

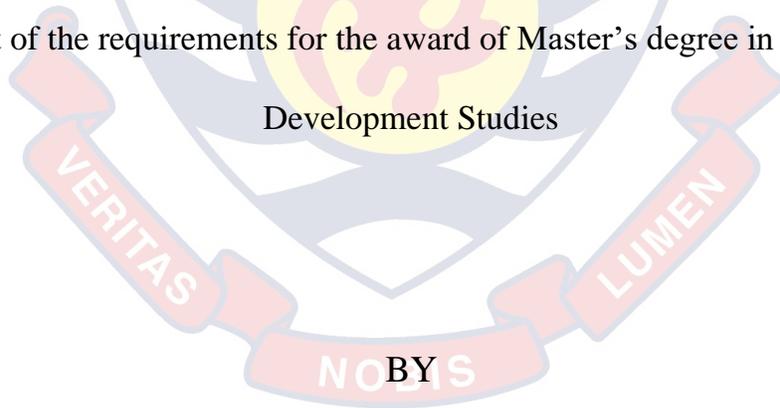
PRESBYTERIAN UNIVERSITY COLLEGE, GHANA

FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF RURAL AND COMMUNITY DEVELOPMENT

ASSESSMENT OF SOLID WASTE MANAGEMENT AMONG HOUSEHOLDS IN
NEW JUABEN MUNICIPALITY

A dissertation submitted to the Department of Rural and Community Development of
the Faculty of Development Studies, Presbyterian University College, Ghana in partial
fulfilment of the requirements for the award of Master's degree in International
Development Studies



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SEPTEMBER 2019

DECLARATION

Candidate`s Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

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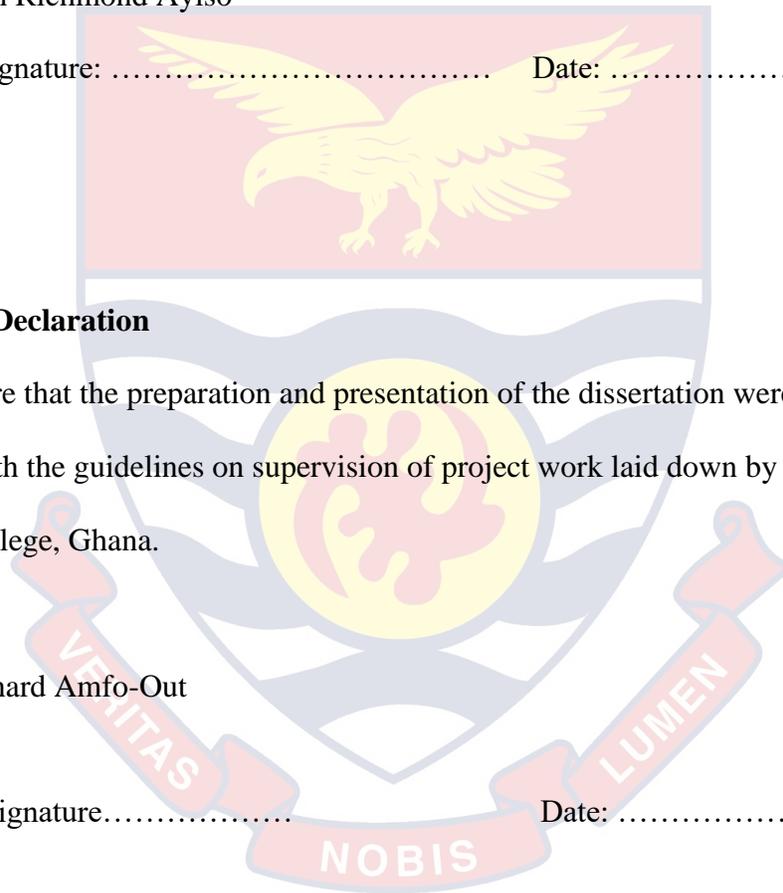
Candidate`s Signature: Date:

Supervisor`s Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of project work laid down by the Presbyterian University College, Ghana.

