

**GARBAGE WASTE DISPOSAL ITS IMPACT AND SOLUTION ON  
THE ENVIRONMENT: AT NYAMPULUKAN O VILLAGE IN  
SENGEREMA TOWN COUNCIL  
MWANZA, TANZANIA**

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**A RESEARCH REPORT SUBMITTED IN PARTIAL FULFILLMENT  
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### **Declaration**

I **RENATUS NCHAL I** declare that this dissertation is my original work and has not been submitted for the award of a degree in any other university.

Signed .....  .....

Date ..... 23/5/2009 .....

### **Approval**

This dissertation entitled, garbage waste disposal its impact and solution on the environment. Has been submitted to the Kampala International University, with my approval as University supervisor.

Sign ..... 

Name of supervisor Mrs. Debora Taligoola.

Date ..... 23/05/2009 .....

### **Dedication**

To Jesus Christ my first love. Who has been the reason for me to overcome the challenges in my life. The sources of my inspiration and guidance.

This work is also dedicated to my parents, my dear father Constantine. M. Nchali and my beloved mother Vestina Konya, as well as my wife Leocadia Masambu for their unrewarded effort to bring me up and bearing the cost of my studies.

Also to my dearest grand parents, Konya wana, my Uncle Thomas Kadash konya for their moral and spiritually support. Also my beloved wife mama Rose for word of encouragement.

And special dedication to my daughter Rose Renatus Nchali, by time I join university she has only one month may lord give her courage to be educated, academician and long life amen.

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## **Abstract**

*The study assessed the garbage waste disposal its impact and solution on the environment, in Nyampulukano village in Sengerema town council, Mwanza region Tanzania. The researcher chose that particular topic because garbage waste disposal especially in Nyampulukano, garbage is one of the major challenges facing the present generation in Nyampulukano village in Sengerema town council. That need to investigate so that we get solution to the problems caused solid waste disposal.*

*The general objective of the research was to assess the garbage waste disposal and its impact on the environment, in Nyampulukano village in Sengerema town council Tanzania.*

*The specific objectives of the research were to find out the impact of garbage waste disposal and to establish solutions of garbage waste disposal in Nyampulukano in Sengerema town council.*

*The scope of the study involved 200 people of Nyampulukano village Sengerema town council, who were above 18 years both male and female who were chosen for the sample of population of 2000 people. This research focuses it self from 2008-2009.*

*This research used a descriptive study design using stratified random sampling. Data was collected using different instruments that included questionnaires, oral interviews and observation. Data was analyzed manually and expressed in tables, bargraphs and pie charts as summary for the data. The findings of the research revealed that they are relationship between ignorance and garbage waste disposal and its impact.*

*The researcher recommended that people of Nyampulukano village should construct / demolition debris, waste storage container, recycling facilities, fines, penalties and sanctions. Government ensures security in Nyampulukano v8illage, the infrastructure should be improved especially to the dumping place, government should try to look for permanent dumping of garbage waste disposal.*

## **CHAPTER ONE**

### **BACKGROUND OF THE STUDY**

#### **1.0. Introduction**

Solid waste disposal (Garbage) and its impact on the environment, is one of the challenges facing the present generation. Solid waste disposal (Garbage) has several impact associated to it which needs to be investigated to come up with solutions to the impact caused garbage disposal.

According to (Rogene, 1983), Solid waste as any unwanted or discarded material that is not in liquid or gaseous form. These wastes include municipal garbage and industrial refuse as well as sewage, agricultural refuse, demolition waste and mining residence”

Like wise, (William 2002), noted “solid wastes are domestic, commercial, industrial, agricultural and mining wastes that are primary non toxic. About 60% of our domestic and industrial wastes are deposited in land fills”.

Thus research therefore seeks to asses the impact of solid waste disposal (garbage) in Nyampulukano village in Sengerema town council in Tanzania.

#### **1.1. Statement of the Problem**

The level of Solid waste disposal (Garbage) and its impact on the environment tends to differ from one continent to another, from one country to another. But it should be noted that the rate of solid waste disposal (garbage) in third world countries is very high.

According to William (2002),” for many people the way to dispose of waste is to simply drop it some place. Open unregulated dumps are still the predominant method of waste disposal in most developing countries. The giant third world mega-cities have enormous garbage problem. Mexico city, the largest city in the world, generates some 10,000 tons of trash each day”

The majority of the people in the world are suffering from solid waste disposal (garbage) and its impact on the environment. Just like any other place in developing countries, Nyampulukano village which found in Serengerema town council in Mwanza region in Tanzania, is facing the impact of Solid waste disposal (Garbage) which need to be solved.

## **1.2. Purpose of the Study**

The researcher sought to investigate the impact of garbage waste disposal on the environment and its solution in Nyampulukano Village.

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

### **1.3.1. General objective**

To asses the impact of Solid waste disposal (Garbage)

### **1.3.2. Specific Objective**

- To find out the common types of garbage waste in Nyampulukano village.
- Assess the methods used to dispose garbages in Nyampulukano village.
- Identify the methods of storage of garbages waste in Nyampulukano village.
- Find out positive impact of garbage waste disposal.
- To find out negative impacts of garbage disposal.

### **1.3.3 Research Questions**

1. What are the common types of garbage waste found in Nyampulukano village?
2. Mention type of garbage disposal in your place?
3. What is the Advantage of garbage waste disposal?
4. What are the negative impacts of garbage waste disposal in Nyampulukano village?
5. What are the ways of transporting garbage waste?

6. What methods do communities use to dispose of garbage waste?
7. What has government done to help in the proper garbage waste disposal?
8. Identify measures of collecting garbage waste disposal in the village?

#### **1.4. Significance of the Study**

This study was useful to, town council administrators because they can formulate a policy to identify causes of Solid waste disposal (Garbage).

And the future researcher who will study thus topic or related topic shall use the findings of the study. The findings of thus study shall be used by policy makers like government officials in making decisions in Nyampulukano village, Sengerema town council and helpful to understand the problems and get the solution to them.

#### **1.5. Scope of the Study**

Sengerema district it has the population of 498,993 according to the government census of 2002. But the annul increment is 3.6 per annum, the approximation of 2008 population is 616,948 people. The district area is 8,817km<sup>2</sup> whereby 3,335 kms its land, and 5,482 km<sup>2</sup> its water.

This study was conducted among 200 people in Nyampulukano village, Sengerema town council in Tanzania, who are above 18 years both male and female who were from sample population of 2000 people. The people should be able to identify the impact of garbage waste disposal.

This research was conducted from 2008 June to 2009 April, at Nyampulukano village Serengema town 35 kms North of Mwanza city.

#### **1.6. Limitation of the Study**

Some of the respondents were not willing to share with the researcher some information which they thought was confidential to them but the researcher was promise to keep the information got with confidentiality.

Language barrier also caused a problem where some of respondents could not express them selves, well, and sometime misunderstood the questions. So the researcher had to help the respondents to interpret the questions.

Limited literature on education level in community library, and other libraries around made the study to be only restricted to use a few literature materials the researcher managed to access.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0. Introduction**

This chapter specifically looked at what other scholars have written about the topic of this study, concerning Solid waste disposal (Garbage), and its impact on the environment and find out solution to the impacts.

#### **2.1. Concept of Garbage Disposal**

Ravi (2001), the disposal of solid waste has been very necessary and there even seems to fear that if the solid waste problem is not solved, eventually there will be no room left for people. Because of this fear, large amount of solid waste get dumped in the ocean.

Seligo (2002), the solid waste that the communities must some how dispose include new papers and beer cans, tooth paste tubes and old television sets, broken refrigerators, cars and tires. American countries are now focusing twin crises in disposing of these wastes.

Cunningham (2001), Solid waste disposal (Garbage) are materials produced from domestic garbage and yard waste to industrial commercial. For many people the way to dispose of waste is simply drop it some place.

Alexander (2005), Defined solid disposal as all materials that are unwanted by their producer which are discarded at waste disposal facilities, (excludes material for recycling). Materials are not in liquid forms.

Eldon (2006), solid waste thus are “objects or particles that accumulate on the site where they are produced, as opposed to water and air borne wastes that are carried away from the site of production” Hence solid disposal was simply to dump solid wastes out side of the city or village limits.



George (1992), solid wastes are defined as “the unwanted remains, residues, discarded materials or by products which are no longer required by the initial user” these materials are the by products of human activities. Such activities include the processes of preparation, manufacture, packing, repacking, unpacking and construction and renovation of structures.

According to (Peter 1999), solid waste are disposed materials such as metal scrap, discarded food, organic waste can be used as source of energy, for “house hold, industrial, clinical”

Not only that Rogene (1993) he said solid waste as any unwanted discarded materials that is not in liquid or gaseous form. Include municipal garbage, agricultural refuse, demolition waste, and mining residues.

But according to Carlar (2000); solid waste (wood, yard waste, food, scraps) this makes 13%, plastic materials 6%, constructions debris, tires, textiles, rubber, miscellaneous 20%, papers 50%, metal 6% and glass 1%.

