

**PARTICIPATION OF HOUSEHOLDS IN SOLID WASTE MANAGEMENT IN  
KAYOLE SOWETO INFORMAL SETTLEMENTS, NAIROBI CITY COUNTY,  
KENYA**

**BY**

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## DECLARATION

I declare that this is my original work and that it has never been presented to any other University for a degree or diploma award.

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This research project has been submitted for examination with my approval as the University Supervisor

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## **DEDICATION**

This paper is dedicated to my late dad Samson Joe Machio. Thank you for believing in me and assuring me that indeed I can make it.

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## **ABSTRACT**

Solid Waste Management is a growing problem in cities of developing countries such as Nairobi, Kenya. While city authorities and other agencies have made efforts to address the problem, it still persists. The objective of the study is to establish the role of households heads participation in solid waste management. The study was carried out in Kayole Soweto which has 9 zones; of these 3 zones were purposively sampled where waste problem disposal was highest. Each zone had residential blocks, and we targeted 10 blocks ensuring that they were well spread out. Each dwelling block has 5-10 dwelling units, we randomly selected three of the units where house heads were present giving a total of 30 households per zone and 90 for the three zones. This study found that all households participated in solid waste management, In terms of profiles there were more males(62.2%) than women(37.8%).on age more younger people participated more in waste management, Majority (47.8%) being between the age of 30-39 years. Majority (73.3%) were aware of solid waste although they defined it differently. They were also aware of its disposal and recycling although they did not practice SWM owing to lack of the necessary techniques of how to do it. The study recommends that there is need to create awareness about integrated solid waste management and especially on how households can reduce, re-use and re-cycle the generated solid waste at the household level by the County government.

## **ABBREVIATIONS AND ACRONYMS**

<b>NCC</b>	Nairobi County Government
<b>NGOs</b>	Non-governmental organisations
<b>SWM</b>	Solid Waste Management
<b>UNEP</b>	United Nation Development Programme

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

The increase in the number of people moving from rural to urban areas has resulted in many challenges. One such challenge is the disposal of solid waste (Henry et al., 2006). In this regard, the municipal authorities of the affected areas have to come up with methods of mitigating the problem. The implementation of Solid Waste Management (SWM) is one of the responses that the authorities can use to solve the problem of waste disposal (Sharholly et al., 2008). For such programs to work well, the involvement of all the concerned stakeholders is essential. Solid Waste Management has had different ramifications from the global to the regional levels.

The problem of dealing with solid waste has been reported globally and it affects all nations but on different scales. (Hoornweg et al., 2009) have discussed some of the global issues that affect the disposal and management of solid waste. One such issue is the multifaceted nature of the parties who contribute to the solid waste management problems. In urban centres, all across the world, disposal of solids is carried out by many sectors. These include the industrial effluents, the wastes from the domestic activities and agricultural activities. In this respect therefore, the problem needs to be solved through engagement of various players.

Achankeng (2003) observes that solid waste management in Africa is related to urbanization and globalization. It can be deduced that the solid waste management problem in Africa is tied to the movement of people from rural areas to urban areas and movement of people from one country to another, all these coming as a result of globalization. With increase in the number of people moving from the rural areas in African countries to urban areas, there has been a strain on the solid waste management facilities. This calls for an innovative way of dealing with the problem.

In Kenya, the management of disposed solid waste is a concern to the authorities, the public health sectors and the citizens in general. In some urban centres, there is no elaborate mechanism of dealing with the disposed solid waste (Henry et al., 2006). The solid waste in urban areas in Kenya comes from different sources which include agricultural wastes, kitchen leftovers, industrial effluents and the littering from the street people (Muniafu & Otiato, 2010).

In Nairobi, the problem of solid waste has been aggravated by the fact that of the total tonnage of garbage generated daily, only 25 percent is collected while the area generates with estimated 1500 tonnes of garbage daily (Malenya, & Omwenga, n.d.). This amount has been increasing. For example, (Kasozi & Von Blottnitz, 2010) estimated that in 2009, the solid waste generated amounted to 5016 tonnes daily. While a small amount is collected, the remaining waste is left at the markets, bus stops, roadsides and drains and it forms mountains of rotting, smelly and eye sore waste. Robust solid waste management approaches are therefore essential to solve the problem in the city.

Solid waste is defined as any discarded material that is not a liquid or gas. There are two kinds of solid waste. One kind is wastes that are made of biodegradable materials, and the other is materials not made of biodegradable materials. A biodegradable material is a material that can be broken down by living things into simpler chemicals that can be consumed by living things. Synthetic materials, or materials created in a laboratory, are non-biodegradable. Plastics can be used as a good case in point to describe non-biodegradable material. Plastics are made up of mostly carbon and hydrogen, but these elements are put together differently than how they are found in nature. Microorganisms have ways to break down things in nature, but not man made things. Plastics may last for hundreds of years before they are able to start the process of being broken down (Bagchi & Bagchi, 2004).

Solid Waste management is the science that deals with prevention and monitoring of wastes released into the environment. There are several mechanisms that both the governmental and non-governmental institutions can use in the solid waste management activities. Examples include recycling solids, reducing and reusing them, recovering energy from the wastes and reducing the generation of the same from the sources. Authorities, community and nongovernmental organizations can come up with strategies to ensure that the disposal and removal of solid wastes from the environment has been carried out properly (Mongkolnchaiarunya, 2005).

Solid waste management is a challenge in the informal settlements due to the uncoordinated nature of the buildings. Housing in the urban and peri-urban areas should be approved officially. However, there are situations where development of houses takes place without approval of the existing authorities. Informal settlements therefore exist where housing has been created in an urban or peri-urban location without official approval. They may contain a few dwellings or thousands of them, and are generally characterized by inadequate infrastructure, poor access to basic services, unsuitable environments, uncontrolled and unhealthy population densities, inadequate dwellings, poor access to health and education facilities and lack of effective administration by the municipality (Mongkolnchaiarunya, 2005).

English dictionary defines an informal settlement as an unplanned settlement on land which has not been surveyed or proclaimed as residential, consisting mainly of informal dwellings. Informal dwellings are made up of makeshift structures that are not erected according to approved architectural plans. It should however be noted that informal settlement definition can take a context specific approach.

## **1.2 The Problem Statement**

Solid waste in informal settlements, especially in developing countries, has had serious impacts on the environment, human and animal health and development in general. Management of solid wastes has not been able to fully solve the problem because of many underlying challenges associated with the stakeholders incorporated. Composition of waste is determined by various factors which include population, level of income,



sources, social behavior, climate, industrial production and the market for waste materials (Njoroge et al, 2014) .

In Kenya, solid waste management is majorly left to the government i.e. the Ministry of Environment and Ministry of Health with Nairobi county government controlling all the operations and activities within the city. The National Environmental Management Authority (NEMA) through the Ministry of Environment has been responsible for formulating environmental policies. The NGOs and CBOs have also been having some role to play in managing solid waste within informal settlements. All these responsibilities brought together, the services provided by these entities have been on the decline due to inadequate infrastructure, lack of good strategy and goodwill. This has prompted other players to come on board. For example, in Nairobi the city council recruited some private collectors in the year 1998 that are only able to collect about 25% of the generated wastes. Incorporating the community into the waste management has been one of the challenges to the disposal and management of solid wastes in informal urban settlements (Njoroge et al., 2014); (Muniafu & Otiato, 2010); (Henry et al., 2006); (Kaseva & Mbuligwe, 2005). Based on these studies, the role of households in solid waste management has been largely ignored. The proposed study seeks to fill this gap by establishing the role of household participation in the effective solid waste management.

### **1.3 Objectives of the Study**

The broad objective of the study is to establish the role of household participation in effectiveness of solid waste management in Kayole – Soweto slums, Nairobi City County.

#### **The Specific Objectives will be:**

- a) To examine profiles of households engaged in Solid Waste Management
- b) To assess the level of awareness of the households on solid waste management
- c) To assess the household heads level of participation in solid waste Management
- d) To establish the level of support of households by self-help groups and other agencies in Solid Waste Management

### **1.4 Research Questions**

- a) Does the profile of a household play any role in determining participation in solid waste management in Nairobi's informal settlements?
- b) What is the effect of community awareness on solid waste management?
- c) What is the level of participation of households within Nairobi's informal settlement in solid waste management?
- d) What is the level of support that the households in Nairobi's informal settlements receive from CBOs and other agencies in solid waste management?

### **1.5 Justification of the Study**

The study by Gulis et al, 2004 shows that low-income and informal settlements have more environmental and public health problems than those in urban formal settlements or

in rural areas. Informal settlement dwellers also encounter more severe environmental problems associated with poor waste management, which accounts for the overtly poor health outcomes in such settlements.

However, the efforts to manage waste from these areas are often considered a preserve of foreign NGOs and government agencies.

