 – 45 Years	48	50.0
46 – 55 Years	22	22.9
Above 55 Years	5	5.2
Total	**96**	**100**

Source: Research Data

Based on the findings, it can be construed that majority (50%) were found to be in the age bracket of between 36 and 45 years. Those who belonged in the age group ranging from 45 – 55 years had a representation of 22.9%. In addition, 19.8% of the respondents were found to fall in the age brackets of 26 – 35 years. However, those who were in the age bracket of over 55 years and 18 – 25 years had a representation of 5.2% and 2.1% respectively. The findings therefore indicate that most residents residing in the villages of Hodhan, Wagberi, God-ade, Barwaqo and Ali Maow are middle aged.

4.3.2 Religion

On the question enquiring to know the religion in which the respondents belonged to, the results are as stated in Figure 4.1. The findings show that overwhelming majority of the respondents with a representation of 97% are Muslims. Nevertheless, only 3% were Christians.

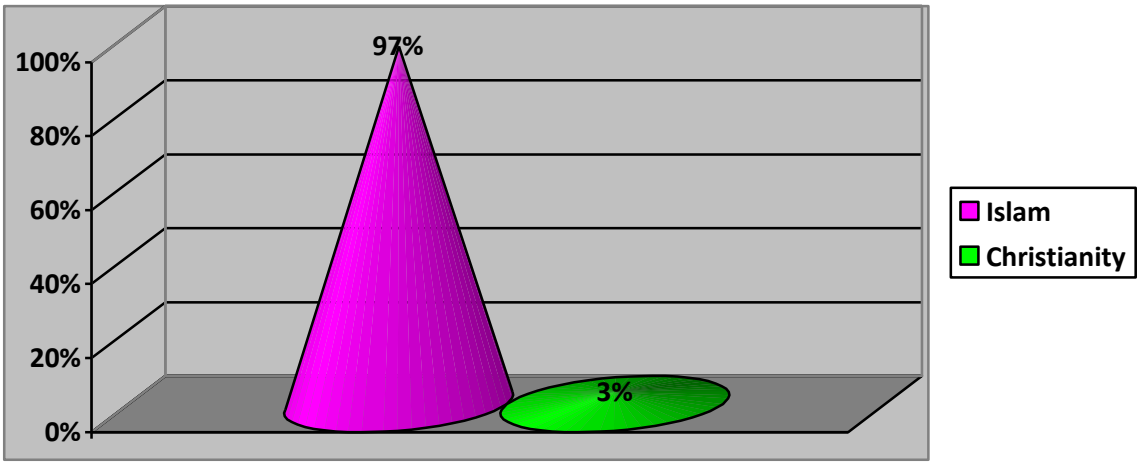

Figure 4.1: Religion

4.3.3 Level of Education

Table 4.3 has responses on the respondents' highest level of education.

Table 4.3: Educational Level of the Respondents

Education Level	Count	Percent (%)
No formal education	47	49.0
Primary	9	9.4
Secondary	19	19.8
Diploma	9	9.4
Bachelor's degree	9	9.4
Master's degree	3	3.0
Total	**96**	**100**

Source: Research Data

4.3.3 Level of Education

Table 4.3 has responses on the respondents' highest level of education. The results in this table reveal that almost a half (49%) of the respondents were found to have not received formal education. Those who were found to have gone up to secondary level were nineteen (19) with a representation of 19.8%. An estimate of 9.4% each was a representation of those who had primary certificates, diplomas, and bachelor's degree respectively. While those with master's degree were represented by 3%. Therefore, this implies that majority of the villagers lacked formal education and this might lead to lack important information of trends in sanitation technologies

4.3.4 Professions of Respondents

The results on inquiry of residents' profession are given in Table 4.4. It was established that majority (30.2%) of the respondents were found to be business men and women operating kiosks, hardware, groceries, vegetable vendors, hawkers, and beauty shops among others. This was followed by teachers teaching in local schools with a representation of 17.8%. Those who were practicing farming were represented by 10.6%. Most of the farmers were involved in keeping livestock such as goats, camels, sheep and cattle. Other respondents who participated in the study included: a human resource manager, an engineer, nurses, procurement officers, area chief, public health officers, drivers, a clerk, a policeman, accountants, a shop attendant, a

banker, a mechanic, a casual worker, a cook and a nutritionist.

Table 4.4: Professions

Profession	Count	Percent (%)
Farmer	5	9.3
Teacher	10	18.5
Human resource manager	1	1.9
Engineer	1	1.9
Nursing	3	5.6
Business	18	33.3
Procurement officer	1	1.9
Chief	1	1.9
Public health officer	3	5.4
Driver	2	3.6
Clerk	1	1.9
Police	1	1.9
Accountant	3	5.6
Shop attendant	1	1.9
Banker	1	1.9
Mechanic	1	1.9
Casual worker	1	1.9
Cook	1	1.9
Nutritionist	1	1.9
Total	**56**	**100**

Source: Research Data

4.3.5 Type of Housing

On the question regarding type of houses where the residents of Wajir town stay in, the results are as given in Table 4.5. In this case, a house built by use of either bricks, cement block, stones and iron sheets, was termed as permanent. A semi-permanent house is that which had mad walls and roofed with iron-sheets. Temporary house did not have iron sheets and cement at all, either thatched with grass, polythene papers, papyrus leaves or any other materials apart from modern sheets or cement. From the results provided, it can be construed that more than three quarters of the respondents with a representation of 78.1% lived in permanent houses. About 13.5% were

found to be living in temporary houses. While only 8.4% of the respondents stayed in semi-permanent houses. This could be an indication that most of the residents residing in Wajir town live in improved houses, hence a sign of a sustainable income.

Table 4.5: Type of Housing

Housing	Count	Percent (%)
Permanent	75	78.1
Semi-permanent	8	8.4
Temporary	13	13.5
Total	**96**	**100**

Source: Research Data

4.3.6 Size of Household

The research sought to establish the total number of members in each of the households under investigation and the findings are as given in Table 4.6. It can be deduced that about a half of the respondents with a representation of 50% revealed that the size of their households ranged from 5 to 10 members. Those who had family of between 2 and 5 members followed with a representation of 44.8%. An estimate of 4.2 percent admitted that their respective households had a total of between 10 and 15 members. A few of the respondents with a representation of 1% disclosed that their household size had less than 2 members. This could imply that most of the residents in Wajir town are married with children.

Table 4.6: Household Size

Members	Count	Percent (%)
Less than 2 members	1	1.0
Between 2 and 5 members	43	44.8
Between 5 and 10 members	48	50.0
Between 10 and 15 members	4	4.2
Total	**96**	**100**

Source: Research Data

4.3.7 Duration of Stay in the Current House

To ascertain the period of which residents had lived in their respective houses, the researcher has resolved to categorize the duration of stay into various manageable ranges from less than two years to over twenty years as shown in Table 4.7.

