UGANDA MANAGEMENT INSTITUTE

FACTORS AFFECTING SOLID WASTE MANAGEMENT IN KAGADI TOWN COUNCIL, KIBALE DISTRICT

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DECLARATION

I, JohnBosco Ssewanyana, do declare that this dissertation is my original work and has never been presented for any award in any University/Institution.

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APPROVAL

This dissertation was supervised and submitted for examination with the approval of Uganda Management Institute supervisors

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DEDICATION

This dissertation is dedicated to my entire family and Rev. Fr. Joseph K. Bukya (RIP) who made unreserved contribution to my success.

ACKNOWLEDGEMENT

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ACRONYMS

CSO	-	Civil Society Organization
KTC	-	Kagadi Town Council
NGO	-	Non Governmental organization
SW	-	Solid Waste

SWM	-	Solid Waste Management
LC1	-	Local Council one
LCII	-	Local Council two
LCIII	-	Local Council three
KCC	-	Kampala City Council
CBA	-	Cost Benefit Analysis
LCA	-	Life Cycle Analysis

ABSTRACT

The study explored the factors affecting solid waste management in Kagadi Town Council, Kibaale District. The objectives of the study were to find out the effect of rapid population growth, Funding and community participation on solid waste management. Participants of the study were drawn from Kagadi Town Council. Data on three independent variables of rapid population

growth, Funding and community participation and the dependent variable (Solid waste management) were collected from 100 participants whose response rate was 100%. Data was collected through the use of a structured questionnaire, interviews, and documentary analysis. The study established that solid waste management in Kagadi Town Council, Kibaale district is an issue that requires urgent attention and that solid waste management; is affected by rapid population growth, Funding and community participation. The study recommends; Kagadi Town Council to formulate by laws for proper management of solid waste. The central government and Kagadi Town Council should increase funding for solid waste management activities and Kagadi town council should embark on community mobilization and sensitization to create awareness for effective solid waste management.

It is suggested that further research should be carried out on the challenges of solid waste management in another local government for comparison purposes. This may trigger policy formulation across the boarder.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Globally, management of solid waste constitutes one of the most serious environmental and health challenges facing local and national governments in developing countries. Several factors influence the quantities and qualities of waste generated in an area that is population, economic and social activities of the inhabitants including geographical location, industrial growth and the standard of the people living in an area. The increasing urbanization rising standards of living and rapid social and economic development associated with population growth has resulted in to increased solid waste generation by domestic, industrial, trading and commercial activities (Ackerman 2000).

The study was devoted to examining the factors affecting solid waste management in Kagadi town council. This chapter therefore, presents the background of the study, statement of the problem, general objectives, specific objectives, research questions, hypothesis, conceptual framework, significance of the study, scope of the study and operational definitions of terms and concepts.

1.1 Background to the study

1.1.1 Historical Background

Tracing from stone age/early man, people generated garbage in various forms of peal offs, black smith products and others in their mode of production process. But given that man was undeveloped, operating in a wider environment and the ratio of the population being low in relation to the acreage, garbage management was left for nature. This can be related to one renowned

scholar at World Watch Institute, Washington (1990) as he was trying to explain how waste is generated from human activities. This scholar had this to say, "Urban councils have become major centers of consumption and waste generation all over the world. In fact urban councils consume as they produce. This is called urban metabolism" implying each man's process leads to the other (production for consumption and vice versa). Towns and cities use over 75% of world resources and release a similar proportion of wastes according to the UN report (1990).

International committees and organizations recognize that waste is a global concern requiring urgent attention. Many United Nations Conferences including conferences on Environment and Development in Rio-Dejanairo, the Global Conference on Sustainable Development of Small Island and Developing States (Barbados, 1994) and the World Conference of Disaster Deduction (Yokoshania, 1994) have raised the need for better strategies to reduce the volume of waste through effective disposal of waste and Waste Management, United Nations, Educational, Scientific and Cultural Organization (UNESCO 2007).

Solid waste management is a big problem to all developing counties and town across the world. In Africa for example, solid waste disposal is a major problem in urban African centers where more than half the population now live. North Africa is the most urbanized while the southern and in West and Central Africa, urbanization levels are still low (33-37%) and East Africa the least urbanized with (23%) United Nations Population Division, (1997). At present, heaps of garbage is seen along the service lanes, in the refuse banks and skips. Substantial amounts are being dumped by the roadside, swampy area and any other open space.

According to United Nations Environment Program (UNEP 2oo8) about 10 million chemicals have been synthesized in laboratories since the beginning of the 20th century and between 1000-2000 new ones appear every year worldwide and consequently about 338 million tones of hazardous wastes are produced annually. Toxicity, radioactivity, flammability, chemical reactivity, corrosively, non-biodegradability, carcinogenicity, mutagen city, infectiousness, oxidizing, are some of the characteristics of hazardous wastes. Common examples are all forms of plastics, x-ray films, celluloid films, cells and batteries, several chemicals and all synthetic.

Jeurg Christen (2002) asserts that waste is a material that has no any value to the person who is responsible for it and it is usually generated by domestic, commercial, health care, mineral extraction and accumulates in streets and public places. While solid waste management includes all activities that seek to minimize the health hazards in environment and aesthetic impacts of solid wastes.

In many rapidly growing towns solid waste is a major source of concern owing to weak institutions, resource constraint and ineffective sanitary management. Solid waste is supply-driven limited only to local authorities, who are much slower in adjusting to the demands of the residential areas, industries, institutions and even streets and market places despite the various charges levied by the Town Council (Fullerton, 1996). Solid waste management has a single problem-cost recovery. This is because, traditionally, solid waste services are financed by general revenues from Town Council taxes and levies. Consequently, many municipalities in developing countries spend a large proportion of their budgets on the collection, transport and disposal of solid waste. Solid waste management is a costly service that consumes between 20 and 50 percent of available operational budgets for municipal services, yet serves no more than 70 percent of the urban inhabitants (Bartone and Bernstein, 1993).

To that effect solid waste management has been an issue of concern and different conferences, seminars, symposium and workshops have been held at global, regional, national and local levels aiming at the situation. For instance, the Global Waste Management Symposium which was held in September 2008 at the Copper Mountain Conference Center, Colorado, USA, the symposium largely discussed practical measures how waste can best be managed. In 2008 another regional conference on urban waste management in Mediterranean was held in Central Hall of the University of Athens discussed issues on how waste could be managed while in 2007 Spokane regional youth conference on solid waste management system was also concerned with waste related issues.

The East African Newspaper (June 1995) noted that Nairobi City Council generated 8,000 tones of solid waste (SW) daily yet there was inadequate equipment for its collection and transportation and that to a greater extent attitude of most residents is that solid waste management is the sole responsibility of the city council. However, though it's the responsibility of the various local urban authorities in their various areas of jurisdiction to manage generated solid waste within their area, (Public Health Act 1964), there has been a shift in the recent years towards involvement of the private service providers and the community in Solid Waste Management at all levels in order to increase the efficiency and effectiveness of this social service (KCC 2000).

Ngategize (2000) estimated that Kampala City Council spent US $ 1.53 million per month yet could only dispose off 30% of the generated solid waste showing that Solid Waste Management is still inadequately provided for.

1.1.2 Theoretical Background

Waste minimization and resource use optimization theory states that "Prevention of waste creation is the main priority of waste management which corresponds to the principal goal of waste management".

Conservation of resources moving towards waste minimization requires that the firm commits itself to increasing the proportion of non waste leaving the process. It has been argued that, it follows from the laws of thermodynamics that producing by-products is concomitant of a main product (Baumgartner and de Swaan Arons 2003). For this reason' industrial firms have to look beyond their factory walls, and seek for external utilization of their waste, in accordance with the principles of industrial ecology (IE). If one accepts that waste minimization and resource use optimization is the most important objective of waste management (Pongracz 20020) The theory of waste management is based on the considerations that waste management theory is to prevent waste causing harm to human health and the environment and application of waste management leads to consideration of resources.

In response to the solid waste management there have evolved theories to explain the phenomena (Burkin, 2006). The theory was developed by Burkin (2006) who argues that through resistance and empowerment, as well as reconnection to production, the communities are able to implement alternatives to the wasteful practices of main stream consumption behavior and achieve partial autonomy from the hegemonic forces of the market. This theory brings to light many issues in view of reducing waste, it poses the fundamental question. Can we control the food market, with all varieties towards waste reduction?

The theory that underpins the study is the theory of new consumption communities by business 2006 which explains how the problem of solid waste management could be addressed through reduction in consumption, hence less solid waste. With less solid waste, solid waste management costs collection and disposal are reduced. This theory agrees with the waste management methods of reduce, reuse, recycle and recover in attempt to consume less and less. It is this theory that seems to have informed policy in Uganda on solid waste management regulation (Ministry of Local Governments, 2003), it draws attention to the need for an integrated approach that ensures the full participation of all in waste management.

It is argued that waste management theory is built under the paradigm of Industrial Ecology, and their side-by-side advancement can greatly contribute to the development of a sustainable agenda of waste management. The Theory of Waste Management is based on the assumption that waste management is to prevent waste causing harm to human health and the environment, and application of waste management leads to conservation of resources. However, Industrial Ecology successfully combines waste minimization and resources use optimization measures, and ensure that resources are effectively circulated within ecosystems. Research continues to evolve the Theory of Waste Management, which helps in incorporating environmental concerns into industrial process and product.

1.1.3 Conceptual background

The factors were conceptualized to mean those independent variables such as rapid population growth, funding and community participation.

In this study, rapid population growth, funding and community participation were the independent variables and solid waste management the dependent variable. Solid waste management methods refer to a particular system being used in collection, transportation and disposal of waste (Houston, 2009). The concept of solid waste management method has the dimensions of garbage collection, transportation and disposal.

Rapid population is the fast increase of a number of people living in a given area at a given time. The increase is due to natural or artificial factors or both. Funding refers to financial support to solid waste management activities while community participation is the process by which individuals and families assume responsibility for their own health and welfare and for those of community and develop the capacity to contribute to theirs and the community development? They come to know their own situation better and are motivated to solve their own common problems. This enables them to become agents of their own development instead of positive beneficiaries of development aid (Herber and Davies (1990)).

For successful development of any solid waste project, community participation in collection, community consultation on cost recovery, and public participation in citing and design of facilities is inherently essential to sustainability.

Virtually every common activity of human life generates waste because nearly everything human beings do involve the use of products resulting in the direct/indirect generation of waste. Waste can therefore be characterized as useless materials resulting from the process of human life and activity.

Rajiv. K.Sinha (1987), solid waste management refers to all activities pertaining to the control, collection, transportation, processing and disposal of those in accordance with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations. It includes all the procedures from the source to the final disposal.

Those who do not receive services are the low-income populations concentrated in the peri-urban areas, which either do not prioritize the importance of clean environment or are caught in the abyss of poverty and therefore have more pressing issues. Even those in decent housing areas are living next to mountains of heaps of garbage lying uncollected. The municipal authorities have not made sufficient efforts in educating them apart from asking for service charges.