Every Japanese community thus has its own incinerators or access to one nearby. To protect against hazardous emissions from incinerators, Japan require the use of all possible operating practices and technologies to reduce air pollution and protect human health and environment (Rogene 1993).

Controlling garbage by zoning areas for our city dumps into usable areas instead ocean or sea dumping.

## **2.2. Negative Impact of Garbage Waste Disposal**

Improper disposal of garbage wastes can be injurious to human health, plants and animals. Example 2005 at Sengerema secondary school, school cow dies after ate hard porage and plastic bag (cavera), not only that but also improper disposal of garbage may cause destruction of designation system to animals and cause ndigana disease especially to cow. Due to these problems of animal to dies because of garbage waste disposal. The government act of 2002 number 378, and

act of 1968 number 80k. It put restriction of grazing animals around town and cities.

Garbage wastes contaminate surface and ground water. This make water unpure hence disease such as viral disease example viral diarrhoea, infectious hepatitis, and protozoa disease such as amoebic dysentery.

Not only that garbage waste, can provide harborage to vermin and disease vectors such as Helminthes worm infections such as askaries.

Can interfere an reasonably with the enjoyment of life or property. Due to poor disposal of garbage. These led to educate people in groups of 25 people, in village, through radio Sengerema, and public meetings at Nyampulukano village.

Garbage waste also can degrade aesthetic appreciation of natural environment. It destruct the nature of the including polluting the environment.

## **2.3 Types of waste**

### **2.3.1 Domestic wastes**

Domestic wastes; have some salvage potential value. They can be utilized in other ways, for example screened dust is used for covering refuse during tipping, these area including Kilabera dumble, IgogoB (mission) dumble, paper can be separated, pulped and then used for the manufacture of fiber or soft board scrap metals can be sold as scrap for re smelting. Rags can be made into new clothes and felt bones can be processed to make grease, glue and animal feeds. Example in Japan and Canada.

Street wastes, There are some wastes that accumulate on the roads and streets as a result of activities which take place there, example bwawani road there are many garbages along the road. These wastes include dust, grit, litter, cinder, motor parts, leaves, waste papers and plastic bags. These wastes must be swept together and removed. Street cleansing involves the organization of sweeping which is carried out either manually with shovel and brooms or mechanically with special vehicles. This reported by district health immune officers.

Street washing and gully emptying are part of street cleansing services. Street cleansing should be done regularly in order to keep the streets of the town clean and avoid nuisances.

Commercial wastes; These are wastes from big establishments like bookshops, example Lugega nad Mbesa bookshp at Nyampulukano Sengerema town, Super markets and hotels example Loi Hill hotel, Risbon hotel, Nyakaduha hotel and Three star hotel, training institution including Sengeema High school, Nursing training college, clinical officer training college Sengerema. The production of these wastes is continuous and needs attention so that collection can be done regularly, preferably and a daily basis. (VED) village executive officer insisted that commercial waste are seriously issue to his area.

Garden/ Agricultural wastes; Attention should be given to the gardens or any trees growing in town or agricultural produce brought to town. These wastes include cut grass maize cobs, leaves of trees, twigs from trimmed flowers, fallen twing from trees etc. When these waste are produced in large amounts, they pose problems to public health and their removal should be done quickly.

The village chairman said the government should solve this problem through public education, by organizing village meeting several times.

Hospital wastes; around the hospital there is large quantity of garbage waste of many types. Some of which are objectionable. The main ones are pads, dressings, used blood bags, plasters, broken bottles, needles, placenta and waste papers from offices, wards and pharmacy.

(Matron & Administrator), (Patron Administrator), to Sengerema hospital together they said that, dressing and plasters form a large of hospital wastes which must be stored properly before collection at Sengerema hospital. Garbage wastes should be collected regularly from all the ward, theatres, offices, out patient and other related areas. All combustible materials should be burnt immediately in incinerator, which is located within the hospital compound. Cleanliness should be the motto in the hospitals and thus quick and hygienic removal of such

objectionable waste is of great importance. Matron said that they have two incinerators for burning solid waste, see the diagram, below.

Switzerland and Japan dispose of less than 15 percent of their waste in landfills, compared to 55 percent in the United States. Instead recycling and incineration are the primary method “in addition the energy produced by incineration and can be used for electric generation or heating (George 1992).

Incineration is the process of burning refuse in a controlled manner. Today 15 percent of the municipal solid waste in United States is incinerated. Canada incinerates about 8 percent, while some incinerators are used just to burn trash most designed to capture the heat which is then used to make steam to produce electricity (Eldon. 2006).

Municipal incinerators are especially designed burning plants capable of burning thousands of waste per day. In some plants refuse is sorted as it comes into remove un burnable and recyclable materials before combustion, Matron said that sorting is done by separating wet solid waste, dry solid waste, and sharp solid waste, hence put into different containers before burning process began, they call yellow box, this is done at Sengerema hospital Nyampulukano village.

This is called refuse derived fuel because the enriched burnable fraction has a high energy content than the raw trash. Another approach called massive burn is to dump everything smaller than sofas and called refrigerators into a giant furnace and burn as much as possible.

Incinerator cost and safety the cost effectiveness of garbage incinerators is the subject of the heated debates. Initially construction costs are high usually between \$ 100 million and \$ 300 million for a typical municipal facility (Cunnighan 2002). Primary risks of incineration however involve air quality problems and the toxicity and disposal of the ash. Not only that but also the amount of pollutants are released into the atmosphere, including certain metals, acid gases, and classes of chemicals known as dioxins and furans, which have been implicated in birth defects and several kinds of cancer. When cities are unable to dispose of the trash

locally in land fill and must begin to transport the trash to distant sites, incinerators became more cost effective.

Design change to soft drink bottles and milk jugs are good example of source reduction. Since the 1977 the weight of a 2 litre plastic soft drink bottle has been reduced from 68 gram to 51 grams and the weight of plastic milk jug has been reduced to 30 percent (Eldon 2006).

Manufacturing process has been changed in many industries to reduce the amount of waste produced. All of these incidents generate waste and their prevention reduces the amount of raw materials needed and the amount of waste generated.

Purchasing decisions can significantly reduce the amount of waste produced. In many cases consumers and businesses can choose to purchase things that have reduced packaging waste.

Re using items is a way to reduce waste at the source because it delays or prevents the entry of re used items into the waste collection and disposal system.

Reducing unnecessary waste of non renewable mineral resources can extend supplies of these resources even more dramatically than recycling or reuse.

### **2.3 Positive Impact of Garbage Waste Disposal**

A clean environment is not in the absence of means of disposing of waste materials. Examples are papers, plastic bottlers, scrapers and food waste.

It avoid contamination of drinking water. Malnutrition and anemia, and reduce resistance of other diseases. Example basically dysentery.

Garbage will not be visible from streets and residences. Since there is proper disposal and transportation to the dumping place. In Nyampulukano, Sengerema town the dumping place its found 1/1/2 km out of the town centre.

It will avoid the excrement of the garbage on school yards. Example of the areas include St Carol school, Muslim school, Kilabera secondary school, Sengerema secondary school, and nursing school.

It reduce air and land pollution by burning garbage waste disposal. Example underground water can be polluted. By reducing improper garbage disposal we can be able to maintain our health. Not only that, it can reduce death to domestic animals, biodiversity and forest species. Example at Nyampulukano village 10 cows died through ate of garbages food waste and plastic bags (cavera).

#### **2.4 Solutions for garbage disposal waste in Nyampulukano village.**

When buying plastic products, pay a few cents extra for environmentally degradable varieties.

Buy food that come with less packaging shop at farmers markets or coop, using your own containers (Gumighan 2002). This will reduce the garbage waste disposal. Take your own washable refillable beverage container to meetings or convenience stores.

When you have a choice at the grocery store between plastic, glass or metal containers for the same food, buy the reusable or easier to recycle glass or metal.

Separate your cans, battles, papers and plastics for recycling. This will help to reduce plastic material around the garbages dumps.

Can significantly depredate current and future economic, development potentials since the poor disposal of garbage cause a number of disease.

Contamination of fresh water and water borne disease. Such as typhoid and diarrhoea, cause breeding of flies, to the full toilets pits.

Cancer related death over the next 300 yrs one every 50 years. Cancer kills over 560,000 people every year in USA, due to the effect of garbage and solid waste in general. Pollution associated with waste and waste management practices, includes biodegradable wastes, batteries, aerosols, oil, acid and fluorescent tubes.

Marine debris also known as marine litter, is human created waste that has deliberately or accidentally become a float in a lack, see, rivers, ocean and water ways. Due to direct dumping of water.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0. Research Methodology**

This chapter discusses the research design, population, sampling procedure, instruments, data collection procedures, data type and source and treatment of data.

#### **3.1. Research Design**

A researcher design is a plan of the proposed research work; it is an arrangement of conditions for collections and analysis of data in manner that aims at making the research relevant.