Table 4.7: Period of Stay

Period	Count	Percent (%)
Less than 2 years	5	5.2
Between 2 and 5 years	23	24.0
Between 6 and 10 years	38	39.6
Between 11 and 15 years	24	25.0
Between 16 and 20 years	5	5.2
Over 20 years	1	1.0
Total	**96**	**100**

Source: Research Data

The results show approximately 39.6 percent of those who responded to the questionnaire were found to have lived in their current houses for a period of between six and ten years. It was further established that an estimate of 25% of the respondents had been in Wajir town for a duration of between eleven and fifteen years. The respondents who indicated to have lived in Wajir town for a duration of between two and five years were represented by 24%. Furthermore, the study established that the residents who were found to have lived in Wajir town for a period of less than two years and that ranging from sixteen to twenty years, each had a representation of 5.2%. Nonetheless, only one respondent was found to have resided in Wajir town for over twenty years. These findings therefore, could indicate that the respondents had lived in Wajir long enough and thus were able to understand the geographical area.

4.4 Sanitation Practices

The second objective was to establish the common sanitation options used in Wajir Town. Therefore, this section consists of various responses on questions related to this objective. For instance, presence of sanitation, common sanitation facilities, alternative sanitation facilities,

stages in sanitation, sanitation preference, distance to the nearest sanitation facility, type of soil, source of water, diseases associated with sanitation as well as bills incurred on such diseases.

4.4.1 Presence of Sanitation Facility in the Households

On the question that enquired to establish whether households in Wajir town had sanitation facilities, the results are as given in Table 4.8. It can be seen that majority (84.4%) of the respondents from whom the data was gathered from confirmed that they had a sanitation facility within their household. About 15.6% of the household were found not to have sanitation facilities. This is a sign of good practices in sanitation within Wajir town. A study by Simiyu (2015) indicated that some factors like inadequate maintenance, gender issues, location/siting, as well as financial issues dictate the use of communal facilities.

Table 4.8: Sanitation Facility in the Households

Responses	Count	Percent (%)
Yes	81	84.4
No	15	15.6
Total	**96**	**100**

Source: Research Data

4.4.2 Common Sanitation Facilities

In different aspect, the research sought to establish some of the common sanitation options used in Wajir town. Based on the findings given in Table 4.9, it is evident that an overwhelming majority (70.4%) of the respondents were found to commonly use bucket toilets. Eco-San toilets were being used by 16% of the respondents. Approximately 7.4% of the respondents were found to be using traditional latrines, while only 6.2% of the respondents commonly used flush toilets. This could be an evidence that households in Wajir town are still using bucket sanitation technology. This revelation is contrary to the findings of the study conducted in Kisumu by Mbeche (2010) which established that the EcoSan technology was the commonly used, viable and safe option for management of excreta for some households

Table 4.9: Sanitation Facilities Commonly Used

Responses	Count	Percent (%)
Bucket toilet	57	70.4
Traditional Latrine	4	7.4
EcoSan toilet	14	16.0
Flush toilet	3	6.2
Total	**78**	**100**

Source: Research Data

In establishment of some of the sanitation technologies commonly found and used in Wajir town, the interviewees gave bucket toilet an upper hand since it was mentioned almost by all the informants. For instance, a local schoolteacher stated,

> *"Most of the residents here have embraced bucket toilet as the main option available to solve their sanitation issues, however, it also depends on class and standard of living."* This was echoed by another sentiment from an area chief who reiterated, *"Bucket latrines are commonly used by members of my jurisdiction not because they don't like other technologies, but due to geographical set up of this area."*

> Interviewees also raised the idea of type of soil and water level. *"Bucket latrine is used by most of the households found in Wajir town however, efforts are underway to educate and introduce other smart technologies like EcoSan toilet which is user and environmentally friendly. The water tables in this region are very high, in the same case the area is composed of sandy soil and therefore not advisable to dig latrine due to cases of water contamination and other health hazards," said a public health officer.*

4.4.3 Alternative Sanitation Facilities

Those who did not have sanitation facilities within their households were asked to state their alternative sanitation facilities and the outcomes are as in Table 4.10.

Table 4.10: Optional Sanitation Facilities

Option	Count	Percent (%)
Outside in the open	5	33.3
At a neighbor's house	10	66.7
Public toilets	0	0.0
At school	0	0.0
Total	**15**	**100**

Source: Research Data

The outcomes given indicate that majority (66.7%) of those who lacked toilet in their premises used neighbours' toilets. Interestingly, the study established that 33.3% of household without sanitation facilities revealed to be practicing unhealthy open defecation. On the contrary, none of them were found to use public or schools' toilets. This could indicate that, either there are no public toilets in Wajir town, or they are very far from the households under investigation.

4.4.4 Sanitation Stage Ladder

On the question that required the respondents to indicate the stage at which their sanitation facilities belonged to, the outcomes are as displayed in Table 4.11. Based on sanitation ladder, about 67.7 % of the respondents indicated that their sanitation facilities were in the rank of unimproved latrine (temporary/pit latrines). Similarly, 19.8% of them were found to fall in the level of improved latrine (permanent latrine with slab). Those who were still in the rank of unimproved option of open defection had a representation of 7.3% and minority (5.2%) of the respondents were in the level of flush toilet. The study's findings are contrary to that of Mbeche (2010) who found out that the sanitation facilities found among the households of Kisumu town in the improved rank where majority were using the EcoSan technology.

Table 4.11: Sanitation Stages

Stage	Count	Percent (%)
Flush toilet	5	5.2
Improved latrine (Permanent Latrine with slab)	19	19.8
Unimproved latrine (Temporary pit latrine)	65	67.7
Open defecation	7	7.3
Total	**96**	**100**

Source: Research Data

4.4.5 Sanitation Facility of Preference

In determination of the sanitation of preference among the household in Wajir town, the output is as illustrated in Table 12. The study established that almost a half of the respondents with a representation of 49% prefer using EcoSan toilet. On the same note about 26% of the respondents, desire to use flush toilet. Those who preferred using traditional latrines were represented by 20.8%. However, 4.2% of them were found to be comfortable in using bucket toilet. This can be translated to mean that given a chance, most of the residents living in Wajir town would prefer using EcoSan toilet to using bucket toilet which was found to be the most commonly used sanitation facility. The findings on preference are in agreement with that of Mbeche (2010) which established that the EcoSan technology is viable and safe option for management of excreta for majority of households in Kisumu town.

Table 4.12: Preferred Sanitation Facility

Facility	Count	Percent (%)
EcoSan toilet	47	49.0
Traditional Latrine	20	20.8
Bucket toilet	4	4.2
Flush toilet	25	26.0
Total	**96**	**100**

Source: Research Data

Some of the reasons given by respondents as to why they preferred the above-mentioned sanitation technologies included: facilities being comfortable to use; some of the sanitation facilities do not fill up fast; they are healthy to use; some of the sanitation options do not smell; less costly; safety; ease to use by many; waste is well disposed; less time consumption; easy to maintain; durable; sustainable; and they sanitation facilities being friendly to the environment.

4.4.6 Distance to the Nearest Sanitation Facility

In establishment of the distance to the nearest sanitation facilities, the responses are as provided in Table 4.13. It can be presumed that majority (84.4%) of the respondents indicated that the sanitation facilities are in a range of less than 100 metres. Those whose sanitation facilities they use are in the range of between 100 and 200 metres had a representation of 11.4%. While few of them (4.2%) used facilities in the distance of between 200 and 300 metres. This is an indication that the sanitation facilities used by households in Wajir town are easily accessible.