Name: Dr. Richard Amfo-Out

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ABSTRACT

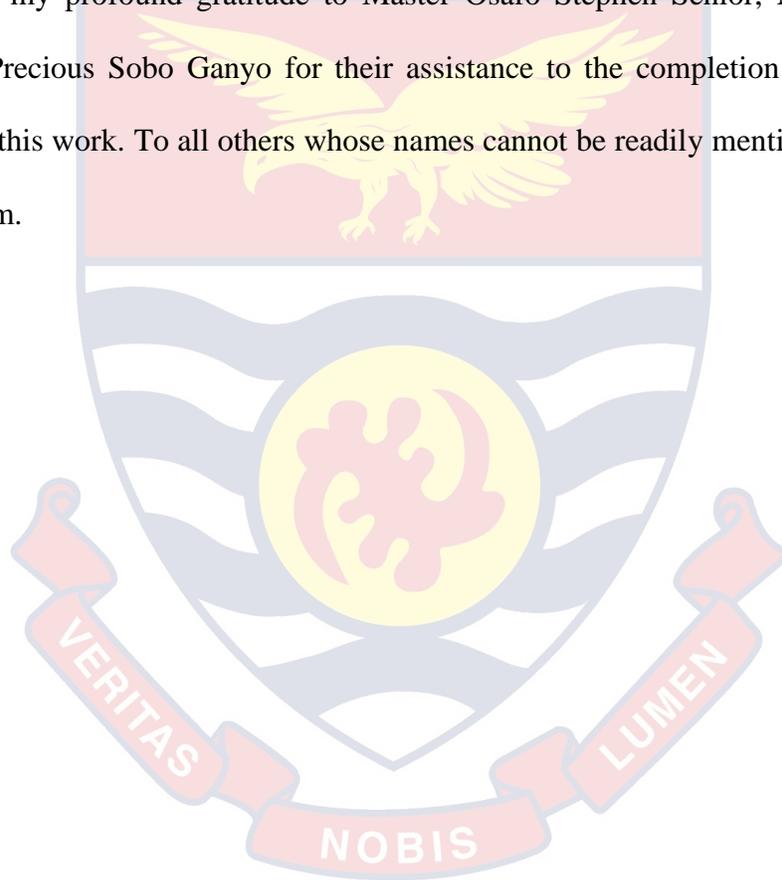
The quality of living in a country can be compared with the standard of solid waste management. Efficient solid waste management must consider the cultural, social, and economic circumstances of a country while coordinating the efforts of the people on a local level. The study intends focused on New Juaben because of its relevance to the purpose of the study, regarding its huge population and also serves of the fasted developing area in the country. A total number of hundred and twenty (130) respondents were targeted and selected areas were stratified, systematic sampling and random sampling procedure was used to administer questionnaire to the respondents. Data collected was analysed with the Statistical Package for Social Scientist (SPSS) software. The study revealed that 43.8 percent were engaged in communal dumping disposal practices, 33.8 percent engaged in house to house collection, 19 percent managed their waste by burning and communal dumping and 3.1 percent engaged in burning and burying. Also, most of the people in the municipality produced plastic waste (84.6%), 13.8 percent produced was organic while 1.5 percent was fabric. The following key findings were established to be the factors affecting effective solid waste management in the Municipality. These are inadequate skip supply for storing waste, improper disposal of waste, poor of routine collection of waste produced and inadequate waste collection receptacles. In the light of these problems enumerated above, the research recommended the adequate supply of receptacles, regular collection of waste, organization of communal labour to work on dumping sites, use of proper management of the landfill and adequate resourcing of the waste management institutions.

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The successful completion of this work came about as a result of a massive contribution made by several people; without which the work would not have been materialised. I therefore, deem it necessary to express my profound gratitude to the following people.