The changing economic trends and rapid urbanization complicate solid waste management (SWM) in developing countries. Consequently, solid waste is not only increasing in quantity but also changing in composition from less organic to more paper, packing waste, plastics, glass, metal wastes among other waste, a fact leading to the low collection rates (Bartone, 1994). In order to cope up with these challenges and because of the critical role in protecting the environment and public health, accomplishing effective municipal SWM be a priority for emerging cities and towns. However, in the past most attempts to improve solid waste management in cities have focused on the technical aspects of different means of collection and disposal (World Bank, 1992). Recently, more attention has been paid to enhancing institutional arrangements for service delivery, with a special emphasis on privatization (Cointreau, 1994).

1.1.4 Contextual background

Solid waste management is a polite term for garbage management. As long as humans have been living in settled communities, solid waste, or garbage, has been an issue, and modern societies

generate far more solid waste than early humans ever did. Daily life in industrialized nations can generate several pounds of solid waste per consumer, not only directly in the home, but indirectly in factories that manufacture goods purchased by consumers. Solid waste management is a system for handling all of this garbage.

To the great benefit of archeology, early solid waste management consisted of digging pits and throwing garbage into them. This created a record of the kinds of lives that people lived, showing things like what people ate, the materials used to make eating utensils, and other interesting glimpses into historic daily life. When human cities began to be more concentrated, however, solid waste management became a serious issue. Houses that did not have room to bury their garbage would throw it into the streets, making a stroll to the corner store an unpleasant prospect. In response, many cities started to set up municipal garbage collection, in the form of rag and bone men who would buy useful garbage from people and recycle it, or waste collection teams which would dispose of unusable garbage.

For most industrialized nations today, solid waste management is a multibillion dollar business which is also crucial to survival. Garbage collection agencies remove tons of garbage yearly and sort it for recycling or ultimate disposal. Most cities require citizens to pay for waste collection, while rural areas have dumps and recycling facilities for citizens to bring their garbage to. The end goal is a reduction of the amount of garbage clogging the streets and polluting the environment, whether that garbage is disposed of or recycled into something useful. Solid waste management also is focused on developing environmentally sound methods of handling garbage.

In Kagadi Town Council and indeed many major towns in Kibaale district, the standards of solid waste management (SWM) have always been gauged and evaluated on the role and performance of service providers such as local authorities and other alternative players. The policies and legal framework governing SWM have also been directed at these providers completely ignoring the demand side to the problem. This leaves the solid waste service providers not fully appreciated by service receivers – households, institutions, industries and commercial premises. With regard to this, the various players have directed less effort at investigating the demand side to solid waste management. This has however, circumvented the proper improvement of the service delivery in the past. The involvement of the service receivers especially households who are the primary producers and generators of significant proportion of solid waste, may not only allow them (households) determine their providers via some arrangements and participate in making of sound policy decisions including designing of effective joint solutions SWM but also help the providers to understand households' willingness to participate, pay and neighborhood characteristics. The key question is: What policy recommendations, if any, can be suggested to ensure efficient delivery of SWS particularly to residential estates.

The majority of solid waste is collected in bins ranging in size from household trash cans to industrial dumpsters which are filled by individuals or companies. Solid waste collection trucks roam the streets on regular schedules to collect these bins. Garbage is also collected by street sweeping agencies, volunteer cleanup organizations, and through consumers who bring their waste directly to the solid waste management company. Once solid waste is collected, it is routed to a recycling facility, garbage facility that can handle toxic waste, composting center, or disposed of. Many solid waste management companies maintain large dumps for this purpose, while others

incinerate their garbage, using the energy generated by the incinerator to run a recycling plant or feed power back into the electrical grid.

Since Kagadi Town Council was created in 2005 and gazetted under instrument No. 23 of 2008, its biggest challenge has been solid waste management (Heath Department Report to works General Purpose Committee May 2010). On the legal mandate the National Environment Act Cap 153 and the National Environment Waste Management Regulations 1999, require urban authorities (municipal and Town Councils) to take all practical steps to ensure that waste management is carried out in a manner that will protect human health and the environment and also guard against the adverse effects of poor solid waste handling and disposal. Increasing urbanization, rising standards of living and rapid developments associated with population growth has resulted in increased solid waste generation by industrial, domestic and other activities and uncontrolled dumping in Kagadi Town Council.

1.2 Statement of the problem

The overall goal of urban solid waste management is to collect, transport, process, treat, store and dispose off solid waste materials generated by all urban population groups through their activities in an environmentally and socially acceptable manner using the most economical means. This is undertaken to reduce their effect on health and environment, National Environment Management Authority (NEMA, 2006)

In a bid to deliver SWM services to the urban community, KTC has put in place structures and systems such as a healthy and environment committee, a healthy and sanitation policy, one health inspector and six porters, a tractor with a trailer that collects garbage daily, an average of annual

budget 12M per year, community mobilization and sensitization on KKCR Local Radio Station every Friday between 8:15-9:00am.

In spite of all these measures, garbage remains a big challenge to KTC. Possibly due to rapid population growth, inadequate funding for solid waste management and poor community participation.

In Kagadi Town Council, the daily garbage generation stands at 50 tons while council collects 26 tones and 24 tones are left uncollected (Kagadi Town Council Health and Environment Department Reports 24/12/2010). Huge amount of solid waste is seen at every corner, along all the service lanes, overflowing skips and service lanes. Some garbage is carelessly and indiscriminately dumped by the roadside in swampy areas and almost all open spaces in the central ward. This creates filthy and unsanitary conditions leaches and garbage odors.

As a result, indiscriminate damping of solid waste is in practice, refuse is found littered on to streets, drainage channels, onto roads and roadsides. And where skips are availed, they are observed overflowing with the accompanying nuisances of flies and offensive smells all of which were a danger to public health and the environment at large. If this trend is not checked there is a likelihood of disease outbreak like cholera, dysentery, typhoid and malaria. The research therefore was intended to examine the extent to which population, funding and community participation affect solid waste management in Kagadi Town Council.

1.3. General objective

To examine the factors that influence solid waste management in Kagadi Town Council.

1.3.1. Specific objectives

The study was guided by the following specific objectives.

1. To examine how rapid population growth influences solid waste management in KTC

2. To assess the effects of funding on solid waste management in the Kagadi Town   Council.

3. To examine the impact of community participation on solid waste management Kagadi Town Council.

1.4. Research Questions

1.   How does rapid population growth influence solid waste management in KTC?

2.   To what extent does funding affect solid waste management in KTC?

3.   What is the impact of community participation on solid waste management?

1.5 Research Hypotheses

The following hypotheses were used for the study.

1. Rapid population growth influence solid waste management in KTC.

2. Funding affects solid waste management in KTC.

3. Community participation has an impact on solid waste management.

1.6 Conceptual Framework showing the factors affecting solid waste management.

Independent variable   **Moderating factor**

Rapid population growth
- Natural growth
- Rural urban shift

Government policies

Dependent variable

Funding
- Central Government
- Local revenue
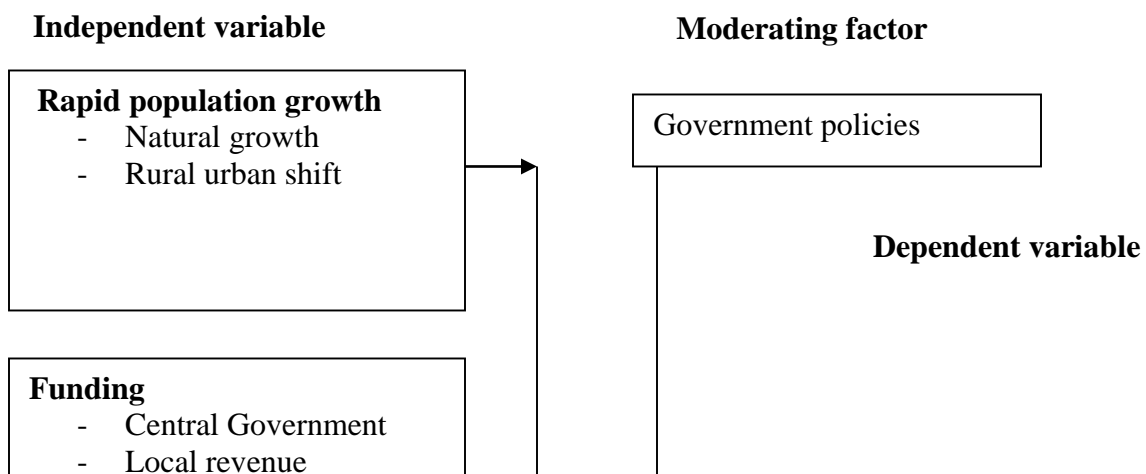
SOURCE: Burkins (2006) and modified by the Researcher

Figure 1: Illustrative Conceptual Frame work

Figure 1 showing the effect of rapid population growth, funding and community participation on solid waste management in Kagadi town council

The above conceptual frame work is a diagrammatic explanation to show the effect of rapid population growth, funding and community participation on solid waste management.

The factors are the independent variables which include rapid population growth funding of solid waste activities and community participation, while solid waste management is the dependent variable.

The report reveals that rapid population growth inadequate funding and poor community participation are responsible for poor solid waste management practices in Kagadi Town council

The variables are being moderated by government policies

1.7   Significance of the study

This study is expected to be beneficial in the following ways:

It will provide relevant information to Kagadi Town Council in solving poor Garbage disposal and levels of hygiene problems in the Town Council and other stakeholders in the Ministry of Health. The study was intended to provide information and knowledge on solid waste management to the urban authority and policy makers for planning and budgeting and will add to the existing knowledge and information to research students and academicians. The information and knowledge acquired during the study will create awareness and prompt remedial actions on solid waste management.

The study acquired relevant information that will guide the Town Council to make a policy on solid waste management.

It is hoped that the findings of the study will help to raise awareness on issues pertaining to solid waste management in Kagadi Town Council for the urban council authority, the urban community, Non Government Organizations (NGOs), Civil Society Organizations (CSOs), the central government and other development partners. The awareness will help build initiatives to curb the problem.

The findings got can be used to provoke debate on waste management issues. In the course of this debate, better options may be developed.

The research identified the role of different stakeholders and responsible centre in solid waste management (SWM). Development partners could use this information to use the responsible stakeholders manage solid waste in the town.

The urban authorities will make use of the findings of the study and will be helpful in their planning and budgeting and also use the same findings to make project proposals for funding.

1.8   Scope of the Study

1.8.1: Geographical scope: The study was conducted in Kagadi Town Council Kibaale district mid western Uganda. This town council is situated in Buyaga East County boarding Kagadi sub-county in the North East and Muhorro Town Council in the West. It comprises of six wards and 41 cells, the wards are:- Mambugu, Kitegwa, Kagadi Central, Kyomukama and Kiraba.