This study was employ descriptive survey method to assess the Solid waste disposal (Garbage), in Nyampulukano no village Serengerema Town Council in Tanzania. The design was preferred because it would collect original data of population, which was too large to be observed or studied, and because there will be limited time and resources. Stratified random sampling was used to choose the respondents who included both educated and non educated respondents who was above 18 years.

#### **3.2. Population of the Study**

The researcher was interviewed 200 respondents out of population of 2000 people to collect data to assess the Solid waste disposal (Garbage) and its impact on the environment; in Nyampulukano village in Serengerema town council Tanzania.

#### **3.3. Sample Selection Techniques**

The descriptive stratifies random sampling method was used to select 200 respondents from total population of 2000 in ten divisions of Nyampulukano village. 20 (Twenty) respondents will be chosen from each of ten division of

Nyampulukano village by randomly. One hundred (100) were educated and one hundred un educated and there total is 200 respondents.

### **3.4. Research Instruments**

The researcher shall use open ended and close ended, researcher made questionnaires, observations and oral interviews methods were also in practice to assess, the Solid waste disposal (Garbage) and its impact on the environment, in Nyampulukano village Serengerema Tanzania.

### **3.5. Data Type and Sources**

This study was used primary data got from the field using questionnaires, oral interviews and observation. While secondary data obtained from reviewing of reports, manual and other sources.

### **3.6. Data Collection Procedure**

The researcher took an introduction letter from Kampala International University School of education to the Chairperson of Nyampulukano village requesting for permission to consult the people in and around Nyampulukano village, for a researcher to assess the Solid waste disposal (Garbage) and its impact on the environment. After with the researcher waited for approval upon approval, a schedule will be prepared and pre tested before administering to the chosen respondent to how effect the question were in collection information needed from the respondents. There after the question were in collecting information needed from the respondents,. There after the respondents were given researcher question to fill at their own free time. The data will then be collected; processed, statistically treated, interpreted the results, arranged the data in order and finally summarized the data.



### **3.7. Data Analysis**

Data that was obtained through mentioned methods, was manually analyzed in statement forms especially for qualitative and quantitative data edited, laded, tabulated and analyzed conclusion drawn based on findings from which recommendation will be made.

Excreta-related viruses, bacteria and parasites cause disease, due to poor garbage disposal, Disease are spread through direct contact with an infected person or indirectly through contamination of food and water or through contact with contaminated soil. The pathogenic organism enter the body through the mouth or skin. Example of disease in Nyampulukano are typhoid, basically dysentery.

Japanese citizens recycle 40% of their total solid waste stream, include 50% of all papers, 55% of glass bottles, and 66% of food and beverage cans.

Japan recognizes recyclable materials as resource and not wastes, as is the common states and other industrialized countries.

## CHAPTER FOUR

### DATA PRESENTATION ANALYSI NG INTERPRETATION OF FINDINGS

#### 4.0 Introduction

The objectives of the research was to find out the common types of garbage waste found at Nyampulukano village. To assess the methods used to dispose the garbage wastes, not only that but also to identify the methods of garbage waste storage, and top find out positive and negative impact of garbage waste disposal at Nyampulukano village.

This chapter it includes the following as findings, methods types of garbages, storage of garbages, ways of transporting, positive and negative impacts.

This study was carried out among 200 respondents, one hundred (100) was educated respondent and one hundred (100) was un educated respondents, 20 educated students they did not respond to the questionnaires, and 10 uneducated respondents they did responded to the questionnaire. So 15% of the whole respondent they didn't answer questionnaire.

#### 4.1 Questionnaire return rate

Two hundred questionnaire were distributed to both educated and non educated respondents, twenty (20) educated respondent they did not returned the questionnaires, and ten (10) un educated respondents they did not return questionnaires.

**Table 1: showing educated and non educated respondents.**

<b>Educational status</b>	<b>Age group</b>	<b>Percentage (%)</b>	<b>Frequency</b>
Primary schools	9-14	15	11
Secondary school	15-19	17	23
Workers	20-60	30	66
Non educated respondents	15-19	20	51
	20-60	18	49
<b>Total</b>		<b>100%</b>	<b>200</b>

Source field data

#### **4.2 Educational background of the respondents**

Respondents are divided as follows, primary level, secondary level education, worker who completed colleges and universities. Including nurses, doctors, health officers, teachers among others. And non-educated who did not know how to write and count.

#### **4.3 Methods of garbage disposal in Nyampulukano village.**

The common methods used are land fills, incinerators, source reduction, compositing, recycling. All these waste are common but the most waste are include, food remains, papers and Cardboard, plastic materials and glass broken bottles, especially in areas such as “mission street” around Sengerema hospital, Ibisabagen, mtakuja and Pambalu.

But the common method of waste disposal at Nyampulukano areas, land fills, incinerator, and source reduction. Simply to dumble solid wastes outside of the city or village limits. Frequently, these dumps were in wetlands adjacent to a river or lake (Victoria). To minimize the volume of the waste dumps was often burned. Unfortunately this method is still being used in remote or sparsely populated areas in the world.

##### **Land fills;**

Have historically been the primary method of waste disposal because this method is the cheapest and most convenient and because of the threat of ground waster contamination was not initially recognized.

Garbage is covered with a layer of soil to prevent if from blowing around and to discourage animals from scavenging for food, these dumble includes mission market and kilabera main dummies. Selection of land fill sites is based on understanding of local geology conditions such as the presence of a suitable clay base, ground water geology and soil type. In case of Nyampulukano village it covered by sedimentary rocks, metamorphic rocks and clay soil, but some parts has slit soil.

In some cases methane produced by decomposing waste is collected and used to produce heat or generate electricity. As a result of the technology involved, new land fills are becoming increasingly more complex and expensive, especially to the poor district like Sengerema can't afford to buy equipment to generate electricity from garbage, or methane from the decomposing waste.

### **Composition of Trash;**

some respondents claimed that composting of trash was frequent used , In Sengerema (2008) paper and yard waste are the most common materials disposed of accounting for about 50 percent of the waste stream. Food scraps 15% percent, plastic materials 15 percent, metals 5 percent, (Rubber leather, textile) 4 percent, wood 6 percent, glass 5 percent, and other 5 percent.

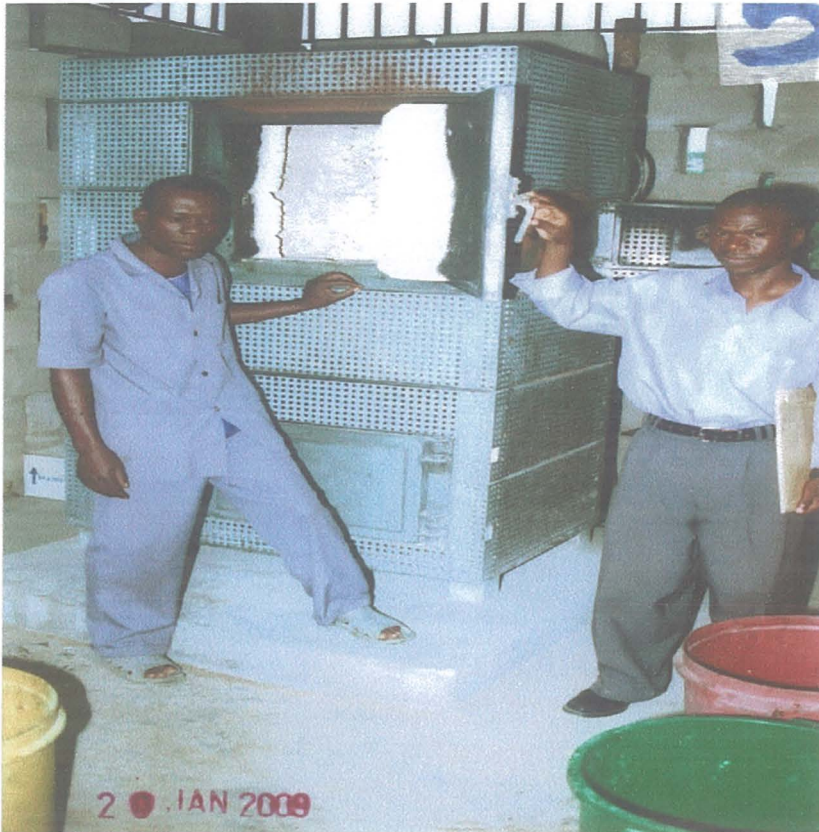
### **Incineration;**

(Thermal treatment) involved burning waste at high temperatures and can be used to destroy a variety of wastes.

In Nyampulukano we have one modern incinerator machine, it can burn 120 kg of garbage (solid waste) per day. It can be operated within two (2) hours, 60 kilograms of solid waste are burnt. Then incinerator can be stopped after two hours, and the incinerator can cool down after four (4) hours after the first burnt. Then you can park another 60 kg, for the second time. This incinerator its using 10 litres of diesel and electric power, within four (4) hours.