Table 4.13: Distance to the Nearest Facility

Distance in Metres	Count	Percent (%)
Less than 100m	81	84.4
100 – 200m	11	11.4
200 – 300m	4	4.2
Total	**96**	**100**

Source: Research Data

4.4.7 Satisfaction of Sanitation Facility

The study resolved to establish whether the households of Wajir town were satisfied by the current sanitation facilities and the upshots are as illustrated in Table 4.14. It can be figured out that majority of the respondents with a representation of 66.7% were not satisfied with the sanitation they use. On the opposite, about 33.3% of those who responded to questionnaires indicated that they were satisfied with their current facilities being used. This means that majority of the residents are not comfortable with the sanitation facilities in use.

Table 4.14: Facility Satisfaction

Response	Count	Percent (%)
Yes	32	33.3
No	64	66.7
Total	**96**	**100**

Source: Research Data

4.4.8 Type of Soil

The research sought to establish the type of soil found within the geographical coverage under investigation and the findings are as given in Table 4.15. It was established that the entire area (100%) of Wajir town has sandy soil. This could be the reason why the residents are using bucket latrine because of lack of compatible soil to enable them dig and construct latrines.

Table 4.15: Soil Type

Soil	Count	Percent (%)
Sandy soil	96	100
Loamy soil	0	0.0
Clay soil	0	0.0
Silt Soil	0	0.0
Total	**96**	**100**

Source: Research Data

4.4.9 Main Source of Water

On different aspect, there was need to know the main source of water for residents of Wajir town.

Table 4.16: Source of Water

Water Source	Count	Percent (%)
Piped water	4	4.2
Borehole/Dug well	92	95.8
Surface water (rivers/dams)	0	0.0
Rain water	0	0.0
Total	**96**	**100**

Source: Research Data

From the responses provided in Table 4.16, it can be deduced that an overwhelming majority (95.8%) of the respondents were found to depend on water from boreholes and/or dug well. Very few with a representation of 4.2% had piped water. On contrary, none of them depended on water from the rivers, dams, or rainwater. This could imply that there either no rivers and dams in Wajir at all or the water in the rivers which are found there, is not fit for consumption. In a different research done by Muhele (2016), it was established that most of the households in Kibera slums sourced their water from local vendors.

4.4.10 Distance to the Nearest Source of Water

To ascertain the distance to the nearest water point, the study categorized the estimates of distances in different ranges, which included less than 100 metres, 100 – 200 metres, 200 – 300 metres and 300 – 400 metres. The upshots displayed in Table 4.17 revealed that almost three quarters of the respondents with a representation of 77.1% specified that their water points were in close range of less than 100 metres. Approximately 17.7% of the respondents indicated that their water points were in range of 100 – 200 metres. Those who were found to travel as far as 200 – 300 metres and 300 – 400 metres had representations of 3.1 and 2.1 respectively. This could mean that most of the residents in the five villages of Wajir have water points within their households.

Table 4.17: Distance to the Nearest Water Point

Distance in Metres	Count	Percent (%)
Less than 100m	74	77.1
100 – 200m	17	17.7
200 – 300m	3	3.1
300 – 400m	2	2.1
Total	**96**	**100**

Source: Research Data

4.4.11 Diseases Associated with Existing Sanitation Facility

The responses on the most common diseases associated with the existing sanitation facility in this area are as shown in Table 4.18.

Table 4.18: Common Sanitation Diseases

Disease	Count	Percent (%)
Dysentery	76	21.8
Worms	28	8.1
Diarrhea	80	23.1
Typhoid	93	26.8
Cholera	70	20.2
Total	**347**	**100**

Source: Research Data

The study discovered that typhoid was the most common disease with a representation of 26.8%, followed by diarrhea (23.1%), then dysentery with 21.8%, thereafter, cholera with 20.2% and worms was found to least affected the residents of Wajir town with only 8.1%. The findings therefore, show that residents of Wajir town are likely to suffer on multiple sanitation related diseases. The results are agreeable with that of Wangui (2016) which indicated that the type of sanitation facility used, significantly contributed to the diseases being experienced in Mathare slum of Ngong town.

The interview as well required the interviewees to state whether there have been reports on outbreak of sanitation related diseases. All the interviewees acknowledged having received or heard reports of sanitation diseases.

> *"We receive several cases related to sanitation diseases in this area where we take such cases as emergency. Patients are rushed to the nearest hospitals, clinics or dispensaries for treatment"* (Public health worker).

> The area chief also stated that *"Outbreaks of sanitation diseases have been experienced in Wajir town in the past years especially in the villages of Hodhan, Barwaqo and Ali Macow due to lack or shortage of water which forced people to use unclean waters. Residents affected complained of stomach aches, running stomachs and dehydration. However, we moved in swiftly taking right measures to save the lives of our people.*

The common sanitation diseases reported were bilharzia, dysentery, cholera, diarrhea and typhoid.

> *"Diseases which were reported included diarrhea, dysentery, and cholera but to some extent there few cases of bilharzia and typhoid"* (Public health worker). Likewise, a school teacher mentioned cholera and diarrhea as the common diseases reported among the pupils. *"The children frequently suffer from running stomach and most of them have been diagnosed by worms and cholera but as a school we insist on cleanliness among the pupils and even educate parents on the effects of such diseases in school parents' meeting."*

4.4.12 Whether Affected by Sanitation Diseases

To investigate whether any of the diseases indicated above had affected the respondents or any member of their household in the last three months, the responses are as given in Table 4.19. More than half of the respondents (56.2%) seem not to have suffered from sanitation related diseases in the past three months. Nevertheless, an estimated 43.8% acknowledged having been affected by the diseases within the three months period before the time of research. This evidence shows that there is presence of water or sanitation related diseases in Wajir town.

Table 4.19: Affected by Sanitation Diseases

Response	Count	Percent (%)
Yes	42	43.8
No	54	56.2
Total	**96**	**100**

Source: Research Data

The question in the interview guide resolved to establish the respondents' opinions on whether the health facilities were well equipped to address the cases of sanitation diseases. The interviewees agreed that the hospitals are well-equipped and ready for any outbreak.

> *"The county has equipped all hospitals and dispensaries with enough tools and drugs treated the most common diseases in this area"* (County administrator). Furthermore, a health officer had this to say, *"We have experienced medical staff members who are ready to handle any case report on diseases related to sanitation"* (Public Health Officer). *"Well I have never seen a case where our hospitals have failed to address any incidence of sanitation diseases, that is a clear show that our county government together with national government have invested more in saving lives of Wajir residents"* stated the area chief.

4.4.13 Hospital Bill Incurred on Sanitation Diseases

On the same note, the study sought to find out whether the residents of Wajir town incurred any hospital bills in treating themselves or any of their family members against sanitation related diseases in the last three months. Based on the outcomes demonstrated in Table 4.20, it can be understood that more than half of the respondents represented by 55.2% had not incurred any hospital bills on such diseases. On the opposite, 44.8% of the respondents admitted having spent on sanitation-based diseases in the last three months.

