**URBANIZATION AND SOLID WASTE MANAGEMENT IN KAMPALA METROPOLITAN AREA: A CASE STUDY OF BWAISE-11 PARISH, KAWEMPE DIVISION**

**By:**

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# DECLARATION

I Kibanda Noah hereby declare that the work presented in this proposal is original and has not been presented to any University or institution of higher learning for any academic award and where the work of others have been used, due acknowledgement has been made.

Sign……………………………….

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Date:…………………………….

# APPROVAL

This dissertation has been submitted with my approval as the supervisor from the School of Business and Information Technology of Nkumba University.

Signature…………………………… Date………………

Mrs. Asiimwe Violet

**Supervisor**

# DEDICATION

It is with genuine gratitude and warm regard that we dedicate this work to

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# LIST OF ACRONYMS

WAU WaterAid Uganda

SWM Solid waste management

UBOS Uganda bureau of statistics

MSW Municipal solid waste

NUP Uganda National Urban Policy

MSWM Municipal solid waste management

KCCA Kampala City Council

SWMO Solid Waste Management Ordinance

# ABSTRACT

The study examined the relationship between Urbanization and Solid Waste Management in Bwaise II. It was guided by three objectives, to examine how urbanization influences solid waste accumulation in Bwaise II, to assess how urbanization influences solid waste collection in Bwaise II, to find out how urbanization influences transportation in Bwaise II.

The study adopted a positivism and phenomenological approaches and used both qualitative and quantitative research approaches. The study population was 145 and a sample size of 124 respondents. The study revealed that solid waste accumulation had Adjusted R Square of 34.9%, while solid waste collection had Adjusted R Square of 54.2% and solid waste disposal had Adjusted R Square of 18.0%.

In conclusion, it is noted that there is a statistically significant relationship between urbanisation and solid waste management and hence the null hypothesis was rejected. This is because all the p-values for the research objectives were below the alpha of 0.05.

The study suggested that Bwaise II management through its health department should hatch strategies of ensuring the community is committed to preventing and minimizing waste generation as well as its sorting at the household level. It was also suggested that Bwaise II in partnership with the Local Community should establish and develop composting initiatives, collection centers for recyclable waste, collection segregated waste.

# CHAPTER ONE

# INTRODUCTION

# 1.0: Overview

This chapter presents the background to the study, statement of the problem, purpose of the study, research objectives, research questions, and hypotheses of the study, scope of the study, the significance of the study and the arrangement of the study.

# 1.1: Background of the study

This study set out to examine the relationship between Urbanization and Solid Waste Management in Kampala Region. It focused on Bwaise II Parish as the case study.

**Urbanisation**

According to (Achankeng 2003); It would be erroneous to attribute the current trends of urbanization in Africa and the rest of the developing world solely to the relatively recent globalization process. It is so believed that African urban history starts with the introduction of foreign religions (Christianity and Islam), slave trade, colonialism, and neo-colonialism (Achankeng 1995). Over the past millennium, Africa’s people and cultures have been subjected to dramatic external interventions and influences enmeshing them firmly with the world system. The successive conquests, colonization and associated cultural imperialism of Arab and European, Islam and Christianity, the hemorrhaging of literally millions of Africans constituted by the slave trade, and more recently the rapid modernization and spread of capitalist consumerism have all transformed and internationalized cultures, conceptualizations, and commodities (Simon 1997). According to recent sources, Africa is 38 percent urban, making the region the least urbanized in the world; however, it is catching up fast with the world’ s most rapid urban growth rate of nearly 4 percent per annum (United Nations Population Division 2002); (Hardoy et al. 2001:28)

In Uganda, the concept of urbanization is believed to have sparked off in the early 1990’s in Kampala. Although many literatures in relation to Kampala’s urbanisation are not exhaustive enough to provide a holistic view, especially when compared to the dynamics that need to be understood as per the list outlined by Nyakaana (2013), the informal dynamics explaining Kampala’s urbanisation from 1990 to 2013 and their policy implications are believed to be the starting gear of this concept throughout other regions in the country. Uganda is still in the early stages of urbanization. About 20% of Uganda’s population lives in urban areas while the rest live in rural areas. Although the level of urbanization is relatively low, the rate at which Uganda is urbanizing, estimated at 5.2% is very high by international standards. According to the Uganda Population and Housing Census (2014), it is projected that half of the Country’s population will be urbanized by 2050. This therefore necessitates deliberate action to prioritize integrated planning of urban areas to harness their potential as engines of economic growth (NUP, 2017).

**Solid waste management**

Open uncontrolled dumping is, was and still the most common method of solid waste disposal in developing countries. Although the environmental consequences are often quite evident, the problem is seldom dealt with (Okot-Okumu, 2011). The evolution of solid waste management is based from primitive origins through the development of open dumps in ancient civilizations of the world to the sophisticated collection and disposal. In most developing countries it is the urban authorities that have been responsible for waste management. From the colonial times, solid waste management was purely centrally controlled by systems monopolised by the urban authorities (Luis, 2012).

Waste management in urban centres of Uganda and other East African states has for a long time been centralised (Liyala 2011), with the use of imported refuse truck (Okot Okumu & Nyenje 2011) that collect wastes from sources or transfer point and deliver to designated waste dumps. Municipal solid waste management (MSWM) system in East Africa has changed from the colonial days in the 40s, 50s and early 60s when it was efficient because of the lower urban population and adequate resources (Okot-Okumu & Nyenje 2011) to the current status that displays inefficiencies. The centralised waste management system has evolved into the current management mixtures that include decentralised as well as the involvement of the private sector which is also a mechanism supported by the (SWMO, 2000). To curb this overwhelming waste capacity, Kampala City Council (KCCA) Solid Waste Management Ordinance (SWMO) of 2000 outlines the key concerns that the authority should address in order to manage waste effectively among which include the use of skips (containers) availed by council for public use as part of the council’s solid waste collection system.

Bodo, (2019) defines Urbanization as the steady increase in the number of people living in cities or urban centres. The Uganda National Urban Policy, (2017) defines Urbanization as a population shift from rural to urban areas; it is the gradual increase in the proportion of people living in urban areas and the ways in which each society adapts to the change. It is predominantly the process by which towns and cities are formed and become larger as more people begin living and working in urban areas. Urbanization is an index of transformation from traditional rural economies to modern industrial one. It is progressive concentration (Davis, 1965) of population in an urban unit.

According to Panday (2005), Solid waste means that material that is made up of residential, domestic, institutional, commercial, agricultural and industrial; it includes garbage, rubbish, ashes, street refuse, dead animals, abandoned automobiles and sewage sludge. However, (Misra and Panday (2005) define Solid waste referring to any material with no direct value to the producer and so must be disposed of. Panday (2005) further pointed that “a solid material becomes waste when it is discarded without expecting to be compensated for its inherent value”. (Epstein, 2015) in addition, defined Solid waste to consist of MSW (garbage), which may contain discards of pet feces, contaminated tissues from humans, contaminated food waste (e.g., chicken with *Salmonella*), and other contaminated sources. Eliot further asserts that, Solid waste includes the following: MSW or garbage, Sewage sludge and biosolids (treated sewage sludge), Septage, Manure and Human excrement from domestic sources that do not have municipal dis­posal facilities.

In addition, (United Nations 1995, World Bank 1995 and 1998, UNEP/SPREP 1997) also categorised wastes according to their generation and characteristics amongst which include: (1) Municipal solid waste (MSW) which is generated from households, offices, hotels, shops, schools and other institutions; (2) Industrial solid waste which encompasses a wide range of materials of varying environmental toxicity such as paper, packaging materials, waste from food processing, oils, solvents, resins, paints and sludges, glass, ceramics, stones, metals, plastics, rubber, leather, wood, cloth, straw, abrasives, etc; (3) Agricultural Waste and Residues which include livestock waste, agricultural crop residues and agro-industrial by-products and; (4) Hazardous Waste which is generated from rapid development in agriculture, industry, commerce, hospital and health-care facilities, and the consumption of vast quantities of toxic chemicals (ESCAP 1997, UNEP/SREP 1997).

According to UN-HABITAT, (2010), solid waste (such as Garbage, trash, waste, rubbish) is viewed as an unwanted material generated from human and animal activities that are normally solid and are considered as useless or has no consumption value to the person disposing it. The possible sources of solid waste include households, commercial activities such as food markets and offices, and institutions such as schools, hospitals and transportation terminals.

Disposal means the final placement or riddance of wastes, excess, scrap, etc., under proper process and authority with (unlike in storage) no intention to retrieve.According to the SWM Ordinance of 2000, Section VI (3); it states that a holder of a permit shall dispose of all solid waste in accordance with the method approved by the council and at an approved site and approval must be obtained in advance (before) the commencement of the operations and before any change of method of disposal or site.

Solid waste management (SWM) as defined by Othman (2002) is the control of waste generation, collection, storage, transfer and transport, processing and disposal consistent with the best practices of public health, economics, and financial, engineering, administrative, legal and environmental considerations. In addition, SWM requires the creation, reducing, categorizing, supervising, handling, treatment, reprocessing and enduring of solid waste in the most effective and efficient methods possible (Nabukeera, 2014). Waste management is one of the most visible urban services whose effectiveness and sustainability serves as an indicator for good local governance, sound municipal management and successful urban reforms. Waste management therefore is a very good indicator of performance of a municipality.

Under Part II of the ordinance, every owner or occupant of any dwelling or commercial premises is held responsible for the waste generated at those premises until it is collected by the council, its appointed agents or operators licensed by the council. In the same discipline, no person is allowed to place, deposit or allow any solid waste to be placed or deposited on his or her premises or on private property, on a public street, roadside, or in a ditch, river, stream, lake, pond, canal, channel, park, gulch, ravine, excavation, or other place where it may be or become a public health nuisance. The ordinance further emphasizes that any person who keeps solid waste other than in a manner prescribed by this Ordinance commits an offence which is punishable by law (SWMO, 2000). In supplement to the 2000 ordinance, The Public Health Act, Cap.281, Solid Waste Management Strategy (SWMS), December, 2002, as revised in (2006), Local Governments Act (1997) revised in 2004, The Constitution of Uganda 1995 (amended 2005) and The National Environment (Waste Management) Regulations, S.I. No 52/1999 also provides some guidance for solid waste management in Uganda and Kampala in particular although with some limitations relating to enforcement and sanctions there in. For example SWM ordinance doesn’t provide a mechanism of collecting solid waste generation fees; the National Environment regulations and the Public health act have been challenged with weak punitive measures and lack of staff to enforce (WaterAid Uganda, 2011).

This study will be supported by the Theory of Urban Bias. It states that, the rural people who are described as being parasitized by urban populations, who benefits massively from the consumption of cheap good from the rural settlements and beautiful urban structures from the tax incomes from these rural areas, thus, necessitating the mass exodus of the rural dwellers to cities for greener pastures and an improved standard of living (Bradshaw, 1987; Corbridge and Jones, 2005).

Michael Lipton, a development economist, who is a leading proponent of the urban bias theory; in 1977 explained this theory in his paper by comparing the data of 63 less developed countries and nine developed countries, which revealed that urban-rural disparity is seen to be growing in the poor countries as the governments of these nations tend to intervene in markets in ways that imposes tax on agriculture; whereas the governments of the richer nation were doing the reverse by intervening in ways that confer subsides on farmers (Lipton, 1977; Dixon and McMichael, 2016). This bias in favour of the urban settlements has created disparity between the rural and urban areas; as regard to consumption, wage and productivity levels; necessitating mass exodus of the rural dwellers to cities for greener pastures and an improved standard of living (Bradshaw, 1987; Corbridge and Jones, 2005). Thus, the concept of the theory clearly aligns with the dependent variable of the subject matter which makes it suitable for the study.

This study will also be guided by the solid waste management model developed by Almodo, (2005) which focuses on the ability to bring multi stakeholders together and foster local ownership in collective solid waste management.

Nyakaana et al, (2007) advocated for sustainable urban development of Kampala metropolitan area were all residents in Kampala have a decent living environment, clean water, sanitation, transport electricity and other services. This is in line with Almodo’s model, (2005) who believes that, Sound solid waste management (SWM) is crucial to meet the 2030 Agenda for Sustainable Development.

In 2005, Almodo developed a SWM model to address the lack of waste collection in Niamey. His idea was to provide along lasting solution to the ever-growing problem of solid waste management in urban centres. They collect, sort and recycle waste using transformation processes well-known to the local population, which makes the technology accessible to all. The waste is then recycled into low-cost products in the field of energy, agriculture, building and carpentry, substituting standard goods that impact climate change through deforestation, industrialisation and chemical fertilisation.

The strength of Almodo’s concept lies in its ability to bring multi stakeholders together and foster local ownership. Led by the private company GVD-Afrique, the Almodo concept is based on a partnership between businesses, civil society organisations (CSOs) and city councils. Therefore, through this multi-stakeholder partnership model, Almodo is able to generate true triple bottom line – environmental, social and economic – impacts. First, waste pollution and landfill gas emission at dumping sites are reduced, recycling rates are increased and the products created out of recycling mitigate climate change. In addition, public health is improved, and marginalised communities develop transferable skills and are lifted out of poverty through safe and regulated employment opportunities. Besides increased income at the bottom of the pyramid (BoP), the products (made out of recycled material) are cheaper than their standard (un-recycled) substitutes; both contributing to the increase of the families’ purchase power. Finally, at municipal level, costs of waste management are reduced (up to 80%) and income increased through carbon credits.

According to Mavropoulos (2011), the amount of waste generation is largely determined by two factors: first is the population in any given area, and secondly, its consumption patterns- which are controlled by the evolution of Gross Domestic Product per capita (GDP/c). Thus, as the number of household increases, the average waste generated per household also increases. In Kampala, the annual population growth rate of 5.5% implies that Kampala absorbs 40% of the national urban population and 4.9% of the national population (UBOS, 2002).This has contributed to the 1,200–1,500 tons of garbage generated per day (WaterAid Uganda, 2011).