Kagadi Town Council is one of the fastest growing towns in Uganda created in July 2005, covering an area of 34.5sqkms. It is about 215km from Uganda's Capital City Kampala and approximate 98km from Fort portal municipality and 81km from Hoima municipality in the Mid Western Region.

1.8.2: Time scope

The study was carried out in Kagadi town council of Kibaale district. The local urban council was created by an act of parliament in 2005 and gazetted under instrument No. 23 of 2008, for that matter the study examined that factors affecting solid waste management in Kagadi TC for the period between 2006 – 2011

1.8.3: Content scope:- The study examined the factors affecting solid waste management in Kagadi town council. Under the factors (independent variable) the researcher considered the effect of rapid population growth funding and community participation on solid waste management in Kagadi Town Council.

The independent and dependent variables were moderated by Government policies.

Under solid waste management, (dependent variable) the dimensions were waste collection, transportation and disposal.

1.9   Justification of the Study

There had been a problem of solid waste (garbage) all around Kagadi Town Council. The daily garbage generation stood at 50 tons while council collects 26 tones and 24 tones are left uncollected (Kagadi Town Council Health and Environment Department Reports 24/12/2010). Huge amount of solid waste was seen at every corner, along all the service lanes and overflowing skips. Some garbage was carelessly and indiscriminately dumped by the roadside in swampy areas and almost all open spaces in the central ward. This created filthy and unsanitary conditions leaches and garbage odors.

There were inadequate facilities for the storage (skips) and disposal (trucks) of solid waste. As a result, indiscriminate damping of solid waste was in practice, refuse found littered on to streets, drainage channels, onto roads and roadsides. And where skips are availed, they were observed overflowing with the accompanying nuisances of flies and offensive smells all of which are a danger to public health and the environment at large. Whereas there have been attempts by few researchers to investigate the challenges related to solid waste management in Uganda, no studies have investigated the factors affecting solid waste management in KTC.

1.10   Operational definitions and concepts

For purposes of this study the following concepts were defined as:-

Solid waste - refers to the refuse from the households, non-hazardous solid waste from commercial and industrial establishments, refuse from institutions and street sweepings (state of the environment report for Uganda 2004/2005)

Solid waste management – this is the collection, transportation, recycling, storage, resource recovery and disposal of solid waste (state of the environment report for Uganda 2004/2005)

Disposal – It's getting rid of unwanted materials (oxford advanced learner's dictionary 6th edition.

Urban authority – includes a city council, city division, municipal council and town council (local government Act (Cap 243)

Ward – in an urban council is the equivalent of a parish in a district council (local government Act (Cap 243)

Solid waste refers to refuse/waste generated in house hold, business, hotels, schools, markets, gardens, street sweepings and non hazardous, waste plus institutional establishments.

Solid waste management refers to the collection transportation, storage, treatments, processing and final disposal and recycling of solid waste.

Garbage means a "trash", "refuse", or "rubbish" Refers to unwanted materials.

Participation is where stakeholders take part or active involvement in the determination of their own destiny. They take part in identifying, planning, implementation, monitoring controlling and evaluation of solid waste management program.

Urban community is groups or net works of people that live in the same area/town or share common interest.

Solid waste disposal: incineration, compositing, burning, dumping land fill.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Under this chapter the researcher brings out a critical review of the issues that have been explored and studied both theoretically and empirically on the existing literature on the factors affecting solid waste management in developing countries and else where in the World. It is important to note that the greatest part of the existing literature is a result of studies which are conducted in other developed and developing countries. Thus, the study intended to highlight the factors affecting solid waste management.

Theoretical review

Several theories or models of waste management have evolved.

These decision support models involve the use of methods and tools such as cost benefit analysis (CBA), life cycle analysis (LCA) and integrated waste management (Morissey and Browne, 2004). Waste management systems based on CBA usually convert all economic, social environmental challenges into monetary terms (Berkhout and Howes, 1997). In this case economic impacts are readily obtained by the cost of building waste management facilities and the revenues generated from such facilities. Social and environmental impacts are estimated by the cost of abating pollution from a waste treatment facility and or how much the public is willing to pay for environmental improvement. These estimations go into deciding which waste management option offers the best benefit.

Maximizing economic efficiency is usually the dominant factor in CBA at the cost of environmental and social criteria, which is not a sustainable approach to waste management.

According to morissey & Browne, (2004), those management practices based on the LCA of products involve the evaluation of the environmental aspect and potential impacts throughout a product's life from raw materials acquisition through production.

Very recent waste management theories are on the other hand concerned with the whole life of products (Mc Dougall et all 2001).

With the aim of making a complete assessment of the systems environmental impact, this approach is essentially for waste minimization as it affords the producers the opportunity to alternative production router and waste reduction strategies. LCA however, a specific and technical environmental accounting process that is unable to deal effectively with the social issues. Petts

(2000) observes that LCA though covers environmental and economic sustainability does not consider social aspects such as health effect predictions and therefore, cannot be considered a sustainable waste management system.

Other management systems are based on integration of different waste management practices. The concept of integrated waste management developed by McDougall et al. (2001) links waste streams, waste collection, and treatment and disposal methods with the LCA concepts while aiming at achieving environmental benefits, economic optimization and social acceptability.

According to Nilsson – Djerf and MCDougall et al (200), for a waste management model to be sustainable. It needs to be environmentally effective economically affordable and socially acceptable.

This point is supported by Petts (200) who stressed that the best solid waste management tool must be related to a local environment, economic and social priorities and must go farther to involve the public before important waste management decisions are made.

Social environmental and economic compatibilities are therefore observed to be the dimensions of sustainable waste management models. In this study, the proposed solid waste management theory concept is based on integrated waste management system that bring together a range of management options, considering the local conditions, while aiming at social, economic and environmental aspects of sustainability.

2.1.0   Rapid population growth and solid waste management

The urban population is growing at a rate of more than 6% a year in the capital cities of West Africa as a result of both natural increase in cities and the continuing influx from the country side.

Vitkovic and Godin (1997) In Uganda, fertility, mortality and migration are the major drivers of population growth. Fertility levels have remained high over the past three decades with the total fertility rate at about 7 children per woman (UBOS 2008). Results of Demographic and Health Surveys (UDHS) of 1989, 1995 and 2000/2001 and for censuses of 1969, 1991 and 2001 reveal a high and stagnant total fertility rate of 7.1 (MFPED) Population Secretariat, 2008).

Ssekkono (2003) contends that every common activity of human life generates waste because nearly every human being involves the use of products resulting in the direct/indirect generation of waste.

Therefore, population increase creates an automatic increase in waste generation. This is because all activities of human beings result into the creation of waste, municipal, clinical, industrial and household waste is generated because of human related activities. There is no single place in the world where waste has accumulated without human activity.

The municipal solid waste management has become a major issue of concern for many developing nations. Emerging literature on solid waste management suggest that involvement of professional collector teams, resident committee workers, private institutions can prove effective in solid waste management rather than involving only public institutions. Some literature argues that involvement of resident community and individuals brings about understanding of garbage management which has been a major source of failure (Sikiru, 1999). The problem is compounded by rapid urbanization rapidly taking place in many developing countries where 30-50% of the population is urban (Thomas- Hope 1998) The review of literature on the above theme was guided by two sub themes Rural- urban migration and natural population growth.

2.1.1: Rural Urban migration and solid waste management

All urban centers in Uganda have grown primarily because of rural urban movements within the south itself as well as migrations from the North to Southern towns (Ministry of Finance, Planning and Economic Development (MFPED) 2007). Uganda Bureau of Statistics UBOS _(2007) indicates that overall migration is driven mainly by the search for employment with 32% of youth and working population migrating more than other groups for this reason. Wageningen (2005) pointed out that Africa is experiencing the most rapid rate of urbanization in the world due to the high rate of rural urban migration. A growing number of towns and cities face the challenge to provide their population with adequate water supply, sanitation and solid waste services. However, Fay and Opal (2003) observed that migrations whether circular, seasonal or permanent, are often a response to economic incentives.

Increased accumulation of solid waste has been associated with rapid population growth in Mbarara Municipality as noted by Mushabe (2002). He further argued that increased population leads to increased solid waste generation in Mbarara municipality. Moeller (2005) asserts that the major causes of increase in solid waste are population growth, increase in industrial manufacturing urbanization and modernization that has created rising demand for food and other essentials that result to the raise in the amount of waste being generated daily by each household. 158 million tones of municipal solid waste are produced annually in the United States.

2.1.2: Natural population growth and solid waste management

Although Uganda's population remains basically rural, the number of urban dwellers is increasing at a current growth rate of 5.7 the total population is now about 3.9 million (MFPED 2008). It

should also be noted that Uganda's population growth rate is one of the highest in the World (MFPED 2007, MFPED 2008b, and UBOS 2008). Natural population growth is determined by four factors of births, deaths, immigrants and emigrants. Natural increase in population is an increase in the native born population stemming from a higher birth rate, a lower death rate or a combination of the two. World over, the last one hundred years have seen a rapid increase in population due to medical advances and massive increase in agricultural productivity.

Mwesigye (2003) indicated that there is a growing population in Uganda due to natural increase. He further contends that Ugandan women have a high fertility rate that has led to high growth rates. He also noted that the proportion of urban population has been on the increase for the last several decades.

The increase in population goes hand in hand with the increase of human activities and the more the human activities the more the garbage created. This is because every human activity creates garbage. Therefore, the more the population, the more the challenges put on administration / management to manage to manage the solid waste.

Between 1969 – 1980 5.8%, 1980- 1991 4.66% and between 1999 – 2002.increased population growth generally represented problems for the country due to increased need for food, infrastructure, solid waste management and other services. Although Article 39 of the Environmental Statute (1995) entitles every Ugandan to a clean and health environment, article 17 states that every citizen has a duty to create and protect a clean and healthy environment.

2.2.0: Funding and Solid waste management

As the urban population grows, the challenge is to sustain the funding for disposal of solid waste. Failure to meet this challenge would result in environmental health related problems.

Presently, solid waste generation is higher among high population (NEMA 1996). Public cleaning of streets and open area is critically important in areas where waste is indiscriminately dumped along roadsides and those inefficient collection techniques may exacerbate this problem (Ohnesorgen 1993). Use of uncovered trucks spills some of their loads back onto streets and roads thereby complicating the garbage collection (Ward and Li (1999)). Waste collection in developing countries maintained that in such countries the cost per metric ton of cleaning waste off the streets is estimated to be between two and three times the cost of collection. He therefore recommended that covered trucks or other more costly collection equipment that reduce spillage would probably be more efficient (Cointreau-Levine 1994).