Mongkolnchaiarunya (2005) observes that little regard is accorded to the fact that the local self-help groups and individual households could be effective in the management of their waste. Particularly, this approach can work well in informal settlements, solid waste present myriad recycling, reuse and disposal challenge.

This study will highlight the role of community participation in waste management and thereby encourage external stakeholders to integrate local households and self-help groups in solid waste management. The findings of this study will also inform programmes that address the problem of solid waste management in Kayole – Soweto slum and other similar settings.

### **1.6 Scope of the Study**

The study solely sought to establish the role of community participation in solid waste management in Kayole – Soweto slums of Nairobi County. The proposed study intends to focus on Kayole – Soweto because of its relevance to the purpose of the study, regarding its huge population, estimated to be between 150,000 and 200,000

Although the factors of community participation could be almost similar across the country or globally, the proposed study's scope only covered the Kayole – Soweto slums in Nairobi County, households to establish the role of community participation in solid waste management. Members of the identified households were requested to respond to the questionnaire items. Data was collected using questionnaires, administered by the researcher and the research assistants. Corroborative secondary data was obtained from relevant government agencies, NGOs and private entities' documents. The data was then analysed descriptively, using SPSS software.

### **1.7 Limitations of the Study**

Since this is a case study of Kayole - Soweto, the findings may not be fully generalised to other parts of Nairobi. The study may also be limited by the changing dynamics of informal settlements that occur over a period of time i.e. the circumstances of Kayole - Soweto slums changed with time. Since the waste management sector in Kenya is quite dynamic and could change after a period, the study's findings will only be appropriate for the immediate circumstances as better and more integrated approaches to waste management may be developed later, might reverse the current trends. However, the findings may prove useful for Kayole - Soweto slum dwellers for quite a long period.

## **1.8 Definitions of Key Terms Used in the Study**

**Community Participation:** The mechanisms through which individuals, households, families and groups take up and share waste management responsibility for own benefits, health and welfare, capacity development. Through integration, communities are able to understand their situation better and become motivated agents of change and development and to solve their common problems.

**Community:** People living together in a form of social organization, characterized by inclusion and cohesion with members sharing their political, economic, social and cultural endeavors, characteristics, goals, aspirations and interests.

**Proper Waste Handling:** The appropriate, correct and careful collection, transport and treatment of the actual waste produced by household users, group users and industries , in treatment site or plant so that it is not harmful to human and plant health as well as to the environment.

**Recycling:** Refers to the mechanisms and strategies for collecting and preparing recyclable materials and reusing them in their original form. Also implies using materials to make other products through manufacturing processes, without destroying them.

**Solid Waste Management:** The collection, transportation, treatment, final disposal and recycling of solid wastes.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This Chapter presents a theoretical perspective, empirically relevant literature on community participation and solid waste management not only from the local or national perspective but also from the international perspective from different disciplines, a summary of the literature review and the conceptual framework of the study.

#### **2.2 Solid Waste Management**

According to New York State Department of Environmental Conservation “Solid wastes are any discarded or abandoned materials. Wastes could be solid, liquid, and semi-solid or containerized gaseous material.” The rationale for effective public participation is clearly based on the fact that everyone generates waste and can be affected directly or indirectly if waste is not properly managed. Solid waste (SW) can be hazardous to man and the environment if not appropriately managed. Apart from the threat of polluted air, inadequate SWM increases the risk of morbidity of conditions such as leptospirosis, dengue fever and gastroenteritis (Singh et al., 2012) Poor management of SW can also affect ground water and marine ecosystems (UNEP, 2007).

### **2.2.1 Solid Waste Management: A Global Perspective**

Everyone should be involved in SWM for effective and efficient SWM systems to be established. On the other hand, waste can be a useful resource, complete with employment opportunities that may contribute to poverty alleviation if the concerned population or community is informed, educated and involved in solid waste management and decision making processes at the international and local level (UNEP, 2007). With the decline of the sugar and banana industries in the Caribbean, the countries are even more dependent on tourism which is still very much nature based. Consequently every effort must be made to maintain public health and environment quality for residents and tourists. It is not only important to involve individuals in SWM but also groups and the private sector since full ownership and management by the government may not be the most efficient approach (Kasozi & Von Blottnitz, 2010).

### **2.2.2 Solid Waste Management in Nairobi**

Nairobi's solid waste situation, which could be taken to generally represent Kenya's status, is largely characterized by low coverage of solid waste collection, pollution from uncontrolled dumping of waste, inefficient public services, unregulated and uncoordinated private sector and lack of key solid waste management infrastructure. According to Kasozi & Von Blottnitz, 2010, Nairobi city generates 4,016 tonnes of solid waste daily. The County government has the fundamental responsibility of handling solid waste within its borders, a service delivered by the Department of Environment (DoE) under the cleansing section.

Until the mid-1970s, the cleansing section collected over 90% of the waste. As years went by, there was a decrease in the number of waste collection vehicles because of lack of appropriate maintenance. On the other hand, the expansion of industrial and commercial sectors resulted in increased urban migration, improved standard of living and technological advancement which in turn led to increased waste generation. In mid 1980s, Nairobi City Council collected only 20% of the municipality's solid waste, leaving about 290,000 tonnes of solid waste at the Dandora open dumpsite, located about 7.5KM from the city centre, from industries, institutions, commercial establishments, and high-income residential areas (Henry et al., 2006).

Solid waste collection remains a challenge in the city and informal settlements are generally the least served areas. It is also worth emphasising that many residential estates usually make their own private arrangements for collection of their waste by private companies licensed by the county government (Kamba, 2013). These private practitioners partly explain why the problem of solid waste management is not extremely severe in some areas, particularly the affluent neighbourhoods (Kamba, 2013). Thus, Nairobi's solid waste situation, which could be taken to generally represent Kenya's urban setting's status, is largely characterized by low coverage of solid waste collection, pollution from uncontrolled dumping of waste, inefficient public services, unregulated and uncoordinated private sector and lack of key solid waste management infrastructure (Kamba, 2013).



### **2.2.3 Community / Household participation in Solid Waste Management**

Informal settlements are characterised by high population density relative to economically well off neighbourhoods, which translate into relatively larger amounts of solid waste in a defined area in the settlements. The more the waste generated, the more are the resources needed to effectively manage it.

According to Baud et al., 2016, low-income residential areas where most services are unsatisfactory, residents normally give priority to water supply, electricity, roads, drainage and sanitary services. Solid waste is commonly dumped onto nearby open sites, along main roads or railroads or into drains and waterways (Kasozi & Von Blottnitz, 2010). Pressure to improve solid waste collection arises as other services become available and awareness about the environmental and health impacts of poor waste collection grows (Kasozi & Von Blottnitz, 2010).

Local communities have a role to play in solid waste management, as stipulated by Principle 10 of the Rio Declaration states, which states that: “environmental issues are best handled with the participation of all concerned citizens, on a relevant level (Squires, 2006). The declaration also states that nationally, each individual should have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes (Squires, 2006). Hence, states should facilitate and encourage public awareness and participation by making

information widely available. Effective access to judicial and administrative proceedings, including redress and remedy should be provided (Squires & Squires, 2006)

#### **2.2.4 Household profile and Solid Waste Management**

Gender has a significant effect on people's attitude towards the physical environment i.e. on their acquisition and development of plots, handling of waste water from their households and their management of drains near their compounds and disposal of solid waste and garbage from households and construction sites. The observed significant effect meant that gender was a strong determinant of the respondents' attitude towards their physical environment. Multiple data sources also showed that gender was a predictor of homeowners' environmental attitude (Panyako, et al., 2015)

Women were more involved in waste separation than men in the household. It is women who know and decide what was useful and what constituted waste; and were more likely to separate and dispose of solid waste from the households than men. (Banga, 2013).

Household head's age also has a significant effect on their management of drains near their compounds and handling of waste water from households. This is attributed to an understanding that older people tend to be more risk averse than younger ones, hence they would cautiously site their homes and dispose of waste in such a way as to minimise disaster risks (Panyako, et al., 2015).

Respondents' level of education is also considered to be having a significant effect on their acquisition and development of plots; use of perimeter walls; use of concrete pavements; and on their disposal of solid waste and garbage from households and construction sites. The study associated high level of education with increased knowledge and awareness which inculcate in people the preferences for a hygienic environment and the need for environmental protection ((Findikakis & Leckie, 1989) (Panyako, et al., 2015).

Level of income is also a determinant factor of households' management of drains near their compounds; disposal of solid waste and garbage from households and construction sites; and handling of waste water from households. The level of income is a strong socio-demographic predictor of environmental attitude. People with higher income had the ability to engage the services of private garbage collectors as well as cleaners to ensure the compound and its surroundings were well kept (Panyako, et al., 2015).