According to Nyakaana et al, (2007), although, Kampala develops at an increasing rate between 5.2 and 16% per annum (Amayo 2013), it occurs in a disorderly manner (Lwasa, 2014; Ogwang 2013). Mukwaya et al. (2010) observed that the urbanisation policy implications are not comprehensively clear. This is in line with the Uganda National Urban Policy, (2017) which quotes that, the rate of urban growth of 5.2% is remarkably high and if not properly planned, it will inevitably exacerbate the serious social constraints on the rural and urban growth centres. This can be manifested by Kampala’s current population size as statistics indicate that Uganda’s urban areas claim 20% of the country’s estimated 35 million people (World Bank, 2017), but over 40% of these people are residents in Kampala City (Uganda Bureau of Statistics, 2009). This however, has come with a wide range of challenges such as growth of slums, unemployment, and uncontrolled development resulting from weak and poor urban management capacities and most importantly, poor solid waste management.

Poor waste disposal is a nation-wide problem with approximately 13% of urban population disposing waste in gardens, 19% in pits, 32% heaping it in drainages and streets and the remaining 36% of the waste is disposed of on open dump sites. In slums and informal settlements, waste is disposed of anyhow and most times finds its way into water drains which results in blockage of water channels. The disposal of waste in open dump sites presents serious environment and health risks (NUP, 2017).

The case in point of Kawempe Division (were Bwaise II is situated) is one of the five divisions in Kampala City which is experiencing continued suffering of poor SWM characterized by: breeding of vectors, offending odor and poor littering of solid waste (Andrea, 2013). With a total population of 24,481 people living in 6,662 households (KD Population Project Report 2010), the average solid waste generation per household in Bwaise II is 4.71675 Kgs; the parish generates a daily solid waste figure of 31,422.989 Kilograms approximately 31 tons of solid waste per day with an average solid waste generation per person of 1.284 kilograms daily (WaterAid Uganda, 2011). This is attributed to the nature of economic activities (carpentry, metal works, shop keeping, market vending among others) in the area (Aijuka, 2016) as well as the function of the affluence of the household. The wastes generated are mainly composed of food related stuff such as peelings (banana, cassava, and potato peelings (66.1%), plastics (5.7%), dust and sweepings (9.1%), Debris (11%), paper (3.7%), metal and glasses (1.5% and 0.7% respectively) and others (2.2%) (Aijuka, 2016).

According to the study by (WAU, 2011) it revealed that; waste reduction, dumping, recycling and reuse, compositing and incineration /burning are among the main solid waste management approaches employed in Bwaise II at the expense of recycling and garbage reuse of inorganic materials from solid waste- which was not well developed by the informal sector and such activities were seldom unrecognized, supported, or promoted by the Kawempe urban authority as one of the approaches to support garbage management in the area despite their advantages. These inadequate approaches have therefore exposed the community to a range of challenges since 2006 when some private waste collectors were brought on board and empowered under section IV (4) of SWM ordinance of (2000) to charge for the collection and final disposal of solid waste. As a result of this privatisation, many private, collectors and transporters only satisfy the demands of the rich people who can afford the charges. Hence, forcing the poor to dump solid waste aimlessly or else, employ illegal collectors and transporters’ who charge very low fees (between 200 shillings to 1,000 shillings) using poor methods such as use of wheel barrows, bicycles and humans (Kato. G & Alemiga. J, 2017). These challenges can be grouped into institutional challenges, social economic, infrastructural and legal challenges (Water Aid, 2011).

# 1.2 Problem Statement

The Uganda national urbanization policy, (2007) highlights in one of its principles that on top of sustainable urban development backed with better management and utilization of resources, waste management should as well be managed effectively so as to reduce its impact on the environment. In line with the above, the Solid Waste Management Ordinance (SWMO), (2000) emphasizes that, in order to manage waste effectively, every owner or occupant of any dwelling or commercial premises should be held responsible for the waste generated at those premises until it is collected by the council, its appointed agents or operators licensed by the council.

On a contrary, with all these establishments in place to balance urbanization with solid waste management, major loopholes relating to enforcement and sanctions have greatly failed this strategy. For example, SWM ordinance, (2000) doesn’t provide a mechanism of collecting solid waste generation fees (WaterAid Uganda, 2011) which leaves a gap in enforcing proper waste management amidst skyrocketing urbanization.

Studies have confirmed that Urbanization directly contributes to waste generation arising from the burgeoning of slums and the growth of squatters and informal housing all around Kampala metropolitan area (Aijuka, 2016). It is also evident that the growing population in Bwaise II with over 24,481 people living in 6,662 households (UBOS, 2017), who generate an estimated volume of 31,422.989 Kilograms of solid waste daily of approximately 31 tons of solid waste per day with an average solid waste generation per person of 1.284 kilograms daily is one major cause of waste generation (Aijuka, 2016). This coupled with the limited capacity of staff (64/250 staff) and vehicle fleet (5-five tonnage/ 22- ten (10) tonnage Lorries) (Kiwuwa, 2017) used by the division to manage waste has posed challenges amounting from institutional, social economic, infrastructural to legal challenges.

The study therefore, seeks to identify the likely causes of such waste management problems with a view of providing solution and suggestions to curb this escalating problem in order to save the country losses of revenue from increased investment in this never-ending tragedy.

# 1.3: Purpose of the study

To examine the relationship between Urbanization and Solid Waste Management in Bwaise II

# 1.4: Objectives of the study

1. To examine how urbanization influences solid waste accumulation in Bwaise II
2. To assess how urbanization influences solid waste collection in Bwaise II.
3. To find out how urbanization influences solid waste transportation in Bwaise II.

# 1.5: Research questions

1. How does urbanization influence solid waste accumulation in Bwaise II?
2. How does urbanization influence solid waste collection in Bwaise II?
3. How does urbanization influence solid waste transportation in Bwaise II?

# 1.6: Hypotheses

H0 There is no significant relationship between Urbanization and Solid Waste Management.

H1 There is a positive and significant relationship between Urbanization and Solid Waste Management.

**1.7: Scope of the study**

**1.7.1: Geographical scope**

This study was conducted in Bwaise II Parish, Kawempe division, Kampala district Uganda.

**1.7.2: Content scope**

The study focused on Urbanization as the independent variable and Solid Waste Management in Kampala Metropolitan area as the dependent variable. The study was discussed in terms of solid waste accumulation, collection and solid waste transportation how these dimensions affect Solid Waste Management in Kampala Metropolitan area with specific reference to Bwaise II. Urbanisation was measured in terms of increase in population size, industrialisation, improved standards of living, increased migration, access to essential services and decline in mortality rates.

**1.7.3: Time Scope**

The study focused on a period of five years that is, 2015-2020. This period is important simply because it is where many reports indicate challenges related to waste management in Kawempe region and basically, in Bwaise II zone. The period also suits the study because it is long enough for the researcher to analyze how Urbanization plays a factor in Solid Waste Management in Kampala Metropolitan area.

**1.8: Significance of the Study**

The study findings and key recommendations will be of benefit to the following:

**Government (Kampala City Council Authority)**

Findings of the study may provide suitable measures for city authorities on how to deal with this waste in a healthy and environment friendly manner so that it may prove a resource instead of waste. It may as well provide a benchmark for reference when making policies and decisions amongst city authorities in Kampala and the affiliated divisions, Bwaise inclusive.

**The researcher**

This study shall provide knowledge and experience required for further research. But most importantly, upon submission of this research study to the school of business administration, shall be a partial fulfillment of the award of the Master’s degree in procurement and logistics management of Nkumba University.

**Other stakeholders**

This study may provide answers to many questions of some interested scholars on matters related to urbanization and solid waste management as well as providing a gap for further research by other scholars in the same discipline.

# 1.9: Arrangement of the report

This proposal is arranged in three chapters.

**Chapter one:** Presents introduction to the study which include; the background of the study, the problem statement, and purpose of the study, the objectives of the study, the research questions and the hypothesis of the study, the significance of the study, the scope of the study, the setting and the arrangement of the report.

**Chapter two:** Presents study literature which highlights literature survey, literature review and the conceptual framework analysis.

**Chapter three:** Presents research methodology. It highlights the research design, Study Population, Sample size determination, Sample selection Sampling techniques, Data sources, Data collection Methods, Data collection Instruments, Data processing, analysis, presentation and interpretation.

**Chapter four**

This chapter focuses on examining how urbanization influences solid waste accumulation in Bwaise II.

**Chapter five**

This chapter presents how urbanization influences solid waste collection in Bwaise II.

**Chapter six**

This chapter presents findings on how urbanization influences solid waste disposal in Bwaise II.

**Chapter seven**

This chapter harmonises urbanization and solid waste management in Kampala metropolitan area, a case study of Bwaise II.

**Chapter eight**

This chapter presents the summary of findings, conclusions and recommendations.

# CHAPTER TWO

# STUDY LITERATURE

# 2.0 Introduction

This chapter includes the introduction, literature survey, literature review, theoretical review and the conceptual framework.

# 2.1 Literature Survey

Katusiime (2019) conducted a study on in Bwaise slum, Kawempe division in Kampala city. The aim of the study was to explore the perceptions and influences on waste management in Bwaise slum Kawempe division. The specific objectives of the study were; to determine people’s perception on wastes management, to map waste management practices and to determine drivers for the identified waste management practices. The study used interview method, where 68 respondents randomly selected to ensure independent opinions and give every community member a chance to participate. Observation and GPS coordinates of the dumping sites were taken and used to plot a map of the study area where Bwaise 3 had many random illegal dumping sites. The study findings show that respondents collected and kept waste materials for directly putting them on collection trucks, 45.6%; outside in an open place, 20.5%; within their compound, 11.7%; and burning of wastes 21.9%. The study further found out that areas that were deep inside communities where vehicles don’t access have poor waste disposal practices than areas near the road sides.

The study above concentrated on the variables of perceptions and influences on waste management in Bwaise slum Kawempe division. This however, differs from the current study which focuses on the variables of Urbanisation and Solid Waste Management in Kampala metropolitan area. Thus, gaps such as time scope gap, knowledge gap, and contextual gap are realized from the above study, which the current study intends to fill.

Nyakaana (2016) conducted a study on Solid Waste Management in Urban Centers with a Case of Kampala City - Uganda. Data (and information) were obtained by employing different methods. Apart from reviewing the existing documents on Kampala solid waste management obtained from government sources, field trips were made to the various dumping sites used by the Kampala City Council. Residents living around these sites and local council officials (LCs) were interviewed about their relationship with the KCCA and about the steps that were taken to alleviate the problems of odor, pests and leachate. Information regarding the capacity and constraints of solid waste management in the city was obtained from the officer in charge of solid waste management within the Engineering Department. Officials of the Health Department provided useful information regarding health hazards associated with improperly managed solid waste. The study concluded that Solid waste in Kampala is made up of organic wastes (food and garden wastes) mainly associated with household and market waste; broken glasses, plastics, polyethylene, rubber, scrap metal, wood, paper and other inorganic wastes associated with the industrial and commercial sectors.

The study above concentrated on the variables of Solid Waste Management in Urban Centers with a Case of Kampala City - Uganda. This however, differs from the current study which focuses on the variables of Urbanisation and Solid Waste Management in Kampala metropolitan area with specific reference to Bwaise II. Thus, gaps such as time scope gap, knowledge gap, and contextual gap are realized from the above study, which the current study intends to fill.

WaterAid Uganda, (2011) conducted a study on Solid Waste Management Arrangements and its Challenges in Kampala using a case Study of Bwaise II Parish, Kawempe Division. The study adopted a combination of qualitative and quantitative designs to get deeper understanding of underlying issues of solid waste management in Bwaise II urban informal settlements. Participants were selected purposively due to their essential knowledge and randomly to estimate the garbage amount generated in the area. Data was transcribed, edited, summarized and analyzed according to the objectives and variables set out in the Terms of Reference. The information was presented in chapters reflecting the key objectives of the study both in narrative, graphical and pictorial forms. The study scope was limited to household and commercial enterprises garbage generated in Bwaise II Parish, Kawempe Division with special emphasis on the Solid waste management cycle from collection to ultimate disposal. The findings of the study revealed that many of the legal structures in place provide some guidelines on solid waste management but they have many gaps. For example SWM ordinance doesn’t provide a mechanism of collecting solid waste generation fees, the National Environment regulations and the Public health act have been challenged with weak punitive measures and lack of staff to enforce.

The study above concentrated on the variables of Solid Waste Management Arrangements and its Challenges in Kampala using a case Study of Bwaise II. This is not in line with the current study which differs in time scope and key study variables. The current study focuses on the variables of Urbanisation and Solid Waste Management in Kampala metropolitan area with specific reference to Bwaise II. Thus, gaps such as time scope gap, knowledge gap, and contextual gap are realized from the above study, which the current study intends to fill.

Bidandi & Williams, (2017) conducted a study on the Challenges Facing Urbanisation Processes in Kampala and the implications of these dynamics for an alternative urban policy framework. The paper focused on the informal dynamics explaining Kampala’s urbanisation from 1990 to 2013 and their policy implications. The sample consisted of 24 purposively selected key informants and 720 city residents selected using multistage sampling. Data was collected using interviews, focus group discussions and questionnaires. Qualitative data was analysed using narrative and thematic techniques, complemented by the descriptive method. Factor analysis was used to analyse quantitative data. The findings explain Kampala’s unplanned urbanisation during the period 1990–2013 including unofficial administrative dynamics; unofficial political influence; political unrest caused by internal and regional civil wars; the city’s attractiveness to jobseekers, job makers and migrants from war-ravaged areas; and rural–urban migration and underdevelopment.

Thus, the study above leaves gaps such as time scope gap, knowledge gap, and contextual gap are realized from the above study, which the current study intends to fill.

# 2.2: Theoretical review

***Theory of Urban Bias***

This theory has been supported by several scholars (London and Smith, 1988; Bradshaw, 1987; Tadoro, 1981; Lipton, 1977). Michael Lipton, a development economist, who is a leading proponent of the urban bias theory; in 1977 explained this theory in his paper by comparing the data of 63 less developed countries and nine developed countries, which revealed that urban-rural disparity is seen to growing in the poor countries as the governments of these nations tend to intervene in markets in ways that imposes tax on agriculture; whereas the governments of the richer nation were doing the reverse by intervening in ways that confer subsides on farmers (Lipton, 1977; Dixon and McMichael, 2016).