There are many funding factors related to solid waste management in Uganda; but the review of literature will be guided by the sub themes of central government transfers and local revenue.
Waste generation is closely linked to population, urbanization and affluence. The archaeologist E.W. Haury wrote: 'whichever way one views the mounds [of waste], as garbage piles to avoid, or as symbols of a way of life, they are the features more productive of information than any others.' Archaeological excavations have yielded thicker cultural layers from periods of prosperity; correspondingly, modern waste-generation rates can be correlated to various indicators of affluence, including gross domestic product (GDP) energy consumption/cap, and private final consumption Mertins *et al.*, 1999; US EPA, 1999; Nakicenovic *et al.*, 2000; Bogner and Matthews, 2003; OECD, 2004). In developed countries seeking to reduce waste generation, a current goal is to decouple waste generation from economic driving forces such as GDP (OECD, 2003; Giegrich and Vogt, 2005; EEA, 2005). In most developed and developing countries with increasing population, prosperity and urbanization, remains a major challenge for municipalities to collect,

recycle, treat and dispose of increasing quantities of solid waste and wastewater. A cornerstone of sustainable development is the establishment of affordable, effective and truly sustainable waste management practices in developing countries. It must be further emphasized that multiple public health, safety and environmental co-benefits accrue from effective waste management practices which concurrently reduce GHG emissions and improve the quality of life, promote public health, prevent water and soil contamination, conserve natural resources and provide renewable energy benefits.

2.2.1 Central Government Transfers and solid waste management

Inadequate funding has always been a problem for urban waste services in Benin City according to World Bank report 2000. That in 1992 the city's budget proposal was US$ 0.1 dollars approximately 23 percent was released and spent. The Local Government Act 2007 Cap 243 section 83 indicates the mandatory types of grants released by the Central Government to local and urban authorities to run the various obligations of the authorities.

The Local Government Act 2007 Cap 243 further reveals the type of grants as conditional grant, equalization grant, and unconditional grant. The appropriation of the unconditional grant and local Revenue is the mandate of the council, but conditional and equalization grants are agreed upon by the central government and the Local authority. Mugenyi (2007) contends that inadequate funding for solid waste handling is one cause of urban waste management problems in Uganda Kagadi town council inclusive. .. The growth of solid waste generation has been rapid while the financial capacity to collect and safely dispose of the material has been on the general decline (NEMA 2008) The study will examine the effect of central government funding on solid waste management.

2.2.2 Local Revenue and solid waste management

The national environmental Act CAP153 and the national environment waste management Regulations 1999, requires all Urban authorities, Municipalities and Town councils to take all practical steps to ensure that waste management is carried out in a manner that will protect human health and the environment against the adverse effects of poor solid waste handling and disposal. The local government Act CAP 243 and Public Health Act CAP 281 mandate the urban authorities to take full responsibility of solid waste management. The local Government Financial and Accounting Regulations (2007) points out all the sources of local Revenue for the local authority which includes licenses, Property tax, rental services from buildings and facilities, local service tax ,hotel tax, fines and surcharge as well as income from the sale of local government assets. The Regulations give council the mandate to appropriate all local Revenue in accordance with the council's needs.

NEMA Report (2004) indicates that the increase in solid waste generation, in almost urban areas has not been matched with the increase in the capacity of the relevant urban authorities to handle this menace financially. Mushabe (2002) asserts that in the absence of the official waste taxes in Uganda, it is already evident that some sections of the urban population have already started incurring costs to meet their demand on solid waste. The study will examine the effect of local Revenue on solid waste management.

2.3.0   Community participation and solid waste management

2.3.1   Community participation and solid waste management

Is the process by which individuals and families assume responsibility for their own health and welfare and for those of community and develop the capacity to contribute to theirs and the community development? They come to know their own situation better and are motivated to solve

their own common problems. This enables them to become agents of their own development instead of positive beneficiaries of development aid (Herber and Davies (1990)).

For successful development of any solid waste project, community participation in collection, community consultation on cost recovery, and public participation in sitting and design of facilities is inherently essential to sustainability.

Virtually every common activity of human life generates waste because nearly everything human beings do involve the use of products resulting in the direct/indirect generation of waste. Waste can therefore be characterized as useless materials resulting from the process of human life and activity.

2.3.2   Community awareness and solid waste management

Community awareness often refers to the degree that people generally know about each other, about social norms and people's different roles within the community and about issues that affect the community.

Community awareness aims to endorse awareness promote education and skills and build up a strong society where basic need and rights of the people are and conserved. Our society is in dire need of assistance in finding a suitable path for a better living.

Qiang Alex Zhao states that maintaining awareness of the on going changes in the environment and the attributes of people, in-between changes in the environment and attributes of people, in-between interpersonal interaction help build and sustain social networks, facilitates the collaboration in creative work, and contribute to the missing link for achieving the state of readiness for such collaborations.

While investigating management of solid waste in Addis Ababa, (Beyene, 1999) found that environmental health does not depend on rising public awareness and on the creation of mechanisms of controlling generation of waste at source.

Public awareness and attitude to waste can affect the whole solid waste management system.

All steps in SWM services, the opposition to citing of waste treatment and disposal facilities, all depends on public awareness and participation. Therefore, community awareness and participation determines success or failure of SWM system

Odongokara (1997) points out that big volumes of solid waste in Uganda, largely is dependant on traditional eating habits whereby a lot of food staffs are acquired in markets in unprocessed form as opposed to processed food staffs consumed in developed countries. This is attributed to the attitude of the urban community.

The primary target of SWM is to protect the health of the population, promote environmental quality, develop sustainability and provide support to economic productivity. In order to meet these goals, sustainable solid waste management systems must be embraced fully by local authorities in collaboration with the public and private sector (NEMA 2008). Emerging literature on solid waste management suggests that involvement of professional collector teams, resident committees' workers and private institutions can prove effective in solid waste management rather than involving only public institutions. Some literature argues that involvement of resident community and individuals brings about understanding of garbage management which has been a major source of failure (Olley and Olbna, 1999; Coker and Sikiru, 1999; Osucha, 1999).

Moellen, (2005) asserts that technological advancement and increase in global population created rising demand for food and other essentials. This has resulted to a rise in the amount of waste being generated daily by each house hold. 158 million tons of municipal solid waste is produced annually in the United States U.S.Mukunya (2004) pointed out that the community needs to be included in waste management efforts as both private and public sectors are unable to provide waste services to low income areas of the city. It was observed that community involvement is an effective way of increasing access of the poor to urban services including solid waste management (SWM).Rifkins (1996) explained the dimensions of community participation in terms of needs assessment, resource mobilization, implementation and project management and later evaluation. This means that if the community is to have sustainable projects they should be committed or willing to participate in the project activities Bredillet (2006) reiterates that it is pertinent to build the capacity of the community members so as to enable effective participation in their development projects.

Community participation ranges from the provision of free labor in government projects on one extreme to autonomous self reliant development on the other. Community participation helps to build on knowledge and experience that through needs of users can be better addressed and ownership enhanced (Feroz and Raman 2000).

The World Bank (2002) further indicated that local organizations capacity refers to ability of the people to work together organize themselves and mobilize resources to solve problems of common interest.

Harber and Davies (1990) noted that willingness to listen to the communities' real needs and perhaps enter into a meaningful dialogue about the relationship between needs and requirements, rather than to try to impose on communities a pre-determined response to a situation is more relevant to the culture of donors, than the community. Community willingness may affect the relationship between sustainability of projects and community participation (Bredillet 2006). Environmental programmes can only succeed if everybody in the community is mobilized, sensitized and take part in good environmental practices (NEMA& Friedrich Ebert Stiftung (FES) 1998).

2.3.3   Government Policy and solid waste management

Lack of deliberate policy and framework for solid waste management at community and institutional level is one of the causes of urban poor solid waste management in Uganda (Mugenyi 2007).The national environmental act cap 153 and the national environmental waste management regulations 1999 require urban authorities (Municipal and town councils) take all practical steps to ensure that waste management is carried out in a manner that will protect human health and the environment and also guard against the adverse effects of poor solid waste handling and disposal. Section 39 (1) of the local government act cap 243 mandate all local governments to make bye-laws that are not inconsistent with the constitution or any law enacted by parliament or an ordinance of the district council or bye-law passed by the higher council.

2.4.0   Solid waste management

While investigating management of solid waste in Addis Ababa, (Beyene, 1999) found that environmental health does not depend on rising public awareness and on the creation of mechanism of controlling generation of waste at the source. Also, sharing of responsibilities between the public, institutions, private sector, non- governmental organizations and the

government. The above argument is internally consistent with Snel (1999) who argued that if responsibilities are shared social stigma on waste disposal could be mitigated. In developing countries, the least costly options of waste dumping in public spaces or burning it openly –are often the most popular (Bartone and Bertntein, 1993). They argue that although inexpensive in terms of out-of-pocket costs and environment effects to those that dump or burn waste, these acts may impose large costs on society. Aesthetic, environmental and health problems may result, especially in densely populated urban areas.

Increasingly, the private formal sector is seen as a key participant in the full range of urban Waste management activities, including collection, transportation, treatment, processing, separate collection, recycling compositing and disposal of waste. The review of literature on this dependant variable will be guided by the following sub themes, namely: - solid waste collection, solid waste transportation and waste disposal.

2.4.1   Solid waste collection

Urban domestic waste management is drawing increasing attention, as citizens observe that too much garbage is lying uncollected in the streets, dustbins causing inconveniences and environmental pollution and being a risk of public health.

Although governments apply all means at their disposal, the piles of waste, only seem to grow from day to day.

One of the main causes of inadequate collection services is the lack of financial resources to cope with the increasing amount of generated waste produced (Zurbrugg, 2000). He further asserts that the majority of the people especially in slum areas remain without solid waste collection services, and usually these are the low income earners living in poor conditions in per-urban areas.

NEMA (2005) admits that almost 80% of the households are not served by Kampala city council because they are hardly accessed by KCCs waste collection facility due to a combination of bad roads and absence of vehicles. NEMA (1998) further contends that in Kampala, 70-80% of the solid waste produced remain uncollected. That the municipal government spends between 20-50% of the municipal available budget to solid waste management. Cointreau –Levine, (1994) admits that waste collection in developing countries maintained that in such countries, the cost per metric ton of cleaning waste off the streets is estimated to be between two and three times the cost of collection. He therefore, recommended that covered trucks or more costly collection equipment that reduces spillage would be probably is more efficient.

2.4.2 Solid waste transportation

Transportation also relies on operational vehicles and frequent breakdowns coupled; with parts shortages can immobilize collection vehicles for extended period of time.

For example, UNEP (1996) estimated that in cities of West Africa, up to 70% of collection/transfer vehicles may be out of action at any one time.

NEMA (1998) contends that handing of solid waste from the point of disposal in other urban areas involves several different methods which range from waste delivery trucks to hand driven cars of different types and sizes.

Bartone and Bernstein, (1993) contends that many municipalities in developing countries spend large proportions of their budgets on the collection, transportation and disposal of solid waste. Their solid management is a costly service that consumes between 20-50% of available operational budgets. Municipal services, yet serves not more than70%

2.4.3   Solid waste disposal

The method of solid waste disposal is always handled differently depending on the type of solid waste generated transported and the waste management system in place. The disposal waste management systems include: - recycling, compositing, incineration, land fill and ordinary burning.