Table 4.20: Hospital Bill Incurred on Sanitation Diseases

Response	Count	Percent (%)
Yes	43	44.8
No	53	55.2
Total	**96**	**100**

Source: Research Data

4.5 Socio-Economic Factors on Choice of Sanitation Practices

The third specific objective of this study was to find out the socio-economic factors that influence household choice of sanitation technologies available in Wajir Town. Therefore, this section cross-tabulated responses on question relating type of occupation, average monthly income, residential ownership status, items owned by residents with sanitation options available in Wajir town. The sub-section further identified other aspects like challenges encountered, state of sanitation funding, fitness in design of sanitation facilities, and sharing of sanitation facilities with either neighbours and/or mother/father in-law.

4.5.1 Employment Status

In the establishment of employment status, the feedback from the field are as indicated in Table 4.21. Majority (70.8%) of the respondents from whom the data was gathered were found to be jobless. About 29.2% were found to have jobs. This could be a sign that many of the residents are either poor or dependents. The findings concurred with that of the study by Hoang and Nguyen (2011) whose research revealed that economic expenditure related to poor sanitation was found to be substantial among the developing countries.

Table 4.21: Employment Status

Response	Count	Percent (%)
Employed	28	29.2
Not Employed	68	70.8
Total	**96**	**100**

Source: Research Data

4.5.2 Employment Status and Sanitation Options

The research further carried out cross-tabulations between the type of occupation and sanitation options and the results are as presented table 4.22. It can be construed that among the respondents, there were five farmers, out of which 3 of them with a representation of 60% were found to be using bucket toilet, while those who were found to use EcoSan and flush toilet were 1/5 represented by 20% each.

The study as well established that 9 out of 10 (90%) respondents who were teachers, used bucket toilet, while only one teacher (10%) found to have EcoSan toilet. It was revealed that only one respondent was working as a human resource manager and was found to use EcoSan toilet. Similarly, the study established that another respondent who was an engineer used EcoSan toilet. The total number of nurses under study were three. Out of which two of them (66.7%) were found to be using bucket toilet and one with a representation of 33.3% of the total nurses had a flush toilet in the household. About 18 of the of the entire response rate were businessmen and women, from which 13 of them (72.2%) were using bucket toilet, and 5 (27.8%) used EcoSan toilet. Overall results show that approximately 38 professionals with a representation of 70.4% used bucket toilet, 13 of them (24.1%) used EcoSan toilet, while only a total of three (5.6%) used flush toilet

Table 4.22: Type of Occupation and Sanitation options

	Sanitation option(s)			
	Bucket toilet	**EcoSan toilet**	**Flush toilet**	**Total Count**
Farmer	3(60.0%)	1 (20.0%)	1(20.0%)	5
Teacher	9(90.0%)	1(10.0%)	0(0.0%)	10
Human resource manager	0(0.0%)	1(100.0%)	0(0.0%)	1
Engineer	0(0.0%)	1(100.0%)	0(0.0%)	1
Nursing	2(66.7%)	0(0.0%)	1(33.3%)	3
Business	13(72.2%)	5(27.8%)	0(0.0%)	18
Procurement officer	0(0.0%)	0(0.0%)	1(100.0%)	1
Public health officer	1(100.0%)	0(0.0%)	0(0.0%)	1
Driver	1(50.0%)	1(50.0%)	0(0.0%)	2
Clerk	0(0.0%)	1(100.0%)	0(0.0%)	1
Police	2(100.0%)	0(0.0%)	0(0.0%)	2
Accountant	2(66.7%)	1(33.3%)	0(0.0%)	3
Shop attendant	1(100.0%)	0(0.0%)	0(0.0%)	1
Banker	1(100.0%)	0(0.0%)	0(0.0%)	1
Mechanic	1(100.0%)	0(0.0%)	0(0.0%)	1
Casual worker	1(100.0%)	0(0.0%)	0(0.0%)	1
Cook	1(100.0%)	0(0.0%)	0(0.0%)	1
Nutritionist	0(0.0%)	1(100.0%)	0(0.0%)	1
Total	**38(70.4%)**	**13(24.1%)**	**3(5.6%)**	**54**

4.5.3 Average Monthly Income and Sanitation Options

Table 4.23 is comprised of cross-tabulation results on monthly income and sanitation options. Among the 22 respondents who earned below Ksh. 10,000, 18 of them (81.8%) were found to have bucket toilets within their households, 3 out of the 22 (13.6%) uses traditional latrines and only 1 out of 22 (4.5%) owned EcoSan toilet. About 20 respondents with a representation of

29.9% were earning income ranging from 10,000 – 20,000. Those who were in the category of between 20,001 and 30,000 were 13 represented by 19.4%.

The respondents who earned between Ksh. 30,001 and 40,000 were only five (7.5%). Those whose monthly income ranged from Ksh. 40,001 – 50,000 had a representation of 6%. While the categories of 60,001 – 70,000, 70,001 – 80,000 and that of Over 100,000, each reported one respondent respectively. The findings are in line with that of Muhele (2016) whose research established usage of sanitation facility require some form of income since majority of the households in Kibera slum used public latrine where they were required to pay for the services.

Table 4.23 Monthly Income and Sanitation Options

	Sanitation Options				
	Bucket toilet	**Traditional Latrine**	**EcoSan toilet**	**Flush toilet**	**Total Count**
Below 10000	18(81.8%)	3(13.6%)	1(4.5%)	0(0.0%)	22
10000 - 20000	15(75.0%)	0(0.0%)	5(25.0%)	0(0.0%)	20
20001 - 30000	10(76.9%)	0(0.0%)	3(23.1%)	0(0.0%)	13
30001 - 40000	4(80.0%)	0(0.0%)	0(0.0%)	1(20.0%)	5
40001 - 50000	3(75.0%)	0(0.0%)	1(25.0%)	0(0.0%)	4
60001 - 70000	0(0.0%)	0(0.0%)	1(100.0%)	0(0.0%)	1
70001 - 80000	0(0.0%)	0(0.0%)	0(0.0%)	1(100.0%)	1
Over 100000	0(0.0%)	0(0.0%)	0(0.0%)	1(100.0%)	1
Total	**50(74.6%)**	**3(4.5%)**	**11(16.4%)**	**3(4.5%)**	**67**

4.5.4 Residential Ownership Status and Sanitation Options

The study as well determined the type of sanitation facilities used by the residents living in either own houses or rentals through cross tabulation. The findings indicated in Table 4.24 clearly show that a good number (74.4%) of the respondents revealed to be living in their own houses, unlike 25.6% who were found to be tenants. From the 20 respondents who were found to be tenants, 16 of them (80%) were using bucket toilet and 4 out of the 20 (20%) used EcoSan toilet. From the 58 respondents who were found to be living in their own houses, 41 of them with a representation of 70.7% were found to have bucket toilet in their households, 4 respondents (6.9%) were using traditional latrines, about 17.2% used EcoSan toiled while only 5.2% owned flush toilet.