This information is according to the operator of the Sengerema hospital incinerator machine.

**Photograph 1. Shows incinerator Machines**



**Source: Field Observation**

**Source reduction;**

Some respondents contributed that some was, In the practice of designing, manufacturing, purchasing, using and reusing materials so that the amount of waste or its toxicity is reduced.

**Compositing;**

Since yard waste constitute a significant percentage of municipal solid waste especially garbage, these wastes can be decomposed in backyard compost bins and used in gardens and flower beds. Degradable solid waste from slaughter houses, food processing plants and kitchens can also be composted as can organic waste produced by animal feedlots, municipal, sewage treatment plants, and various

industries. Much of this materials can be collected and degraded in large composting plants, and solid at a profit as a soil conditioner and fertilizers. But the societies or people of Nyampulukano village they lack these knowledge of composting garbage waste due to lack of education.

### **Recycling;**

Is the processing of discarded materials into new useful products, some recycling processes reuse materials, old aluminum cans and glass bottles are usually melted and recast into new cans and bottles. Actually the merchants collect the materials for recycle at Nyampulukano, and all areas of Sengerema town to Mwanza city for recycle. News papers become cellulose insulation, kitchen wastes become a valuable soil amendment and steel cans become new automobiles and construction materials.

### **Burning land fills;**

In the past it was common practice to burn the waste in landfills to reduce the volume. Waste is still being burned, in sparsely populated areas in Nyampulukano dumps and other places like Igogo B, mission market, and Kilabera dumps and other parts of the world.

**Table 2: showing methods used to dispose garbage waste in Nyampulukano village.**

<b>Methods used to dispose</b>	<b>Frequency</b>	<b>Percentage(%)</b>
Land fills	70	50%
Incinerators	30	10%
Source reduction	50	20%
Composting	25	10%
Recycling	25	10
<b>Total</b>	<b>200</b>	<b>100%</b>

**Source: Field Data.**

## **4.4 Observation of Storage of Garbage Wasted Disposal**

Standard metal dustbins: Used for the storage of refuse are of galvanized iron, mild steel, etc. These types of storage receptacles are very convenient in storing wastes in very many areas like Sengerema secondary school, Nyampulukano

secondary school, Sengerema hospital, Sengerema clinical officer college, and small industrial areas and garbages in Sengerema town.

Commercial premises, residential houses shops, training institution in order to cope with the work, the dustbins should be of reasonable sizes.

The common size are  $0.028\text{ m}^3$ ,  $0.56\text{ m}^3$ ,  $0.07\text{ m}^3$  or 71 litres and  $0.09\text{ m}^3$  or 92 litre dustbins. The 92 litre dustbin weighs 12.7 kg when empty and many contain refuse up to 15 kg.

#### **The plastic standard dustbin;**

Are becoming increasingly popular and are preferred storage to the metal type. In Kenya they have been tried in the main town such as Mombasa, In Tanzania towns such as Mwanza and Dar-es-salaam. And results have been very encouraging.

They are constructed of plastic which can last up to 15 years if properly used. Misused. But at Nyampulukano we don't have the plastic standard dustbin, in public areas so that these cause accumulation of garbage along the streets.

#### **Plastic sacks (bags);**

Plastic sacks are made from one layer of plastic materials. It is storage it's strong enough to withstand the storage of refuse outside. There are many sizes but the common ones are  $0.07\text{ m}^3$  or 71 litre sacks and  $0.09\text{ m}^3$  or 92 litre sacks. These sacks are becoming increasing popular in many areas for storage of areas including Nyampulukano village.

#### **Paper sacks;**

Are mainly used in industries which park fertilizers, time foods etc the sacks are made from two ply water proof paper. The common sizes are the  $0.07\text{ m}^3$  are 71 litre sack.

They are constructed in such a manner as to be open at the top and sewn at the bottom and the sides. The seans are reinforced with ant-acid glue or latex adhesive. When full one sack weights 18-27 kg. These paper sacks are not common at Nyampulukano village.

**Litter bins;**

When litter is left lying everywhere in compounds on the streets and public park it annoys many people. Litter is unsightly, it smells and may be a breeding place for many insects and vermin which transmit disease.

The accumulation of litter is controlled by using litter bins which are provided by the local authorities. Litter bins small receptacles which are used in parks streets and other public places. The size varies and capacity range from 5 to 20 litres, or occasionally even larger. But the town council failed to buy litter bins for the public service, especially Nyampulukano, Ibisabageni and Nyatukala areas.

When advising the local community on the proper positioning of litter bins, it is important to emphasize that, litterbins should be placed where they are convenient for the users. These sites should be easily accessible to the collectors.

Containers; There are two types of containers, the standard and bulk used at communal places such as commercial areas, hospitals such as Sengerema hospital, women and child project health centre, large institutions like, Sengerema nursing school, Sengerema clinical officer school, markets, transfer stations, industrial areas and street cleansing areas.

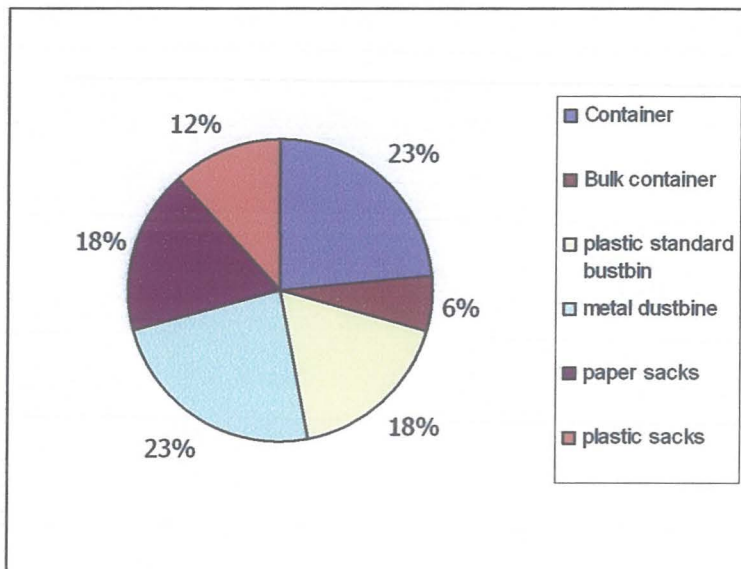
**Bulk containers;**

Are bigger than the standard containers. The size of bulk containers vary from 30 m<sup>3</sup> on lig industry premises up to 50-60m<sup>3</sup> in the large transfer stations. These containers can be used in industrial areas, big hospitals like Bugando hospital Mwanza Tanzania, muhimbili hospital also in Tanzania, busy markets and streets cleansing areas.

The only disadvantages of the bulk containers is that they require a lifting vehicles with specifically fitted lifting equipment as the containers are extremely heavy. Also area where space is limited it is difficult to locate a suitable site for a bulk container.



**Pie-Chart 1: Showing containers for waste garbages at Nyampulukano village.**



**Source: Field data.**

The above is pie chart showing garbage storage percentage, using dustbin, sacks, and containers.

Domestic wastes; have some salvage potential value. They can be utilized in other ways, for example screened dust is used for covering refuse during tipping, these area including Kilabera duple, IgogoB (mission) duple, paper can be separated, pulped and then used for the manufacture of fiber or soft board scrap metals can be sold as scrap for re smelting. Rags can be made into new clothes and felt bones can be processed to make grease, glue and animal feeds. Example in Japan and Canada.

Street wastes, There are some wastes that accumulate on the roads and streets as a result of activities which take place there, example bwawani road there are many garbages along the road. These wastes include dust, grit, litter, cinder, motor parts, leaves, waste papers and plastic bags. These wastes must be swept together and removed. Street cleansing involves the organization of sweeping which is carried

out either manually with shovel and brooms or mechanically with special vehicles. This reported by district health immune officers.

Street washing and gully emptying are part of street cleansing services. Street cleansing should be done regularly in order to keep the streets of the town clean and avoid nuisances.

Commercial wastes; These are wastes from big establishments like bookshops, example Lugega nad Mbesa bookshp at Nyampulukano Sengerema town, Super markets and hotels example Loi Hill hotel, Risbon hotel, Nyakaduha hotel and Three star hotel, training institution including Sengerema High school, Nursing training college, clinical officer training college Sengerema. The production of these wastes is continuous and needs attention so that collection can be done regularly, preferably and a daily basis. (VEO) village executive officer insisted that commercial waste are seriously issue to his area.

Garden/ Agricultural wastes; Attention should be given to the gardens or any trees growing in town or agricultural produce brought to town. These wastes include cut grass maize cobs, leaves of trees, twigs from trimmed flowers, fallen twing from trees etc. When these waste are produced in large amounts, they pose problems to public health and their removal should be done quickly.

The village chairman together they said the government should solve this problem through public education, by organizing village meeting several times.