Zerbock (2003) asserts that, only potential change to the waste disposal framework must take into account the urban poor, many of whom dependant on waste scavenging for their entire subsistence. In an examination of landfills throughout the developing world in 1997-1998 Johannessen (1999) found varying amounts of planning and engineering in MSW dumping among the various regions visited, African nations (with exception of South Africa) had the fewest engineering landfills with most nations practicing open dumping for waste disposal.

Summary of literature Review

The review of literature on variables has brought out important issues on the factors affecting solid waste management. It has been pointed out that even if the population was not rapidly growing, funding for solid waste activities was also adequate and community participation was active, there would still be need to address other issues like policy framework and population behavior.

It has been observed that World over, population growth goes hand in hand with solid waste accumulation and most authorities especially in developing countries have failed to match up the control of solid waste.

Therefore, solid waste is a global phenomenon that requires a global approach with everybody being touched equally because the world has become one global village and people are always on the move.

CHAPTER THREE
METHODOLOGY

3.0   Introduction

In this chapter, the researcher highlights on the research design, Study population, Sample size and population, sampling techniques, Data collection methods, research instruments, Reliability and validity, Data collection procedure and data analysis and measurement of variables.

3.1   Research design

The study used a cross-sectional design which was used in assessing respondents' views towards the factors affecting solid waste management in Kagadi Town Council as recommended by Mugenda and Mugenda (1999). This type of research design utilized different groups of people who differ in the variable of interest, but share other characteristics such as socioeconomic status and educational background. Cross-sectional research was designed to look at a variable at a particular point in time and focuses on finding relationships between variables at a specific point in time. Both qualitative and quantitative methods of data collection and analysis were used.

3.2   Study population

The study sampled various categories of people above the age of 18 years in Kagadi town council and they included the Town Clerk (1), Heads of Departments (10), Group employees in the solid

waste management department (6), environment committee (8), Town councilors (16, business

community (12), Chairperson L.C.III (1), L.C.II (6) and L.C.Is (41).

3.3   Sample size and Selection

The study used both purposive and stratified random sampling procedures. Stratified simple random sampling was used because respondents have equal chances of being selected and purposive was used because all the members in the category were selected.

Table 1; Showing the respondents by population, sample size, and selection techniques.

Respondent category	Target population	Simple size	Sampling techniques
Town Clerk	1	1	Purposive
Heads of department	10	10	Purposive
Group employees in solid waste management (SWM) department	6	6	Purposive
Environment committee	8	8	Purposive
Town councilors	15	15	Purposive
Stakeholders i.e NGOs, CSOs	320	12	Stratified simple random
Cell Chairpersons	41	41	Purposive
LC III and II Chairperson	7	7	Purposive
	408	100	

N:B Sample size of each category was arrived at using R.V Krejcie and D.W Morgan (1970) table.

3.4   Sampling Techniques and procedure

The purposive and stratified, techniques were used to select and categorize respondents.

They comprised of both sexes but of different marital statuses and age groups and the study used 100 respondents that is; Town Clerk, Heads of Departments, Group employees in the solid waste management department, environment committee, Town councilors, stakeholders and local councils. This was intended in order to get a variety of views and unbiased response which made the study a reality. Also this sample size was selected since, Sutton and David, (2004); states that a sample size should not be less than 30. Beyond basic description it would be difficult for the researcher to undertake more complex statistical analysis, as most of these analyses require a minimum sample of 30.

3.5 Data Collection Methods

3.5.1 Questionnaire Survey method

A comprehensive questionnaire covering all the aspects of the study variables was designed. The first section of the questionnaire covered general information (gender, age, education, marital status). Section 3 covered the questions that were set in line with the objectives of the study. The questionnaires were first pre-tested before being administered on the respondents. The questionnaires were self administered to ease data collection. The questions were both open and close ended. This enabled the respondents to express their opinion about solid waste management at their convenience hence increasing chances of getting valid information and also offer greater assurance of anonymity (Sarantakos, 1998, Amin, 2005)

The Likert Scale statement of five category response continuum; strongly agree, agree, no comment, strongly disagree, disagree as recommended by Martin Amin (2005) was employed.

3.5.2 Documentary Review

This involved the researcher revisiting existing literature on the study variables by reading

journals, text books, news papers, reports, bye-laws and policies plus the already existing on internet and magazines among others.

Hygiene and sanitation bylaws, Local Government Act, Health and environment report 2011 work plan and budget for health departments, health committee minutes, public health Act, journals, text books, news papers, reports bye-laws and policies plus the already existing on internet and magazines among others. These were very important sources of data that supplemented that data obtained from primary sources. These records were scrutinized and information analyzed by the researcher from where he drew conclusions and reasonable recommendations.

3.5.3   Interview Method

The researcher conducted interviews with selected respondents and gathered data through verbal interaction (Amin 2005). This provided in-depth data that is more flexible and rich in information due to probing and problem questions (Mugenda and Mugenda 1999).

Interviews with the target respondents were conducted to interview all the categories of respondents mentioned above. A separate interview was used for the key informants. This involved first making an appointment with the targeted respondents after which an interview meeting between the researcher and respondents was held to discuss the issues on solid waste management.

3.6   Data collection Instruments

The researcher used questionnaires, interview guide, documentary review, observation checklists as the main tools for collecting data. The selection of these tools was guided by the time, objectives and the nature of data collected. The researcher was interested in capturing the views, perceptions, feelings, attitudes and opinion of respondents towards solid waste management.

3.6.1 Questionnaire

Open ended and closed questionnaires were administered on respondents of different categories of the study. Questionnaires were completed at the respondents' convenience hence increasing chances of getting valid information. They also gave greater assurance of anonymity (Sarantokos, 1998 & Amin, 2005).

3.6.2 Interview guide

In this study, an interview guide was used to obtain data. The researcher asked questions or comments intended to lead the respondents towards giving data to meet the objectives. This was administered on heads of departments. Garbage collectors and elected leaders. Mugenda and Mugenda (1999) contends that interview guide makes it possible to obtain data required to meet specific objectives of the study

3.6.3 Observation check list

Observation checklist was developed to assist the researcher make observations and gather information on non verbal behavior. This involved personal intuition of the researcher by seeing, hearing and smelling Harter, (1980:147) states that the term observation is used to indicate that the object or the subject of the investigation is being subjected to a close visual surveillance and the information obtained is related to more general proportions or theories.

Therefore the researcher used the checklist to local garbage collection sites, landfills, refuse collection equipments, drainage and garbage bins.

3.6.4 Documentary Review check list

A number of documents containing information on solid waste management were reviewed with emphasis on waste collection, transportation, disposal and reduction.

Literature on various sources such as textbooks, journals, newspapers, national and international policy documents, reports bulletins were reviewed to enrich the researcher with local and international knowledge and information

3.7   Validity

Table 2: Showing content validity index (CVI)

Judge	Content Validity Index
1	0.932
2	0.955
3	0.909
4	0.886
Total	**3.682/4 = 0.921**

Validity is the degree to which results obtained from analysis of the data actually represent the phenomenon under study. Pre- testing the instrument therefore, enables identification and correction of deficiencies such as unclear or ambiguous questions, insufficient space to write responses, cluttered questions and wrong numbering (Babbie, 2007). I consulted the two supervisors /sought expert judgment of one more to rate the items for each instrument, and proceeded to compute the content validity index. CVI of 0.7 and the above were got for all instruments and considered valid for the study (Amin, 2005).

For example, using the formula; total items rated valid/total number of items, for the questionnaire;

3.7.1   Reliability of Research Instruments

Table 3.   Summary of Reliability Statistics

Variable	Reliability Statistics
Solid Waste Mgt	0.794
Rapid popn. Growth	0.884
Funding	0.732
Community Participation	0.903

Total	3.313
Average	3.313/4 = 0.828

Source: Primary data

The internal consistency method was used. The researcher administered the questionnaires to 10 different categories of respondents once in an area that had similar characteristics as the study area, i.e Muhorro Town council this was to minimize errors and increase reliability of the data collected by taking corrective action based on the pre-test results. This was tested by use of Cronbach's Alpha and an average of 0.828 was got hence, relevant for use (Hair, et al, 2006)

3.7   Data collection procedure

After the approval of the research proposal by Uganda Management Institute, the Institute wrote a letter of introduction of the researcher to the Town Clerk Kagadi Town Council in Kibaale District, requesting him or her to allow the researcher carry out a study in the jurisdiction of Kagadi Town Council. The Town Clerk accordingly wrote a letter accepting and introducing the researcher to the target respondents requesting them to accept and work with him. The researcher then selected six research assistants one from each Ward of Kagadi Town Council. The research assistants were trained for one day by an experienced researcher who took them through; the back ground of the study, purpose of the study objectives, what is expected to be achieved, the geographical scope and the methods of data collection.

They were equally equipped with skills of handling and administering the research instruments. The research instruments were pre tested during the training so as to give hands on skills to the research assistants

During data collection, the research assistants ensured proper use of the instruments and handling of data until it was taken to the collection centre for coding interpretation and analysis

3.8   Data Analysis

Data analysis included editing the findings, coding and tabulation in the computer Statistical Package for Social Scientists (SPSS) for analysis. Main ideas in qualitative data were clearly recorded. The data filled in the questionnaires were copied and analyzed by tallying it and tabling it in frequency tables identifying how often certain responses occurred and later evaluation was done. This yielded the primary data which was raw in nature. Both qualitative and quantitative methods were used for data analysis as the study generated both qualitative and quantitative data. Once the data was collected, it was coded and analyzed by use of descriptive statistics such as frequencies percentages, means, modes, medians, standards deviations, variances and correlations.

3.9   Quantitative Data Analysis

Quantitative data was collected using closed ended questionnaire. The researcher ensured that data is properly coded. Data was presented in form of frequency tables and graphs with their respective percentages. A computer statistical package for social scientists (spss) was used. Subsequently data was analyzed using linear regression in order to establish whether   SWM was significantly dependant on the independent variables. Regression allows social scientists to make predictions about the value of a variable if another variable is known (sararitakos, 1998).

3.10   Qualitative data Analysis

Qualitative data was analyzed by arranging the data in different themes and by source of information. Data was then coded to generate a description of the setting for analyzing (Amin,2005) interpretation of data was done in accordance with the study variables and study objectives.

3.11   Measurement of Variables

Since the researcher used both qualitative and quantitative methods, the measurement of variable equally applied to all. Variables for quantitative data were measured numerically using the Likert Scale. The numbers in Likert Scale indicate the presence or absence of the characteristics being measured if ordered. (Mugenda & Mugenda, 1999)

Under qualitative data, data codes or labels were assigned to emerging theme.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.0   Introduction

In this chapter, the results are presented analyzed and interpreted using descriptive, relational and inferential statistics. The researcher utilized statistical measures of central tendencies followed by tests for correlations between independent variables and the dependent variables. The presentation analysis and interpretation were done following the respective study objectives.