In this sense, the rural people were described as being parasitized by urban populations, who benefits massively from the consumption of cheap good from the rural settlements and beautiful urban structures from the tax incomes from these rural areas (Dixon and McMichael, 2016). This bias in favour of the urban settlements has created disparity between the rural and urban areas; as regard to consumption, wage and productivity levels; necessitating mass exodus of the rural dwellers to cities for greener pastures and an improved standard of living (Bradshaw, 1987; Corbridge and Jones, 2005).

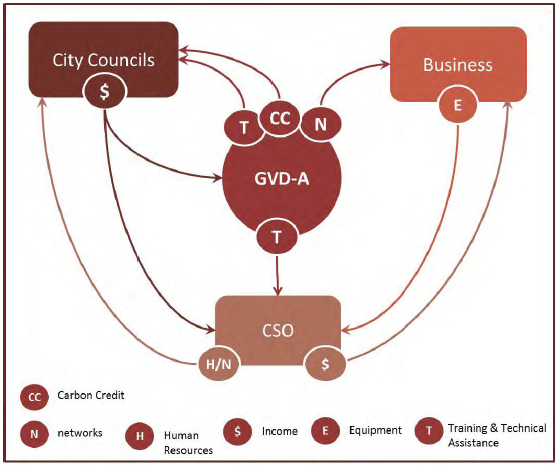
The sufferings and abject poverty among the people in the rural areas is attributed to urban bias (Lipton 1977). This results from the uneven distribution of available resources among the populace; a situation that concentrate developmental projects like agricultural and industrial reforms in the urban centres, making the impoverish rural dwellers to move to the cities where they can access quality education, health care service, basic social amenities, security, essential goods and services (Lipton, 2005; Bates, 1981).

The urban bias theorists believed that there are groups that hinder the economical development of the rural areas by pressuring the government to protect their interest by their location in urban areas at the expense of the rural areas (Ades and Glaeser, 1994) and this development process in the poor countries that is economically bias to the rural areas has been embedded in the political structure by the urban groups (Varshney, 1994). So, the people in these rural areas continue to suffer from stunted growth, reduced investments, lower public goods provision and political repression due to the lack of political will or power to aid their development (Lipton, 1977).

***The Almodo partnership model.***

Established in 2005, Almodo developed a SWM model to address the lack of waste collection in Niamey. They collect, sort and recycle waste using transformation processes well-known to the local population, which makes the technology accessible to all. The waste is then recycled into low-cost products in the field of energy, agriculture, building and carpentry, substituting standard goods that impact climate change through deforestation, industrialisation and chemical fertilisation (GREAT Insights, 2016).

# Figure 2.1: The Almodo partnership model, 2005



**Source:** Adopted fromGREAT Insights, (2016)

The strength of Almodo lies in its ability to bring multi stakeholders together and foster local ownership. Led by the private company GVD-Afrique, the Almodo concept is based on a partnership between businesses, civil society organisations (CSOs) and city councils. Upon request, Almodo first trains city councils in sustainable waste management and sets up a project plan for the city. The second step revolves around engaging CSOs that work with marginalised citizens with few employment opportunities (mainly women, youth, rural communities, illiterate and disabled people). Through training, Almodo professionalises those vulnerable citizens as waste handlers and recyclers and ensures their products and service suit the local market. Finally GVD-A engages other local businesses to provide technical equipment, mostly locally sourced, and strengthens their know-how on innovative equipment development and maintenance. Most important in the process is the engagement of all partners from the outset and during the decision making process (GREAT Insights, 2016).

Through this multi-stakeholder partnership model, Almodo is able to generate true triple bottom line – environmental, social and economic - impacts. First, waste pollution and landfill gas emission at dumping sites are reduced, recycling rates are increased and the products created out of recycling mitigate climate change. In addition, public health is improved, and marginalised communities develop transferable skills and are lifted out of poverty through safe and regulated employment opportunities. Besides increased income at the bottom of the pyramid (BoP), the products (made out of recycled material) are cheaper than their standard (unrecycled) substitutes; both contributing to the increase of the families’ purchase power. Finally, at municipal level, costs of waste management are reduced (up to 80%) and income increased through carbon credits (Bymolt et al. 2015).

The replication rate of the model is a testimony to its success. Starting out with 1147 households in two quarters of Niamey, they have now been approached by 50 city councils in Niger, Mali, Togo, Congo, Cameroon, and Ivory Coast to replicate the model. As a result, they now provide direct employment to over 2,500 people and cater for over 100,000 low income households (GREAT Insights, 2016).

# 2.3: Literature Review.

# 2.3.1: Urbanization and solid waste accumulation in Kampala metropolitan area.

Cities across the globe attract people for reasons such as employment opportunities, education, and health care, and this is so because they (cities) extensively contribute to national and urban economies. However, often urbanisation, as in this case, is associated with poverty, environmental degradation and population demands that outstrip service capacity (Bidandi, 2015). The above conditions create unpleasant urban environments which lead to numerous dynamics such as poor housing, increased demand for infrastructure development, overcrowding, air pollution, transportation, insufficient or contaminated drinking water, inadequate sanitation and solid waste disposal, industrial waste, increased motor vehicle traffic, stress associated with poverty and unemployment, among others (Mukwaya, Sengendo, & Lwasa, 2010).

Urbanisation in Uganda and Kampala in particular has translated into rising slum establishments, increased poverty, inequality, insufficient basic infrastructure, and poor service delivery (De Blij & Muller, 2000). Moreover, Uganda’s capital, Kampala, is experiencing unprecedented rates of urbanization that are higher than the resources the city can offer as per the demands of the population. This scenario provides an understanding of how urbanisation impacts negatively on urban service delivery (Mukwaya et al., 2010).

Solid waste is at the core of urban environmental problems (Nyakaana, 1997). This conforms to studies which assert that Urbanization directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation (Lwasa S, 2007). In Uganda, the rapid and often unauthorized growth of the urban areas has in many cases outpaced the ability of the urban authorities to provide adequate housing, roads, water supplies, sewers and collection of solid waste which has immensely contributed to the skyrocketing waste accumulation in urban regions.

It is universally believed that, a planned urbanization process leads to orderly urban centers which are a catalyst and contributors to national economic growth, centres for innovation and entrepreneurship and a source for high social services. Whereas lack of proper planning for urbanization results into hotbeds of poverty, unemployment, crime, disease, poor service delivery, waste accumulation, among others (Nyakaana J.B, 2007). Thus, the consequence of the undetected rapid concentration of people in urban centres that has been neglected in planning is the amount of solid waste that is generated.

The solid wastes generated in Kampala are from diverse sources that include; Domestic , Commercial activities , Industrial activities, Hospital, Clinics, Maternity Centres , Offices, Building Contractors, Schools and Colleges(Nyakaana J.B, 2007). It is believed that Kampala generates an estimated amount of 30,000 tons of waste per month, with a composition of vegetable matter 73.8%, paper 5.4%, saw dust 1.7%, plastic 1.6% metals 3.1% , glass and porcelain 0.9%, tree cutting wood 0.7%, miscellaneous 5.5% (ERL 1990, KCCA 1995 and NEMA 1996). Open uncontrolled dumping is still the most common method of solid waste disposal in major urban centres of Uganda which distorts proper control and management of waste within urban centres (Okot Okumu, 2011). This therefore originates from the failed proper planning of urban centres by government and city council authorities.

Urbanisation comes with multiplication in numbers of people concentrated in an area. This increased population growth not only comes with positive rewards, but if not well managed, it can become a primary contributor to waste accumulation. Kampala, Uganda’s capital city has experienced rapid population growth of 5.61%per annum in 1991 to 1.2 million in 2002 (UBOS 2002). According to NUP, (2017); urbanization is estimated at a rate of 5.2% per annum and almost 20% of Ugandans live in urban areas and it is projected by 2050, about half of Uganda’s population will be living in urban areas.

# 2.3.2: Urbanization and solid waste collection in Kampala metropolitan area.

Although the environmental problems associated with garbage do not disappear with collection, uncollected garbage exacerbates many of the environmental hazards associated with urban centers. Such hazards include fire, pests and disease vectors which create human health problems (Nyakaana, 1997).

Municipal solid waste (MSW) or urban solid waste is normally comprised of food wastes, rubbish, demolition and construction wastes, street sweepings, garden wastes, abandoned vehicles and appliances, and treatment plant residues. Quantity and composition of MSW vary greatly for different municipalities and time of the year. Factors influencing the characteristics of MSW are climate, social customs, per capita income, and degree of urbanization and industrialization. The composition of MSW as collected may vary greatly depending upon geographical region and season. The typical moisture content of MSW may vary from 15 to 40 percent depending upon the composition of the waste and the climatic conditions (Chaudhary & Gaurav, 2014).

Solid waste collection and transport involves storage at the generation and pick-up points, pick up by the crew, trucks driving around the neighborhood, and truck transport to a transfer station or disposal point. The collection is difficult, complex and costly. Collection of solid waste typically consumes 60-80 percent of the total solid waste budget of a community. Therefore, any improvement in the collection system can reduce overall cost significantly (Chaudhary & Gaurav, 2014).

Wisner, B. and Adams, J. (2002) posit that householders may transport their solid waste to the disposal site or communal collection may be organized. Communities themselves can organize waste collection, for example by purchasing a suitable vehicle and charging households for the service. If this is done, however, it is essential that the community members who perform the service are provided with protective equipment and are trained to handle waste safely. This type of approach provides employment and income to community households, improves the environment and reduces health risks.

According to Sphere (2011) Communal collection points are particularly important at places such as markets and bus stations, where large numbers of people congregate and food is prepared, sold and eaten. Communal containers, such as empty oil drums, skips or concrete bunkers, can be located strategically, so that solid waste is collected at a single site. If communal concrete bunkers are constructed, they should have holes at the base to encourage drainage away from the bunkers, but care must be taken not to cause contamination of either groundwater or surface water sources. Ideally, water from the waste bunkers should flow into the drainage system and be treated before it enters a river or stream.

OXFAM (2008) notes that all waste from communal collection points should be collected several times a week and taken to a designated disposal site. It can be transported inboxes, or by handcarts, animal carts, bicycles with box containers, tractors with trailers and skip-trucks. The waste should preferably be collected by staff wearing protective clothing and masks, who are trained in safe disposal methods.

In residential areas, the most common collection methods are curb or alley, setout-setback, and backyard carry. In curb or alley service, the residents carry the single-use plastic bags and containers to the curb or collection point, and then return the empty container after pickup. Setout service utilizes a crew that carries the containers to the collection point. A separate collection crew empties the containers and residents return the empty containers. In setout-setback service, a third crew returns the empty containers. In backyard carry service, the collection crew transfers the solid waste into a wheeled barrel, and then unloads it into the collection truck. The containers remain in the backyard. Many communities have instituted regulations for separation of solid wastes at the source by residents. Components such as newspapers and cardboard, aluminum, mixed glass, and food wastes from restaurants have been separated at the source. Although the concept is good, the participation of the public drops quickly (Davis and Cornwell, 1993).

Also, the price of recycle material fluctuates greatly, and it is often more expensive to recycle waste material. All these factors are considered for instituting a mandatory separation and recycling program. There is, however, much interest in recycling these days due to mounting pressures of decreasing landfill sites, environmental concerns, economic incentives, and political support. The usual vehicle for residential collection of solid wastes is the manually rear or side-loaded compaction truck operating with a crew of two or three, including the driver. The typical truck is 14 to 18 m3 (15 to 20yd3), and can carry 4 to 5 tons of wastes to the disposal site or transfer station. Woods (1992) reported features of new trucks that are equipped with an electronic control system for efficient operation and information storage and retrieval.

Large self-loading compactor vehicles are equipped to centers, and then replace the empty ones for reuse at the site. Other container trucks provide container exchange service. They are equipped to carry an empty storage container to a collection point, pick up a full container and transport it to a central location or disposal site, then replace the empty container at a new location. The frequency of solid waste collection in most communities is once or twice per week. The daily truck routes are fixed and balanced to provide a fair day’s work. Several methods are used to optimize the route. Shuster and Schur has, (1974) developed heuristic routing rules.

In single family residential areas solid waste storage is handled by residents and tenants. Commonly used containers are plastic or galvanized metal containers, and disposable paper or plastic bags. The plastic or galvanized containers are 75-150 liter size with tight covering (Chaudhary & Gaurav, 2014). The single use paper or plastic bags are generally used when curb service is provided and the homeowner is responsible for placing the bags along the curb. In high-rise buildings the waste is picked up by the building maintenance personnel, or special vertical chutes are provided to deliver the waste to a central location for storage, processing, or resource recovery. A recent development is to provide underground pneumatic transport systems to move waste to a central location for onsite storage, processing, or resource recovery. Apartment districts utilize stationary container systems into which the residents drop the solid wastes. Solid wastes from commercial buildings are collected in large containers that may be stationary or transportable.

It is argued that municipalities in developing nations face problems of managing solid waste because they continue to rely on a ‘collect, transport and throw away’ approach. Conventional waste management systems have been criticised for their ‘one size fits all approach’ because they do not account for the fact that each town or city and its neighborhoods has unique waste management needs (Eriksson, O.; Bisaillon, M, 2011). It is also discredited in that this approach lacks the ability of solving waste management problems because it allegedly transfers ‘the problem’ (which is waste) from the source of waste generation to waste disposal sites.

Furthermore, the system is considered to be land-intensive as vast tracts of land are required to cater for waste dumps and landfills (Tukahirwa, J.T.; Mol, A.P. & Oosterveer, P, 2010). These limitations of a conventional SWM system form a compelling argument for a much more comprehensive approach to SWM. In a bid to address the limitations of conventional waste management systems, a community-based approach to waste management, also known as participatory SWM, has been initiated in several developing cities (Rigasa, Y.A et al, 2017).

# 2.3.3: Urbanization and solid waste transportation in Kampala metropolitan area.

Poor waste disposal is a nation-wide problem with approximately 13% of urban population disposing waste in gardens, 19% in pits, 32% heaping it in drainages and streets and the remaining 36% of the waste is disposed of on open dump sites. In slums and informal settlements, waste is disposed of anyhow and most times finds its way into water drains which results in blockage of water channels. The disposal of waste in open dump sites presents serious environment and health risks (NUP, 2017).