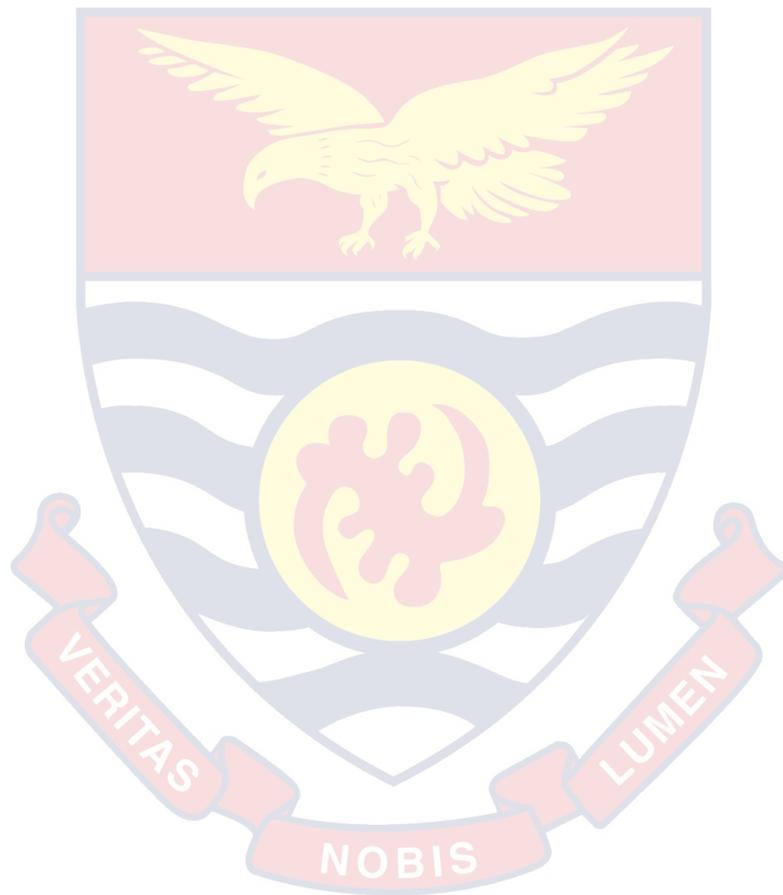
I am very grateful to my dynamic supervisor, Dr. Richard Amfo-Otu whose support and guidance went a long way to bring this work into shape. God richly bless you.

I also express my profound gratitude to Master Osafo Stephen Senior, Mr. Michael Osei Assibey and Precious Sobo Ganyo for their assistance to the completion of the successful completion of this work. To all others whose names cannot be readily mentioned I am equally grateful to them.



DEDICATION

I dedicate this project to my entire family.



LIST OF ACRONYMS

SPSS	Statistical Package for Social Scientist
UN	United Nations
SWM	Solid Waste Management
SWMP	Solid Waste Management Practice
US EPA	United States Environmental Protection Agency
FLW	Food Loss and Waste
WEEE	Waste Electrical and Electronic Equipment
EPA	Environmental Protection Agency