4.1   Response Rate

Response rate is the ratio of the actual number of respondents, vis-à-vis the targeted. The researcher had targeted to get information from the various respondents and got the following:

Table 4: Respondents response rate

Respondent category	Expected Respondents	Actual respondents	%age response
Town Clerk	1	1	100
Heads of department	10	10	100
Group employees in solid waste management (SWM) department	6	6	100
Environment committee	8	8	100
Town councilors	15	15	100
Stakeholders i.e NGOs, CSOs	12	12	100
Cell Chairpersons	41	41	100
LC III and II Chairperson	7	7	100
	100	100	100

The results in table 4 shows an excellent response rate of 100% for the study by all categories of respondents. This is an excellent participation/response rate because as Amin (2005)

recommends that a minimum of 70% is adequate for a valid research. The excellent response rate is attributed to the fact that all categories work with Kagadi Town Council, who were easily accessible and seemed interested in Solid waste management. The respondents were able to open up and voice their concerns so as to be helped out. This data can be relied upon to give a frame work in which conclusions can be made.

4.2   Demographic characteristics of the respondents:

This section presents the findings on the respondents' sex, age and level of education of which all were considered important for the study.

4.2.1   Level of Education attained by the respondents.

The level of education attained by the respondents was considered important as it would help the researcher to know the extent to which the respondents understood the dynamics of Solid waste management.

Table 5: Level of Education attained by the respondents.

Highest Level of Education of Respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary Education	48	48.0	48.0	48.0
	Diploma/Certificate	33	33.0	33.0	81.0
	University Education	10	10.0	10.0	91.0
	Post Graduate Degree	1	1.0	1.0	92.0
	Others	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Source: primary data

From the table above, majority of the respondents had attained secondary level of education with 48%. This implies that almost half of the respondents were able to understand the dynamics

concerning solid waste management. The second majority constituting 33% had attained diploma/certificate.

4.3.1 Rapid population growth and solid waste management

Ssekkono (2003) contends that every common activity of human life generates waste because nearly every human being involves the use of products resulting in the direct/indirect generation of waste. This first objective was aimed at examining how rapid population growth influences solid waste management in KTC. The data to achieve this was obtained from the primary sources (Town clerk, heads of departments, group employees in solid waste management, environmental committee, Town councilors, cell chair persons, LC11 chairpersons, chairperson LC111 and stakeholders (NGOs, CSOs) and by secondary data (documented work).

The study investigated how rapid population growth influences solid waste management using a five scale questionnaire of Strongly Agree (SA), Agree (A), No Comment (NC), Disagree (D) and Strongly Disagree (SD). A summary of the responses is presented in the table below.

Table 6:   A summary of the findings on Rapid population growth and solid waste management

Rapid population growth	SA	A	NC	D	SD	Mean	Standard Deviation
There is rapid population growth in KTC	41%	49%	3.0%	4%	3%	1.79	0.913
Rapid population growth is associated with solid waste accumulation.	20%	58%	4%	16%	2%	2.22	1.011
Rapid population growth is caused by occurrence of garbage	34%	62%	1%	2%	1%	1.74	0.676
High population growth is responsible for SW generation and accumulation in KTC	47%	34%	6%	10%	3%	1.88	1.094

Source: primary data

N.B.   SA + A = Majority of the respondents agreed
SD+D = Majority of the respondents disagreed
NC = No comment by Respondents

The results in table 6 indicate that the majority respondents' high response (90%) towards rapid population growth in KTC shows that rapid population growth leads to much accumulation of solid waste. Only 3% did not comment and 7% respondents disagreed.

The District population officer thus revealed that population Kagadi town council for the past three years has been increasing. In 2010 it was female - 12165 and male 11423 and to date 2013 female is 13927 and male 13700. By national standards this is rapid population growth. This is attributed to immigration into the town, high fertility of women and improved health services.

Majority 78% respondents agreed that rapid population growth is associated with natural population growth. Only 4% had no comment and 18% disagreed.

Majority 96% of the respondents agreed that rapid population growth is caused by rural urban shift, only 1% had no comment and only 3% disagreed. This high response is an indication that high accumulation of garbage is as a result of this influx to urban areas.

Majority respondents 81% agreed that High population growth is responsible for SW generation and accumulation in KTC. Those with no comment were 6% and 13% disagreed.

It was found out that high and ever increasing population match with the increase in garbage. It becomes a challenge for management to cop up with rapid increase of garbage due to inadequate financial resources and modern tools to use in collection, transportation and disposal of garbage.

Hypotheses Testing

To verify the alternative hypothesis that Rapid population growth influence solid waste management in KTC, the Pearson's product moment correlation coefficient was thus, used to determine the magnitude of the relationship as shown on the table below:

Table 7: Correlation matrix for Rapid population Growth and solid waste management

Correlations

		Rapid Population	Solid waste management
Rapid Population	Pearson Correlation	1	.246*
	Sig. (2-tailed)		.002
	N	100	100
Solid waste management	Pearson Correlation	.246*	1
	Sig. (2-tailed)	.002	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Source: primary data

Table 7 above, shows a correlation coefficient of .246* which is significant at 0.01 level implying a very strong significant positive relationship.

A regression analysis was hence, run in order to determine the strength of relationship between rapid population growth and solid waste management, that is, how much of the variance in the independent variable would affect the dependent variable.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.246a	.060	.052	.60754

a. Predictors: (Constant), Rapid Population

The coefficient of determination .052 implies that rapid population growth affects by 5.1% of the solid waste management in KTC. Thus, there is a significant positive relationship. It means, the more there is rapid population growth, the more strong effect on solid waste management.

Therefore, the researcher upholds the research or alternative hypothesis.

4.3.2 Funding and solid waste management

NEMA Report (2004) indicates that the increase in solid waste generation, in almost urban areas has not been matched with the increase in the capacity of the relevant urban authorities to handle this menace financially.

The second objective was aimed at establishing the extent to which Funding affects solid waste management in KTC. The data to achieve this was obtained from the primary sources and by secondary data (documented work).

A summary of the responses is presented in the table below.

Table 9:   A summary of the findings on Funding and solid waste management

Funding	SA	A	NC	D	SD	Mean	Standard Deviation
There is adequate funding of SWM in KTC	4%	20%	15%	48%	13%	3.46	1.077
Kagadi Town Council receives adequate funds from the Central Government for SWM	6%	21%	16%	42%	15%	3.39	1.154
Kagadi Town Council has inadequate funds to manage garbage	21%	42%	8%	23%	6%	2.51	1.227
Kagadi Town Council generates adequate locally raised funds for SWM	8%	26%	5%	53%	8%	3.27	1.171
Kagadi Town Council is satisfactorily handlings SW in KTC	9%	25%	3%	54%	9%	3.29	1.200
Garbage accumulation is due to inadequate funds in Kagadi Town Council	13%	45%	6%	31%	5%	2.70	1.185

Source: primary data

From table 9 above, 24% respondents agreed that there is adequate funding of SWM in KTC. Although 15% of the respondents had no comment because they did not know financial issues 61% of the respondents disagreed with the view that there was adequate funding for SWM activities. This view therefore is a justification of the presence of a lot of solid waste in KTC since funding is inadequate.

The table above indicates that 26% of the respondents acknowledged that KTC received adequate funds from the central government for SWM. 16% of the respondents on the other hand did not make any comment. The majority of the respondents 57% disagree with the view that KTC receives adequate funds from the central government an indication that solid waste management activities are financially inadequately handled since the local revenues are also unreliable.

The majority 63% agreed that generally KTC has inadequate funds to manage garbage. This is a justification for garbage accumulation. In comparison, a small number of 8 % respondents had no comments to make; but 29% of the respondents disagree with the view that KTC has inadequate funds.

The table also reveals that 34%% of the respondents agreed that KTC generates adequate locally raised funds for SWM. The minority 5% of the respondents had no comment, but the majority 61% disagreed. The findings reveal that 63% are in support of the fact that KTC is satisfactorily handling solid waste management due to lack of adequate financial resources. 3% had no comment but 34% still believed that KTC was still on course as far as SWM is concerned.

The findings reveal that 58% confirmed that garbage accumulation in KTC was due to Inadequate financial resources. Only 6% had no comment at all, but 36% contend that inadequate funds were not responsible for garbage accumulation but even other factors like community negligence and culture.

Hypothesis Testing;

To verify the alternative hypothesis that Funding affects solid waste management in KTC, the Pearson's product moment correlation coefficient was thus, used to determine the magnitude of the relationship as shown on the table below:

Table 10:   Correlation matrix for Funding and solid waste management.

Correlations

		Funding	Solid waste management
Funding	Pearson Correlation	1	.159
	Sig. (2-tailed)		.113
	N	100	100
Solid waste management	Pearson Correlation	.159	1
	Sig. (2-tailed)	.113	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).
Source: primary data

The table shows a correlation coefficient of .159 which is significant at 0.01 levels implying a

significant relationship.

A regression analysis was thereafter run in order to determine the strength of relationship

between Funding and solid waste management, that is, how much of the variance in the

independent variable would affect the dependent variable.

Table 11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.159a	.025	.015	.47878

a. Predictors: (Constant), Funding

The coefficient of determination 0.15 implies that Funding affects by 1.5% of the solid waste

management. Thus, there is a significant relationship. It means that funding has an effect on solid

waste management. That the more the funding of SWM related activities the less the garbage that

would accumulate in the town. That if funding was adequate, the need for this research would

have been minimized or even rendered irrelevant.

Table 12: Regression output summary on Funding and solid waste management

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.126	.272		11.509	.000
	Funding	.138	.086	.159	1.598	.113

a. Dependent Variable: Solid waste management

Results further confirm a significant effect of Funding on solid waste management with a Beta

value of 0.159 at 95% of confidence. This implies that Funding affects solid waste management

by 0.159. Therefore, the researcher upholds the research hypothesis.

4.3.3 Community participation and solid waste management

The third objective was aimed at examining the impact of community participation on solid waste

management in Kagadi Town Council. The data to achieve this was obtained from the primary

sources and key informants.

A summary of the responses is presented in the table below.

**Table 13:   A summary of the findings on Community participation and solid waste
          management**

Community participation	SA	A	NC	D	SD	Mean	Standard Deviation
Lack of community sensitization and awareness are responsible for SW accumulation	11%	52%	3%	27%	7%	2.67	1.190
The community has been mobilized and awareness created on SWM in KTC	5%	48%	6%	35%	6%	2.89	1.127
Community participation in solid waste collection	3%	52%	5%	35%	5%	2.87	1.089
Community members have dustbins for garbage collection	3%	40%	2%	44%	11%	3.20	1.172
The community is reluctant to collect garbage	10%	40%	6%	39%	5%	2.89	1.180
Community participates in the transportation of SW from the source to the skips	4%	30%	2%	44%	20%	3.46	1.226
Community voluntarily gives away their vehicles to transport garbage	1%	11%	3%	56%	29%	4.01	.927
Community participation in the proper disposal of waste	1%	21%	5%	50%	23%	3.73	1.072
Community provides disposal grounds/landfills	0%	21%	8%	50%	21%	3.71	1.028
Community burn their garbage	4%	34%	6%	47%	9%	3.23	1.136
Community members recycle their garbage	2%	11%	9%	57%	21%	3.84	.950

Source: primary data

Table 13, shows that 63% respondents agreed that Lack of community sensitization and awareness are responsible for SW accumulation. The 3% of the respondents did not make any comment. The findings further reveals that 34% disagreed. Therefore, there is need for community sensitization and awareness on SWM.