Hospital wastes; around the hospital there is large quantity of garbage waste of many types. Some of which are objectionable. The main ones are pads, dressings, used blood bags, plasters, broken bottles, needles, placenta and waste papers from offices, wards and pharmacy.

(Matron & Administrators), (Patron Administrator), together they said that, dressing and plasters form a large of hospital wastes which must be stored properly before collection at Sengerema hospital. Garbage wastes should be collected regularly from all the ward, theatres, offices, out patient and other related areas. All combustible materials should be burnt immediately in incinerator, which

is located within the hospital compound. Cleanliness should be the motto in the hospitals and thus quick and hygienic removal of such objectionable waste is of great importance. Matron said that they have two incinerators for burning solid waste, see the diagram, below.

**Photograph 2: shows the room for incineration machine.**



**Source: Field Observation**

#### **4.5 Methods of Waste Disposal**

Dumping and open burning of wastes is no longer an acceptable practice from an environment or health perspective. While the technology of waste disposal has evolved during the past several decades our options are still limited.

Switzerland and Japan dispose of less than 15 percent of their waste in landfills, compared to 55 percent in the United States. Instead recycling and incineration are



the primary method “in addition the energy produced by incineration and can be used for electric generation or heating (George 1992).

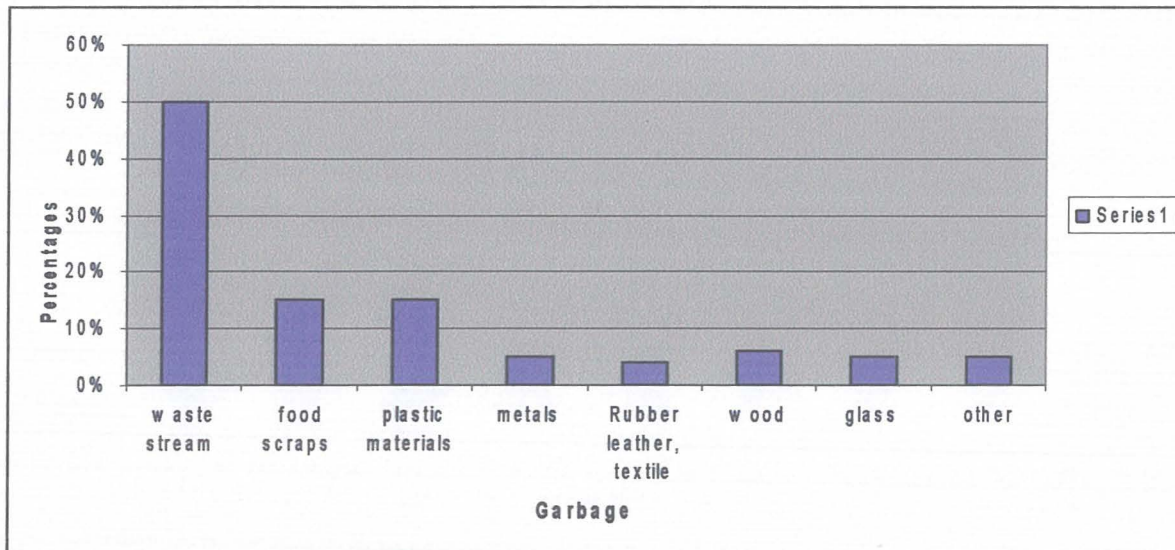
**Photograph 3 : Shows the market dumping site in Iibisabageni**



**Source: Field Observation**

The changing nature of Trash; paper product are the largest component of waste stream. Changes in life style and packaging have led to a change in the nature of trash. These is common around markets such as Ibisabageni, Soko Mjinga, and Nyamazugo road, also around institution of learning including Nyampulukano secondary, school, Ntundulu secondary, Sengerema secondary, and Twitange secondary school, Sengerema clinical Officer Training College. Note the increase in the amount of plastics in the waste stream. Most of what is currently disposed of could be recycled. See below the market duple.

**Figure 1 : showing percentage of garbage waste.**



**Source: Field Data**

Incineration is the process of burning refuse in a controlled manner. Today 15 percent of the municipal solid waste in United States is incinerated. Canada incinerates about 8 percent, while some incinerators are used just to burn trash most designed to capture the heat which is then used to make steam to produce electricity (Eldon. 2006).

Municipal incinerators are especially designed burning plants capable of burning thousands of waste per day. In some plants refuse is sorted as it comes into remove unburnable and recyclable materials before combustion, Matron said that sorting is done by separating wet solid waste, dry solid waste, and sharp solid waste, hence put into different containers before burning process began, they call yellow box, this is done at Sengerema hospital Nyampulukano village.

This is called refuse derived fuel because the enriched burnable fraction has a high energy content than the raw trash. Another approach called massive burn is to dump everything smaller than sofas and called refrigerators into a giant furnace and burn as much as possible.

Incinerator cost and safety the cost effectiveness of garbage incinerators is the subject of the heated debates. Initially construction costs are high usually between \$ 100 million and \$ 300 million for a typical municipal facility (Cunnighan 2002). Primary risks of incineration however involve air quality problems and the toxicity and disposal of the ash. Not only that but also the amount of pollutants are released into the atmosphere, including certain metals, acid gases, and classes of chemicals known as dioxins and furans, which have been implicated in birth defects and several kinds of cancer. When cities are unable to dispose of the trash locally in land fill and must begin to transport the trash to distant sites, incinerators became more cost effective.

Design change to soft drink bottles and milk jugs are good example of source reduction. Since the 1977 the weight of a 2 litre plastic soft drink bottle has been reduced from 68 gram to 51 grams and the weight of plastic milk jug has been reduced to 30 percent (Eldon 2006).

Manufacturing process has been changed in many industries to reduce the amount of waste produced. All of these incidents generate waste and their prevention reduces the amount of raw materials needed and the amount of waste generated.

Purchasing decisions can significantly reduce the amount of waste produced. In many cases consumers and businesses can choose to purchase things that have reduced packaging waste.

Re using items is a way to reduce waste at the source because it delays or prevents the entry of re used items into the waste collection and disposal system.

Reducing unnecessary waste of non renewable mineral resources can extend supplies of these resources even more dramatically than recycling or reuse.

#### **4.6 Advantages and Disadvantage of Using Dustbins and Containers**

Most of the dustbins are more disadvantageous to the society since they called a lot of garbage wastes they have along live span and they are transported using vehicles easily. Not only that there is also disadvantages of using dustbins such as its difficulty to use

containers to old buildings because of narrow streets and lack of suitable vehicles with lifting mechanism.

**Table 3: Advantage and Disadvantage of dustbin**

Advantages	Disadvantages
(i) If properly covered refuse remain dry.	(ii) It can rust and get holes if not covered.
(iii) It eliminates fly breeding and other vermin	(iv) It is noisy when being emptied.
(v) It is long lasting.	(vi) It can be dented
(vii) It is hygienic	(viii) It can be heavy.

**Source: Field data.**

**Table 4: Merits and Demerits of plastic dustbins**

Merits	Demerits
(i) They are light	(ii) Rodents can grow through them.
(iii) They are easy to clean	(iv) If hot ashes are put into the dustbins they will be burnt.
(v) They are hygienic	(vi) If used in areas where acids are present, they will be dissolved and collapse.
(vii) Their life span can be long.	

**Source: Field Data**

#### **4.7 Collection and Transportation of Garbage**

Terrace house; The dustbins are usually kept at the back of terrace house, Access is by a service lane at the back and at the end of the last house where terrace house are arranged in blocks. These include migombani street, mnadani street, St. carol Street, all these street found in Sengerema town.

The collection vehicles pass by the last block where the dustbins are taken by the owners, example this is common at Kampala city streets, The collectors empty the dustbins and return them to the kerb. Services blocks are provided between the blocks through which the dustbins are carried.

**Table 5: Shows disadvantages of garbage bins in percentages**

<b>Dustbins</b>	<b>Percentages</b>
Metal dustbins	20%
Plastic dustbins	70%
Containers	10%

**Source: Field Data**

Semi-detached and detached houses; in this arrangement collection is done from house to house. The dustbins are kept on stances at the back of the houses. The dustbins are removed from these stances by collectors and then emptied into the vehicles. The lanes (narrow road) provided are big enough to allow passage of the collection vehicles at the back. This is a convenient arrangement for both the house holders to take the dustbins to the front of the house. But this is not the case in Nyampulukano village. What they do is to collect garbage in dumping station along the road side, to the town street, where by the collector pick up the garbage using tractors.

Estates and markets; Dustbins are normally taken to the kerb where they are emptied into the containers provided. But if the containers are not provided then dustbins are not the kerb until they are emptied by the collectors. The containers are emptied into the vehicle by mechanical means. The use of containers eliminates the problems of dustbins being over filled or stolen. Example down are the container at Nyampulukano, Sengerema town bwawani road, where by refuse are kept to the container.