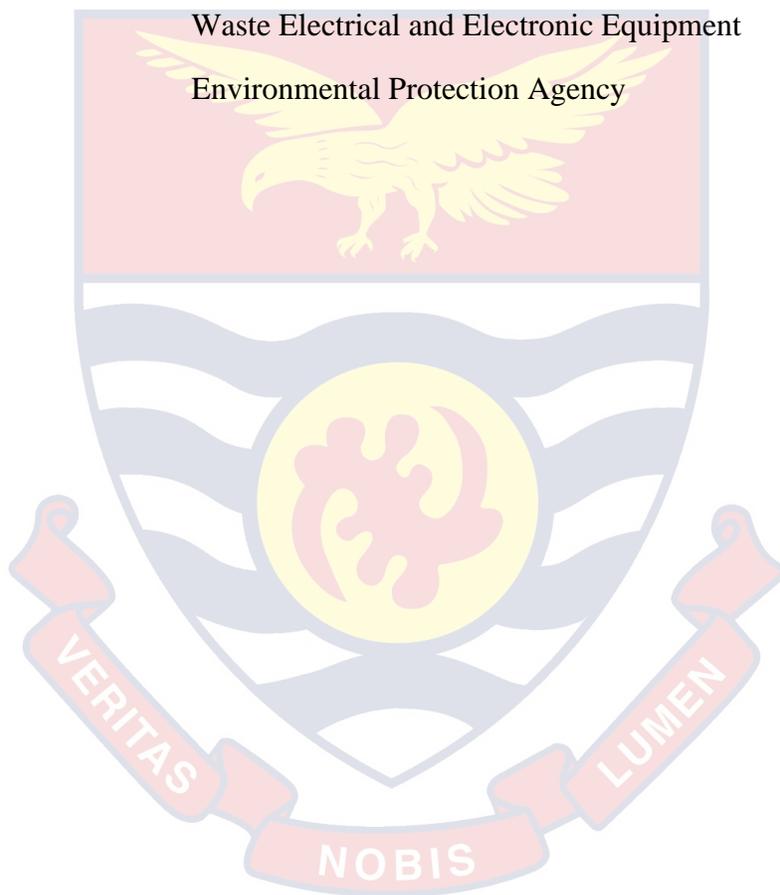


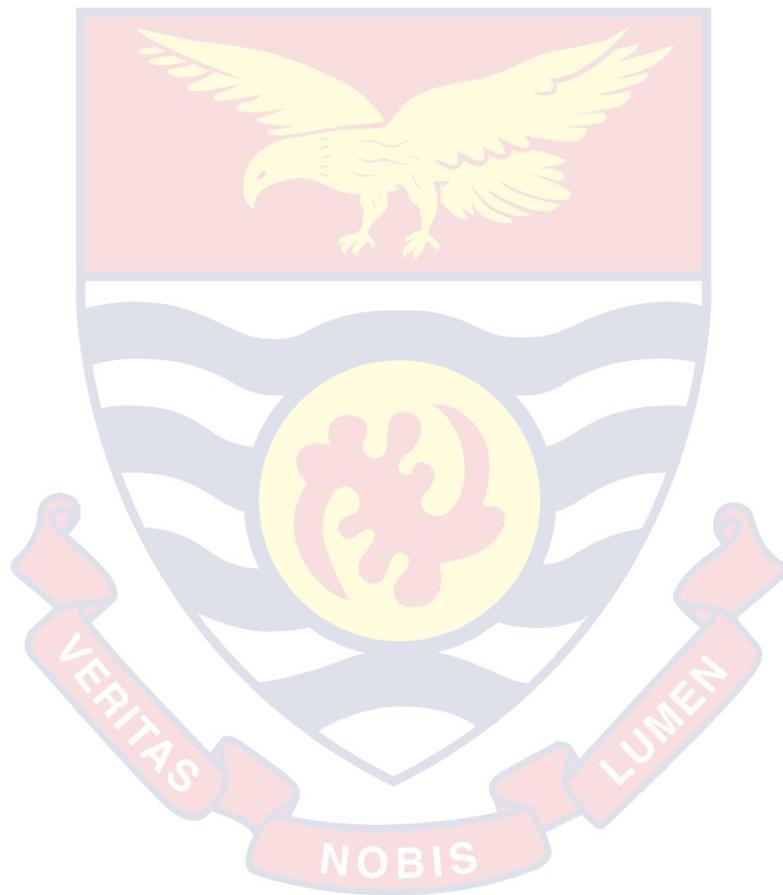
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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The standard of living in a country can be correlated with the standard of solid waste management. Efficient solid waste management must consider the cultural, social, and economic circumstances of a country while coordinating the efforts of the people on a local level (Finn 2007). The ever-increasing quantities of household wastes are a growing environmental problem in urban centres in both developed and developing countries around the world (Barr et al., 2001). As a result, domestic solid waste poses a complex challenge for environmental policy (Barr, 2007). Agenda 21 of the blueprint for worldwide sustainable development agreed by national leaders in Rio de Janeiro in 1992, (UNCED, 1992), already identified waste from domestic sources as a major barrier to achieving environmental sustainability in the 21st century.