### **2.2.5 Household awareness on sustainable waste management policies**

Most informal settlements have serious sustainability challenges as far as solid waste management is concerned. Top among these challenges are reduction of waste generation to manageable or acceptable levels and the proper disposal of the generated waste. To achieve local waste management sustainability is a difficult task because most informal settlements, little attention is given to solid waste management, making waste management a constantly prevailing issue, unless proper sustainability initiatives are designed and implemented at the local and national levels ( Njoroge, et al, 2013).

The main underlying factors causing the poor waste management state in local towns and informal settlements are high population growth rate, poor consumption patterns by the citizens, poor waste management services and facilities by local authorities and inadequate and ineffective law enforcement by the government (Njoroge, et al., 2013). Other factors are insufficient or lack of community participation resulting from lack of awareness by local communities and households. Equally important are factors associated with increased urbanization and industrialization.

According to UN-Habitat (2010), the main sources of solid wastes in Nairobi are industrial and manufacturing activities, which account for 68% of domestic waste. The bulk of the waste is made up of 57% food waste, 13% plastic and 8% paper ( Njoroge, et al., 2013). The mismanagement of these wastes at the community and household causes pollution and contamination of environmental resources. Unfortunately, the current total recycling capacity in Nairobi is quite low compared to the total waste being generated. Notably, middle-to high-income areas have better waste collection, which is done mainly by private institutions. In such neighbourhoods, the residents have a greater ability to pay for the services from private waste managers (Hyman, et al., 2013). However, low-income areas such as Kayole -soweto lack the capacity to pay for such services. Thus, these households and informal settlements are vulnerable to waste management problems such as health, safety and environmental hazards (Njoroge, et al., 2013).

Waste management should support sustainable development, which refers to development that meets and exceeds the needs of the present without compromising the ability of future generations to meet their needs. Such waste management should eliminate or reduce domestic and industrial wastes, which deteriorate the condition of environmental resources by contamination of air, water and soil and destruction of biodiversity or the ecosystem (Hyman, et al., 2013). In informal settlements, like anywhere else, poor waste disposal interferes with the environment to the degree that future generations may lack the privilege to a clean environment (Njoroge, et al., 2013).

Thus, sustainable waste management is vital in ensuring the current and future generations' access to a clean and productive environment (Hyman, et al., 2013). In other cities across the world such as Johannesburg, access to solid-waste removal services is almost universal while access is reasonably high in Dakar. However, in Nairobi's informal settlement, access to solid waste services is almost non-existent. In Johannesburg, 90% of slum households have some form of access to an organized garbage-disposal system, compared to Dakar's 76% and Nairobi's 12% (Njoroge, et al., 2013).

For sustainable waste management practices and facilities, proper waste management structures for recycling, reusing, reducing and collection from sources should be designed and implemented. These strategies would be effective in preventing further accumulation of solid waste in Nairobi's neighborhoods.

In 2010, population of Nairobi City was estimated at 3.1 million. In the same year, the total amount of waste generated was estimated at 3,121 tonnes per day, translating into an average of 0.59kg per person per day. 68% of this waste was noted to be from households while only about 25% of the total waste was collected in 2010 (Njoroge, et al., 2013).

In other terms, the rate of solid waste generation by far exceeds the capacity of the authorities to collect and dispose of.

#### **2.2.6 Support by CBOs, NGOs and other agencies in waste management**

Considering the current population growth rate in Kenya, there is expected a drastic impact on the environment, particularly concerning waste management. Evidently, population densities are higher in low income slum dwellings where waste management structures are considerably inefficient . In Kenya, informal settlements in Nairobi are the most densely populated ( Njoroge, et al., 2013).

As a result of this dense population among other factors, solid waste management continues to pose serious challenges, especially since these settlements lack well-established legal or institutional frameworks to address waste management issues. On a rather positive note, NGOs have taken initiatives to address various waste issues in the slums. However, there is need for input from households, self-help groups and the government to address the issue of solid waste management.

Local self-help groups and households can participate in solid waste management in various ways. For instance, youth or women groups can be formed to empower these groups from slums to adapt sustainable waste management initiatives. The key objective of such groups should be to design and implement systems of household waste disposal that provide alternative sources of income for these groups besides creating environmental awareness of the waste management issue.

These groups should then be educated on recycling, reusing and reducing household waste and sorting out waste at the household level. The household waste, mostly made up of plastic bags, bottles and glasses, should then be collected to a common collection point for purchase by recycling firms at a fee (Njoroge, et al., 2013) The collected money should then be distributed to the groups after a given period, via a financial scheme.

Groups such as youth and women should be the focus of waste management initiatives since they are the major partakers of household activities, thus better placed to be in charge of household wastes. Such projects should have an education component to improve the environmental ethics of slum populations through knowledge and information on impacts of poor solid management and taking of responsibility of their actions on waste management and the environment. Although households and self-help groups should be at the core of waste management, successful waste management relies on the regulatory measures by the government and the larger population. Extensive education on recycle, reuse, reduce and response to waste is critical for the population to

understand the importance of sustainable resource use and waste management (Njoroge, et al, 2013).

## **2.3 Theoretical Framework**

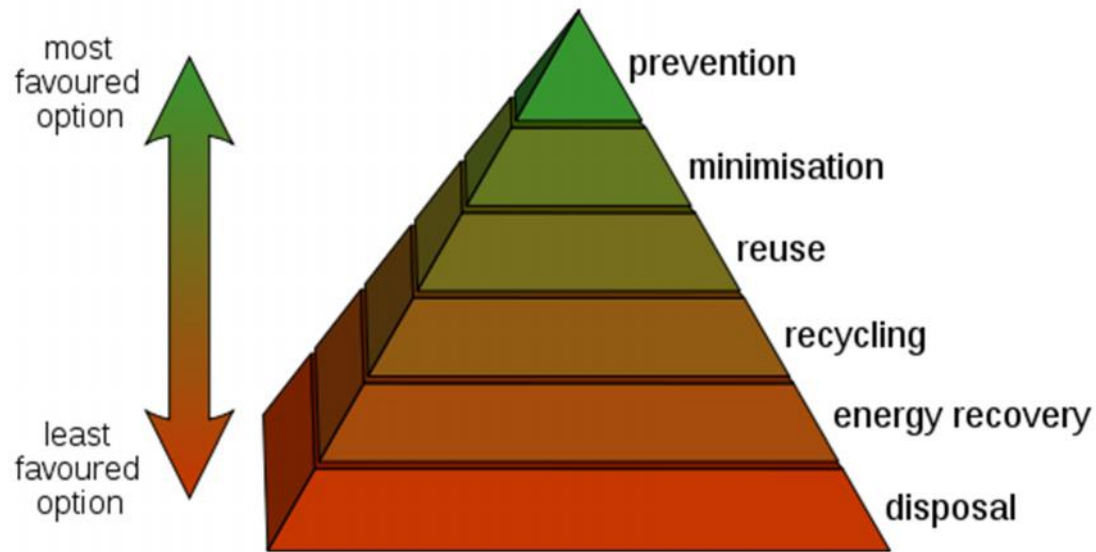
### **2.3.2 Waste Hierarchy Theory**

The concept of waste hierarchy is the basis for waste minimization strategies and refers to the 3RS which are reducing, reuse and recycle. According to Baud et al 2004 a more environmentally friendly and sustainable solid waste management strategies emphasizes on activities in relation to reduction, reuse and recycle.

Reduction is aimed at reducing the amount of waste produced by adopting or optimizing the production process of manufacturers and industries. As a result, natural resources will be saved. Reuse does not involve reprocessing or transformation from one type of material to the other. Rather it means when a material has served its original purpose and reused for another purpose rather than being thrown away.

Recycling is about reprocessing the materials that served the original product into a new product. Recycling also involves organic material for the production of compost (Zhu et al, 2007)





**Source: ADB (2002)**

The solid waste management hierarchy categorises solid waste strategies depending upon their ability to minimize waste as reduce, reuse and recycle. The concept promotes the collaboration between waste generators, collectors, processors, and manufacturers and reduces the amount of waste disposed. As a result the amount of environmental deterioration will be reduced, emissions from landfills will be minimised, and natural resources and energy will be saved (Zhu et al, 2007)

This theory is relevant to the study as households are encouraged to reuse, recycle and reduce their waste generated in their households, through this the youths and women groups can be engaged in activities that can generate income to them through the recycling of materials that can be useful to them, this can be possible if the relevant authorities like NEMA and Nairobi County can set up recycling centres which the groups can be collecting materials and sell to the recycling firms to produce a new products. Households are also encouraged to reuse materials.

### **2.3.3 Community Participation Perspective**

The concept of community participation was important for this study. Brager and Specht (1973) observe that people participate in different degree, roles and methods in a wide variety of happenings, experiences, groups, and organizations. Participation refers to the means by which people that are not elected or appointed officials of agencies and of government influence decisions about programs and policies which affect their lives.