**Photograph 1 : show the dumping site along the road at Bwawani area**



**Source: Field Observation.**

Commercial buildings; These buildings are mainly in urban centres and fast growing trading centres. There is provision of service lanes at the back of the building. The refuse collection vehicle pass through these lanes and the collectors empty the refuse from the dustbins into the vehicle. But have at Nyampulukano village, the commercial garbage are gathered together at one place, then vehicle or trailers and tractors are taken to the main duple. The use of containers eliminates are provided at a central place. Mechanical means of emptying are usually provided. See down below the Ibisabageni commercial centre, where the duple is just near the business centre, including shops ad market.

**Photograph 2 : Shows commercial wastes At Ibisabageni market**



**Source: Field Observation**

Frontage collection: This is a system where by refuse is taken to the front from where it is collected. Where there are many dustbins in a particular estate a larger team should be deployed to load the vehicles quickly. Many people work faster than few people but if mechanical means are employed, then the number of people can be as few as two men and a driver. The collection at Nyampulukano, Sengerema town is done by wheelbarrows, to the main centre where all the garbage are collected together then transported to the main duple Kilabera 2kms out of the town. See below the curbs, plastic bags (cavera) and other garbage materials, to Igogo B (mission market duple).



**Photograph 3: Shows cob waste at Mission market**



**Source: Field Observation**

**Table 6: Shows collection percentages**

Constituents	Volume%	Frequency
Food waste	50%	100
Papers	20%	55
Glass and Others	15%	30
Metal	5%	15
<b>Total</b>	<b>100</b>	<b>200</b>

**Source: Field data 2009**

Labour; The selection and training of the personnel required and important factors in the efficient operation of the refuse collection programme. With modern packer type collection vehicle few people are needed to empty the dustbins. A crew of four men will be enough for parker type of vehicle.

On the other hand poor uses of toilet pits especially to the organization or institution, this cause toilet chambers and pits to float, by throwing plastic bags (cavera) plastic bottlers example this is common to the hospitals. So that fit cost the hospital to remove those plastic materials from the toilet chamber. Where

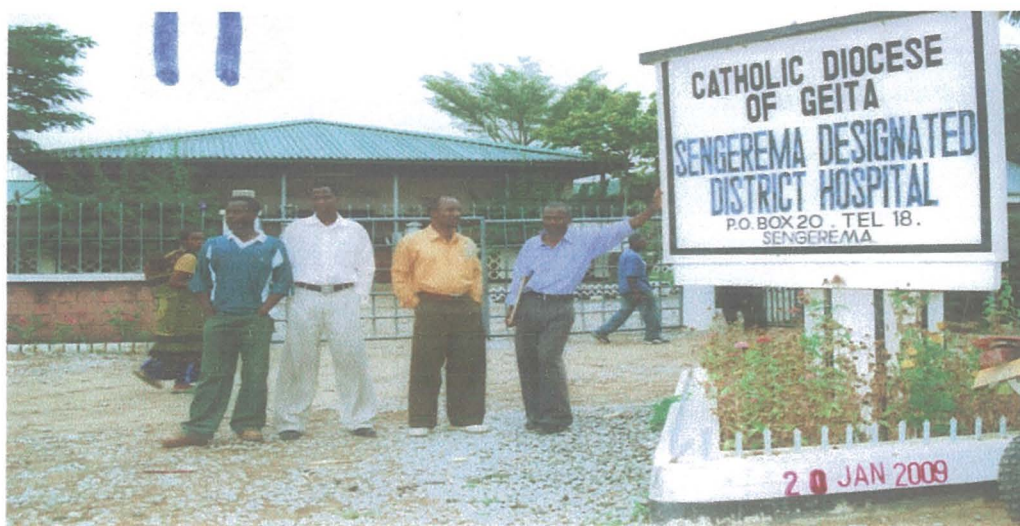
labour power is need for this service. See below floated toilet chambers due to throwing of plastic materials and garbage into the toilet pits. At Sengerema designated district hospital.

**Photograph 4: Shows block toilet chambers due to floated plastic materials at Sengerema hospital.**



**Source: Field Observation**

**Photograph 5: Shows Sengerema hospital**



**Source: Field observation**

#### **4.8 Equipments and Vehicles used to collect garbage waste at Nyampulukano village.**

Basically refuse collection is the process of transferring solid wastes (garbage) from storage receptacles into vehicles and then transporting it to the disposal sites. Example around Sengerema town disposal sites includes Igogo B. (mission market), Ibisabageni near Bwawani guest house, and Kilabera disposal site. Refuse collection is a very costly service which should be evaluated carefully.

The basic equipment and vehicles which are required in refuse collection are, Rakes, shovels and spades, wheelbarrows, Hand carts, Animal carts, Trailers and tractors, various types of vehicles. This is what the researcher sought to establish.

**Table 7: showing how people in Nyampulukano collecting rubbish**

<b>Equipment / vehicles for waste collection</b>	<b>Frequency</b>	<b>Percentage</b>
Trailers /Tractors	66	32%
Hand carts	33	26%
Animals carts	15	50%
Rakes	24	10%
Dustbin	30	12%
Plastic bags	32	15%
<b>Total</b>	<b>200</b>	<b>100%</b>

**Source: Field Data**

##### **Rakes, spade and wheelbarrow**

Are usually used in markets and fast growing towns. After refuse has been collected by wheel borrows, it is taken to a central place where it is dumped to a wait further collection.

##### **Handcarts;**

Hand carts are used to collect refuse from narrow streets and then to a central place. If only an open hand cart is used, a lot of time is wanted. This happens because from the hand carts refuse is dumped on the ground and from the ground refuse is transferred on to the vehicle. This process wastes labour and increase vehicle standing time. To correct this situation, the collectors are advised. To carry receptacles on the hand carts. The receptacles are lifted off the hand carts and then



emptied directly into the vehicle. This is the commonly used to Nyampulukano area.

#### **Animal carts;**

Animal drawn carts operate in a similar manner to hand carts except that animal carts carry more receptacle than hand carts and thus more refuse is collected. They are very useful when collecting refuse from narrow lanes.

The animals which draw the carts include donkeys and oxen. Animal carts are normally used in small town in East Africa where transport is a problem and the disposal site is near by. But at Sengerema animal carts are not used since they use, hand carts and trailers and tractors, or vehicles.

#### **Trailers and tractors;**

Trailers and tractors are used in almost all towns, whether big or small. Tractors do not travel very fast and they offer the cheapest method of motor transport for solid wastes.

According to the immune health officers, collection of waste disposal system at Sengerema town it uses tender system and this tender always uses tractors and vehicles. Example of them at J.M investment, these are some of the tenderers. They transfer solid waste up to main dumps like Mwahaluhi; and Kilabera. The main five sites where solid wastes are Sengerema town "Bwawali". Busis, Nyatukala, mission (Igogo.B) and Nyanazugo road.

The trailers and tractors are used as a continuously coupled unit for the collection of refuse from house or communal storage points. They are also used at transfer stations because of the ease with the trailers and tractor can be separated. See the picture below. Bwawani site Sengerema town.

**Photograph 6 : Shows tractor trailer and garbages at Bwawani Dumple site**



**Source: Field Observation**

Vehicles; In smaller and fast growing town, tractors with trailers and open died vehicles are commonly used in refuse collection. In big towns such as Mwanza, Nairobi, and Mombasa, modern vehicles for refuse collection are in use.

#### 4.9 Negative Impact of Garbage Waste Disposal

**Table 8 – Showing the negative impact of Garbage waste Disposal at Nyampulukano Village**

Negative impact of improper garbage waste disposal	Frequency	Percentage
Contamination of the surface and ground water.	$\frac{92}{200}$	46%
Keeps vectors and the spread of diseases	$\frac{116}{200}$	58%
Intefers with the beauty of the environment / makes it ugly to look at.	$\frac{103}{200}$	51.5%
May lead flies	$\frac{21}{200}$	10.5%
Causes air pollution	$\frac{130}{200}$	65%
Endangers children's health	$\frac{110}{200}$	55%
May cause disease such as cancer	$\frac{50}{200}$	25%
	200	100%

**Source: Field Data.**

Improper disposal of garbage wastes can be injurious to human health, plants and animals. Example 2005 at Sengerema secondary school, school cow died after eating hard porridge and plastic bags (cavera), not only that but also improper disposal of garbage may cause destruction of digestion system to animals and cause ndigana disease especially to cow. Due to these problems of animal to dies because of garbage waste disposal. The government act of 2002 number 378, and act of 1968 number 80k. It put restriction of grazing animals around town and cities. The researcher therefore investigate this.

Garbage wastes contaminate surface and ground water. This male water unpure hence disease such as viral disease example viral diarrhoes, infectious hepatitis, and protozoa disease such as amoebic dysentery.



Not only that garbage waste, can provide harborage to vectors and disease vectors such as Helminthes worm infections such as askaries.

Can interfere an reasonably with the enjoyment of life or property. Due to poor disposal of garbage. These led to educate people in groups of 25 people, in village, through radio Sengerema, and public meetings at Nyampulukano village.