The issue of managing solid waste in the urban areas must be seen in the wider context of problems caused by rapid urbanization. In Africa a growing number of cities are faced with the challenge of providing their populations with adequate water supply, sanitation and solid waste services, because of the rapid rate of the urbanization process. United Nations projections estimate that the urbanization rate will increase from 24% in 2005 to 38% by 2030 (United Nations, 2006). The management capacities available for processing the rapid increasing amounts of waste in Africa are often poor and inadequate, especially in low-income areas. Most districts, municipal and regional authorities in developing countries have failed to provide their increasing populations with services that are adequate for effective management of solid waste as well as for providing water and sanitation (Abduli, 2007).

In Africa, particularly in the cities and towns, urban solid waste management poses a serious environmental problem. The exponential growth in quantities of domestic wastes presents a great challenge for the local and regional authorities. Inability to properly manage these wastes

further result in pollution and degradation which may in turn fuel the outbreak of diseases which may result in reduction in productivity as a result of likely loss of lives. A fair comprehension of both the technological and managerial aspects is needed in order to improve their management strategies as related to domestic solid wastes.

1.2 Statement of the problem

In Ghana the generation of waste has been increasing over the years. For instance, in 1979, the percentage was 1.4% which rose to 4% in 1993, 1996 it increased to 5% and 1999 and 2000 to 8% (Quartey et al., 2015). Regionally, in Ghana it is reported that 8.7% of waste are dumped indiscriminately (Ghana Statistical Service, 2012). The main underlying factors contributing to poor waste management includes inadequate supply of skip containers use for storing wastes, lack of routine collection of wastes, poor methods of waste management, and inadequate resources for waste management institutions to effectively collect the waste generated (Ghana Statistical Service, 2012)

There are various reports, projects and policy documents on the subject of solid waste management available; however, the roles of households as primary producers of solid wastes to address the numerous challenges confronting city authorities tend to be ignored or overlooked by researchers. Some studies have tried to assess households' willingness to pay for waste services, Amfo-Otu et al. (2012) and to separate waste at source, Hong kong Environment Protection Department, (2017). These have attempted to consider how households can contribute to deal with some aspect of solid waste management. Improper conceptualization of the role of households in urban solid waste management can contribute to make the waste management system a failure. Urban waste management services may be inadequate and hence some households may be affected and this can influence their contribution toward proper solid waste management. Those who are deprived solid waste management services may play adversarial; collection and transportation of generated waste

thereby resulting in illegal dumping at undesigned areas for instance streams, rivers and highways (UN HABITAT, 2014). However, research has not comprehensively addressed the role of households in solid waste management. The study is designed to contribute to fill this gap in knowledge.

1.3 Objectives

The main objective is to assess the solid waste management practices among the household and suggest possible measures to tackle the problem in the New Juaben Municipalities.

Specific objectives

1. To examine solid waste practices adopted by the households.
2. To identify the types of waste generated by the households.
3. To examine means of waste disposal by households (place of disposal).
4. To identify the challenges with the solid waste management practices.

1.4 Research questions

These issues identified above raise critical questions such as;

1. What are the challenges with domestic waste management in the municipalities?
2. What can households do to help address the solid waste management challenges?
3. How has the household's been involved in solving the solid waste management challenges?

1.5 Significance of the study

Solid waste management among households has become a major development challenge in New Juabeng in recent times. This deserves not only the attention of the Municipal Assembly and the waste management institutions but also concerns of corporate organizations and individuals to find a lasting solution to the problem. This is because, vital human resource could be lost through poor waste management and this will affect productivity in the nation. The study solely sought to

establish the role of community participation in solid waste management in New Juaben. The proposed study intends to focus on New Juaben because of its relevance to the purpose of the study, regarding its huge population and also serves of the fasted developing area in the country.

The study will serve as a reference point to the Municipal Assembly and waste management institutions as far as household solid waste management is concerned. In this case, it will give them an in-depth understanding of what the problems of domestic solid waste management are and the strategies to address the problems. Additionally, the study will furnish to existing body of knowledge on household solid waste management and also prompt further research.