Brager and Specht (1973) observe further that the primary goal of community work as a professional process is to increase the capacity of community members to use and influence service agencies such as the Nairobi City County and NEMA to better meet their needs and protect their interests. Often, this requires recasting the ways in which the individuals participate which includes redefining their roles and extending their access and control of activities of the agencies.

On degree of participation, Brager and Specht (1973) indicate that everyone does not participate in organizational decision making to the same degree. Decision making involvement is an important dimension and varies with the extent of one's participation. as reflected in time spent, secondary. A service recipient may expend considerable time and energy being informed, for example, and relatively little time in planning jointly with the agency. Where there is a joint planning, the person's degree of participation will be higher since he will have more control over decisions that are made.

The cited author see participation as ranging from low on one hand and high on the other. In low participation, members of a community are told by staff of an agency about what is to be done. The agency prepares a plan and informs the community about it and may modify it slightly to accommodate their views. In high level of participation, staff of the agency asks members of the community to identify their problems and make key decisions relating to planning and solution of the problems including control of needed resources.

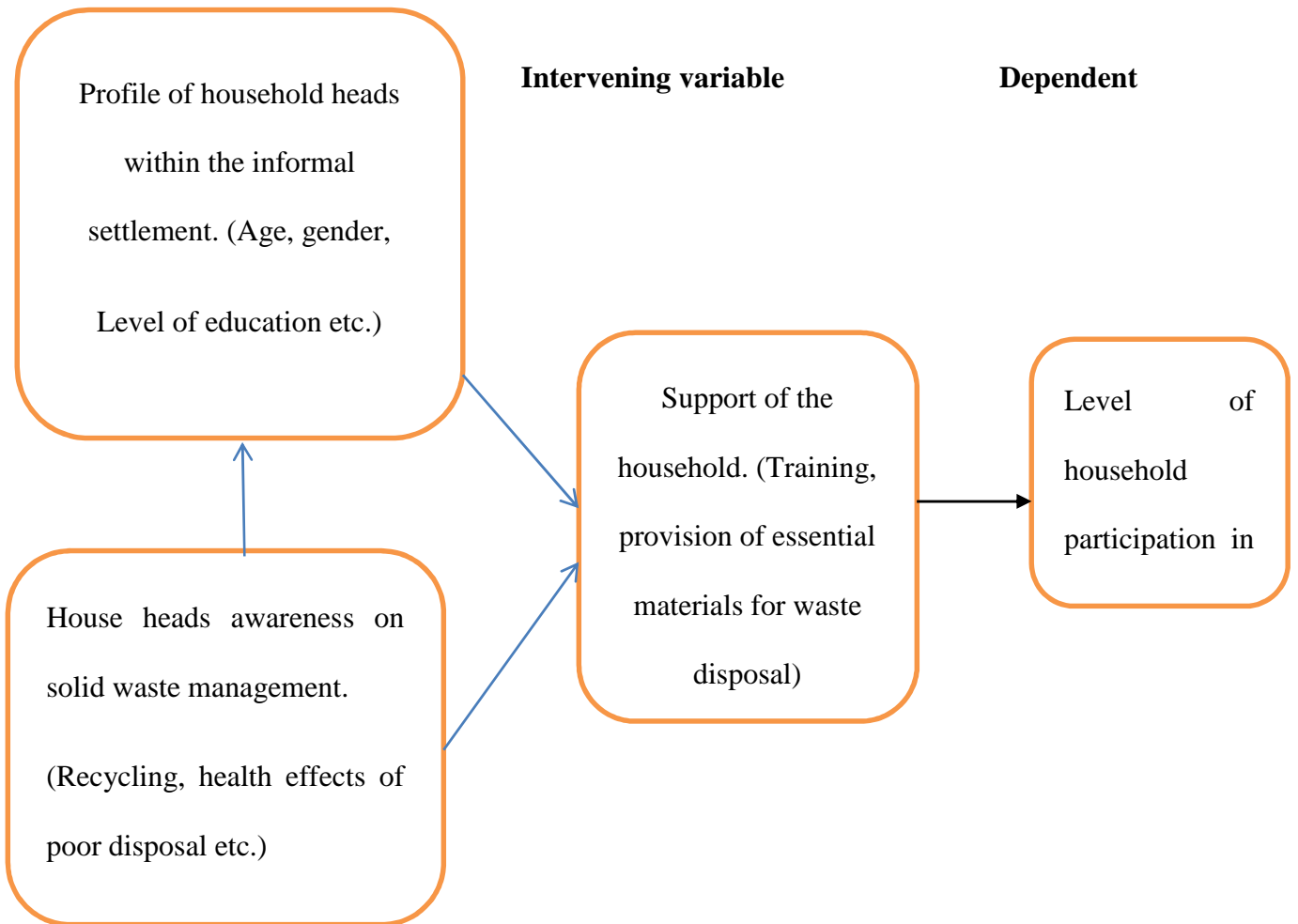
In this study, this conception of participation is used to show the extent to which household's heads were involved in solid waste management.

#### **2.4 Conceptual Framework**

Conceptual framework is a scheme of concept (variables) which the researcher uses to show link between his/her variables of study. A variable is a measure characteristic that assumes different values among subject. Independent variables are variables that a researcher manipulates in order to determine its effect of influence on another variable, states that independent variable also called explanatory variables is the presumed change in the cause of changes in the dependent variable; the dependent variable attempts to indicate the total influence arising from the influence of the independent variable Mugenda and Mugenda, (2013).

**Figure 2.1: Conceptual Framework for the study**

**Independent variable**



Support provided to households is likely to affect how they participate in waste management. The independent variables of household profiles and awareness will determine the level of participation in waste management.

Positive outcome will be expected in the study because when the households receive the needed support through training they will be able to improve their perception on waste management.

## 2.10 Operationalization

**Table 3.1: Operational Definition of Variables**

<b>Variables</b>	<b>Indicators</b>
Profile of households engagement in SWM	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Level of education</li> <li>• Occupation</li> <li>• Marital status</li> </ul>
Awareness	<ul style="list-style-type: none"> <li>• Health effects of poor disposal</li> <li>• Methods of recycling</li> <li>• Reuse of wastes</li> <li>• Knowledge of solid waste collection</li> </ul>
Support through Self-help groups other agencies	<ul style="list-style-type: none"> <li>• Trainings on solid waste management</li> <li>• Provision of essential materials for waste disposal</li> </ul>
Level of participation	<ul style="list-style-type: none"> <li>• Waste generated in the household</li> <li>• Type of waste generated</li> <li>• Separation of solid waste by household</li> <li>• Household recycling of solid waste</li> </ul>

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses the research design and the methods used to collect data, sampling procedures, study respondents, study instruments and piloting of the instruments and fieldwork. The chapter ends with a discussion of the methods of data analysis.

#### **3.2 Research design**

This study employed both quantitative and qualitative methods and gathered quantitative data. The study relied on data from household heads that enabled the researcher to explain variables of study (Kothari, 2004).

#### **3.3 Study Site population**

A research study site is the area within which the survey is to be carried out and the relevant information obtained. The research was done in Kayole Soweto slum in Nairobi County. Nairobi County is one of the 47 counties of Kenya. It was founded in 2013 on the same boundaries as Nairobi Province, after Kenya's 8 provinces were subdivided into 47 counties; it has a population of about 3,375,000 according to the 2009 census (African Population and Health Research Center (APHRC), 2014)

There are over 200 informal settlements in Nairobi. Kayole - Soweto slum was chosen purposively, being that it is among the largest slums in Nairobi and few studies have been done on solid waste management in Kayole Soweto. It is home to about 50,000 people according to the 2009 census which forms our general population of the study.

### **3.4 Unit of Analysis**

The first step in deciding how to analyse the data is defining the unit of analysis (Harwell, 2011). A unit of analysis is the ‘who’ or the ‘what’ the analysis of the study is based on. In this study the unit of analysis is the household and whether they participate in solid waste management in Kayole-Soweto slum.

### **3.5 Sampling of sub sites and respondents**

#### **3.5.1 Sub-Sites**

This study was conducted in Kayole Soweto in Nairobi County. The settlement has 9 zones namely Muoroto, Mzesa, Shauri yako, Kibagare, Gitau, Bahati, Muungano, Muthaiga and Central. In consultation with the chief and other leaders, we purposively sampled 3 zones where waste problem disposal is highest; they were Bahati, Shauri Yako and Mzesa.

#### **3.5.2 Heads of households**

In consultation with zone leaders of the sampled three zones, I sampled households within the zones. Each zone had residential blocks and we targeted 10 blocks within each zone. With guidance of leaders of the zones sampled, we selected the 10 blocks ensuring that they were well spread out in the zone. In each dwelling block we had 5-10 dwelling units. We randomly selected three of the units where house heads were present giving a total of 30 households per zone and 90 for the three zones.