Table 4.24: Residential Ownership Status and Sanitation Options

	Sanitation option(s)				
	Bucket toilet	**Traditional Latrine**	**EcoSan toilet**	**Flush toilet**	**Total**
Tenant	16(80.0%)	0(0.0%)	4(20.0%)	0(0.0%)	20
Owner	41(70.7%)	4(6.9%)	10(17.2%)	3(5.2%)	58
Total	**57(73.1%)**	**4(5.1%)**	**14(17.9%)**	**3(3.8%)**	**78**

4.5.5 Items in Possession and Sanitation Options

Furthermore, the research enquired to know some of the items owned by residents of Wajir town and the kind of sanitation options owned/used. The responses are as shown in Table 4.25. The results indicated that about 29 respondents with a representation of 36.7% owned radios. From those who owned radios, about 17 of them with a representation of 58.6% were using bucket toilet, 10 (34.5%) used EcoSan toilets and 2(6.9%) were using flush toilet. An estimate of 36 respondents possessed mobile phones where 30 of them represented by 83.3% used bucket latrines while those who used traditional and EcoSan toilets were found to be 4(11.1%) and 2(5.6%) respectively. Television owners were 13 out of which 10 of them used bucket toilet, 2 of them had EcoSan toilets while only one owned a flush toilet. Refrigerator owner was one and used bucket toilet. The overall results show that majority (73.4%) of the respondents who owned items were using bucket latrines. This was followed by those who were found to be using EcoSan toilet by 17.7%, then those who used traditional latrines by 5.1% and ultimately, flush toilet by 3.8%.

Table 4.25: Items Owned and Sanitation Options

	Sanitation option(s)				Total
	Bucket toilet	Traditional Latrine	EcoSan toilet	Flush toilet	
Radio	17(58.6%)	0(0.0%)	10(34.5%)	2(6.9%)	29
Mobile phone	30(83.3%)	4(11.1%)	2(5.6%)	0(0.0%)	36
Television	10(76.9%)	0(0.0%)	2(15.4%)	1(7.7%)	13
Refrigerator	1(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1
Total	**58(73.4%)**	**4(5.1%)**	**14(17.7%)**	**3(3.8%)**	**79**

4.5.6 Challenges Encountered

The respondents were required to indicate the frequency of experiencing social and economic challenges in their area and the responses are as provided in Table 4.26. This was done based on a Likert scale of 1 – 5, where 1 = Never, 2 = Just once or twice, 3 = Several times, 4 = Many times, and 5 = Always. It can be deduced that most households under investigation many a times experienced lack of enough clean water for home consumption (Mean = 4.0388, Standard deviation of 0.97942). Another challenge which was experienced just once or twice (Mean = 2.3229, Standard deviation = 1.28550) was that of residents being unable to afford medical bills for family members. Likewise, the challenge of insufficient income was experienced just once or twice given a mean value of 2.2187 and a standard deviation of 1.24142. Based on mean values of 1.9889, 1.6354 and 1.6250, inadequate gas/kerosene to cook food, being unable to take children to school, and lack of enough food for family members were challenges faced by the residents of Wajir town.

Table 4.26: Challenges Experienced

Challenges	N	Minimum	Maximum	Mean	Std. Deviation
Lack of enough clean water for home use	96	1.00	5.00	4.0388	0.97942
Unable to afford medical bills for family members	96	1.00	5.00	2.3229	1.28550
Insufficient income	96	1.00	5.00	2.2187	1.24142
Inadequate gas/kerosene to cook your food	96	1.00	5.00	1.9889	1.27636
Not able to take your children to school	96	1.00	4.00	1.6354	0.97462
Lack of enough food for your family members	96	1.00	4.00	1.6250	0.87359

Source: Research Data

From the feedback provided, there is evidence that the residents of Wajir town are faced with socio-economic challenges. A business lady who was a resident living in Ali Macow village had this to say,

> *"We experience challenges in terms of lack of enough clean water for home consumption and most of our people are affected by poverty which make it hard for them to meet some of these basic obligations."* Additionally, an area chief stated that *"Our people are poor and therefore not able to afford medical bills for family members in case of disease outbreaks. The little money they have are spent on food and part of it on school fees, though we encourage the health management to be charging affordable amount."*

> A school teacher also reported that *"the main challenges facing residents in the area include: poverty, unemployment, overdependence, illiteracy and lack of adequate information as far as sanitation practices are concerned"*.

In establishment of the measures taken to cab sanitation challenges being experienced by the residents of Wajir town, the interviewees highlighted a number of measures. The County administrator mentioned,

> *"The County facilitates community health programs and has disseminated community health workers in all areas who are able to identify such cases fast and give first aid or perform initial treatment of giving drugs related to the diseases before referring the patients to the nearest health facilities"*. Area chief also reiterated, *"We sensitize and educate our people on the safety measures related to sanitation, this is done through gatherings such as self-help groups or chief barazas organized regularly in different parts of this location. Sometimes we conduct a door to door and site visits in the affected areas to make sure that no loss of life as a result of poor sanitation"*.

4.5.7 Sponsorship of Sanitation Facility

Having established that the households of Wajir town had sanitation facilities, the study also enquired to know who constructed or funded the construction of those facilities. The results highlighted in Table 4.27 revealed that most of the respondents (52.1%) built their respective sanitation facilities on their own. About 20.5% of the respondents most probably the tenants, disclosed that their respective property owners funded sanitation facilities they use. On estimate, 13.7% of the respondents acknowledged that family members sponsored the construction of the facilities they use. Non-Governmental Organization (NGO) also participated in funding the construction of some sanitation facilities as indicated by about 9.6% of the respondents. Ultimately, 4.1% of the respondents confessed to have received assistance from self-help groups within their area. A researcher by Wasonga, Okowa and Kioli (2016) established that that latrines found within the households of Nyakach town were majorly constructed by men. Furthermore, Routray, et. al. (2015) established that the latrines sponsored by government were found to be incomplete.

Table 4.27: Funder of Sanitation Facility

Item	Count	Percent (%)
Land lord	15	20.5
Self	38	52.1
Family Member	10	13.7
Non-Governmental Organization (NGO)	7	9.6
Self-help group	3	4.1
Total	**73**	**100**

Source: Research Data

Furthermore, the interviewees shared similar sentiments on the aspect of sponsorship of sanitation facilities in villages of Wajir town where they mentioned family members, self-help groups, land lords/ladies, self-sponsorship and non-governmental organizations.

> *"We built or purchase sanitation facilities with our own savings. Very few of our people get support from outside"* stated a business lady. In addition to that, a school teacher reported that *"there has been few cases where people have been supported by non-governmental organizations to construct toilets, but many of the residents construct on their own. Government only supports the sanitation facilities in public entities like schools and hospitals."*

A different sentiment by a county administrator reinforced the preceding viewpoints by indicating that

> *"It depends on where one is living, for example those living in leased houses their sanitation facilities are definitely constructed by the house owners who in this case is either a landlord or a landlady. Family members can also contribute to purchase a sanitation facility to use."*

4.5.8 Whether Sanitation Facility Fits All

The respondents were further asked to state whether the design of sanitation facilities in their household was fit for all members and visitors including those who were physically challenged and aged and the reactions are as provided in Table 4.28. The study revealed that 85.4% of the respondents indicated that the designs of their sanitation facilities were not fit for all. Dissimilarly, about 14.6% of the respondents felt otherwise. The results have indication that the residents of Wajir town do not consider physical challenges of the user on the choice of their sanitation facilities.