1.6 limitation

The following hindered the smooth completion of the study. These are enumerated below.

1. Some potential respondents wanted to be compensated for the time spent in responding to the questionnaire. This makes the administration of questionnaire quite difficult.
2. The unwillingness to release data from Zoom Lion Company Limited and Municipal Assembly.

1.7 Organization of the Work

The research work is presented in five (5) chapters. Chapter one provides a general introduction to the research. Chapter two examines existing literature on solid waste management. That is concepts, processes and methods of households managing solid waste. Chapter three describes a brief description of the location of New Juabeng, the history, population and housing characteristics as well as cultural values the methodology employed in gathering data from the field. These included preliminary field investigation, questionnaire survey and face-to-face interviews. Chapter four analyses the findings gathered from field and chapter five summarises the key findings of the study, recommendations and conclusion.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents relevant literature on solid waste, household solid waste management and challenges associated with household waste management not only from the local perspective but national perspective.

2.1 Waste

According to National Waste Report (20105) waste is any discarded, rejected, unwanted, surplus or abandoned matter; discarded, rejected, unwanted, surplus or abandoned matter intended for recycling, re-processing, recovery, re-use, or purification by a separate operation from that which produced the matter, or for sale, whether of any value or not.

2.2 The meaning of Solid waste management

Wastes are an unavoidable part of human activity. They either come from man's production activities or as a by- product of the materials consumed by man. A rising quality of life and high rates of resource consumption patterns have had an unintended and negative impact on the urban environment - generation of wastes far beyond the handling capacities of urban governments and agencies (Chati, 2012). According to Rouse (2008), Solid waste is defined as material which no longer has any value to its original owner, and then discarded. The main constituents of solid waste in urban areas are organic waste (including kitchen waste and garden trimmings), paper, glass, metals and plastics. Ash, dust and street sweepings can also form a significant portion of the waste.

Solid waste management (SWM) involves the collection, storage, transportation, processing, treatment, recycling and final disposal of waste. Systems need to be simple, affordable, and sustainable (financially, environmentally and socially) and should be equitable, providing collection services to poor as well as wealthy households. SWM therefore, requires adequate infrastructure provision and maintenance for all activities.

The growth of the world's population, increasing urbanization, rising standards of living, and rapid developments in technology have all contributed to an increase in both the amount and the variety of solid wastes generated by industrial, domestic and other activities. Many industrialized European countries like Britain, France, Spain, Ireland and Italy were being classified by as constituting the nucleus of the “dirtiest” countries in Europe, “drowning in a sea of garbage” and with most of their “municipal rubbish dumped in landfill sites (Suleman & Darko, 2015). According to Suleman et al. (2015), Low income countries are expected to generate 213 million tons of solid waste a day with the population rising to 676 million by 2025. Lower Middle Income ones are also projected to generate 956 million tons of solid waste per day with a population of 2.08 billion.

Household waste in Africa contains food waste (biodegradable/ compostable), sand, gravel, paper, plastic, metals (example aluminium) and glass. Plastic is a major nuisance in municipal solid waste which degrades the environment, clogs drains and causes flooding in the rainy season. Waste is normally discarded without considering the environmental and human health impacts, leading to its accumulation in cities, towns and uncontrolled dumpsites. Waste handlers and waste pickers are especially vulnerable and may also become vectors, contracting and transmitting diseases when human or animal excreta or medical wastes are in the waste stream (Suleman et al., 2015).

2.3 Types of Solid Waste

The types of solid waste include municipal waste which comprises house hold waste, construction waste, sanitation residue and wastes from the streets. These are briefly explained below;

The Environmental Protection Agency of America highlights that Municipal solid waste is more commonly known as trash or garbage and consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps,

amongst others. This in a way comes from our homes, schools, hospitals and businesses. Municipal waste is defined as refuse from households, non-hazardous solid waste from industrial, commercial and institutional establishments (including hospitals), market waste, yard waste and street sweepings Schubeler et al. (1996) whereas USEPA, 2008 defines Municipal solid waste is a broad category of non-hazardous solid waste that includes animal carcasses as well as the typical garbage or trash .