### **3.6 Data Collection instruments**

We collected primary data using a semi structured questionnaire containing closed and open ended questions. It was administered to the respondents by the researcher and research assistants. The respondents of the study were heads of households and in cases where such heads were not present the oldest/most senior adult available was interviewed.

The collected data was sorted and edited in order to detect any inconsistencies during data collection. It was cross – checked and cleaned for accuracy and completeness then entered into the computer for analysis.

### **3.7 Data analysis**

The study utilized descriptive statistics available in Statistical Package for Social Scientists (SPSS) software which provided frequencies, graphs and cross tabulations.

### **3.8 Validity of Research Instruments**

The study tested content validity which helped us to assess the degree to which the instrument measured what the test was designed to measure and for this to exist, the techniques used were meant to yield information that was not only relevant to the study hypothesis but also in terms of relevance and corrections. In this study content validity was tested by consulting lecturers, colleagues, supervisor and correcting errors (Karanja, 2013).



### **3.9 Reliability of Research Instruments**

Reliability is the degree to which an assessment tool produces stable and consistent results. In this study the researcher employed the pre-test method to establish reliability involved in administering the instruments to a group of subjects with similar characteristics. The number in the pre-test was 10 % of the entire sample (Wanjau & Muthiani, 2012). Cronbach (1951)'s correlation coefficient of 0.7 and above was deemed reliable for the administration of the questionnaires. The instruments were then adjusted where necessary in order to achieve the best results for this study.

### **3.10 Ethical Considerations**

The study considered a number of ethical issues since in the collection of data, the researcher interacted with the respondents during interviews. First, the researcher avoided plagiarism, not presenting other peoples' work as an original piece. Any ideas borrowed from other authors and researchers were properly acknowledged. Second, the researcher did not abuse the privileges and powers associated with her level of training, experience and institutional and legal authority to undertake the study. The researcher did not also abuse the trust from the respondents and their families. The privacy and the confidentiality of the respondents were also observed and their consent obtained prior to their voluntary participation. Importantly, the researcher endeavoured to prevent any physical or psychological harm to the respondents. Anonymity was also upheld by not revealing the respondents' identity.

Equally important was the obtaining of an approval letter from the University of Nairobi and research permit from the National Commission on Science, Technology and Innovation (NACOSTI).

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRENTATION

#### 4.1 Introduction

This chapter presents the results of the study showing the level of participation of households in solid waste management in Kayole Soweto informal settlement. The chapter presents results as stipulated in the objectives.

#### 4.2 Profiles of households

Our first objective was to examine the profiles of households including gender, age in years, level of education, marital status and occupation. We expected these profiles to be associated to Solid Waste Management.

##### 4.2.1 Gender

The researcher sought to establish the gender categories of the respondents. We expected more women to handle Solid Waste of their households and to participate more in its management. Their responses are highlighted in the Table 2 below.

**Table 2: Distribution of the respondents according to their Gender**

Description	Frequency	Percent
Male	56	62.2
Female	34	37.8
<b>Total</b>	<b>90</b>	<b>100.0</b>

From the findings, 62.2% of the respondents were males and 37.8% were females; majority of the respondents were males. Although females were fewer in the sample, it was likely that they participated more in Solid Waste Management. Women are more involved in waste separation than men in the household. Its women who know and decide what is useful and what constitute waste.

#### 4.2.2 Age

Households participating in solid waste management were owned by household heads aged between 30-39 years (47.8%) followed by those below 29 years (9.0%), 40-49 years (32.2%) above 50 years (11.0%) . This indicated that most households in Kayole – Soweto that participated in solid waste management were younger with heads that fell in the age bracket of 30-39 years. This is the age where someone is active and full of energy to participate in clean up exercises as well as join groups that help in waste management.

**Table 3: Age bracket of the respondents**

<b>Age bracket of the respondents</b>	<b>Frequency</b>	<b>Percent</b>
Below 29 years	9	9.0
30-39 years	43	47.8
40-49 years	26	32.2
Above 50 years	12	11
<b>Total</b>	<b>90</b>	<b>100.0</b>

### 4.2.3 Level of Education

All household heads participating in solid waste management had some level of education with those with primary education as the majority (41.1%) followed by secondary school (28.9%), college diploma (16.7%) and finally a minority with university education (13.3%). We expected educated people to likely participate more in SWM. High level of education is associated with increased knowledge and awareness which inculcate in people the preference for a hygienic environment.

**Table 4: Level of Education**

<b>Level of Education</b>	<b>Frequency</b>	<b>Percent</b>
Primary education	37	41.1
secondary school	26	28.9
college diploma	15	16.7
university education	12	13.3
<b>Total</b>	<b>90</b>	<b>100.0</b>

### 4.2.4 Marital Status

From Table 5 the study established that majority (57.8%) of the respondents were married while 23.3% were single and 18.9% declined to respond on this question possibly because they considered the question too personal. This means that the majority of the respondents were married and also this findings are consistent with the findings on age of the respondents which shows that majority of the respondents were between the ages of 30-39 years. We expected married respondents to be more involved in SWM.

Women are more involved in waste separation in the household; it's them who decide what useful thus participating more in waste management

**Table 5: Marital Status of the Respondents**

<b>Marital Status</b>	<b>Frequency</b>	<b>Percent</b>
Single	21	23.3
Married	52	57.8
Declined to respond	17	18.9
<b>Total</b>	<b>90</b>	<b>100.0</b>

#### **4.2.5 Occupation**

From Table 6, 30% of the respondents were employed, 28.9% self-employed and 41.1% unemployed. Employed people were likely to participate more in SWM. Employed people have ability to engage the services of private garbage collectors as well as cleaners to ensure the compounds and its surrounding are well kept.

**Table 6: Gender characteristics of respondents**

<b>Occupation</b>	<b>Frequency</b>	<b>Percent</b>
Employed	27	30
Self-employed	26	28.9
Unemployed	37	41.1
<b>Total</b>	<b>90</b>	<b>100</b>

These results show that most of the household heads who participated in solid waste management in Kayole Soweto were males within the age bracket of 30-39 years. This is the age where a member is active and well energised to participate in community activities. The household heads had some level of education with the majority having primary education. We expected those who were married to participate more in SWM than the single ones which is consistent with other studies such as (Banga, 2013) which associated women household heads with involvement in waste separation in a household. They argued that it is women who know and decide what was useful and what constituted waste. Those who were unemployed also had the time to participate more in activities of the community such as managing waste unlike their counterparts who were employed.

### **4.3 Level of awareness on Solid Waste Management**

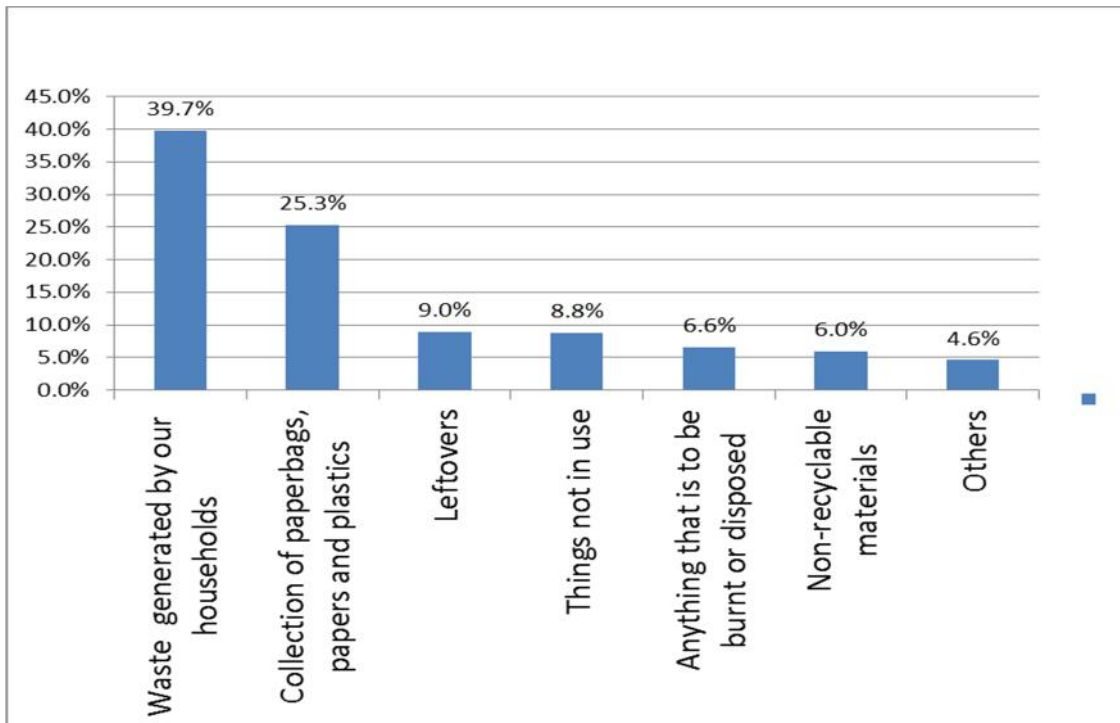
The second objective of the study was to assess the level of awareness of household heads on solid waste management. The indicators were: awareness on the method of waste disposal, health effect of poor waste disposal, awareness of waste recycling and meaning of recycling.