The findings from the table indicate that 53% respondents confirmed that community in KTC has been mobilized and awareness created. The minority 6% did not make any comment. And 41% disagreed on the ground that they are not informed. This was revealed by one of the community members that; "*We get to know about solid waste management community meetings that took place*

only after 2 weeks. We think mobilization to that effect should be emphasized by the Town council authorities."

The above table reveals also that 58% agreed that community participates in solid waste collection. At least 5% did not make any comment but 41% disagreed as they are not informed in time.

It was also revealed that 43% agreed that community members have dustbins for garbage collections. Only 2% had no comment and 45% disagreed on this issue citing reasons as; no policy in place and costly garbage bins.

Respondents (40%) agreed that community is reluctant to collect garbage. Only 6% had no comment and 44% disagreed.

For 34% agreed that community participates in the transportation of SW from the source to the skips. Only 2% had no comment and 64% disagreed, an indication that most of the garbage is not collected.

The table further reveals that only 12% agreed that community voluntarily gives away their vehicles to transport garbage. Only 3% made no comment and the majority 85% disagreed.

Only 22% agreed that community participate in the proper disposal of waste. 5% made no comment and 73% disagreed an indication that the disposal part is the responsibility of the authority.

Only 21% agreed that community provides disposal grounds/landfills. 8% had no comment, but 71% majority disagreed on the ground people have limited land to give out for garbage dumping.

Aleast 38% respondents agreed that community burn their garbage. Only 6% had no comment and 56% disagreed as burning produces smoke and ash dust.

For 13% agreed that community members recycle their garbage. 9% made no comment and 78% disagreed as they don't have the rural technology to carry out recycling.

Hypothesis Testing;

Research hypothesis; Community participation has an impact on solid waste management.

The Pearson's product moment correlation coefficient was used to determine the magnitude of the

relationship as shown on the table below:

Table 14:   Correlation matrix for Community participation on solid waste management.

Correlations

		Community Participation	Solid waste management
Community Participation	Pearson Correlation	1	.390**
	Sig. (2-tailed)		.000
	N	100	100
Solid waste management	Pearson Correlation	.390**	1
	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).
Source: primary data

The table shows a correlation coefficient of .390** which is significant at 0.01 levels implying a

significant strong relationship.

A regression analysis was thereafter run in order to determine the strength of relationship between

community participation and solid waste management, that is, how much of the variance in the

independent variable would affect the dependent variable.

Table 15: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.390ᵃ	.152	.143	.44666

a. Predictors: (Constant), Community Participation

The coefficient of determination 0.143 implies that community participation affects by 14.3% of

the solid waste management. Thus, there is a significant strong relationship. It means that

community participation has a significant role on solid waste management

Table 16: Regression output summary on community participation and solid waste management

Coefficientsᵃ

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	2.205	.325		6.783
	Community Participation	.406	.097	.390	4.187

a. Dependent Variable: Solid waste management

The result in the above table revealed a regression coefficient of .390 at 0.01 significance level,

hence a strong significant relationship. Results further confirm a significant effect of community

participation with a Beta value of 0.390at 95% of confidence.

Therefore, the researcher upholds the research or alternative hypothesis.

4.4   Descriptive statistics on views of respondents

Dependent variable:

Solid waste management

This section presents the findings on dependent variable; solid waste management using the questions set to generate information from the respondents.

Table 17:   A summary of the findings on Solid waste management

Solid waste management	SA	A	NC	D	SD	Mean	Standard Deviation
Solid waste collection is adequately managed	5%	20%	3%	58%	14%	3.56	1.113
Garbage is collected daily by Kagadi Town Council	1%	20%	3%	58%	18%	3.72	1.016
All generated refuse is collected by Kagadi Town Council	3%	40%	3%	40%	14%	3.22	1.203
Kagadi Town Council has enough garbage collection tins and skips	6%	15%	3%	56%	20%	3.69	1.134
Garbage accumulation is associated with lack of collection bins and skips.	13%	24%	6%	36%	21%	2.28	1.379
Solid waste collection services reach every corner of the town	9%	12%	3%	54%	22%	3.68	1.205
Kagadi Town Council has enough transportation trucks for SW	4%	9%	4%	59%	24%	3.90	1.000
The collection trucks access all areas where SW is accumulation	0%	9%	2%	64%	25%	4.05	.796
The available trucks are in good working conditions	3%	9%	9%	52%	27%	3.91	.996
The trucks are designed to carry garbage and therefore cannot drop garbage on the way as they move.	3%	9%	9%	54%	25%	3.89	.984
Kagadi Town Council has landfill for disposing refuse	0%	12%	20%	42%	26%	3.69	.957
The landfill in enough for all the garbage	1%	8%	29%	45%	17%	3.69	.884
The disposal site/landfill is properly maintained	0%	7%	27%	46%	20%	3.79	.844
The landfill is in a reasonable distance and accessible	0%	11%	28%	42%	19%	3.69	.907
Residents in KTC burn their garbage	5%	29%	12%	44%	10%	3.25	1.132
Town residents are aware about the current legislation on SWM in KTC	0%	37%	14%	40%	9%	3.21	1.047
Kagadi Town Council has formulated bye-laws on SWM	3%	38%	16%	37%	6%	3.05	1.058
The bye-laws are effective and appropriate in addressing SWM problems in KTC	2%	38%	19%	33%	8%	3.07	1.057
The bye-laws are enforced to ensure proper waste management	4%	32%	23%	37%	4%	3.05	1.009

Source: primary data

From the above table**,** 25% respondents agreed that Solid waste collection is adequately managed. 3% had no comment but 72% disagreed. The majority disagreed because a lot of garbage could still be seen all around the town areas.

21% of the respondents agreed that garbage is collected daily by KTC, 3% did not comment and 76% disagreed. These respondents who disagreed were basing on the fact that garbage was still not yet collected.

43% agreed that all generated refuse is collected by Kagadi Town Council. 3% made no comment and 54% disagreed as the refuse was not collected and could be seen in some parts of the town.

 21% agreed that Kagadi Town Council has enough garbage collection tins and skips. 3% made no comment but 76% of the respondents disagreed as garbage was littered everywhere without specific dumping places, skips and tins.

37% agreed that Garbage accumulation is associated with lack of collection bins and skips**.** 6% had no comment and 57% disagreed. The reason why these respondents disagreed was that even where the skips were, the garbage was still heaping.

Only 21% agreed that Solid waste collection services reach every corner of the town .3% made no comment and 76 disagreed because garbage was still at large.

13% agreed that Kagadi Town Council has enough transportation trucks for SW. 4% had no comment but 83% disagreed. The town council has only one old tractor which is used for garbage collection throughout the town council.

9% agreed that the collection trucks access all areas where SW is. 2% had no comment while 89% disagreed on the ground that there is only one tractor that cannot access all the places.

12% agreed that the available trucks are in good working conditions. 9% had no comment and 79% disagreed because there are no trucks but only one tractor which is always on and off.

12% agreed that the trucks are designed to carry garbage and therefore cannot drop garbage on the way as they move. 9% had no comment and 79% respondents disagreed as there not enough trucks and the tractor is not designed to carry the garbage and therefore some garbage is dropped on the way as the trucks moves.

12% respondents agreed that Kagadi Town Council has a landfill for disposing refuse. 20% had no comment, while 68% disagreed and this is in agreement with the comment from the town Clerk, that; *"We are in the process of procuring land where we shall dispose garbage." But currently we have the land.*

9% agreed that the landfill was enough for all the garbage collected. Only 29% had no comment, while 62% disagreed as commented by the Town council Health Inspector that; *The land fill is already full and we are in the process of procuring another one."*

7% agreed that the disposal site/landfill is properly maintained. 27% had no comment and 66% disagreed on the ground that the landfill does not exist and therefore nothing to mainatain.

Findings further reveal that 11% of the respondents agreed that the landfill is in a reasonable distance and accessible. Whereas 28% had no comment, 61% disagreed. This is true because the landfill is not there.

34% agreed that residents in KTC burn their garbage. 12% had no comment and 54% disagreed.

37% agreed that town residents are aware about the current legislation on SWM in KTC. 14% had no comment and 49% disagreed as they are not aware of the bylaws on SWM.

41% agreed that Kagadi Town Council has formulated bye-laws on SWM. 16% had no comment

and 43% disagreed. If these by laws were in place, solid waste management would be carried out

properly.

40% agreed that the bye-laws are effective and appropriate in addressing SWM problems in

KTC. 19% had no comment and 41% disagreed as there are no bylaws in place addressing SWM

issues.

36% agreed that the bye-laws are enforced to ensure proper waste management. 23% had no

comment and 41% disagreed because if they were properly enforced, the solid waste

management issue would not have risen.

4.5 Multiple regression analysis

In order to determine the combined effects of the independent variables on the dependent variable

or whether the independent variable predicts the dependent variable, a multiple regression was run

and results shown below:

Table 18:   Summary of multiple regression analysis

Coefficients^a					
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.709	.441		3.871	.000
	Rapid Population	.021	.074	.027	.288	.774
	Funding	.142	.080	.165	1.782	.078
	Community Participation	.411	.097	.394	4.248	.000

 a. Dependent Variable: Solid waste management
Source: primary data

From the above table, the best factor that explains / predicts solid waste management is

community participation (beta 0.394). This implies that solid waste management is best achieved

with more community participation. Funding follows with a beta 0.165. The third is rapid

population growth with a beta 0.027. Therefore there is need to put in place legislation that will

guide on rapid population growth, sensitize the community on proper management of solid

waste.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0   Introduction

This chapter presents summary of the findings, discussion of the main findings, the conclusions and the recommendation and areas that need further research.

5.1.1   Rapid population growth and solid waste management

The first objective was to examine how rapid population growth influences solid waste management in KTC. The study found out that rapid population growth has a statistically significant effect on solid waste management of a coefficient 0.246 at 0.01 significance level. The major findings were that majority of the respondents agreed that rapid population growth is caused by rural urban shift . This high response was an indication that high accumulation of garbage is as a result of this influx to urban areas.

However some respondents did not agree that rapid population growth is caused by rural urban shift on the ground that also the high fertility rate also leads to rapid population growth.

5.1.2   Funding and solid waste management

Further, the study found out that there exist a significant relationship between Funding and solid waste management of a coefficient of .159 which is significant at 0.01 level. Majority of the respondents agreed that generally KTC has inadequate funds to manage garbage. This is a justification for garbage accumulation.