According to the section V (4) of the SWM ordinance of (2000), it is an offence for any person to haul (transport) or cause to be hauled (transported) on or along any public street; right of way or alley (passage) in the city; any solid waste, unless that waste is in a vehicle or receptacle (container) so constructed or covered as to prevent the contents from falling; leaking or spilling and to prevent any obnoxious (unpleasant) odor escaping from waste. It is also an offence under section 20 (d & e) of the SWM Ordinance, 2000 to collect; transport; remove or dispose refuse for a fee or other consideration without a valid permit from the Council (Water Aid, 2011).

The collected solid waste takes a form of heterogeneous in nature because they are composed of mixed paper, plastic, cloth, metal, glass and organic matter among others that are generated from households, commercial establishments and markets. The proportion of different constituents of waste varies from place to place and from season to season, depending on standards of living, the lifestyle, food habits, the extent of industrial and commercial activities in the area actively produce solid wastes (Katju, 2006). These solid wastes comprise all wastes arising from human and animal activities that are solid, discarded as useless or unwanted. They are organic and inorganic waste materials produced by various activities of the society which have lost their value to the first user.

Improper transport and disposal of solid wastes pollutes all the vital components of the living environment such as air, land and water at local and global levels. There has been a significant improvement in management of solid waste in various cities in developed world as opposed to developing world. Infrastructure development, general concern to the public demands and people’s health are main concern leading government in developed world to think of disposing disposed waste.

According to Gombya and Mukunya (2004), there are various areas among cities in developing nations that still have too much of wastes despite efforts by city authorities to collect and dispose solid waste and this is due to lack of appropriate transport means to dispose them. This goes along with limited number of human personnel to collect and dispose such. It was also found that the increased number or rapid population growth and rate of economic development within developing cities normally cause threats. They however insist that poor collection and inadequate transportation are responsible for the accumulation of solid waste at every nook and corner.

Mamdouh, Messery, Gaber, Ismail and Anwaar (2009) point out that the process of transport involves solid waste preliminary treatment and this is done for recycling purposes or reuse or transformation at various levels. There must be treatment processes before disposal to separate the recyclable and reusable resources out of the wastes. It needs consciousness among the residents of the city or urban area to collect well the wastes and make sure that they are transported to the open disposal site without segregation. It is not also binding at present to separate recyclable or reuse materials from the collected wastes at the city level. However, informal recyclers at small-scale level are accomplishing some form of sporadic recycling manually though it is insignificant. There are craftsmen who recycle metal, wood, rubber, clay to provide essential goods to great number of customers in various cities (Hayal et al, 2014).

Sharholy et al (2008) found out that cities in low-income countries often lack sufficient transportation and equipment to collect wastes and transport such waste in proper manner. This exists among African countries and Sub-Saharan nations in particular. They mention an example of Addis Ababa where waste collecting trucks are not available to the level demanded and even some of the available trucks do not all fully perform on daily basis attributable to long age, frequent accidents and maintenance problems. However, Solid Waste Management agencies transport the collected wastes to the disposal site; all the trucks carry only a single container of maximum capacity of 8 m3or 2160 kg at the time of disposal. That most of the trucks have no cover for waste containers so that they are dropping wastes in the city on their way to the disposal site (Tadesse, 2004).

While presenting a paper on the disposal of the solid waste, Kurian, Nagendran and Palanivelu (2002) shows that disposal is the ultimate stage in solid wastes management system for those wastes that have no further use to society and there is a need for all generated solid wastes to be properly collected and disposed. There are still some city dwellers disposing of their organic wastes in their respective premises and world municipalities; cities and towns have had little concern onto such people. Most low-income countries make use of open dumping as their form of land this cut across the African continent.

Nyakaana (1997) proposed that the private sector and the waste pickers should be integrated into solid waste management just as in the local communities where neighborhood cleanliness competitions could be organized and institutionalized. Solid waste management plans should be developed to ensure that waste from various areas can be collected and transported to acceptable disposal sites or treatment plants. Transfer stations and collection organizations should be identified as a necessity for further treatment facilities. All of these require the KCCA to increase the budget for solid waste management. The city should introduce other methods of solid waste disposal. The following methods should be considered by the City: Incineration - this is the process of reducing combustible wastes to inert residue by burning at high temperatures of over 900°C. At such temperatures all combustible materials are consumed leaving a residue of ash and non-combustibles which occupy only 5-25% of the original volume. Though incineration greatly reduces the volume, the problem of disposal still remains, but a much smaller space is now required (Nyakaana, 1997).

Every municipal, city or town authority in the world is responsible for setting up a waste processing and disposal facility, and for preparing an annual report regarding the collection and improvement there under. The central governments and districts administration have the overall responsibility for enforcement of the provisions of the rules and regulations within territorial limits of their jurisdiction. In most African cities and urban centers solid waste accumulation is estimated at 0.5 kg per capita/day with a density ranging from 205 to 370 kg m-3 and in other cities where the population is 3.5 million people, research reveals that one million m3 of solid waste is generated per year (Palczynski, 2002; Hayal, Hailu and Aramde, 2014). Despite of limited infrastructures and man power capacity, attempts to collect and transport solid waste to disposal sites on a daily basis have been put in place but some cities have distant disposable sites that often hinder such attempts.

A successful solid waste management system utilizes many functional elements associated with generation, on-site storage, collection, transfer, transport, characterization and processing, resource recovery and final disposal (U.S. Environmental Protection Agency, 1976). All these elements are interrelated, and must be studied and evaluated carefully before any solid waste management system can be adapted. It is a multidisciplinary activity involving engineering principles, economics, and urban and regional planning. Final disposal of solid waste consists of the adoption of procedures which aim to release the waste into the ground, minimizing environmental impacts by following operational norms to avoid public health problems and promote population safety. In Brazil, final disposal is restricted to solid waste which cannot be treated or recovered, classified as rejected (Brazil, 2017).

Thus, uncontrolled disposal by burning and dumping adds to atmospheric and hydrologic pollution loads, clogs waterways and increases the danger of flooding. This has been experienced in parts of Kampala like Bwaise, Kisenyi, Katwe and Kalerwe. The most pervasive impression of Kampala is that of filth and squalor, unswept streets and lanes, scattered dumps of accumulated trash and refuse whose removal and disposal appear to be beyond the capability of the authorities who are currently in charge. The status of waste management in Kampala, just like in other urban centers in the country, is unhygienic and unsatisfactory (Nyakaana, 1997).

# 2.4: Conceptual Framework.

The conceptual framework has been developed from the review of literature with regard to Urbanisation and solid waste management in Kampala metropolitan area as the dependent variable as illustrated below;

# Figure 2.2: Conceptual framework showing the relationship between Urbanisation and solid waste management.

**Independent Variable Dependent Variable**

**Solid waste disposal & management**

Solid waste accumulation

Solid waste collection

Solid waste disposal

**Urbanisation**

* Increase in population size.
* Industrialisation.
* Improved standards of living.
* Increased migration.
* Access to essential services.
* Decline in mortality rates.

**Intervening Variables**

* Community awareness.
* Resource availability.
* Staff capacity, skills & knowledge.
* Government policy towards SWM.

***Source:*** *Model based on literature review and modified by researcher, (2021)*

In the conceptual framework, the independent variable (IV) is hypothesized to influence solid waste management in which the dimension of Urbanisation is used. Solid waste management on the other hand, is conceptualized as a dependent variable (DV) and is measured in terms of SWM Policy, Waste collection facilities, SW transportation facilities, Effective disposal methods and increased city sanitation.

# CHAPTER THREE

# METHODOLOGY

# Introduction

This chapter describes the process and procedures involved in conducting the study. It explains the research design, Study Population, Sample size determination, Sample selection Sampling techniques, Data sources, Data collection Methods, Data collection Instruments, Data processing, analysis, presentation and interpretation.

# Research Design

Dalton and Todor (1979) define research design as the plan and structure of investigation so conceived to obtain answers from research questions. The research design consists of the research approach, research strategy, research duration and research classification.

## Research approach

The research approaches for this study were positivism and phenomenological approaches also known as the combination approach, using hypothesis testing and explaining, both quantitative and qualitative information. These approaches are to be subjected to this study because they hold high chances of achieving the desired outcomes for the study objectives.

## Research strategy

Research strategy is a general plan of how a researcher goes about answering the research question. Therefore, research strategies include: experiment, survey, case study, action research, grounded theory, ethnography and archival research. The researcher employed case study and survey strategies. Surveys allowed the collection of a large amount of data from a sizeable population in a highly economical way. The use of standardized self-administered questionnaires allows easy comparison of data. The survey strategy is also perceived as authoritative by people and is relatively easy to explain and understand (Saunders, Lewis and Thornhill, 2007:144). The single case study strategy therefore helped the researcher generate plausible answers to the questions “why?” as well as the “what?” and “how?”

## Research duration

The study covered a period from 2015 to 2020 so that the researcher can effectively determine the solid waste management practices in the study area. A cross-sectional research design was adopted for this study. This is where data is gathered just once from a cross section of sources for purposes of answering questions (Sekaran, 2003) and it can produce data which permits the establishment of casual relationships (Serantakos, 2005).

## Research classification

The study used explanatory research classification. This is because explanatory research seeks to establish causal relationships between variables. The researcher therefore used explanatory research to find out the relationship between Urbanisation and solid waste management in Kampala metropolitan area.

# Study Population

Dooley, 1995) defines a study population as the collection of individual units or respondents to whom the results of a survey are to be generalized. The study population of this project was 190.

# Sample size

Kothari, (2004) described sample size as the total number of units or items used to represent the characteristics of whole population Sample size must satisfy some requirements such as representativeness, flexibility, efficiency and reliability. To undertake this study, the researcher collected data from 124 participants.

## Sample size determination

This study adopted Krejcie and Morgan's (1970) simplified heuristics population and sample guidelines to determine the sample size. From the population of 190, a sample size of 124 participants was selected basing on Krejcie and Morgan sample size table in (Appendix I).

# Background information of the respondents

This section presents the background information that was collected from respondents.

Out of the 124 questionnaires distributed, only 110 respondents filled and returned the questionnaires representing 88.7% response rate. The 110 filled questionnaires are the basis of reporting in this chapter and the subsequent chapters.

## Sex of respondents

The respondents were asked to identify the sex in which they belonged to, responses to the question are summarized in table 3.1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 3.1: Sex | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Male | 49 | 44.5 | 44.5 | 44.5 |
| Female | 61 | 55.5 | 55.5 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in Table 3.1, it is revealed that 44.5% of the respondents were males while 55.5% were females. This means that most of the information was gathered from male participants. The results also show that there was a fair representation of both male and female respondents which eliminated gender bias in the study.

## Age of respondents

Respondents were asked to identify the age group that they belonged to, results to the question are summarised in table 3.2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 3.2: Age bracket (in years) | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | 20-25 Years | 13 | 11.8 | 11.8 | 11.8 |
| 26-31 Years | 18 | 16.3 | 16.3 | 28.1 |
| 32-37 Years | 30 | 27.2 | 27.2 | 55.3 |
| 38-43 Years | 16 | 14.5 | 14.5 | 69.8 |
| 44-49 Years | 15 | 13.6 | 13.6 | 83.4 |
| 50-55 Years | 8 | 7.2 | 7.2 | 90.6 |
| 56-61 Years | 6 | 5.4 | 5.4 | 96.0 |
| Above 61 Years | 4 | 4.0 | 4.0 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in Table 3.2, results show that majority of the respondents 27.2% were aged between 32-37 years, 16.3% were aged between 26-31 years and 14.5% were aged between 38-43 years. The results show that the lowest number of respondents 4.0% were aged above 61 years. The results imply that all respondents were adults and mature to understand the research instruments and as such provided reliable and valid information.

## Period of stay in Bwaise II

The respondents were asked to identify the period of stay in years in Bwaise II. The results are summarised in table 3.3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 3.3: Period of stay in Bwaise II | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Below 1 year | 10 | 11.2 | 11.2 | 11.2 |
| 1 - 3 Years | 15 | 16.9 | 16.9 | 28.1 |
| 4-6 Years | 28 | 31.5 | 31.5 | 59.6 |
| 7-9 Years | 17 | 19.1 | 19.1 | 78.7 |
| Above 10 Years | 19 | 21.3 | 21.3 | 100.0 |
| Total | 89 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

The results in Table 3.3 indicate that majority of the respondents had spent a period between 4-6 years in Bwaise II, while minority had spent a period of below 1 year. The results can be concluded to mean that all respondents had spent a recognisable number of years within the area to have observed the situation of solid waste management hence provide reliable information to the study.

## Highest level of education attained

Respondents were also asked to identify their highest level of education, responses to this question are highlighted in table 3.4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 3.4: Level of education | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Certificate | 15 | 13.6 | 13.6 | 13.6 |
| Diploma | 19 | 17.3 | 17.3 | 30.9 |
| Degree | 43 | 39.1 | 39.1 | 70.0 |
| Masters | 29 | 26.4 | 26.4 | 96.4 |
| Others, specify | 4 | 3.6 | 3.6 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 3.4, it is indicated that majority of the respondents had degrees and masters represented by 39.1% and 26.4% respectively. This can be interpreted to mean that majority of the respondents at the schools had degree qualifications in different academic fields. This also means that they have knowledge about the study variables.

# Sampling methods

Holloway and Wheeler (2010) define sampling as the purposeful selection of an element of the whole population to gain knowledge and information. This study used probability sampling methods.

## Probability sampling

Probability sampling is when elements in the population have a known chance of being chosen as subjects in the sample (Sekaran and Bougie 2010). All cases have an equal chance of being selected (Saunders et al, 2007).

# Sampling Techniques

## Purposive sampling

Purposive or judgmental sampling is a strategy in which particular settings, persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Maxwell, 1996). It is where the researcher includes cases or participants in the sample because they believe that they warrant inclusion.

The researcher used purposive sampling technique to choose specific respondents basing on their knowledge of the subject matter. The researcher also collected data from purposively selected respondents basing on their ability to give information readily since the study requires specific information.

## Random sampling

Simple random sampling was also used in selecting participants from various disciplines of the case study. The choice of this technique helped the selection process not to be biased and to reduce on the time and costs involved in the process of collecting data.