#### **4.3.1 Awareness on the meaning of solid waste**

First, we wanted to establish households' awareness on the meaning of solid waste. Of all the responses obtained, 39.7% were of the view that SW was waste generated by their households, 25.3% said it was collection of bags, papers and plastics, 8.8% said it was things not in use, 6.6% said it was anything to be burnt or disposed, 5.3% said it was materials that are non-recyclable. Other responses were that, 3.3%, said it was materials that were

non-recyclable, 4.4% left over, 4.6% something like left overs in the community of the urban, 2.2% said its poor waste management and 1.1% said its materials that are non-recyclable

**Figure 1: Distribution of the household’s heads according to their Definition of Solid Waste**

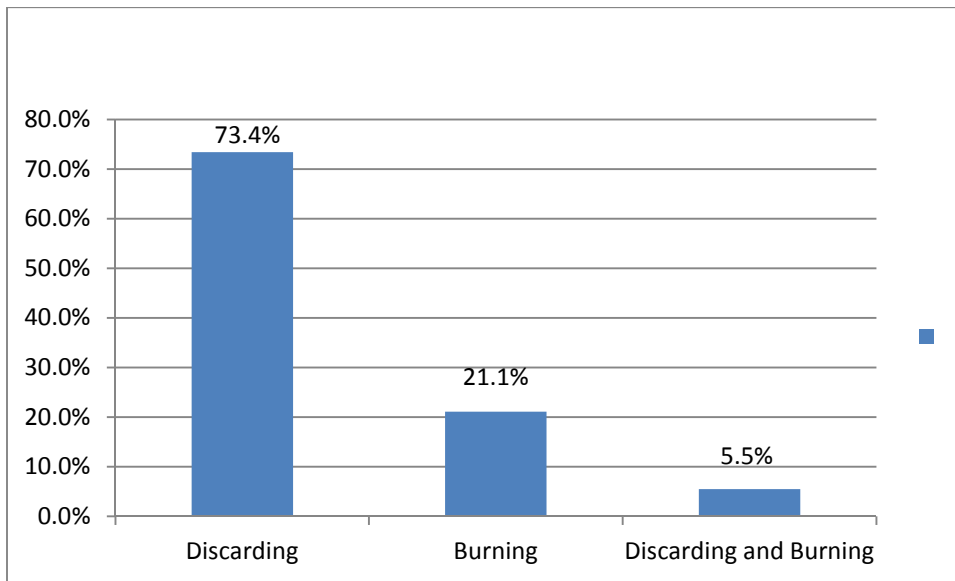


#### 4.3.2 Awareness on Method of disposal

The researcher also wanted to establish the households’ awareness on the method of solid waste disposal and the results are presented in Figure 4.3. “discarding” emerged to be the most popular method (73.3%) followed by burning (21.1%) and the last was a combination of “burning and discarding” which was 5.5%.



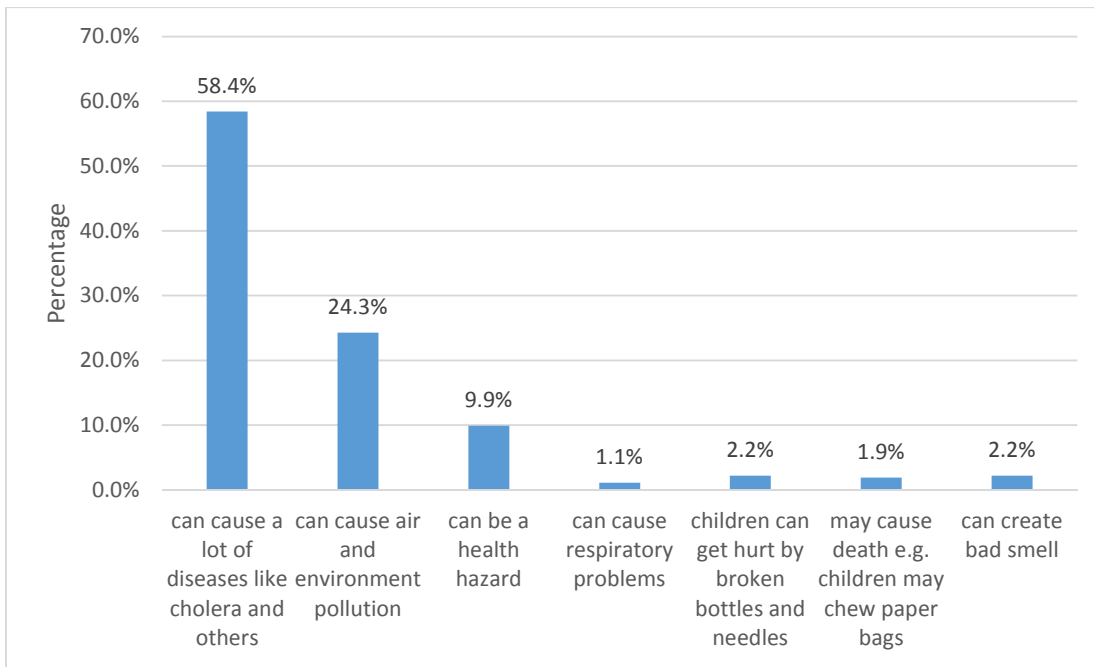
**Figure 2: Distribution of the household heads according to their awareness methods of Solid Waste disposal**



#### **4.3.3 Awareness on effect of poor waste disposal on health**

We also assessed the knowledge of households on the effects of poor waste disposal on health and the results presented in Figure 4.4 indicate that a majority (58.4%) thought that poor waste disposal could cause diseases such as cholera. These were followed by other responses which were closely related i.e. “could cause air and environment pollution” (24.3%). Other responses included, could cause respiratory problems, children could be hurt by broken bottles and could cause death to children who chewed paper bags (16.4%).

**Figure 3: Distribution of the respondents according to their awareness on effects of poor waste disposal on their health.**



#### 4.3.4 Awareness of waste recycling

The situation of whether the respondent had ever heard of waste recycling or not is presented in Table 11. A majority (73.3%) of the respondents indicated that they were aware of waste recycling, while the remaining 26.7% were not aware of waste recycling.

Table 7: Respondents Distributions on Separation of solid waste by household

<b>Response</b>	<b>No. of Respondents</b>	<b>Percent</b>
Yes	66	73.3
No	24	26.7
<b>Totals</b>	<b>90</b>	<b>100.0</b>

#### 4.3.5 Awareness on meaning of waste recycling

When asked what was meant by waste recycling the responses were: collection, separation and cleaning of waste (6.6%), processing of collected used waste materials into new products to prevent waste (67.7) and process of used waste materials (25.6%).

**Table 8: Respondents Distributions on Meaning of waste recycling**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percent</b>
Collection, separation and cleaning of waste	6	6.6
Processing of collected used waste materials into new products to prevent waste	61	67.8
Processing of used waste materials	23	25.6
<b>Totals</b>	<b>90</b>	<b>100.0</b>

It was clear that of the respondents interviewed, a minority (39.7%) were aware of what solid waste meant, meaning that a majority of the residents still did not understand the definition. On the effects of poor disposal method on their health, majority (58.4%) were aware of the effects on their health as they knew that it would cause diseases.

#### 4.4 Level of participation of the respondents in solid waste management

The third objective was to determine level of participation of households in Solid Waste Management. The indicators were: waste generated in the household, type of waste generated, separation of solid waste by household and waste recycling.

#### 4.4.1 Waste generated in the household

All of the respondents interviewed (100%) were in agreement that they generate wastes in their households.

#### 4.4.2 Type of waste generated

When asked on the type of waste generated, 23.3% of the respondents said it is organic, 8.9% said the waste generated were plastics, 32.4% were of the opinion that its paper bags, while 35.4% agreed that it's both plastics and paper bags.

**Table 9: Respondents Distributions on Type of waste generated**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percent</b>
Organic	21	23.3
Plastics	8	8.9
Paper bags	29	32.4
Both plastics and paper bags	31	35.4
<b>Totals</b>	<b>90</b>	<b>100.0</b>

There were different types of waste generated. The type of waste generated usually depended on the items used and consumed. The items commonly used in the households included packaging materials, papers, pens, food remains, old clothes and plastics.