Table 4.28: Fitness of Sanitation Facility

Status	Count	Percent (%)
Yes	14	14.6
No	82	85.4
Total	**96**	**100**

Source: Research Data

4.5.9 Sharing Sanitation Facility with Neighbour

Responses in Table 4.29 indicate that an overwhelming majority of the respondents with a representation of 90.6% exposed that they were sharing their sanitation facilities with their neighbours. Only 9.4% of them seemed not to share their sanitation facilities with fellow residents. This is an indication that most of the sanitation facilities in Wajir town are communal, most probably constructed through contribution of the residents. The findings echo that Wangui (2016) which revealed that most of the households within Mathare slum of Ngong town were found to share available sanitation facilities.

Table 4.29: Sharing Sanitation Facility with Neighbour

Status	Count	Percent (%)
Yes	87	90.6
No	9	9.4
Total	**96**	**100**

Source: Research Data

4.5.10 Sharing Sanitation Facility with Mother/Father In-law

The research also asked the respondents if their customs allowed them to share a given sanitation facility with either mother or father in-law, the results are as illustrated in Table 4.30. Nearly all (99%) of the respondents revealed that sharing a sanitation facility with in-laws was not a problem. Unlike one respondent who felt that, their custom does not allow the sharing of sanitation facilities with a father or a mother in-law. An indication that residents of Wajir town do not observe some traditional customs and/or myths related to sanitation facilities, income and urban problem. The results are contrary to that of Wasonga, Okowa and Kioli (2016) established that sanitation, hygiene issues were ritualized and bound by taboos in Nyakach Town of Kisumu County in Kenya, and sharing the same with in-laws and older children was prohibited.

Table 4.30: Sharing Sanitation Facility with Mother/Father In-law

Status	Count	Percent (%)
Yes	95	99.0
No	1	1.0
Total	**96**	**100**

Source: Research Data

4.5.11 Factors to Consider in Choice of Sanitation

Based on a Likert scale of 1 – 5, where 1 = no extent, 2 = small extent, 3 = moderate extent, 4 = great extent, and 5 = very great extent, the study required the respondents to rate the extent to which various factors influenced choice of sanitation in Wajir town and the findings are as illustrated in Table 4.31.

Table 4.31: Factors to Consider in Choice of Sanitation

Factors	N	Minimum	Maximum	Mean	Std. Deviation
Household's income	96	4.00	5.00	4.9271	0.26136
Employment status	96	1.00	5.00	4.1146	0.85680
Type of soil	96	2.00	5.00	3.9792	0.28943
Design of latrine	96	1.00	5.00	3.9271	0.44117
Educational level	96	2.00	5.00	3.7187	1.03317
Community culture	96	1.00	5.00	2.1146	0.55951

Source: Research Data

To a very high extent, household's income was found to be a key determinant in the choice of any type of sanitation facility given a highest mean score of 4.9271. Employment status influenced choice of sanitation facilities to a great extent (Mean = 4.1146). Type of soil and design of latrine also determined choice of sanitation facilities to a great extent since they provided a mean score of 3.9792 and 3.9271 respectively. Level of education among the residents of Wajir town influenced selection of a particular type of sanitation facility to be used in households (Mean = 3.7187). Nevertheless, community cultural norms, customs and taboos were found not to have much impact on the choice of sanitation facility among the people living in Wajir town. A study by Rotowa, Olujimi, Omole and Olajuyigbe (2015) revealed that all the socio-economic factors except gender of household significantly affected the type of sanitation facilities used by households.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the study summary of the findings. Conclusions are also made with focus on the results of the research as well as suggestion of recommendations to be considered by the relevant authorities.

5.2 Summary of Study Findings

The main goal of this research was to assess the factors influencing the choice of sanitation technologies in Wajir Town. Specifically, the study sought to determine the characteristics of the households using sanitation services in Wajir Town; to establish the common sanitation options used in Wajir Town; and find out the socio-economic factors that influence household choice of sanitation technologies available in Wajir Town.

5.2.1 Summary of Qualitative Findings

The responses from the interviews conducted revealed that sanitation technology commonly found in Wajir town was bucket toilet. The interviewees stated that sanitation facilities in villages of Wajir town were funded by family members, self-help groups, land lords/ladies, self-sponsorship and non-governmental organizations. All the interviewees acknowledged to have received or heard reports on cases of sanitation diseases. Some of the common sanitation diseases reported to have affected the residents of Wajir town included bilharzia, dysentery, cholera, diarrhea and typhoid. The interviewees agreed that the hospitals are well-equipped and ready for any disease outbreak.

From the feedback provided, there is evidence that the residents of Wajir town are faced with socio-economic challenges. These included lack of enough clean water for home consumption, poverty, unemployment, overdependence, illiteracy and lack of adequate information as far as sanitation practices are concerned. However, the county government and administration had put in place measures to cab sanitation challenges being experienced by the residents of Wajir town.

For instance, the county was found to facilitate community health programs and has disseminated community health workers. Residents are also sensitized and educated on the safety measures related to sanitation, this is done through gatherings such as self-help groups or chief barazas and conducting a door to door and site visits in the affected areas

5.2.2 Summary of Study Findings

From the findings provided in the preceding chapter, the study reported an overwhelming response rate of 96%. It was established that majority of the respondents were in the age bracket of between 36 and 45 years. The findings show that majority of the respondents with a representation of 97% were found to be Muslims. The results revealed that almost a half (49%) of the respondents were found to have not received formal education, apart from 19.8% who were found to have gone up to secondary level. Majority of the respondents represented by 30.2% were found to be business men and women operating kiosks, hardware, groceries, vegetable vendors, hawkers, and beauty shops among others. More than three quarters of the respondents with a representation of 78.1% were found to be living in permanent houses. It was as well established that about a half of the respondents revealed that the size of their households ranged from 5 to 10 members. The results indicated that approximately 39.6% of those who responded to the questionnaire were found to have lived in their current houses for a period of between six and ten years.

Majority (84.4%) of the respondents confirmed that they had a sanitation facility within their household. Overwhelming majority (70.4%) of the respondents were found to commonly use bucket toilets. Majority (66.7%) of those who lacked toilet in their premises were found to use neighbours' toilets as an alternative. About 67.7% of the respondents indicated that their sanitation facilities were in the rank of unimproved latrine (temporary/pit latrines). The study established that almost a half of the respondents with a representation of 49% prefer using EcoSan toilet. It was presumed that majority (84.4%) of the respondents indicated that the sanitation facilities they use are in a range of less than 100 metres.

It was figured out that majority of the respondents with a representation of 66.7% were not satisfied with the sanitation they use. The entire area of Wajir town was found to be composed of sandy soil. Overwhelming majority (95.8%) of the respondents were found to depend on water

from boreholes and/or dug well. Almost three quarters of the respondents with a representation of 77.1% specified that their water points were in close range of less than 100 metres. The study discovered that typhoid was the most common disease in Wajir town, followed by diarrhea, then dysentery and cholera. More than a half of the respondents (56.2%) seem not to have suffered from the sanitation related diseases in the past three months. The findings revealed that more than half of the respondents represented by 55.2%, had not incurred any hospital bill on such diseases.

Majority (70.8%) of the respondents from whom the data was gathered from were found to be jobless. Most of the respondents had an average monthly income of below Ksh. 20,000. A good number (83.3%) of the respondents revealed to be living in their own houses. The findings indicated that the most common items owned by people living in the villages of Wajir town were mobile phones and radios. The major challenge facing the residents many a times was found to be lack of enough clean water for home consumption.