**Table 3.1: Showing category of respondents as well as the Sample size**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category of respondents** | **Study population** | **Sample size** | **Sampling technique** |
| Town clerk | 01 | 01 | Purposive |
| Administrators | 20 | 19 | Random |
| Community and development officer | 01 | 01 | Purposive |
| Public Health and Environment officers | 06 | 06 | Purposive |
| Community based organizations | 11 | 11 | Purposive |
| Solid waste engineer | 01 | 01 | Purposive |
| Council licensed collectors | 05 | 05 | Purposive |
| Community members | 100 | 80 | Random |
| Total | 145 | 124 |  |

Source: Primary data, 2021

# Data collection procedure

The researcher obtained an introductory letter from the research coordinator in the university school of business administration, Nkumba University. The introductory letter was presented to the relevant offices in the study area seeking permission to obtain information from all sources within the relevant departments of the University to feed in the research.

# Data collection sources

## Primary data

Primary data is data that is collected by a researcher from first-hand sources. In this study, primary data was collected directly from primary sources with the aim of gathering richness of information from most reliable and informed respondents about the current situation of the study problem.

## Secondary data

Secondary data was be from documents for instance, Kampala city council annual reports. The study also ensured that recent publications in form of journals, internet alongside media articles and textbooks about urbanisation were reviewed to ensure that the most recent developments are captured.

# Data collection methods

## Survey questionnaire method

According to Allen (2010), a questionnaire is a data collection method consisting of a series of questions and other prompts for the purpose of gathering information from respondents. The study used this data collection method because it is limited to the fact that respondents must be able to read questions and respond to them and it saves time.

## Interview

Andrea (2014) states that interview method of data collection is a verbal conversation between two people with the objective of collecting relevant information for the purpose of research. This method was selected because it produces data based on information priorities, opinions and ideas focused on informants. Therefore, respondents had an opportunity to expand on their ideas, explore their views and also identify what they regard as their crucial factors. The purposes of the interview are to explore the views, experiences, beliefs and/or motivations of individuals on specific matters and are particularly appropriate for exploring issues where participants did not want to talk about such issues in a group environment.

# Data collection instruments

The researcher used a questionnaire as a tool of Primary data collection to collect primary data.

## Self-administered questionnaire

The researcher used a semi-structured questionnaire with closed ended questions. These closed-ended questions contained predetermined alternative answers for the respondent to choose from in the process of responding to the question. The questions in the questionnaire were constructed in the simplest language possible to enable participants respond to them with ease. The questionnaire was designed in such a way that specific questions were asked for each objective of the study.

For measurement purposes, close ended questions were used with a semantic differential scale requesting respondents to indicate their extent of agreement with each statement. The statements were rated on a five-point Likert scale ranging from: 1–strongly agree; 2–agree; 3– unsure; 4– disagree; and 5 strongly disagree.

## Interview guide

Andrea (2014) states that, an interview is a verbal conversation between two or more people with the objective of collecting relevant information for a given study; For management respondents face to face interviews were conducted so as to enhance response to questions generally regarded as sensitive. The interviews were conducted to fill the information that might arise through the use of questionnaires. The researcher used structured and face to face interviews because they provide first-hand information; data was collected because it is less costly and has the ability to clarify questions. In this method, interview guides were drafted and questions were asked and then note responses corresponding the asked questions.

# Validity and Reliability of Instruments

For quality control, the questionnaire was pre-tested purposely to form an appropriate questionnaire that the selected respondents understood. It also enabled the research team to identify question ambiguity and response categories, interviewer instructions and questionnaire length. The pre­testing exercise was provide the insights into the level of understanding of both the respondents and the researcher.

# Data Quality Control

Data quality control refers to the reliability and validity of the instruments used for collecting data. These two concepts are important in the acceptability of the use of an instrument for research purposes (Amin, 2005). This is to ensure that the data collected is accurate. The design based on the internal and external validity, while reliability was guided by pretest of the study instrument through cross checking the respondents to find out if they are dependable and consistent with the asked questions as obtained from the research objectives.

## Validity of the instrument

A pre-test of the research instrument to establish its validity was done. The instrument was given to two experts who provided their opinions on the relevance of the questions using a 5- point scale of relevant to not relevant. It was be further pre-tested by administering it to probable respondents (n=10) and test their understandability of the items. Items that were found not to be relevant were eliminated and those found not to be understood were adjusted for understandability for the final research instrument that was used.

## Reliability of the instrument

Reliability of the questionnaire items was tested using the Cronbach’s alpha coefficient. Reliability of this study’s instruments was ascertained by pre-testing the questionnaires and interview guide in the field. The researcher established the reliability of the questionnaire by using pre-testing. The researcher gave questionnaire guides to the same groups of respondents and re-testing was done. This indicates that the instrument used to collect data from the respondents were dependable and reliable and also yielded good results. Therefore, the results and conclusions of this study were a basis for decision making.

# Data processing and presentation

The quantitative collected data was edited, coded and cross checked for completeness using Ms Excel and exported to Statistical Package for Social Sciences version 25 for analysis. The quantitative date was presented in form of numeric using tables and charts representing frequencies and percentages of results. In regards to qualitative data, the researcher presented the findings in narrative form by directly reporting respondents’ responses through quotations.

# Data analysis

Data was analysed after making reference to the available literature so as to compare and contrast opinions presented to statistical analysis to generate descriptive statistics in order to draw conclusions and make recommendations. The data collected was presented and used in explaining the relationship between the two variables of the research study; Urbanisation and solid waste management. The researcher then presented the findings quantitatively in numeric and qualitatively in form of narrative in a research report.

**Ethical considerations**

Research ethics refers to the appropriateness of the researcher’s behavior in relation to those who become the subject of the research work or are affected by it. The research was conducted basing on the prevailing ethical considerations. The privacy and confidentiality of personal information obtained in the due course of the research was protected. It was only the researcher to access to the answered questionnaires and also respondents were asked not to put their names, departments on the questionnaire. The collection and analysis of data ensured that the researcher’s objectivity is maintained throughout these processes. To ensure that ethical considerations are maintained and adhered to, anonymity, informed consent and confidentiality was assured to the respondents

**Anonymity:** The researcher ensured that none of the respondents’ name is mentioned anywhere in the report but instead respondents were referred to using letters of alphabet for example client “A or B or AB”.

**Informed consent:** The researcher ensured that he informs his respondents about the purpose of the study and before distributing questionnaires to the respondents, the researcher asked the respondents whether they have agreed or not to be included in the study and disclose their personal information.

**Confidentiality:** The researcher ensured that other than him and his supervisor, no one else had access to the information obtained during the study and that all data was treated with absolute confidentiality.

# Limitations of the study

The researcher is likely to face the following setbacks during the research:

* Non response from the participants: Some participants may deliberately refuse to respond owing to the “sensitivity” of the variables or because they have limited time owing to their busy schedules. The researcher used substitutes with delegated authority who are knowledgeable about the subject matter.
* Methodological challenges in view of measuring the variables. It may be cumbersome to choose measures to use for the different variables. The researcher encountered a trade-off between measurability and significance.

# CHAPTER FOUR

# URBANISATION AND SOLID WASTE ACCUMULATION

# Introduction

This chapter is about the presentation, analysis and interpretation of findings about the first objective; The chapter presents analysis and interprets findings in respect to objective one of the study; “examine how urbanization influences solid waste accumulation in Bwaise II”. This chapter aims at critically examining how urbanization in Kampala Metropolitan Area has influenced solid waste accumulation

# Descriptive statistics on how urbanization influences solid waste accumulation

In relation to objective one, the descriptive data was presented in form of frequencies and percentages of the collected data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.1: The division has an explicit policy framework to guide growth of the area | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Not sure | 15 | 13.6 | 13.6 | 13.6 |
| Agree | 32 | 29.1 | 29.1 | 42.7 |
| Strongly agree | 63 | 57.3 | 57.3 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 4.1, it is indicated that 57.3% strongly agreed and 29.1% agreed, since this is the majority, it can be interpreted to mean that the growth of Bwaise II is guided under a regulatory framework established by the government. Respondents revealed that the guidance is under the National Urban Policy formulated in 2017 which draws a planned urbanization process to orderly urban centers like Bwaise II which are a catalyst and contributors to national economic growth because the lack of proper planning for urbanization results into hotbeds of poor solid waste management which in turn lead to diseases.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.2: There is an explicit implementation action plan of the existing policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 18 | 16.4 | 16.4 | 16.4 |
| Disagree | 21 | 19.1 | 19.1 | 35.5 |
| Not sure | 12 | 10.9 | 10.9 | 46.4 |
| Agree | 36 | 32.7 | 32.7 | 79.1 |
| Strongly agree | 23 | 20.9 | 20.9 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 4.2, it is indicated that 32.7% agreed and 20.9% strongly agreed, since this is the majority response it can be interpreted to mean that the success of the existing policy depends on the scope of implementation which is done in terms of diversity and the specific needs of the area of Bwaise II and other areas. It was revealed under an interview session that;

“*The achievement of successful implementation of the policy (National Urban Policy) is done with the establishment of effective mechanism for co-ordination of tasks and efforts at both national and local government levels”.*

This means that the implementation action plan is in place to support the mainstreaming of interventions at local and national levels including aspects of solid waste management.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.3: The community is aware of the existing waste accumulation policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 28 | 25.5 | 25.5 | 25.5 |
| Disagree | 30 | 27.3 | 27.3 | 52.8 |
| Not sure | 11 | 10.0 | 10.0 | 62.8 |
| Agree | 19 | 17.3 | 17.3 | 80.1 |
| Strongly agree | 22 | 19.9 | 19.9 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 4.3, it is indicated that 25.5% strongly disagreed and 27.3% disagreed , since this response was the majority, it could be interpreted to mean a number of community members are unaware of the waste management regulations and practices in Bwaise II. Respondents revealed that this has been a major cause of ineffective removal of domestic and commercial solid waste from the area through safe systems of collection, transportation and disposal. It was revealed that many people especially local traders and local residents have poor waste management practices with waste seen extending in the road reserves and disposed in unofficial sites hence done outside the waste cycle in a socially unsatisfactory manner.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.4: The community has a positive attitude towards waste control | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 33 | 30.0 | 30.0 | 30.0 |
| Disagree | 31 | 28.2 | 28.2 | 58.2 |
| Not sure | 9 | 8.2 | 8.2 | 66.4 |
| Agree | 17 | 15.5 | 15.5 | 81.8 |
| Strongly agree | 20 | 18.2 | 18.2 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 4.4, it is indicated that 30.0% strongly disagreed and 28.2% disagreed, since this is the majority, it can be interpreted to mean that the knowledge, attitude and practices of waste control is Bwaise II among the community is very poor. It was revealed that the attitude of people towards waste control has been mainly affected by their level of knowledge, as a result they do not use dustbins, open defecation is also common in the area which has caused serious threats to the health of the people. The negative attitude towards waste control is evidenced in these people’s homes which explains the multiplications of pathogens that have causes diseases such as diarrhea through flies.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.5: Community sensitization is done on solid waste control | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 18 | 16.3 | 16.3 | 16.3 |
| Disagree | 17 | 15.4 | 15.4 | 31.7 |
| Not sure | 9 | 8.1 | 8.1 | 39.8 |
| Agree | 27 | 24.5 | 24.5 | 64.3 |
| Strongly agree | 39 | 35.7 | 35.7 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 4.5, it is indicated that 35.7% strongly agreed and 24.5% agreed, this response had a combined positive percentage of 60.2%, this can be interpreted to mean that sensitisation of the masses involves teaching the people about the dangers of poorly disposing of waste to both their health and environment, by learning this, residents take more precautions such as emphasing dustbins, collecting waste for etcetera. This implies that sensitisation is an important element.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.6: The urban authority provides adequate housing, roads, water supplies, sewers and collection of solid waste to avoid waste accumulation | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 47 | 42.7 | 42.7 | 42.7 |
| Disagree | 27 | 24.5 | 24.5 | 67.2 |
| Not sure | 5 | 4.5 | 4.5 | 71.7 |
| Agree | 17 | 15.4 | 15.4 | 87.1 |
| Strongly agree | 14 | 12.9 | 12.9 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 4.10, results indicate that 42.7% strongly disagreed and 24.5% disagreed, since this is the majority, it can be interpreted to mean that the strategies and provisions by authorities to ensure effective solid waste management in Bwaise II are inadequate. It was revealed during an interview session that;

“*The authority for the past years has emphasised provision of water supplies, sewers and collection of solid waste, however, all these are still not adequate to improve solid waste disposal because there is laxity in the implementation of rules and regulations that can enforce this objective”.*

This means that individuals who practice poor waste disposal practices are not fined or held accountable in way that could make sure that the provisions of the authorities are effective.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.7: There is a relationship between population explosion and waste generation | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 10 | 9.1 | 9.1 | 9.1 |
| Disagree | 12 | 10.9 | 10.9 | 20.0 |
| Not sure | 7 | 6.3 | 6.3 | 26.3 |
| Agree | 31 | 28.1 | 28.1 | 54.4 |
| Strongly agree | 50 | 45.6 | 45.6 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 4.7, it is indicated that 45.6% strongly agreed and 28.1% agreed, since this is the majority, it can be interpreted to mean that the rate of population growth affect the services of waste management. Respondents expressed that in any high population was characterised by different personalities of citizens where many don’t take on the responsibility to properly dispose of waste which the level of waste increases within the city. However, the minority who disagreed and strongly disagreed expressed that despite the population, most residents are ignorant about the benefits of proper waste management and just loiter waste anyhow, this variable has nothing to do with population.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 4.8: The general consumer patterns of citizens contribute to waste generation | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 22 | 20.0 | 20.0 | 20.0 |
| Disagree | 19 | 17.3 | 17.3 | 37.3 |
| Not sure | 14 | 12.7 | 12.7 | 50.0 |
| Agree | 31 | 28.2 | 28.2 | 78.2 |
| Strongly agree | 24 | 21.8 | 21.8 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 4.8, results show that 28.2% strongly disagreed and 21.8% disagreed, since this is the majority response it can be interpreted to mean that the generation mechanism of waste generation varies according to the differences in consumption patterns across the area. The respondents revealed that Bwaise II’s consumption patterns have unique features such as high proportion of expenditure on housing which contributes a lot to waste generation. The respondents also revealed that the income levels and social characteristics influence the consumption patterns, many people buy domestic products which generate high volumes of waste and recycling is a problem given the poor attitude of waste control in the area.