However on contrary, some respondents disagreed on ground that KTC has some funds to manage garbage but not put into good use.

5.1.3   Community participations and solid waste management

The study found out that there existed a positively significant relationship between Community participation and solid waste management with a coefficient of 0.390 at 0.01 significant level . The findings revealed that majority respondents agreed that Lack of community sensitization and awareness are responsible for SW accumulation.

However on contrary some respondents disagreed that community voluntarily gives away their vehicles to transport garbage.

5.2   Discussion of findings

5.2.1   Rapid population growth and solid waste management

The study objective was to examine how rapid population growth influences solid waste management in KTC, Kibaale district and the findings showed a significant positive relationship. The major findings were that majority of the respondents agreed that rapid population growth is caused by rural urban shift. This high response was an indication that high accumulation of garbage is as a result of this influx to urban areas.

 In Uganda, fertility, mortality and migration are the major drivers of population growth. Fertility levels have remained high over the past three decades with the total fertility rate at about 7 children per woman (UBOS 2008).

It is, therefore, an onus on KTC to ensure that solid waste management is perfected by putting in place legislation that will guide on rapid population growth, sensitize the community on proper management of solid waste.

5.2.2 Funding and solid waste management

The researcher set out to establish the effect of funding on solid waste management in KTC and found out that the relationship was positively significant. The study revealed that generally KTC has inadequate funds to manage garbage. This is a justification for garbage accumulation.

The researcher found out that mainly funding was by central government and locally generated revenues to ensure proper solid waste management.

The above is supported by World Bank report 2000 that Inadequate funding has always been a problem for urban waste services in Benin City.

The local Government Financial and Accounting Regulations (2007) points out all the sources of local Revenue for the local authority which includes licenses, Property tax, rental services from buildings and facilities, local service tax ,hotel tax, fines and surcharge as well as income from the sale of local government assets. The Regulations give council the mandate to appropriate   all local   Revenue in accordance with the council's needs.

However on contrary, it was found out that some respondents disagreed on ground that KTC has some funds to manage garbage but not put into good use.

5.2.3 Community participation and solid waste management

Another objective of the study was to examine the impact of community participation on solid waste management in Kagadi Town Council. Findings revealed that indeed there was a significant positive relationship. The study found out that majority of the community lacked sensitization and awareness on solid waste management which are responsible for SW accumulation.

The above is supported by (Feroz and Raman 2000), that, community participation helps to build on knowledge and experience that through needs of users can be better addressed and ownership enhanced.

5.3 Conclusions

5.3.1 Rapid population growth and solid waste management

Since the findings revealed that rapid population growth had a positively significant effect on solid waste management, it therefore, means that rapid population growth affects solid waste management. That is, high accumulation of garbage is as a result of rapid population increase due to immigration and natural population increase.

5.3.2 Funding and solid waste management

The positively significant relationship between funding and solid waste management implies that the more the funding, the more solid waste management activities carried out. However, inadequate funding has not facilitated effective management of solid waste.

5.3.3 Community participation and solid waste management

The significant positive relationship between Community participation and solid waste management implies that the more the community participates, the more effective solid waste is managed. In some areas of Kagadi town council where community participated in solid waste management, garbage was not a big issue.

5.4 Recommendation

The following recommendations have been made basing on the findings and conclusions drawn from the study:

5.4.1 Rapid population growth and solid waste management

There is need for the KTC to formulate bylaws regarding solid waste management. Through community mobilization and sensitization on natural population growth and rural urban shift, the intervention of the local councils and community leaders in ensuring solid waste management activities will go a long way in curbing the challenges of solid waste management.

5.4.2 Funding and solid waste management

Central government should increase funding towards solid waste management and KTC should avail enough resources for proper solid waste management.

Town council should introduce waste taxes that will generate revenue for effective management of solid waste.

5.4.3 Community participation and solid waste management

The communities should continuously be mobilized to fully participate in all activities related to solid waste management.

There is need to sensitize communities on collection, transportation and disposal of solid waste. Once these are clearly understood, then their effects on solid waste management will be overcome.

5.5   Limitations of the study

Geographical coverage has only been limited to one Local government – Kagadi town council and the finding are only limited to the experiences in Kagadi town council and may not necessarily wholesomely apply to other local governments. Also the sample size of 100 people can only provide inductive statistics and not results that can be used for inference. Therefore, a much bigger sample would have been more representative to produce more dependable results.

Limited corporation from some sections of the respondents who thought, that the researcher was on fault finding mission.

5.6   Contributions of the study

The findings will add value to the existing body of knowledge about solid waste management on one part and how it is being influenced by rapid population growth, funding and community participation. The study findings will also help policy makers at local and central government levels to find new ways and re-focus their approach on addressing solid waste management challenges across the board. For example, the issues of funding, the governments should allocate enough resources to handle what has now turned to be a public menace.

5.7   **Areas for further research**

The study has adequately established, presented and discussed the factors that affect solid waste management like rapid population funding and community participation. Other factors other than those covered by the study need to be identified studied and researched on as well so that comparison can be made.

Since the study used purely structured questionnaires, documentary review and interview methods of data collection. It is hereby suggested that further research can be carried out using focus group discussions. This helps to strengthen quantitative results.

Conclusively, further research in another local government is hereby suggested and this will help to compare results.

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APPENDIX I

QUESTIONAIRE FOR THE GENERAL RESPONDENTS IN

KAGADI TOWN COUNCIL

Dear respondent

I am Ssewanyana JohnBosco, a student of Uganda Management Institute conducting a research study about *"the factors affecting solid waste management in urban councils"*; as a requirement for the award of a Masters Degree in Public Administration and Management, I kindly request you to spare some time and fill this questionnaire. The information given will be used for academic purposes only and will be treated with utmost confidentiality. Your cooperation will be highly appreciated.

Section A: BACKGROUND INFORMATION

Please tick the most suitable answer.

1. What is your job title?...

2. In which ward are you attached to?..

3. Sex

    1. Male ☐
    2. Female ☐

4. Age bracket

    1. 20-25 ☐
    2. 26-30 ☐
    3. 36-40 ☐
    4. 41 and above ☐

5. Highest level of education.

1. Secondary ☐

2. Diploma/Certificate ☐

3. University education ☐

4. Post-graduate degree ☐

5. Others specify)……………………………..

Instructions:

In this section below please complete the questionnaire by ticking or circling the number that best

describes your answer to each question using the following scale:

1. (Strongly agree) 2. (Agree) 3. (No comment) 4. (Disagree) 5. (Strongly disagree)

(Circle or tick only one answer for each statement).

Section 2: Rapid population and solid waste management.

2.1. Natural growth

6. There is rapid population growth in KTC.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

7. Rapid population growth is associated with natural population growth.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

2**.2 Rural urban shift**

8. Rapid population growth is caused by rural urban shift.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

9. High population growth is responsible for SW generation and accumulation in KTC

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

Section 3: Funding and solid waste Management.

3.1Cenntral Government transfers

10. There is adequate funding of SWM in KTC

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

11. Kagadi Town Council receives adequate funds from the Central Government for SWM

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

12. Kagadi Town Council has inadequate funds to manage garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

3.2. Local Revenue:

13. Kagadi Town Council generates adequate locally raised funds for SWM

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

14. Kagadi Town Council is satisfactorily handlings SW in KTC

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

15. Garbage accumulation is due to inadequate funds in Kagadi Town Council

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

Section 4: community participation and SWM

4.1 Community awareness

16. Lack of community sensitization and awareness are responsible for SW accumulation.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

1. The community has been mobilized and awareness created on SWM in KTC.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

4.2 Collection:

17. Community participation in solid waste collection.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

18. Community members have dustbins for garbage collection.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

19. The community is reluctant to collect garbage.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

4.3: Transportation:

20: Community participates in the transportation of SW from the source to the skips.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

21. Community voluntarily gives away their vehicles to transport garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

4.4. Solid waste disposed

22. Community participates in the proper disposal of waste

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

23. Community provides disposal grounds/landfills

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

24. Community burn their garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

25. Community members recycle their garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

Section 5: Dependent variable

5.1: **Solid waste collection**:

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

26. Solid waste collection is adequately managed.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

27. Garbage is collected daily by Kagadi Town Council

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

28. All generated refuse is collected by Kagadi Town Council

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

29. Kagadi Town Council has enough garbage collection tins and skips

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

30. Garbage accumulation is associated with lack of collection bins and skips.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

31. Solid waste collection services reach every corner of the town

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

Solid waste management

32. Kagadi Town Council has enough   transportation trucks for SW

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

33. The collection trucks access all areas where SW is accumulation

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

34. The available trucks are in good working conditions

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

35. The trucks are designed to carry garbage and therefore cannot drop garbage on the way as they more.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

5.3. Solid waste disposal

36. Kagadi Town Council landfill for disposing refuse

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

37. The landfill in enough for all the garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

38. The disposal site/landfill is properly maintained

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

39. The landfill is in a reasonable distance and accessible.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

40. Residents in KTC burn their garbage

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

Section 6: Government policy and solid waste management

41. Town residents are aware about the current legislation on SWM in KTC

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

42. Kagadi Town Council has formulated bye-laws on SWM

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

43. Thebye-laws are effective and appropriet in addressing SWM problems in KTC

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

44. The bye-laws are enforced to ensure proper waste management.

1. Strongly Agree   2. Agree   3.No comment   4. Disagree   5. Strongly disagree

……………………………………

Thank you very much for your participation

APPENDIX II

AN INTERVIEW GUIDE FOR THE RESPONDENTS IN CHARGE OF

SOLID WASTE MANAGEMENT IN KAGADI TOWN COUNCIL

Dear respondent

I am Ssewanyana Johnbosco, a student of Uganda Management Institute conducting a research study about *"the factors affecting solid waste management in urban councils"*; as a requirement for the award of a Masters Degree in Public Administration and Management, I kindly request you to spare some time and fill this questionnaire. The information given will be used for academic purposes only and will be treated with utmost confidentiality. Your cooperation will be highly appreciated.

Section A: BACKGROUND INFORMATION

Please fill in the most suitable answer.

1) What is your job title?..

2) In which ward are you attached to?..

3) Gender

4) Age bracket

5) Highest level of education.

6) How many years have you worked in this Town Council?

7) What is your marital status?

8) Number of People under your supervision in solid waste management?

9) Are you are aware of the effects of rapid population growth on solid waste management?

10) If yes in qn. 9 above mention some of the effects of rapid population growth on solid waste management?

11) Mention some of the funding on solid waste management done by Kagadi Town Council.

12) What are the effects of inadequate funding on solid waste management in the Kagadi Town Council?

13) Do you think the Town Council utilizes the funds available appropriately?

14) Does the community around the Town Council participate in solid waste management?

15) In what ways does the community around the Town Council participate in solid waste management?

16) 19. Explain the impact of community participation on solid waste management in Kagadi Town Council?

17) 20. What possible recommendations would you put forward as far as solid waste management in Kagadi Town Council?

Thank you very much for your participation