Most of the respondents (52.1%) sponsored the construction of their respective sanitation facilities. The study realized that 85.4% of the respondents indicated that the designs of their sanitation facilities were not fit for all including aged and people with disability. Overwhelming majority of the respondents with a representation of 90.6 % exposed that they were sharing their sanitation facilities with their neighbours. Nearly all (99%) of the respondents revealed that sharing a sanitation facility with in-laws was not a problem. Household's income, employment status, type of soil and design of latrine were found to be key determinants in the choice of any type of sanitation facility.

5.3 Conclusion Based on the Study Findings

The study concludes that the residents of Wajir town use bucket latrine as their main sanitation option. The choice of a sanitation technology was found to be based on various socio-economic factors as highlighted in the study. The aspect of household's income was paramount. Residents were found to be involved in a number of livelihoods to generate income to cater for their family needs. From the study findings, it can further be concluded that bucket latrine was used among low and middle-income earners. This is so since this kind of sanitation technology was found among the residents who had income level of less than Ksh 50,000 while those who earned

higher than this had embraced either Ecosan or Flush toilets. It can therefore be concluded that economic status of people determines the level of sanitation ladder.

Another major factor was employment where the residents were found to belong to different professions which in one way or another had enabled them own their respective sanitation technologies based on their rate of earning and lifestyle. The spread of usage/ownership of sanitation options seem to be matching across all professionals. The residents possessed luxurious items such as mobile phones, radios, televisions and refrigerators in their households. However, possession of items in household does not limit the type of sanitation facilities to be used as people with different items equally owned different sanitation options available.

Cases of illiteracy levels were also identified. Some residents were found to use available sanitation technologies as the only option at hand due to lack of knowledge about other existing options. The study can conclude that people with higher education levels tend to adopt more improved sanitation technologies due to access to information from different sources. These as well concludes that both governments, landlords and other potential sponsors are not showing willingness to invest in improved sanitation facilities. This could be due to the type of soil found in the area, which makes construction of such facilities slightly expensive. The type of soil also surfaced as an essential factor in determining the type of sanitation technology to be owned by the residents of Wajir town. The research revealed that most parts of the town is composed of sandy soil and this made it difficult for residents to build improved sanitation facilities, sinking of pit latrine might not possible, since the water table is high ,it might pollute the source of water and this can increase the risk of diseases transmission.

At the household level, other socio-economic dynamics were identified where residents seemed to share some sanitation facilities despite their religions, clans, professions, educational level, type of housing owned or age. For instance, being a Muslims or a Christian does not dictate the choice of a sanitation facility since they use same facilities available. Furthermore, the factor related to design of sanitation facility was key in choosing the sanitation option to own. This could be because some designs are not fit for all. For example, the elderly and people with disabilities find it hard to use some of the technologies available in Wajir due to their un-accommodative designs.

On other hand, cultural practices and customs of communities living in Wajir town are friendly to the usage of any kind of sanitation facility. However, the construction of facilities in this area does not consider other users like the aged and people with disability. Lack of adequate water and high water table are also setbacks in the usage of sanitation facilities in Wajir town, embracing flush toilet might be challenging due to water shortage. It is therefore, common knowledge to conclude that most of the diseases related to sanitation which was found to have affected majority of the residents in Wajir town, are rooted from unhygienic practices, poor sanitation, and lack of enough clean water. This in turn becomes a burden to poor residents of urban villages of Wajir town in footing the bills that comes along with such diseases.

Despite efforts from the county and national governments together with other stakeholders to improve the state of sanitation technologies, there is more than meets the eye in Wajir town. Some of the urban poor residents are still using unacceptable sanitation options which might lead to outbreak of sanitation related diseases. A good number of residents have embraced use of bucket latrine and more surprisingly, there exist some who are still defecating in open areas.

5.4 Recommendations Based on the Study Findings

From the research findings realized in chapter four, it can be recommended that: In order to improve the state of a sanitation technology in Wajir town, there is need to understand the effects related to demographic/households' characteristics for the residents. For instance, the age, household size, gender among others. This is due to the fact that the individuals' features are found to serve as main drivers of their demand for improvement of sanitation technologies and this can be used as a point of reference when introducing new sanitation technology.

Key aspects including, educational level, income, as well as information available for that particular facility would determine the use a particular sanitation facility. There is a need for government, manufacturers, promoters and entrepreneurs to educate and sensitize people on the functions and benefits of other sanitation technologies on offer. Information package and marketing strategies shall be vital in increasing the adoption and behavioral change towards embracing a given technology.

The residents should devise more ways of creating wealth which can help them to improve their level along the sanitation ladder. It is advocated that policy makers in both governments and other potential sponsors should put in measures to intervene the construction of more viable sanitation facilities in the five villages of Wajir town.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

The aim of this research project is to provide information on **SOCIO-ECONOMIC FACTORS INFLUENCING CHOICES OF SANITATION TECHNOLOGIES IN WAJIR TOWN**. This research is for academic purposes only.

All responses will be treated in strict confidence.

Tick in the box or fill where appropriate.

SECTION A. HOUSEHOLDS CHARACTERISTICS

1. Serial number: ……..…..……
2. Name of village of interview……..
3. Which age bracket do you belong to? (Please tick where appropriate)

   18 – 25 Years [ ]

   26 – 35 Years [ ]

   36 – 45 Years [ ]

   46 – 55 Years [ ]

   Above 55 Years [ ]

4. Which religion do you belong to?

   Muslim ☐ Hindu ☐ Christianity ☐

   Others (Please specify) ……

5. Level of education.

No formal education ☐ Primary ☐ Secondary ☐ Diploma ☐

Bachelor's degree ☐ Master's degree ☐ Doctoral degree ☐

6. What is your profession? ……..

7. What type of house do you stay in?

   Permanent ☐ Semi-permanent ☐ Temporary ☐

8. What is the size of your household?

   Less than 2 members [ ]

   Between 2 and 5 members [ ]

   Between 5 and 10 members [ ]

   Between 10 and 15 members [ ]

   Over 15 members [ ]

9. How long have you stayed in your current premise?

   Less than 2 years ☐

   Between 2 and 5 years ☐

   Between 6 and 10 years ☐

   Between 11 and 15 years ☐

   Between 16 and 20 years ☐

   Over 20 years ☐

SECTION B: SANITATION PRACTICES

10. Do you have a sanitation facility within your household?

    Yes [ ] No [ ]

11. If **Yes** in Question 10 above, which among the following common sanitation option(s) do you have?

Sanitation option	Have	Don't have
Bucket toilet		
Traditional Latrine		

EcoSan toilet		
Flush toilet		
Others (Please specify)		