# Testing implied hypothesis 1

# Correlation

In order to establish whether urbanization was related to solid waste accumulation, the Pearson product correlation moment technique bi-variate correlation in particular was used.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 4.9: Correlations | | | |
|  | | Urbanisation | Solid waste accumulation |
| Urbanisation | Pearson Correlation | 1 | .595\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 110 | 110 |
| Solid waste accumulation | Pearson Correlation | .595\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 110 | 110 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | |

**Source: Primary data**

Table 4.9 above, comprises of correlations results for urbanisation and solid waste accumulation in Bwaise II. Findings obtained (R=.595\*\*) reveal a positive relationship between the two variables meaning that increased urbanisation, followed by analysis of the current and future situation and designing achievable community action plans would result into increased amount solid waste accumulation. Its implication is that when there is an increase in the number of people in the areas, increased commercial and household activities, the more solid waste will be accumulated.

# Liner regression results for urbanisation and solid waste accumulation

A linear regression technique was used by the researcher to determine the variation of urbanisation had on solid waste accumulation in Bwaise II and the results obtained are reflected in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 4.10: Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .595a | .354 | .349 | .48181 |
| a. Predictors: (Constant), Urbanisation | | | | |

Table 4.10 comprises of the model summary with R, R2, adjusted R2 and standard estimate of error, the adjusted R square is considered a better population estimate, useful when comparing the R square values between models with different number of independent variables. The value of Adjusted R2 obtained of .349 reflects a 34.9% variation the urbanisation has on solid waste accumulation. The percentage of 65.1% was attributed to other factors. This implies that urbanisation had a positive effect on solid waste accumulation.

**Hypothesis 1:** Urbanisation significantly affects the accumulation of solid waste. Results obtained reveal a significant effect that urbanisation had on solid waste accumulation, hence the null was rejected and the alternate accepted.

# CHAPTER FIVE

# URBANISATION AND SOLID WASTE COLLECTION

# Introduction

This chapter is about the presentation, analysis and interpretation of findings about the second objective; The chapter presents analysis and interprets findings in respect to objective two of the study; “assess how urbanization influences solid waste collection in Bwaise II”. This chapter aims at critically examining how urbanization in Kampala Metropolitan Area has influenced solid waste collection.

# Descriptive statistics on how urbanization influences solid waste accumulation

In relation to objective two, the descriptive data was presented in form of frequencies and percentages of the collected data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.1: The division has a solid waste collection policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 14 | 12.7 | 12.7 | 12.7 |
| Disagree | 19 | 17.2 | 17.2 | 29.9 |
| Not sure | 11 | 10.0 | 10.0 | 39.9 |
| Agree | 32 | 29.1 | 29.1 | 69.0 |
| Strongly agree | 34 | 31.0 | 31.0 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 5.1, it is indicated that 31.0% strongly agreed and 29.1% agreed, since this is the majority, it can be interpreted to mean that the practices and activities under solid waste collection are mentioned under a solid waste management policy. It was revealed during an interview session that;

“*Enforcement of the solid waste collection is under the law of the solid waste management ordinate, 2000 which makes is illegal and punishable to dump garbage in places where it may be or become a public health nuisance”.*

This means that solid waste collection cannot be done in water bodies, public streets or roadsides and there are authorities that have the responsibility to enforce the rules and regulations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.3: There is an explicit implementation action plan of the existing policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 38 | 34.5 | 34.5 | 34.5 |
| Disagree | 28 | 25.5 | 25.5 | 60.0 |
| Not sure | 11 | 10.0 | 10.0 | 70.0 |
| Agree | 17 | 15.5 | 15.5 | 85.5 |
| Strongly agree | 16 | 14.5 | 14.5 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 5.2, it is indicated that 34.5% strongly disagreed and 25.5% disagreed, since this is the majority, it can be interpreted to mean that the division does not always prioritise provision of implementing actions under solid waste collection. Respondents revealed that the waste collectors appointed by the division lack safety ware and gear during the implementation of solid waste collection. It was also revealed that the principal assistant town clerk has proved negligent in effectively implementing strategies, policies and guidelines that can result proper solid waste collection; this is one of the major reasons why Bwaise II is not free of garbage.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.3: The community is aware of the existing waste collection policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 33 | 30.0 | 30.0 | 16.4 |
| Disagree | 28 | 25.5 | 25.5 | 33.6 |
| Not sure | 12 | 10.9 | 10.9 | 44.5 |
| Agree | 19 | 17.3 | 17.3 | 70.0 |
| Strongly agree | 18 | 16.4 | 16.4 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 5.3, results indicate that 30.0% strongly disagreed and 25.5% disagreed, this response was the majority and it was interpreted to mean that community participation and planning in solid waste management is limited. Respondents revealed that the division has not taken proactive actions towards sensitisation and awareness of the local community about solid waste management. It was revealed that some effort has been made by actors such as community integrated initiatives for establishment of community solid waste management structures and plan Uganda; however, the reach of their efforts was only near and short which made awareness difficult.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.4: Solid waste is regularly collected in Bwaise II division | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 31 | 28.2 | 28.2 | 28.2 |
| Disagree | 29 | 26.4 | 26.4 | 54.6 |
| Not sure | 9 | 8.2 | 8.2 | 62.8 |
| Agree | 20 | 18.2 | 18.2 | 81.0 |
| Strongly agree | 21 | 19.1 | 19.1 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 5.4, it is indicated that 28.2% strongly disagreed and 26.4% disagreed, since this is the majority, it can be interpreted to mean that solid waste management service providers do not regularly monitor the area. It was revealed that monitoring team have not efficiently and effectively ensured the implemented waste management measures and management does not get timely and regular reports on the matter. Respondents revealed that the people in Bwaise II are not positively collaborating in this effort which could improve solid waste collection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.5: Citizens use sacks to collect solid waste | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 23 | 20.9 | 20.9 | 20.9 |
| Disagree | 17 | 15.5 | 15.5 | 36.4 |
| Not sure | 5 | 4.5 | 4.5 | 40.9 |
| Agree | 38 | 34.5 | 34.5 | 75.4 |
| Strongly agree | 27 | 24.5 | 24.5 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 5.5, it is indicated that 34.5% agreed and 24.5% strongly agreed, this response had a combined negative percentage of 59.0% and since it is the majority it can be interpreted to mean that households in Bwaise II mostly possess solid waste collection receptacles with sacks as the most used storage receptacle. It was further revealed that few households segregated and paid for collection of their solid waste and less than half of households exhibited proper solid waste management practices. Households that used plastic containers for waste collection and household heads that were aware of the solid waste management laws and the dangers of improper solid waste management were more likely to properly manage their waste.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.6: Solid waste is collected from generation to the transfer/storage sites | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 15 | 13.6 | 13.6 | 13.6 |
| Disagree | 16 | 14.5 | 14.5 | 28.1 |
| Not sure | 5 | 4.5 | 4.5 | 32.6 |
| Agree | 21 | 19.0 | 19.0 | 51.6 |
| Strongly agree | 53 | 48.4 | 48.4 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

As seen in table 5.6, it is indicated that 48.4% strongly agreed and 19.0% agreed, since this is the majority, it can be interpreted to mean that Bwaise II has solid waste transfer stations. It was revealed during an interview session that;

*“All solid waste collected by the authority in Bwaise II is dumped at the gazetted landfill at Kitezi plus some of that is collected by the private collectors. However much of the solid waste collected by the illegal and unlicensed collectors and some poor informal households dump their garbage in ungazetted places like the roadsides, illegally constituted dumpsites and the drainage channels when it rains due to the costs involved in waste management”.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.7: Curbside collection is used for solid waste in Bwaise II division | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 24 | 21.8 | 21.8 | 21.8 |
| Disagree | 20 | 18.2 | 18.2 | 40.0 |
| Not sure | 6 | 5.5 | 5.5 | 45.5 |
| Agree | 31 | 28.2 | 28.2 | 73.2 |
| Strongly agree | 29 | 26.3 | 26.3 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 5.7, it is indicated that 28.2% agreed and 26.3% strongly agreed, since this is a majority response it can be interpreted that some of the households in Bwaise II have solid waste service collection for disposal of gathered waste. It was revealed that trucks do weekly collection of waste and it is delivered either at landfills or recycling plants where it is processed for reuse. Respondents also revealed that the households that use curbside collections pay monthly fees which range between 15,000/= and 20,000/= when the truck service collects money at the end of the month.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5.8: Solid wastes are collected by Council licensed collectors | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 12 | 10.9 | 10.9 | 10.9 |
| Disagree | 16 | 14.5 | 14.5 | 25.5 |
| Not sure | 8 | 7.3 | 7.3 | 32.7 |
| Agree | 32 | 29.1 | 29.1 | 61.8 |
| Strongly agree | 42 | 38.2 | 38.2 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 5.8, it is indicated that 38.2% strongly agreed and 29.1% agreed, since this is the majority response it can be interpreted to mean Bwaise II council uses licensed collectors to ensure that solid waste in the region is collected and conveyed to treatment installations and approved disposal sites to the extent required to satisfy both public health and environmental conservation requirement as provided by the law. Respondents also revealed that it is an offence for an unathourised persons by the council to remove, collect or disturb solid waste in containers or to remove waste from containers. This means that its only licensed solid waste transporters to collect and dispose of solid waste.

# Testing implied hypothesis 2

# Correlation

In order to establish whether urbanization was related to solid waste collection, the Pearson product correlation moment technique bi-variate correlation in particular was used.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 5.9: Correlations | | | |
|  | | Urbanisation | Solid waste collection |
| Urbanisation | Pearson Correlation | 1 | .740\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 110 | 110 |
| Solid waste collection | Pearson Correlation | .740\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 110 | 110 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | |

**Source: Primary data**

Table 5.9 above, comprises of correlations results for urbanisation and solid waste collection in Bwaise II. Findings obtained (R=.740\*\*) reveal a positive relationship between the two variables meaning that increased urbanisation, followed by analysis of the current and future situation and designing achievable community action plans would result into increased amount solid waste collection. Its implication is that when there is an increase in the number of people in the areas, increased commercial and household activities, the more solid waste that will be collection.

# Liner regression results for urbanisation and solid waste accumulation

A linear regression technique was used by the researcher to determine the variation of urbanisation had on solid waste accumulation in Bwaise II and the results obtained are reflected in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 5.10: Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .740a | .547 | .542 | .81437 |
| a. Predictors: (Constant), Urbanisation | | | | |

Table 5.10 comprises of the model summary with R, R2, adjusted R2 and standard estimate of error, the adjusted R square is considered a better population estimate, useful when comparing the R square values between models with different number of independent variables. The value of Adjusted R2 obtained of .542 reflects a 54.2% variation the urbanisation has on solid waste collection. The percentage of 45.8% was attributed to other factors. This implies that urbanisation had a positive effect on solid waste collection.

**Hypothesis 2: Urbanisation significantly affects Solid Waste collection.** Based on the results obtained, it revealed a significant effect of urbanisation on solid waste collection, hence the alternate was accepted and null rejected.

# CHAPTER SIX

# URBANISATION AND SOLID WASTE DISPOSAL

# Introduction

This chapter is about the presentation, analysis and interpretation of findings about the third objective; The chapter presents analysis and interprets findings in respect to objective three of the study; “finding out how urbanization influences solid waste disposal in Bwaise II”. This chapter aims at critically examining how urbanization in Kampala Metropolitan Area has influenced solid waste disposal.

# Descriptive statistics on how urbanization influences solid waste disposal

In relation to objective one, the descriptive data was presented in form of frequencies and percentages of the collected data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.1: The division has a solid waste disposal policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 13 | 11.8 | 11.8 | 11.8 |
| Disagree | 17 | 15.5 | 15.5 | 27.3 |
| Not sure | 11 | 10.0 | 10.0 | 37.3 |
| Agree | 30 | 27.3 | 27.3 | 64.5 |
| Strongly agree | 39 | 35.5 | 35.5 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results shown in table 6.1, it is indicated that 35.5% strongly agreed and 27.3% agreed, this response had a combined response of 62.8%, this can be interpreted to mean that the disposal of waste in Bwaise II is guided under a regulatory framework established by the government. Respondents revealed that the guidance is under the National Urban Policy formulated in 2017 which draws a planned urbanization process to orderly urban centers like Bwaise II which are a catalyst and contributors to national economic growth because the lack of proper planning for urbanization results into hotbeds of poor solid waste management which in turn lead to diseases.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.2: There is an explicit implementation action plan of the existing policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 14 | 12.7 | 12.7 | 12.7 |
| Disagree | 23 | 20.9 | 20.9 | 33.6 |
| Not sure | 4 | 3.6 | 3.6 | 37.3 |
| Agree | 26 | 23.6 | 23.6 | 60.9 |
| Strongly agree | 43 | 39.1 | 39.1 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results shown in table 6.2, it is indicated that 39.1% strongly agreed and 23.6% agreed, this response had a combined response of 62.7%, this can be interpreted to mean that the success of the existing policy depends on the scope of implementation which is done in terms of diversity and the specific needs of the area of Bwaise II and other areas. Respondents revealed that the achievement of successful implementation of the policy (National Urban Policy) is done with the establishment of effective mechanism for co-ordination of tasks and efforts at both national and local government levels. This means that the implementation action plan is in place to support the mainstreaming of interventions at local and national levels including aspects of solid waste management.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.3: The community is aware of the existing waste disposal policy | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 37 | 33.6 | 33.6 | 33.6 |
| Disagree | 33 | 30.0 | 30.0 | 63.6 |
| Not sure | 10 | 9.0 | 9.0 | 72.6 |
| Agree | 14 | 12.7 | 12.7 | 85.3 |
| Strongly agree | 16 | 14.7 | 14.7 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 6.3, it is indicated that 33.6% strongly disagreed and 30.0% disagreed, since this is the majority, it can be interpreted to mean that community participation and planning in solid waste management is limited. Respondents revealed that the division has not taken proactive actions towards sensitisation and awareness of the local community about solid waste management. It was revealed that some effort has been made by actors such as community integrated initiatives for establishment of community solid waste management structures and plan Uganda; however, the reach of their efforts was only near and short which made awareness difficult.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.4: Open dumping spaces are commonly used as final disposal centres | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 12 | 10.9 | 10.9 | 10.9 |
| Disagree | 15 | 13.6 | 13.6 | 24.5 |
| Not sure | 9 | 8.2 | 8.2 | 32.7 |
| Agree | 46 | 41.8 | 41.8 | 74.5 |
| Strongly agree | 28 | 25.5 | 25.5 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 6.4, it is indicated that 41.8% strongly disagreed and 25.5% disagreed, since this is the majority, it can be interpreted to mean that open dumping is commonly done in Bwaise II. It was revealed under an interview session that;