#### 4.4.3 Separation of solid waste by household

Respondents of the study were also asked to indicate whether they separated solid waste within the household. Majority of the respondents (48) were in agreement that they did not separate solid waste while 46.7% agreed that they separated their solid wastes. They did so by either burning them off, disposing off the non-recyclable wastes and paper bags.

**Table 10: Distributions of the respondents on Separation of solid waste by household**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percent</b>
Yes	42	46.7
No	48	53.3
<b>Totals</b>	<b>90</b>	<b>100.0</b>

#### 4.4.4 Household recycling of solid waste

Respondents of the study were asked to indicate whether they recycle solid waste within the households. Majority of the respondents (86.7%) were in agreement that they did not recycle solid waste while only 13.3% agreed that they recycled their solid wastes, mainly plastics, bottles and organic waste.

**Table 11: Respondents Distributions on recycling of solid waste by household**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percent</b>
Yes	12	13.3
No	78	86.7
<b>Totals</b>	<b>90</b>	<b>100.0</b>

#### **4.4.5 Frequency of solid waste collection from the area of residence**

When asked to indicate the frequency at which solid waste from their area of residence were collected, all the respondents agreed that they were collected on a weekly basis.

#### **4.4.6 Challenges face on solid waste management**

When we asked the respondents about the challenges they faced in SWM within their households, majority said that the county government did not sort solid wastes for a number of reasons. They noted first that sorting solid wastes at the source was a public health risk especially in densely populated informal settlements, as contaminants were likely to crawl back and infect residents. Secondly, there was no space in the informal settlements for extra containers for sorting solid wastes.

#### **4.5 Support by self-help groups and other agencies**

The fourth objective of the study was to determine the support provided to house heads by self-help groups and other agencies to help them manage Solid Waste. This was through either education or training offered or provision of other services that helped in waste management.

#### 4.5.1 Agency helping in Managing Solid Waste

Figure 4.5 below shows that a majority (62.2%) of respondents reported the presence of agencies that offered them support on solid waste management, while 37.8% of the respondents reported lack of agency to support waste management.

**Table 12: Distribution of the respondents according to support by development agencies**

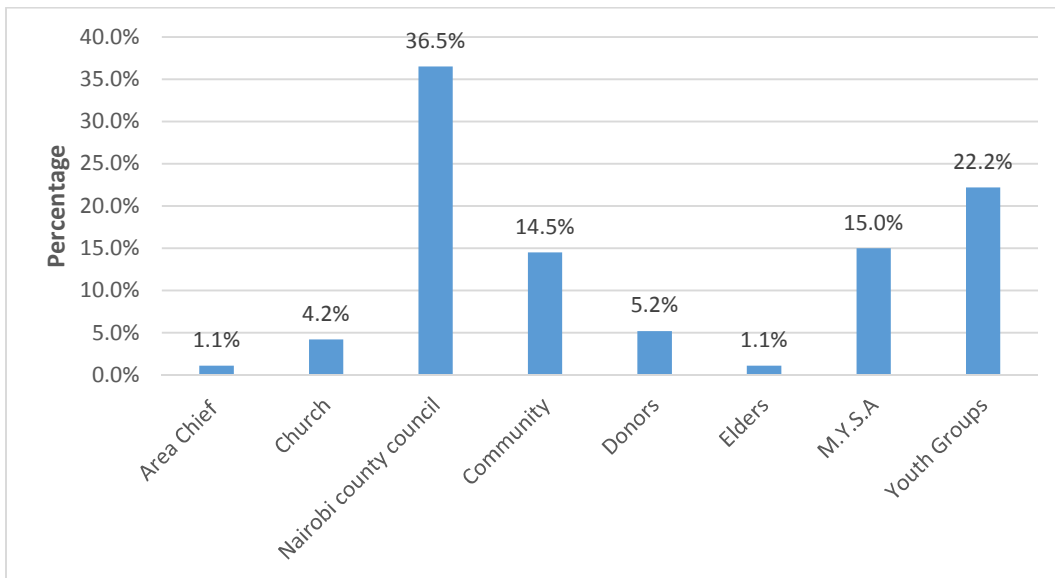
<b>Description</b>	<b>Frequency</b>	<b>Percent</b>
Yes	56	62.2
No	34	37.8
<b>Total</b>	<b>90</b>	<b>100</b>

#### 4.5.2. Agencies that Organise Solid Waste Management process in Kayole-Soweto

Figure 4.6 indicates that a majority (36.5%) of the respondents mentioned the Nairobi County government. This was followed by the community (14.5%), Mathare Youth Sports Association (MYSA) (15%), church (4.2%), youth groups (22.2%), area chief (1.1%), elders (1.1%) and donors (5.2%). When these results were examined critically, we realized that there are only five categories of SWM organizers which were: Nairobi County government, the community (elders, MYSA, youth groups), national government agency (area chief), religious agency (church) and donors.

When the SWM organizers were categorized in this manner then we ended up with Nairobi county government leading with 36.5%, followed by the community (21.1%), church (4.2%), donors (5.2%) and nation government agency (1.1%).

**Figure 4: Distribution of the respondents according to types of agencies supporting them in SWM**

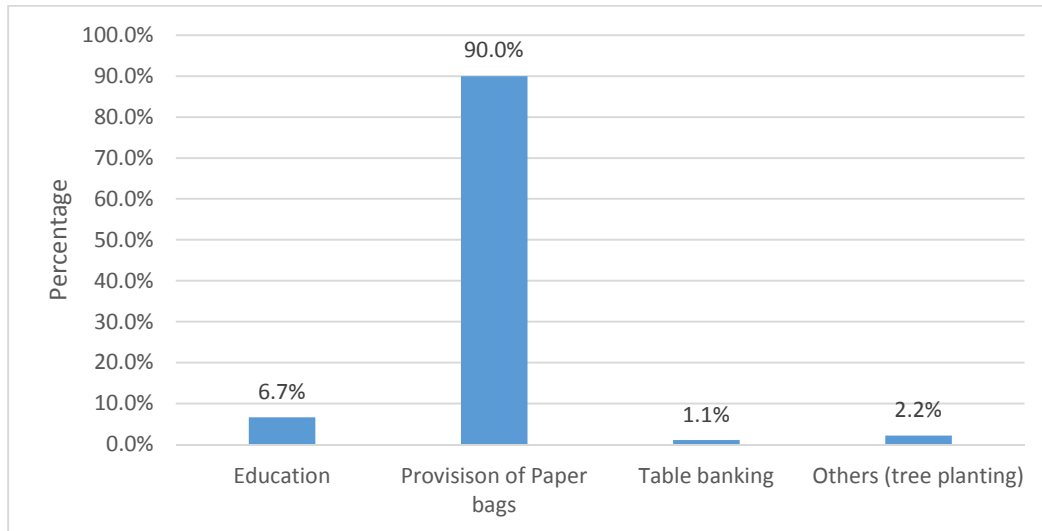


#### 4.5.3 Type of support offered by SHG or Agencies

Members of the households were asked about the type of support offered by their self-help group and the most popular response (90%) according to Figure 4.7 was that these self-help groups provided them with paper bags to put their waste. Education on Solid Waste Management, as a support, came a distant second mentioned by 6.7%.



**Figure 5: Distribution of the respondents according to the type of support they received from agencies**



From these responses, it is clear that, a majority reported to have an agency that manages waste in their community, with the Nairobi City County having been rated the highest. A majority of the respondents had received support from the SHG and other agencies in the form of paper bags and education on SWM.

#### **4.7 Conclusion**

In terms of profiles there were more males in sample although it was likely that females were more involved in SWM. There were also younger people although more were of primary school level. It was likely that the younger people who were better educated were likely to participate more in SWM.

Majority were aware of SW although they defined it differently .They were also aware of its disposal and recycling. Of the agencies that supported in SWM, the city government was ranked highest.

All of the household heads sampled participated variously in SWM by throwing, burning and recycling.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATION

We set out to examine participation of households in solid waste management in Kayole-Soweto in Nairobi County, Kenya and we sampled 90 heads of households. The dependent variable was “ participation in Solid Waste Management” and our independent variables were household profiles, level of awareness, and support of the households by CBOs & agencies. Descriptive statistics in the form of frequencies were used in analysis. From the findings it was evident that there were more males in the sample although it was likely that females were more involved as is its women who know and decide what was useful and what constituted waste; and that they were more likely to separate and dispose of solid waste from the house holds than men (Banga, 2013 & Ekere et al., 2009). Younger people from the age of 30-39 years participated more in solid waste than the older people, this could be so because at this age they are energetic enough to be involved in managing waste. Although older people tend to be more risk averse than younger ones, in this case it was not so.