Garbage waste also can degrade aesthetic appreciation of natural environment. It destruct the nature of the including polluting the environment.

Garbage waste cause also land pollution. They are unhygienic to the user of such area. They are frequently smell, children may be reluctant to use the area for playing because they afraid of sharp materials such as glass, silinge, crapers etc.

The five sued to burn the garbage got out of hand and grew that the municipality sent for five fighter to put out the blaze.

The lack of data about solid waste composition makes it difficult for people of Nyampulukano assess the actual impact on human health, and more over on the environment.

Potential headache from these temporary unsanitary dumping sites can reach the ground water aquifer and then potential contamination to scarce water resource imminent.

Older land fills do posses a potential for harm to the ecosystem and human especially when built on wetland however even lf style landfills generally pose minimal danger, in part because remarkably little biodegradation is drawn off by well on site and burned or purified and sold.

Biodegradable waste is of specific concern as breaks down in land fills to form methane a potential green house gas. If this gas is not prevented from entering the atmosphere, by implication, it contribute to climate change.

#### **Illegal dumping and leaching on private and public land.**

These led to act No 101, 51 (a), township law to protect the environment, immune health officer said. Also he said that every Thursday of the end of the month, they have family cleansing campaign to the communities around. Not only that madam

R. Mwandambo she said the majority of people are affected by malaria disease, viral disease, protozoa diseases and Hermits worm infections.

After sorting the recyclables, the hazardous elements require special treatment or disposal are removed from remaining waste stream.

Wastes are sealed between successive layer of clean earth each day. And monitored regularly for underground leads, which can pollute the underground water.

Residents are urged to recycle old news papers, magazines, bottles and can in an effort to reduce the negative impact of trash disposal on our environment as well as reduce the cost of handling the trash. "Online government" all this shows the importance of garbage wastes.

Sending recyclables like aluminum, glass, news papers, curb board, mixed papers, scrap metal, yard clippings, pop bottles, and milk jugs all the way to Klickitat country wastes landfill space and natural resources.

These resource could be recycled again and again into new products instead of being buried in the land fill.

To avoid wasteful packaging or poor quality items that break is also important. Use sturdy durable instead of disposables. Filling up our landfill with "Convenience" items or unnecessary packaging is truly a waste "on line got information and science Washington".

**Table 9: Shows illegal dumping percentages in Nyampulukano village**

WASTES	VOLUME %	Frequency
Domestic wastes	30%	76
Street wastes	15%	26
Commercial wastes	25%	36
Hospital wastes	20 %	36
Agricultural wastes	10%	26
Total	100	200

**Source: Field Data 2009.**

#### 4.10 Positive Impact of Garbage Waste Disposal

**Table 10– Showing the views of respondents on positive impacts of garbage disposal**

According to the table the following were the views of different respondents. Each view was counted and computed over the total number of respondents.

<b>Positive impacts of improper garbage disposal</b>	<b>Frequency</b>	<b>Percentages</b>
Prevents contamination of the drinking water	$\frac{150}{200}$	75%
Leaves the streets clean	$\frac{170}{200}$	85%
Helps to maintain the cleanliness of the school environment	$\frac{110}{200}$	80%
Reduced land and air pollution	$\frac{100}{200}$	50%
Reduces health problems	$\frac{180}{200}$	90%
Can be profitable through recycling	$\frac{95}{200}$	47.5%
If properly disposed it will reduce the spread of vectors	$\frac{110}{200}$	55%
Useful for manure	$\frac{80}{200}$	40%
	<b>200</b>	<b>100%</b>

**Source: Field Data**

A clean environment is not in the absence of means of disposing of waste materials. Examples are papers, plastic bottlers, scrapers and food waste. It avoid contamination of drinking water.

It will avoid the excrement of the garbage on school yards. Example of the areas include St Carol school, Muslim school, Kilabera secondary school, Sengerema secondary school, and nursing school.

It reduce air and land pollution by burning garbage waste disposal. Example underground water can be polluted. By reducing improper garbage disposal we can be able to maintain our health.

Not only that, it can reduce death to domestic animals, biodiversity and forest species. Example at Nyampulukano village 10 cows died through ate of garbages food waste and plastic bags (cavera).

It will reduce health problems by using clean water and environment. Because garbage are profitable it its handled in a good way to the environment.

Garbage also can be profitable, through recycling materials such as papers and be used again for second time. Not only papers but also plastic materials such as bottlers.

Not only that proper disposal of the garbage waste on the earth surface, it will reduce the emission of toxic gases.

On the other hand the proper garbage waste disposal, it support to non-invasion of homes by vermin which can destroy human health, by being attached cholera, typhoid, bacillary dysentery, protozoa, diseases ad helminthes.

Pig or animal feeding, the garbage is collected from hotels, hospitals and other institutions and fed to animals such as pigs. This method is practiced mainly in urban centres where a lot of garbage is generated, the matron of Sengerema hospital said. Where as garbage is the main element in solid wastes, it is difficult to handle these wastes in sanitary manner.

Garbage also can be used as a raw materials for fertilizer, through compositing. The wastes of organic origin such as garbage and animal matter are decomposed natully by bacteria. The decomposed matter is turned into manure which is used as a solid conditioner as it adds some fertility to the soil, this is according to the patron of Sengerema hospital. Very many people in the rival areas use this manure to grow crops without using artificial fertilizers.

It seems also Sengerema hospital under the good leadership of the top leaders, matron, patron and other administrators. They always provide education to the people and community in general how to handle garbage waste, and protections from other disease to their own environment.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATION**

#### **5.0 Introduction**

The research covered types of garbage waste, methods, ways of storage positive and negative impact of garbage waste disposal. During the research I discovered that, the majority of people they dispose poorly garbage. Because of lack of knowledge and education of the proper disposal of garbage and its problem to the people.

#### **5.1 Summary**

Not only that the findings shows that there many problems which are caused by garbage waste disposal and solid waste disposal in general. Improper storage of wastes causing fly-breeding, bad smells, rodent and vermin breeding. The various receptacles that are used for storing solid wastes such as metal standard bin, plastic dustbins and litter bins, which must all be well maintained.

The air and health on the near garbage disposal area like Bwawani, and Nyatukara area, these population is much affected. Due to bad smell and odors are common as a result of decaying the garbage and that can sources of discomfort to the public. Allows animals scavengers and insects to invade the piles of waste and impact the health of the people.

The vaive curiosity of children that may put them in contact with the solid waste materials exposing them disease or injury, especially when they sort through the waste in search of aluminums, glass or other material to sell.

Littering can be considered the most visible from solid waste pollution. These are common in different parts of villages and cities all over the world.

### **5.3 Conclusion for the Impact of Garbage Wastes Disposal**

Once all people do their responsibilities to keep the environmental clean. Garbage will not be visible from streets and residences. Since there is proper disposal and transportation to the dumping place. In Nyampulukano, Sengerema town the dumping place its found 1/1/2 km out of the town centre. People will live healthier and avoid impacts of garbage waste disposal, such as diseases and other contaminants.

### **5.4 Recommendations**

When buying plastic products, pay a few cents extra for environmentally degradable varieties.

Buy food that come with less packaging shop at farmers markets or coop, using your own containers (Gumighan 2002). This will reduce the garbage waste disposal. Take your own washable refillable beverage container to meetings or convenience stores.

When you have a choice at the grocery store between plastic, glass or metal containers for the same food, buy the reusable or easier to recycle glass or metal.

Separate your cans, battles, papers and plastics for recycling. This will help to reduce plastic material around the garbages dumps.

Wash and reuse bottles, alumin foil plastic bags, etc for your personal use. These will help to keep the environment clean.

Compost yard and garden wastes leaves and grass clipping. It will help to get more compost manure and reduce wastes.

Write to your senators and representatives and urge them to vote for container deposits, recycling, and safe incinerators or land fill (cunning ham 2002).

Buy things that last keep them as long as possible and have them repaired if possible (Eldon 2006).

Buy things that are reusable or recyclable and be sure to reuse and recycle them.

Buy beverages in refillable glass containers instead of cans or throwing away bottles.

Use plastic or metal lunch boxes and metal or plastic garbage containers without throwing away plastic liners.

Skip the bag when you buy only a quart of milk, a loaf of bread or anything you can carry with your hands.

Recycle all the news papers, glass and aluminum and any other items accepted for recycling in your community.

Push for mandatory trash separation and recycling programs in your community and schools. It will reduce garbage wastes.

Choose items that have the least packaging or better yet no packaging (rude products).

Composite your yard and food wastes and pressure local officials to set up a community compositing program (Eldon 2006).

Construction / demolition debris discarded construction or demolition materials e.g roofing, shingles, siding, doors and windows.

Discarding shall mean to abandon e.g drop, dump, eliminate, leave, pitch, place, scrape. All these will reduce garbage waste.

Violators of the ordinance shall be served a write document. This will help improper garbage waste disposal.