*“What are common in Bwaise II are open dump spaces with no regulation and illegally constituted as a result of the city authority’s failure to enforce good garbage management practices and the poor infrastructural development as well as management challengeses”.*

This means that the regions do not have a progressed solid waste management system and as such open dumping of solid waste in a prevalent manner.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.5: Collected solid wastes are disposed in recommended landfills | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 14 | 12.7 | 12.7 | 12.7 |
| Disagree | 16 | 14.5 | 14.5 | 27.3 |
| Not sure | 5 | 4.5 | 4.5 | 31.8 |
| Agree | 30 | 27.3 | 27.3 | 59.1 |
| Strongly agree | 45 | 40.9 | 40.9 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

According to results in table 6.5, it is indicated that 40.9% strongly agreed and 27.3% agreed, since this is the majority, it can be interpreted to mean that most of the solid waste collected by the authority in Bwaise II is dumped at the gazettedlandfill. Respondents revealed that Bwaise II has a recommended landfill of Kitezi plus and some is collected by the private collectors. It was also revealed that there is still much of the solid waste collected by the illegal and unlicensed collectors and some poor informal households dump their garbage in ungazetted places like the roadsides, illegally constituted dumpsites and the drainage channels when it rains due to the costs involved in waste management. It was also reported that Kiteezi is located about 14 kilometers from Kawempe and for each truck that dumps solid waste is charged a fee of 10,000/= Ugandan shillings per trip.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.6: Bwaise II has waste trucks that move solid wastes to disposal centres | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 18 | 16.4 | 16.4 | 16.4 |
| Disagree | 25 | 22.7 | 22.7 | 39.1 |
| Not sure | 10 | 9.1 | 9.1 | 48.2 |
| Agree | 27 | 24.5 | 24.5 | 72.7 |
| Strongly agree | 30 | 27.3 | 27.3 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

The results in table 6.6 indicate that 27.3% strongly agreed and 24.5% agreed, this reflects a majority response in the response to the statement which can be interpreted to mean that some of the households in Bwaise II have solid waste service collection for disposal of gathered waste. It was revealed that trucks do weekly collection of waste and it is delivered either at landfills or recycling plants where it is processed for reuse. Respondents also revealed that the households that use curbside collections pay monthly fees which range between 15,000/= and 20,000/= when the truck service collects money at the end of the month.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.7: Solid waste disposal is done by licensed private contractors | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 13 | 11.8 | 11.8 | 11.8 |
| Disagree | 17 | 15.4 | 15.4 | 27.2 |
| Not sure | 9 | 8.1 | 8.1 | 35.3 |
| Agree | 29 | 26.3 | 26.3 | 61.6 |
| Strongly agree | 54 | 38.4 | 38.4 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

The results in table 6.7 indicate that 38.4% strongly agreed and 26.3% agreed, this reflects a majority response in the response to the statement which can be interpreted to mean that Bwaise II council uses licensed collectors to ensure that solid waste in the region is collected and conveyed to treatment installations and approved disposal sites to the extent required to satisfy both public health and environmental conservation requirement as provided by the law. Respondents also revealed that it is an offence for an unathourised persons by the council to remove, collect or disturb solid waste in containers or to remove waste from containers. This means that its only licensed solid waste transporters to collect and dispose of solid waste.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 6.8: Bwaise II has enough budget to meet the costs of solid waste disposal | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Strongly disagree | 37 | 33.6 | 33.6 | 33.6 |
| Disagree | 32 | 29.1 | 29.1 | 62.7 |
| Not sure | 11 | 10.0 | 10.0 | 72.7 |
| Agree | 14 | 12.7 | 12.7 | 85.4 |
| Strongly agree | 16 | 14.6 | 14.6 | 100.0 |
| Total | 110 | 100.0 | 100.0 |  |

**Source: Primary data, 2021**

The results in table 6.8 indicate that 33.6% strongly disagreed and 29.1% disagreed, this reflects a majority response in the response to the statement which can be interpreted to mean the amount of solid waste in Bwaise II is increasing and the cost of its removal is increasing yet the budget does not cover much resources to completely and efficiently carry this responsibility. In an interview session it was revealed that;

*“The high cost of disposing off waste has caused delays and this is coupled with communities that are ignorant of the best way to manage the waste, as there is little community initiative to undertake collective action”.*

This means that there is need to promote complimentary alternatives such as to manage garbage in a suitable manner.

# Testing implied hypothesis 3

# Correlation

In order to establish whether urbanization was related to solid waste collection, the Pearson product correlation moment technique bi-variate correlation in particular was used.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 6.9: Correlations | | | |
|  | | Urbanisation | Solid waste disposal |
| Urbanisation | Pearson Correlation | 1 | .431\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 110 | 110 |
| Solid waste disposal | Pearson Correlation | .431\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 110 | 110 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | |

**Source: Primary data**

Table 5.9 above, comprises of correlations results for urbanisation and solid waste disposal in Bwaise II. Findings obtained (R=.431\*\*) reveal a positive relationship between the two variables meaning that increased urbanisation, followed by analysis of the current and future situation would result into increased amount solid waste disposal. Its implication is that when there is an increase in the number of people in the areas, increased commercial and household activities, the practice and amount of solid waste disposed of is a lot.

# Liner regression results for urbanisation and solid waste disposal

A linear regression technique was used by the researcher to determine the variation of urbanisation had on solid waste disposal in Bwaise II and the results obtained are reflected in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 6.10: Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .431a | .185 | .180 | .54090 |
| a. Predictors: (Constant), Urbanisation | | | | |

Table 6.10 comprises of the model summary with R, R2, adjusted R2 and standard estimate of error, the adjusted R square is considered a better population estimate, useful when comparing the R square values between models with different number of independent variables. The value of Adjusted R2 obtained of .180 reflects a 18.0% variation the urbanisation has on solid waste disposal. The percentage of 82.0% was attributed to other factors. This implies that urbanisation had a positive effect on solid waste disposal.

**Hypothesis 2: Urbanisation significantly affects Solid Waste disposal.** Based on the results obtained, it revealed a significant effect of urbanisation on solid waste disposal, hence the alternate was accepted and null rejected.

# CHAPTER SEVEN

# TOWARDS HARMONISING URBANISATION AND SOLID WASTE MANAGEMENT IN BWAISE II

# Introduction

This chapter links the findings to the literature review and suggests the way forward in the solution to the problem of the study.

# Urbanisation and solid waste accumulation

It was revealed that 57.3% strongly agreed and 29.1% agreed to the statement that the division has an explicit policy framework to guide growth of the area, 32.7% agreed and 20.9% strongly agreed to the statement that there is an explicit implementation action plan of the existing policy, 25.5% strongly disagreed and 27.3% disagreed to the statement that the community is aware of the existing waste accumulation policy, 30.0% strongly disagreed and 28.2% disagreed to the statement that the community has a positive attitude towards waste control, 35.7% strongly agreed and 24.5% agreed to the statement that community sensitization is done on solid waste control, 42.7% strongly disagreed and 24.5% disagreed to the statement that the urban authority provides adequate housing, roads, water supplies, sewers and collection of solid waste to avoid waste accumulation, 45.6% strongly agreed and 28.1% agreed to the statement that There is a relationship between population explosion and waste generation and 28.2% strongly disagreed and 21.8% disagreed to the statement that the general consumer patterns of citizens contribute to waste generation.

The quantified findings presented previous of this research are similar to a study carried out in Buffalo City Municipality (BCM) in 2008. Where the Report highlights that to listen to the community at committee meetings where ideas interests and challenges of the community were documented. And as a rule, community service standing committee was the platform through which all issues relating to SW were discussed and integrated into the environmental and public health sector were planned and deliberated for future consideration by the mayoral committee which would later present pertinent issues in council. There after a resolution is made and follows the same step back to the community through the representing councilors. The resolution would be presented to the community by the standing committee with a representative of the Solid Waste Department.

Reflected by the earlier findings, it can be argued that many of the respondents agreed that stakeholders like schools’ women and the youth have not been integrated into the management of waste. Awareness campaigns to disseminate information about the benefits of waste handling in the appropriate way are also insufficient and lacking as indicated by Moningka (2000). However, a few people participate in various ways in the management of Solid waste especially at household level. The activities that they carry out include: cleaning areas around their premises, storing waste in a proper way like in containers or bins or polythene bags and taking waste to the collection sites. However, there are few gazettes collection sites, in the community and no designated time for the community to take their waste. Everyone one disposes of waste at different times but mostly it is done by children and house maids late in the evening and at night. This category of people just dump waste indiscriminately at times even when the skips are empty, they pour it outside the skips that result into scattered waste around the collection sites.

# Urbanisation and solid waste collection

It was indicated that 31.0% strongly agreed and 29.1% agreed to the statement that the division has a solid waste collection policy, 34.5% strongly disagreed and 25.5% disagreed to the statement that there is an explicit implementation action plan of the existing policy, 30.0% strongly disagreed and 25.5% disagreed to the statement that the community is aware of the existing waste collection policy, 28.2% strongly disagreed and 26.4% disagreed to the statement that solid waste is regularly collected in Bwaise II division, 34.5% agreed and 24.5% strongly agreed to the statement that citizens use sacks to collect solid waste, 48.4% strongly agreed and 19.0% agreed to the statement that solid waste is collected from generation to the transfer/storage sites, 28.2% agreed and 26.3% strongly agreed to the statement that curbside collection is used for solid waste in Bwaise II division and 38.2% strongly agreed and 29.1% agreed to the statement that solid wastes are collected by council licensed collectors.

Borrowing from previous studies, the findings can be linked to Visvanathan & Jankler (2013) who stated that waste management and Community involvement can lead to sustainable development when individuals and organization with a legitimate interest towards achieving the goal of minimizing waste by allowing the community in general to be aware of the problems posed by inefficient management of waste. These include: government formal and informal organization sectors, environmental organizations and other groups working together to create awareness through solid waste management programs. Community involvement and participation is a means to create a sense of individual responsibility towards waste management and hence the sustainability of the system.

In Uganda the Local Government Act Cap 243 and Article 176 (2) b of the Constitution of the Republic of Uganda have mandated local and urban authorities under the decentralization policy to ensure participation and democratic control in decision making while planning for their communities and to exemplify this principal the ministry of local government has recognized the beauty of community participation by developing several guidelines which include the Harmonized Participatory Planning Guide for parishes/wards, April 2004, the Harmonized Participatory Planning Guide for Lower Governments (June, 2004) as well as the District and Urban Council Development Planning Guidelines (2006). The objective of all this is to enable Local Governments and Urban Authorities involve people in the way they are governed such as identification of problems, challenges, settings priorities, planning and budgeting, procurement, implementation and monitoring of projects and programs in their areas of jurisdiction. Planning in Uganda is supposed to be bottom- up and all stakeholders are supposed to play a big role for it to succeed.

# Urbanisation and solid waste disposal

It is indicated that 35.5% strongly agreed and 27.3% agreed to the statement that the division has a solid waste disposal policy, 39.1% strongly agreed and 23.6% agreed to the statement that there is an explicit implementation action plan of the existing policy, 33.6% strongly disagreed and 30.0% disagreed to the statement that the community is aware of the existing waste disposal policy, 41.8% strongly disagreed and 25.5% disagreed to the statement that open dumping spaces are commonly used as final disposal centres, 40.9% strongly agreed and 27.3% agreed to the statement that collected solid wastes are disposed in recommended landfills, 27.3% strongly agreed and 24.5% agreed to the statement that 27.3% strongly agreed and 24.5% agreed, 38.4% strongly agreed and 26.3% agreed to the statement that solid waste disposal is done by licensed private contractors and 33.6% strongly disagreed and 29.1% disagreed to the statement that Bwaise II has enough budget to meet the costs of solid waste disposal.

Atienza (2014) pointed out that in addressing the issues of solid waste management local governments should adopt the Los Banos example of employing a participatory approach to identify and solve problems where the mayor conducted a series of multi-sector dialogues and consultations with different sectors of the community such as the researchers of the community, and academicians, barangy officials, food chains, restaurants, shopping malls and supermarkets, home owners and house residents associations, transport, gasoline stations and repair shops, junk shops and waste traders and religious sectors, resort and hotel operators, hospitals, clinics, funeral parlors, computer shops and cell phones dealers.

It is also explained that the planning process was different from the conventional processes as it focused on intensive participation of the citizens and stakeholders in generating alternatives with identification of technical gaps in the system. The broad aim of this inclusive approach is to develop a participatory agenda that: Builds capacity for the community to take decisions in solid waste management systems, Recognize the importance of local stakeholders’ involvement for improvement of existing situations of the town by incorporating their demands and suggestions in the action plan and ensure the informal sector and the marginalized are part of the planning process (Pria, 2012).

In support of the above observation, Moningka (2000), describes the roles of different actors with their respective activities in the involvement of SWMP where: Individuals store waste in an organized way in bags and bins the recyclables in the right place. Groups collectively engage in meetings, clean ups, campaigns awareness activities, provide materials, financial and physical contribution to activities of solid waste management for example cart operators, sweepers and paying fees for waste collection. Formulate project meetings, opinions, ideas and objectives and activities of project committee members. Inclusion of the marginalized, the very poor, disabled, women, religious bodies, low literacy rates, traditional and social hierarchy other actors include the municipality CBO-micro-enterprises and local leaders.