12. If **No** in Question 10 above, where do your family members go to the toilet?

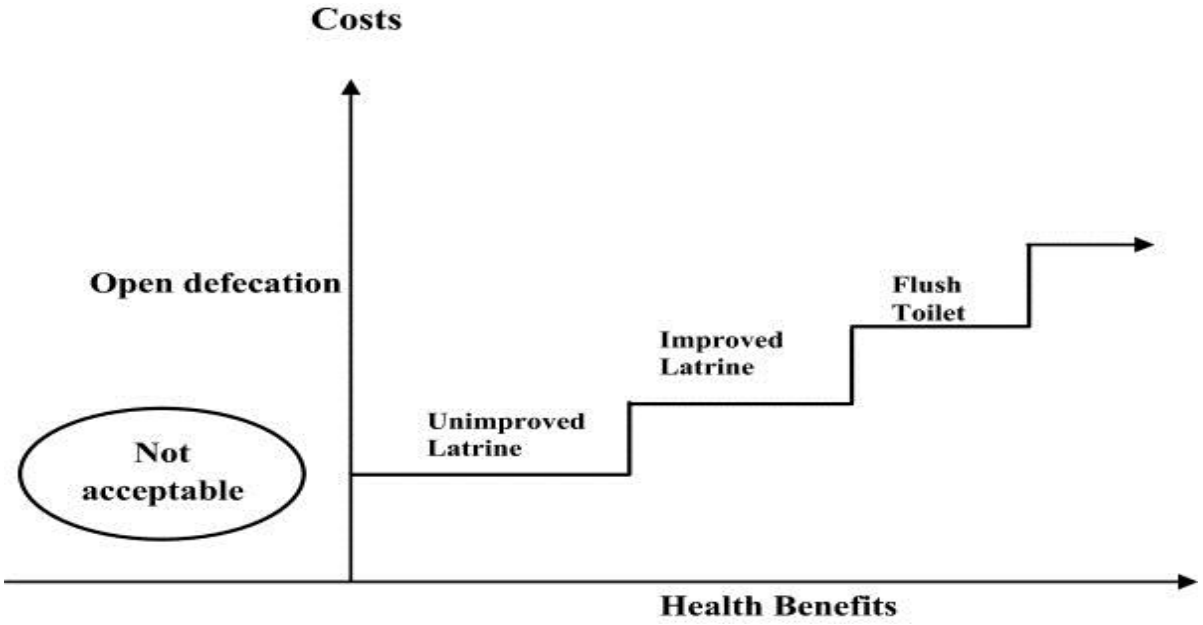
Public toilets [ ] Outside in the open [ ]

At school [ ] At a neighbor's house [ ]

Don't know [ ]

Other (*please specify*): _____

13. Sanitation ladder is comprised of various stages of advancement of technology as illustrated below



Based on the sanitation facility/technology available in your household, which stage does your facility belong in?

Sanitation	
Flush toilet	
Improved latrine (Permanent Latrine with slab)	
Unimproved latrine (Temporary pit latrine)	
Open defecation	

14. Which of the following common sanitation option(s) do you prefer using in your area?

Sanitation option	Prefer	Don't prefer
EcoSan toilet		
Traditional Latrine		
Bucket toilet		
Open defecation		
Flush toilet		
Others (Please specify)		

15. Why do you prefer this kind of sanitation option(s) as compared to others?

……

……

……

……..

16. Among the following sanitation option(s) does your household use on regular basis?

Sanitation option	Regularly use	Don't use regularly
Open defecation		
Bucket toilet		
Traditional Latrine		
EcoSan toilet		
Others (Please specify)		

17. How far is the nearest sanitation facility in Metres?

Less than 100m ( ) 100 – 200m ( ) 200 – 300m ( ) 300 – 400m ( )

400 – 500 m ( ) More than 500m ( )

18. Are you satisfied with the sanitation facility in your household?

Yes [ ] No [ ]

19. Which type of soil is found in your area?

    Sandy soil ( ) Loamy soil ( ) Clay soil ( ) Silt Soil ( )

    Other (Please specify) …….…….

20. What is the main source of water used by your household for purposes such as drinking, cooking and hand washing?

    Surface water (rivers/dams) [ ] Piped water [ ]

    Borehole/Dug well [ ] Rain water [ ]

    Others please specify…….

21. What is the distance to the nearest water point in metres?

    Less than 100m ( ) 100 – 200m ( ) 200 – 300m ( ) 300 – 400m ( )

    400 – 500 m ( ) More than 500m ( )

22. What are the most common diseases associated with the existing sanitation facility in this area?

    Dysentery [ ] Worms [ ]

    Diarrhoea [ ] Typhoid [ ]

    Cholera [ ]

23. Has any of the diseases indicated above affected you or any member of your household in the last three months?

    Yes [ ] No [ ]

24. Have you incurred any hospital bill in treating yourself or any family member against sanitation related diseases in the past three months?

    Yes [ ] No [ ]

SECTION C: SOCIO-ECONOMIC FACTORS OF CHOICE OF SANITATION PRACTICE

25. Employment status

Employed ☐ Not Employed ☐

26. On average, state your monthly income …….

27. What is the ownership status of your residence?

Tenant ☐ Owner ☐

28. Which among the following items do you own in your household?

ITEM	**OWN**	**DON'T OWN**
Refrigerator		
Radio		
Bicycle		
Mobile phone		
Television		

29. **In the last one month, how often have any of family member in your household experienced any of the following challenges?**

Challenges	**Never**	**Just once or twice**	**Several times**	**Many times**	**Always**	**Don't Know**
Lack of enough clean water for home use						
Insufficient income						
Lack of enough food for your family members						
Unable to afford medical bills for family members						
Not able to take your children to school						
Inadequate gas/kerosene to cook your food						

30. Who funded the construction of the sanitation facility that you use?

Land lord [ ] Self [ ]

Family Member [ ] Government [ ]

Non-governmental organization (NGO) [ ] Self-help group [ ]

31. Does the design of sanitation available in your household fit for all members and visitors including those who are physically challenged and aged?

Yes [ ] No [ ]

32. Do you share your sanitation facility with a neighbour?

Yes [ ] No [ ]

33. Does your custom allow you to share same sanitation facility with your mother/father in law?

Yes [ ] No [ ]

34. If no in Question 26 above, please give reason(s)

……

……

……

……

35. In your own opinion, rate the extent to which the following factors influence choice of sanitation to use within your area. Use a likert scale of 1 – 5, where 1 = No extent, 2 = Small extent, 3 = Moderate extent, 4 = Great extent, and 5 = Very great extent.

Choice factors	**1**	**2**	**3**	**4**	**5**
Household's income					
Educational level					
Employment status					
Community culture					
Design of latrine					
Type of soil					
Others (Please specify)					

APPENDIX II: RESEARCH INSTRUMENT (INTERVIEW GUIDE)

(For Key Informants in Wajir Town)

Position of Informant ……

1. Which sanitation option is commonly used by residents of Wajir town? And why?

   ……
   ……
   ……
   ……

2. Who is in charge of funding the construction of the sanitation facilities found in Wajir town?

   ……
   ……
   ……
   ……

3. Has your office received any reports from residences of Wajir town on outbreak of sanitation related diseases?

   ……
   ……
   ……
   ……

4. If yes, name some of the common sanitation diseases reported

   ……
   ……

……
……

5. How are hospitals in Wajir town well-equipped towards treatment of diseases related to sanitation?

……
……
……
……

6. What are some of socio-economic challenges experienced in Wajir town?

……
……
……
……

7. Which measures has the administration of Wajir town put in place to cab sanitation issues?

……
……
……
……