Penalties and sanctions, for those who dispose garbage improper it will help to reduce this problem, of poor waste disposal.

Increase the waste planning and management information (both technical and education), available to states, local communities, waste handlers, citizens and increase data collection for research and development.

Increase effective planning by waste handlers local communities and states.

Increase resource reduction activities by the manufacturing industries, government and citizens.

Introduce recycling by government and individual and corporate citizens.

Reduce risks from town council garbage waste combustion in order to protect human health and the environment.

Reduce risks from landfill in order to protect human health and the environment.

Introduce movable cement container along streets, which its not easy to be stolen like plastic containers.

Fines to those who pollute land using garbage waste.

Mass education through public meetings radio, CD, DVD, and Television.

To encourage compositing of garbages and getting more compost manure.



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## APPENDICES

### A Questionnaire for educated respondent

#### Dear Respondents;

I am a Student at Kampala International University pursuing undergraduate degree in Bachelor of Arts with Education in Geography and History.

Kindly assist me to answer the questions which seek your understanding on solid waste disposal (garbage) and its impact on the environment. Your contribution will enhance strategies to solve the problem of increasing solid waste disposal (garbage), facing our village and possible may other places in Tanzania and other developing countries in the world.

I assure you that, your opinion will be treated with confidentiality. Your name will not be known.

#### Topic

**SOILID WASTE DISPOSAL (GARBAGE) AND ITS IMPACT ON THE ENVIRONMENT; AT NYAMPULUKANO VILLAGE IN Sengerema Town Council – Mwanza Tanzania**

#### A: PERSONAL DETAILS

##### Profile of the Respondents

- i) Age .....
- .....Sex.....
- ii) Occupation
- iii) Level of Education
- Non – Educated ☐
  - Primary level ☐
  - Secondary level ☐
  - College / University Level ☐

## QUESTIONNAIRES FOR UN EDUCATED RESPONDENTS

1. Tick type of garbage waste in your place

Domestic waste		
Industrial waste		
Hospital Waste		
Commercial waste		

2. What is the Advantage of garbage waste disposal?
3. How have people tried to reduce the amount of garbage waste disposal in the environment?
4. Garbages waste must be strictly observed  
Yes ( )  
No ( )
5. What has government done to help in the proper garbage waste disposal?
6. Identify measures of collection garbage waste disposal in the village?
7. What are some of the positive impact of garbage waste disposal?
8. What are some negative impacts of garbage waste disposal?

## QUESTIONNAIRES FOR EDUCATED RESPONDENTS

1. Tick types of garbage waste is common your place
- a) Domestic wastes ☐
- b) Industrial wastes ☐
- c) Hospital wastes ☐
- d) Commercial Wastes ☐
2. Do you have dustbin at home
- a. Yes ☐
- b. No ☐
3. Which type of dustbin are you using at home.
- a) Metal Dustbin ☐
- b) Plastic Dustbin ☐

4. Do the village have public litter bins
- a. Yes ☐
- b. No ☐
5. Did the village have public dumping site
- a) Yes ☐
- b) No ☐
6. Which type of solid are common in your place
- a. Papers ☐
- b. Plastic ☐
- c. Food Products ☐
- d. Metal Products ☐

**ORAL QUESTIONNAIRE / INTERVIEW FOR THE UN EDUCATED  
RESPONDENTS**

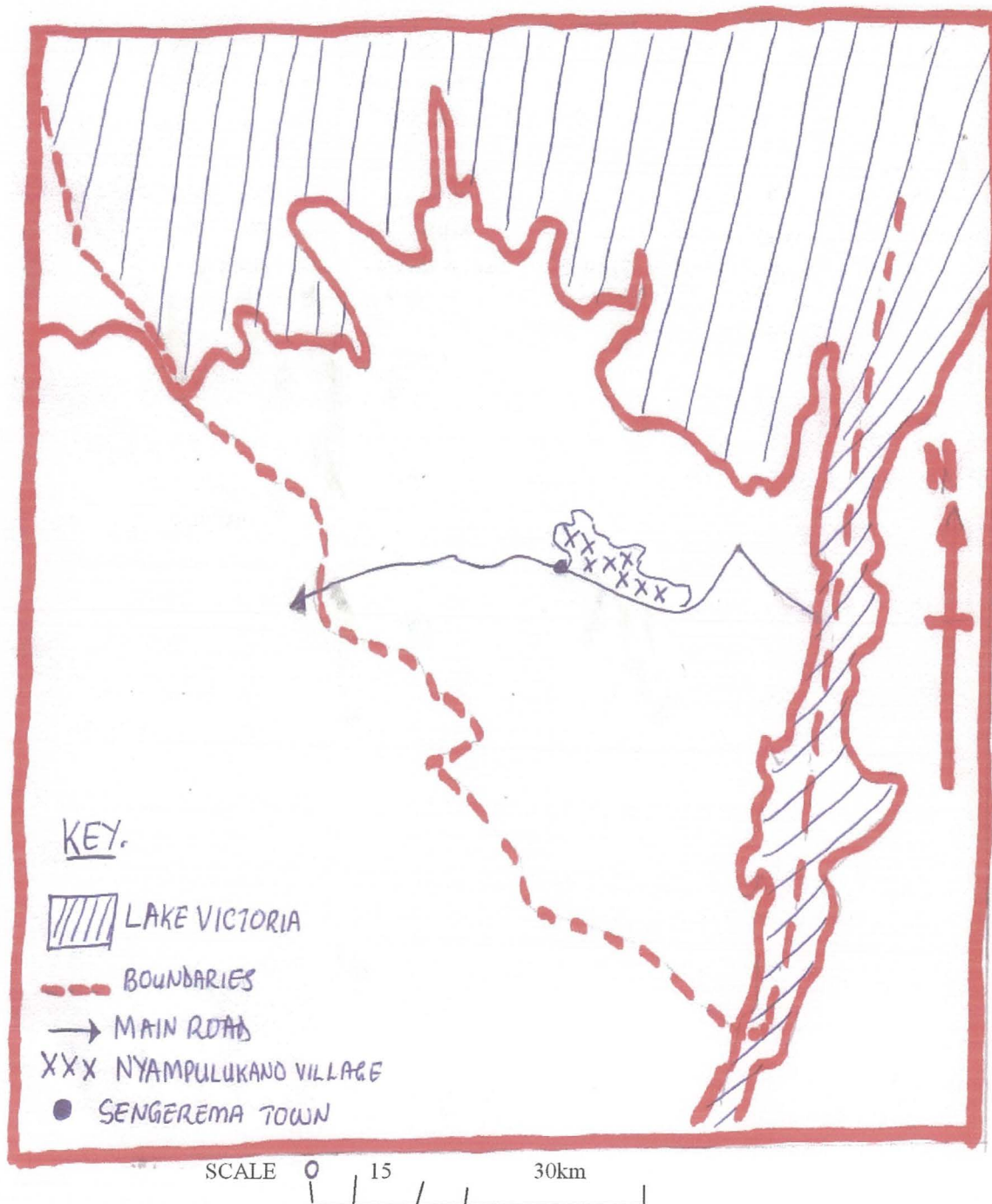
1. How solid waste (Garbage are stored)
2. Which means of transport used to collect solid wastes
3. What method used to handle solid waste
4. What is the role of government in reducing garbage waste disposal?

**THANK YOU**

+255752389999

Email: [nchalirc73@yahoo.com](mailto:nchalirc73@yahoo.com)

**SENGEREMA TOWN COUNCIL**  
**SKETCH MAP SHOWING CASE STUDY OF GARBAGE WASTE**  
**DISPOSAL AT NYAMPULUKANO VILLAGE**



**FACULTY OF EDUCATION  
OFFICE OF THE DEAN**

**Monday November 24, 2008**

**TO WHOM IT MAY CONCERN**

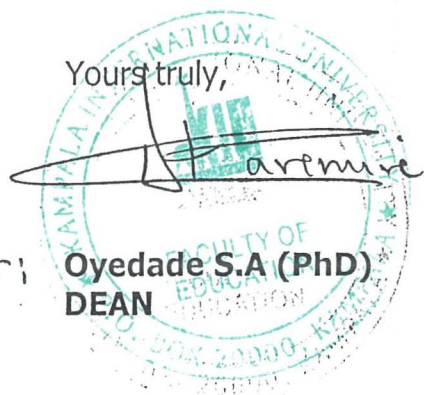
Dear Sir,

**INTRODUCTION LETTER**

Mr/Ms/Mrs RENATUS NCHALI RegNo. BAE/12815/611DF is a student in the Faculty of Education. He/She is now carrying out a study about GARBAGE WASTE DISPOSAL AND ITS IMPACT ON THE ENVIRONMENT AT NYAMPULUKANO VILLAGE - SENGEREKA. as one of the requirements for the completion of his/her studies. He/She is thus introduced to you.

Kindly help him/her accordingly.

Yours truly,



**Oyedade S.A (PhD)**  
**DEAN**