# CHAPTER EIGHT

# SUMMARY, CONCLUSION AND RECOMMENDATIONS OF FINDINGS

# Introductions

This chapter presents the summary and conclusion and recommendation to the study.

# Summary of the findings

The summary is built basing on the three objectives of the study that is; to examine how urbanization influences solid waste accumulation in Bwaise II, to assess how urbanization influences solid waste collection in Bwaise II and to find out how urbanization influences solid waste disposal in Bwaise II.

## Urbanisation and solid waste accumulation

Findings revealed that the growth of Bwaise II is guided under a regulatory framework established by the government, the success of the existing policy depends on the scope of implementation which is done in terms of diversity and the specific needs of the area of Bwaise II and other areas, a number of community members are unaware of the waste management regulations and practices in Bwaise II, the knowledge, attitude and practices of waste control is Bwaise II among the community is very poor, sensitisation of the masses involves teaching the people about the dangers of poorly disposing of waste to both their health and environment, the strategies and provisions by authorities to ensure effective solid waste management in Bwaise II are inadequate, the rate of population growth affect the services of waste management and the generation mechanism of waste generation varies according to the differences in consumption patterns across the area.

## Urbanisation and solid waste collection

Findings revealed that the practices and activities under solid waste collection are mentioned under a solid waste management policy, the division does not always prioritise provision of implementing actions under solid waste collection, community participation and planning in solid waste management is limited, solid waste management service providers do not regularly monitor the area, households in Bwaise II mostly possess solid waste collection receptacles with sacks as the most used storage receptacle, Bwaise II has solid waste transfer stations, some of the households in Bwaise II have solid waste service collection for disposal of gathered waste and Bwaise II council uses licensed collectors to ensure that solid waste in the region is collected and conveyed to treatment installations and approved disposal sites to the extent required to satisfy both public health and environmental conservation requirement.

## Urbanisation and solid waste disposal

Findings revealed that the disposal of waste in Bwaise II is guided under a regulatory framework established by the government, that the success of the existing policy depends on the scope of implementation which is done in terms of diversity and the specific needs of the area of Bwaise II and other areas, community participation and planning in solid waste management is limited, open dumping is commonly done in Bwaise II, most of the solid waste collected by the authority in Bwaise II is dumped at the gazettedlandfill, some of the households in Bwaise II have solid waste service collection for disposal of gathered waste, Bwaise II council uses licensed collectors to ensure that solid waste in the region is collected and conveyed to treatment installations and approved disposal sites to the extent required to satisfy both public health and environmental conservation requirement as provided by the law and he amount of solid waste in Bwaise II is increasing and the cost of its removal is increasing yet the budget does not cover much resources to completely and efficiently carry this responsibility.

## Conclusion

As indicated in the introduction of the summary of findings, the study was guided by three research questions namely; to examine how urbanization influences solid waste accumulation in Bwaise II, to assess how urbanization influences solid waste collection in Bwaise II and to find out how urbanization influences solid waste disposal in Bwaise II. After analysis and presentation of findings, the following conclusions are made;

Urbanisation in Bwaise II mostly affects solid waste collection which presented an Adjusted R2 of 54.2%. The second elements under solid waste management that is affected by urbanisation is solid waste accumulation which presented an Adjusted R2 of34.9%. Thirdly, the lowest element under solid waste management that is affected by urbanisation is solid waste disposal which presented an Adjusted R2 of 18.0%

# Recommendations

In order to have the community participate, the authorities need to develop a solid waste information system or develop guidelines on how to make their products useful like the recyclables on how to sort and segregate waste from the toxics for all stakeholders.

The researcher recommends that Bwaise II authorities should consider the introduction of more awareness campaigns to entice the community to contribute in the development of an effective solid waste management system.

The Bwaise II management through its health department should hatch strategies of ensuring the community is committed to preventing and minimizing waste generation as well as its sorting at the household level.

Bwaise II in partnership with the Local Community should establish and develop composting initiatives, collection centers for recyclable waste, collection segregated waste.

Bwaise II together with its Legal department should ensure that bye-laws compelling the community to participate in environmentally related issues and penalties to offenders are well outlined and enforced appropriately with the consultation with the community.

# Areas for further research

This study did not give the amount of waste that is recyclable and the amount that reaches the land fill. Since recycling can be a source of income there is need to know how much is collected to qualify it as a resource thus this area needs further investigation.

The information gathered in this study indicates that no municipality collects 100% waste, most municipalities collect 60 % and below, in our study it is 54.2%. So, one wonders where the uncollected waste goes? Or is it the one we find scattered on streets? So, this area needs to be studied further.

This research did not consider the influence of politics and governance over solid waste management, so this area also needs further investigation

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# APPENDICES

# APPENDIX A: SELF ADMINISTERED QUESTIONNAIRE

Dear respondent,

You are kindly requested to fill in the following questions to enable the researcher accomplish the study about **“*Urbanization and Solid Waste Management in Bwaise II*”,** leading to the award of a Degree of Master of Procurement and Logistics Management of Nkumba University. Therefore, the study is an academic work and thus the information given will confidentially be used for that purpose. You are kindly requested to give your own views, as no response is wrong, you may not disclose your name**.**

**SECTION A**

**BACKGROUND INFORMATION**

Instruction: Please tick an option that applies to you

**1. Sex**

|  |  |
| --- | --- |
| (1) Male | (2) Female |
|  |  |

**2. Age bracket (in years)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (1) 20-25 | (2) 26-31 | (3) 32-37 | (4) 38-43 | (5) 44-49 | (6) 50-55 | (7) 56-61 | (8) Above 61 |
|  |  |  |  |  |  |  |  |

**3. Period of spent in Bwaise II (in years)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (1) Below 1 year | (2) 1 – 3 | (3) 4-6 | (4) 7-9 | (4) Above 10 |
|  |  |  |  |  |

**4. Highest level of education attained**

1. No formal education
2. PLE certificate
3. ‘O’ level certificate
4. ‘A’ level certificate
5. Diploma
6. Bachelor’s degree
7. Master’s degree
8. If others, please specify

**5. Position held in Bwaise II**

1. Town clerk
2. Administrator
3. Community & dev’t officer
4. Public Health & Env’t officer
5. Community based org’n
6. Solid waste engineer
7. Council licensed collector
8. If others, please specify

For section B, C, D, and E read the statement provided and indicate your most honest level of agreement or disagreement to the statement using the scale of 1-5 where;

1=Strongly Disagree

2=Disagree

3= Neutral

4= Agree

5= Strongly Agree

**SECTION B: Urbanization and solid waste accumulation in Bwaise II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Statement** | **Scale** | | | | |
| 6 | The division has an explicit policy framework to guide growth of the area | 1 | 2 | 3 | 4 | 5 |
| 7 | There is an explicit implementation action plan of the existing policy | 1 | 2 | 3 | 4 | 5 |
| 8 | The community is aware of the existing waste accumulation policy | 1 | 2 | 3 | 4 | 5 |
| 9 | The community has a positive attitude towards waste control | 1 | 2 | 3 | 4 | 5 |
| 10 | Community sensitization is done on solid waste control | 1 | 2 | 3 | 4 | 5 |
| 11 | The urban authority provides adequate housing, roads, water supplies, sewers and collection of solid waste to avoid waste accumulation | 1 | 2 | 3 | 4 | 5 |
| 12 | There is a relationship between population explosion and waste generation | 1 | 2 | 3 | 4 | 5 |
| 13 | The general consumer patterns of citizens contribute to waste generation | 1 | 2 | 3 | 4 | 5 |

**SECTION C: Urbanization and solid waste collection in Bwaise II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Statement** | **Scale** | | | | |
| 16 | The division has a solid waste collection policy | 1 | 2 | 3 | 4 | 5 |
| 17 | There is an explicit implementation action plan of the existing policy | 1 | 2 | 3 | 4 | 5 |
| 18 | The community is aware of the existing waste collection policy | 1 | 2 | 3 | 4 | 5 |
| 19 | Solid waste is regularly collected in Bwaise II division | 1 | 2 | 3 | 4 | 5 |
| 20 | Citizens use sacks to collect solid waste | 1 | 2 | 3 | 4 | 5 |
| 21 | Solid waste is collected from generation to the transfer/storage sites | 1 | 2 | 3 | 4 | 5 |
| 22 | Curbside collection is used for solid waste in Bwaise II division | 1 | 2 | 3 | 4 | 5 |
| 23 | Setout collection system is used in Bwaise II division | 1 | 2 | 3 | 4 | 5 |
| 24 | Solid wastes are collected by Council licensed collectors | 1 | 2 | 3 | 4 | 5 |
| 25 | Solid wastes are collected from door to door | 1 | 2 | 3 | 4 | 5 |

**SECTION D: Urbanization and solid waste disposal in Bwaise II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Statement** | **Scale** | | | | |
| 26 | The division has a solid waste disposal policy | 1 | 2 | 3 | 4 | 5 |
| 27 | There is an explicit implementation action plan of the existing policy | 1 | 2 | 3 | 4 | 5 |
| 28 | The community is aware of the existing waste disposal policy | 1 | 2 | 3 | 4 | 5 |
| 29 | Open dumping spaces are commonly used as final disposal centres | 1 | 2 | 3 | 4 | 5 |
| 30 | The community has full awareness about solid waste disposal | 1 | 2 | 3 | 4 | 5 |
| 31 | Collected solid wastes are disposed in recommended landfills | 1 | 2 | 3 | 4 | 5 |
| 32 | The zone has a waste treatment facility at the disposal centres | 1 | 2 | 3 | 4 | 5 |
| 33 | Bwaise II has waste trucks that move solid wastes to disposal centres | 1 | 2 | 3 | 4 | 5 |
| 34 | Solid waste disposal is done by licensed private contractors | 1 | 2 | 3 | 4 | 5 |
| 35 | Bwaise II has enough budget to meet the costs of solid waste disposal | 1 | 2 | 3 | 4 | 5 |

**SECTION E: Solid Waste Management in Bwaise II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Statement** | **Scale** | | | | |
| 36 | Bwaise II has a solid waste management policy | 1 | 2 | 3 | 4 | 5 |
| 37 | There is an explicit implementation action plan of the existing policy | 1 | 2 | 3 | 4 | 5 |
| 38 | The community is aware of the existing waste management policy | 1 | 2 | 3 | 4 | 5 |
| 39 | Bwaise II has a legal framework and system of enforcement to support solid waste management | 1 | 2 | 3 | 4 | 5 |
| 40 | Bwaise II ensures that solid waste management activities are well planned for | 1 | 2 | 3 | 4 | 5 |
| 41 | Bwaise II ensures solid waste management is done in a manner that promotes sound environment management practices | 1 | 2 | 3 | 4 | 5 |
| 42 | Bwaise II maintains solid waste management records that provide complete and reliable data | 1 | 2 | 3 | 4 | 5 |
| 43 | Bwaise II ensures proper Planning and Budgeting for solid waste management activities | 1 | 2 | 3 | 4 | 5 |
| 44 | Bwaise II has existing byelaws on solid waste management | 1 | 2 | 3 | 4 | 5 |
| 45 | Enforcement officers of byelaws conduct periodic inspections within the area to ensure compliance | 1 | 2 | 3 | 4 | 5 |

**SECTION F: Urbanisation in Bwaise II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Statement** | **Scale** | | | | |
| 46 | Bwaise II has an Urbanisation policy | 1 | 2 | 3 | 4 | 5 |
| 47 | There is an explicit implementation action plan of the existing policy | 1 | 2 | 3 | 4 | 5 |
| 48 | There is a high level of Industrialisation in Bwaise II | 1 | 2 | 3 | 4 | 5 |
| 49 | There is high influx of people into the area | 1 | 2 | 3 | 4 | 5 |
| 50 | The division experiences increase in population size | 1 | 2 | 3 | 4 | 5 |
| 51 | The division regulates the flow of people into the area | 1 | 2 | 3 | 4 | 5 |
| 52 | The division has active bye-laws on population control in the area | 1 | 2 | 3 | 4 | 5 |
| 53 | The division experience low mortality rates in the area | 1 | 2 | 3 | 4 | 5 |
| 54 | There is easy access to essential services in the area | 1 | 2 | 3 | 4 | 5 |
| 55 | The area has improved standards of living | 1 | 2 | 3 | 4 | 5 |

# APPENDIX B: INTERVIEW GUIDE

**Section A: Urbanization and solid waste accumulation in Bwaise II**

1. Does the division have an explicit policy framework to guide growth of the area?
2. Is the community aware of the existing waste accumulation policy?
3. Does the urban authority provide adequate housing, roads, water supplies, sewers and collection of solid waste to avoid waste accumulation?
4. Is there a relationship between population explosion and waste generation in Bwaise II?
5. Do Residential residues contribute to waste generation in Bwaise II?

**Section B: Urbanization and solid waste collection in Bwaise II**

1. How do you rate the services related to solid waste collection in Bwaise II?
2. Which approach is used for solid waste collection in Bwaise II?
3. How frequently are wastes collected in Bwaise II?
4. Who is in charge of solid waste collection in Bwaise II?
5. What are some of the problems associated with collection of solid waste in Bwaise II?

**Section C: Urbanization and solid waste disposal in Bwaise II**

1. How do you rate the services related to solid waste disposal in Bwaise II?
2. Which method of solid waste disposal practiced in Bwaise II?
3. Does Bwaise II have waste trucks that move solid wastes to disposal centres?
4. Who is in charge of solid waste disposal in Bwaise II?
5. What are some of the problems associated with disposal of solid waste in Bwaise II?

**Section D: Solid Waste Management in Bwaise II**

1. How do you rate the services related to solid waste management in Bwaise II?
2. Does Bwaise II ensure that solid waste management is done in a manner that promotes sound environment management practices?
3. Does Bwaise II have existing byelaws on solid waste management?
4. Do Enforcement officers of byelaws conduct periodic inspections within the area to ensure compliance?
5. What are some of the problems associated with solid waste management in Bwaise II?

**Section E: Urbanisation in Bwaise II**

1. Does Bwaise II have an Urbanisation policy?
2. Is there an explicit implementation action plan of the existing policy?
3. Does the division experience increase in population size?
4. Does the division have active bye-laws on population control in the area?
5. Does the division experience low mortality rates?