Those who participated in managing solid waste had at least some level of education with the highest being the primary level, This is in line with Ekere et al and Panyako et al who study associated level of education with increased knowledge and awareness which inculcate in people the preferences for a hygienic environment and the need for environmental protection

There were more unemployed respondents in the sample although the employed were more likely to participate in solid waste management. This is in line with a study by Panyako *et al.*, (2015) who posied that the level of income is a determinant factor of households' management of drains near their compounds; disposal of solid waste and garbage from households and handling of waste water from households. The level of income is a strong socio-demographic predictor of environmental attitude and those with a higher income were more likely to hire private garbage collectors.

Majority of the respondents were married people, this was expected as married people were more likely to participate as women are associated with proper management of waste.

Majority of the respondents were aware of solid waste, though they defined it differently. They were also aware of its disposal and recycling, on the waste disposal majority of the responded reported to be throwing waste, without proper waste disposal it's very difficult to manage waste generated in the households, this is in line with Grandy,2004 who emphasized that challenges of reduction of waste generation to manageable or acceptable levels and the proper disposal of the generated waste.

A majority of the respondents were aware of waste recycle and its meaning,Gandy,2004 states that for sustainable waste management practices and facilities proper waste management structures for recycling, reusing ,reducing and collection from sources should be designed and implemented. From the findings, it was evident that a majority of

those who participated in solid management were aware of waste recycling and its meaning, hence needed more sensitization on the same for them to put it in practice and participate effectively.

On awareness on poor waste disposal on their health, majority of the respondents were aware that poor waste disposal could cause disease, from this it was clear that even with poor waste disposal methods respondents were aware of its effect on their health, Njoroge et al.2003, noted that informal settlements did not have the capacity to pay for services from private waste managers hence they were vulnerable to waste management problems such as health, safety and environmental hazards.

On the support by self-help groups and other agencies, majority indicated that the presence of an agency with Nairobi County leading as an agency that organise solid waste management. From the empowerment theory which is defined by Ledwith as the act of providing necessary tools to shape the whole person and promote a critical way of thinking and consciousness, youth and women groups needed to be empowered for them to participate more in solid management. This was in line with the National Waste and Recycling Association which states that “Local self-help groups and households could participate in solid waste management in various ways. For instance, youth or women groups could be formed to carry out sustainable waste management initiatives”.

The key objective of such groups should be to design and implement systems of household waste disposal that provide them alternative sources of income.

On the level of participation in SWM, all of the households heads sampled participated variously. On the type of waste generated a majority indicated plastics and paper bags. Majority of the responded indicated that they separated waste and that they didn't recycle waste, despite of their being aware of recycling, they didn't practice it.

In 2010, population of Nairobi City was estimated at 3.1 million. In the same year, the total amount of waste generated was estimated at 3,121 tonnes per day, translating into an average of 0.59kg per person per day. About 68% of this waste was noted to be from households while only about 25% of the total waste was collected in 2010 (Njoroge *et al.* 2013). From this it was clear that waste generated was not disposed appropriately, but with adoption of proper separation and recycling techniques the problem could be contained.

### **5.3 Conclusions**

This study's aim was to examine participation of households in solid waste management in Kenya's informal settlements and it established that all households participated in Solid waste management. In terms of profiles there were more males in sample although it was likely that females were more involved in SWM. There were also younger people although more were of primary school level. It was likely that the younger people who were better educated were likely to participate more in SWM.

Majority were aware of SW although they defined it differently .They were also aware of its disposal and recycling though they didn't practice the SWM owing to lack of the necessary techniques of how to do it. Majority (73.3%) of Kayole – Soweto households used “throwing” as their method of solid waste management and they were also aware of health and environmental effects of poor waste disposal.

All of the household heads sampled participated variously in SWM by throwing, burning and recycling.

Results on Solid Waste Management's organizers have indicated that the Nairobi County Council was the main organizer of solid waste management (36.5%). This left the Kenya's government and Donors playing a minor role i.e. 1.1% and 2.2% respectively.

## **5.4 Recommendations**

### **5.4.1 Recommendation for Programs**

- a. There is need to create awareness about integrated solid waste management and especially on how households can reduce, reuse and recycle the generated solid wastes at the household level by the County government
- b. NEMA and the County government should implement programmes, and work out policies with regard to waste handling, right from the source to the recycling/composting/recovery centres.
- c. The County government should facilitate collection of fee for waste collection from the households; a system incorporating paying stations as well as field clerks

- could be introduced. The area could be divided into small sections and each section to have persons responsible for fee collection and receipting. An action could be taken for defaulters. However, the fee should be minimal to encourage people to pay.
- d. The organizations should make use of available technologies to convert the waste materials into other economically important products to generate money to run the programme. The separated materials could also be sold out to those who can recycle them.
  - e. Empowerment is to be done to women and youth groups in the Kayole Soweto for its them who directly encounter and deal with solid waste

#### **5.4.2 Recommendation for Further research**

Further research should be conducted on determinants of household participation in Solid Waste Management in Kenya's informal settlements.



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## APPENDIX 1: Questionnaire

### Participation in Solid Waste Management in Kayole Soweto Informal Settlement

My name is Christine Machio, I will be conducting a study on solid waste Management and how participation of households is key to its success in your area. Please, note that all the information given shall be purely used for academic purposes and shall be treated as confidential. **Please notes that participation is voluntary**

#### Part A: Household profiles

1. Please indicate your Gender: Male ( )

Female ( )

2. How old are you?

( ) Below 29 Years                      ( ) 30 – 39 Years

( ) 40 – 49 Years                      ( ) Above 50 Years

3. What is your highest level of education?

No education                      ( )

Primary school                      ( )

Secondary school                      ( )

College diploma                      ( )

University degree                      ( )

4. How many years have you been a resident in this area?

Less than 5 years                      ( )

6-9years                      ( )

11-15years                      ( )

Over 16years                      ( )

5. How many people live in this household?

1-3 ( ) 4-5 ( ) above 6 ( )

6. What is your marital status?

Single ( )

Married ( )

Divorced /Separated ( )

Widowed ( )

7. What is the main occupation for yourself and your spouse?

	Self	Spouse
Employed	-----	-----
Unemployed	-----	-----
Self-employed	-----	-----

8. How many children do you have?

Young out of school.....

Nursery.....

Primary school.....

Secondary school.....

Training college/University.....

Working.....

Unemployed staying with you.....

**Part B: level of awareness on solid waste management**

9) What is meant by the following?

Solid waste

.....  
.....

10) What method does your household use in solid waste disposal?

Burning.....

Throwing.....

Recycling.....

11) What are effects of poor waste disposal on the health?

.....  
.....

12) At which points is garbage collected in this area?

.....  
.....

13) Which agencies handle solid waste in this area?

.....  
.....

**Part C: levels of household solid waste management**

14) Are there any waste that you generate in your household?

YES.....NO.....

15) If yes, what type of waste do you generate?

(a) Organic (b) Plastics (c) Paper bags (d) Others (Specify)

16) Do you separate solid waste within your household?

Yes.....No.....

17) If yes, in which way.....?

18) Have you ever heard of waste recycling?

Yes.....No.....

19) If yes, what is meant by waste recycling?

(a) Processing of used waste materials

(b) Processing of collected used waste materials into new products to prevent waste

(c) Collection, separation and cleaning of waste

(d) Other (Specify)

20) Does your household recycle its solid waste?

Yes.....No.....

21) If yes, which of the following types of waste does your household recycle?

(a) Plastic (b) bottles (c) Paper bags( d) Organic waste( e) Others (specify).....

22) How frequently is solid waste collected from your area of residence?

More frequent (weekly).....

Frequent (fortnightly).....

Less frequent (once a month).....

Rarely (once every 3months).....

23) What are some of the challenges you face with regards to solid waste management within your households?

.....  
.....



**Part D: support through Self Help Group and other agencies**

24) Are there any groups that carry out solid waste Management in your area?

Yes.....No.....

25) If yes, are you a member of one of them?

Yes.....No.....

26) If yes, what is the name of your Self Help Group.....

27) What activities does your group carry out?

.....  
.....  
.....

28) In what way has the SHG supported you to carry out Solid waste management?

Provision of paper bags ( )

Education ( )

Others (Specify).....

29) Have you participated in any community-wide cleaning campaigns?

Yes.....No.....

30) If yes, who organized it.....?

31) What activities did you carry out?

.....  
.....

32) Are there agencies that collect solid waste in your area?

Yes.....No.....

33) If yes, which ones

.....  
.....

34) Do you pay for the collection service?

Yes.....No.....

35) If yes, how much per month (KSH).....

36) Apart from S.H.Gs and collection companies, has your households been supported by other agencies? Yes.....No.....

37) If yes, which ones.....

38) In which way was your household supported?.....

35) Any comments/suggestions

.....  
.....

*Thank you for your cooperation*