According to Samuel et al.(2014), Households and communal solid waste storage and handling approaches in Ghana are myriad. Over the years, rural settlers managed to bury solid waste just outside their settlements or dispose of it in near-by rivers or water bodies. In recent times, though these practices have not changed entirely because waste is collected and stored in temporary refuse containers which do not prevent the spread of bad smells and diseases before it is buried, burned or carried. Household wastes are solid wastes that are generated in small amounts by individual households across the nation. This type includes various household cleaners, solvents and other chemicals. Some of the items in this category, such as batteries and light bulbs, are also considered universal waste. US EPA, (2008) defines Universal wastes are hazardous solid waste items that are widely generated by all sectors of the population. Every individual household generates garbage or waste day in and day out. Items that are no longer useful fall in the class of waste and are discarded. These include Organic waste such as kitchen waste, vegetables, flowers, leaves, fruits as well as Toxic waste: old machines, paints, chemicals, bulbs, spray cans, fertilizer and pesticide containers, batteries, shoe polish. Recyclable waste also include paper, glass, metals and plastics. Haven examine what the household waste or domestic waste is, the next session discusses the various components of household waste or domestic waste. According to Tchobanoglous et al. (1993) pin pointed the types of domestic solid waste as the following; food waste, rubbish, ashes and residues.

Food waste

Food waste is a significant problem. According to the United Nations Food and Agriculture Organization (2012), approximately 1/3 of food produced for humans in the world is either lost or wasted. Industrialized and developing countries dissipate roughly the same quantities of food respectively 670 and 630 million tonnes. Furthermore, an estimated one third of all food produced globally is either lost or wasted. In an age where almost one billion people go hungry, this is unacceptable. Food loss and waste (FLW) represent a misuse of the labour, water, energy, land and other natural resources that went into producing it. Food embodies much more than what is on our plates. It is, therefore, important that we recognize, appreciate and respect the value of food.

Food waste, on the other hand, refers to the discarding or alternative (non-food) use of food that is safe and nutritious for human consumption. Food is wasted in many ways including:

- Fresh produce that deviates from what is considered optimal in terms of shape, size and color, for example is often removed from the supply chain during sorting operations;
- Foods that are close to, at or beyond the “best-before” date are often discarded by retailers and consumers; and large quantities of wholesome edible food are often unused or left over and discarded from household kitchens and eating establishments, (Food and Agriculture Organization of United Nation, 2011).

According to World health organization (2015), Food wastes are all the animal, plant or vegetable residues resulting from the handling, preparation, cooking, and eating of foods (also called garbage) . The most important characteristics of these waste is that they are highly putrescible and will decompose rapidly, especially in warm weather. Often, decomposition will lead to the development of offensive odours. In many locations, the putrescible nature of these wastes will significantly influence the design and operations of solid waste collection (Food and Agriculture Organization, 2019). According to FUSIONS (2016), Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or

disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea)”.

Rubbish:

Rubbish consists of combustible and non-combustible solid wastes of households' activities. This excludes food wastes or other highly putrescible materials. Typically, combustible rubbish consists of materials such as paper, cardboard, plastics, textiles, rubber, leather, wood, furniture, and garden trimmings. Non-combustible rubbish consists of glass, tin cans, aluminium cans, ferrous and other non-ferrous metals, and dirt, FUSION (2016). Ashes and Residues are materials remaining from the burning of wood wastes in homes and stores for purposes of heating and cooking. These are referred to as ashes and residues Ramachandna, (2006).

2.3.3 Constructional Waste

Constructional waste comprises of unwanted materials that are produced directly or indirectly as a result of activities by construction industries. Such waste consists of waste building material and rubble. The rubble is generated from activities at new construction sites, remodelling, repair and demolition operations on houses, commercial buildings, repair of roads, pavements and other structures. Examples of materials found in construction are scraps of wood, tree stumps and brush, concrete, bricks, blocks, roofing materials, paper, metal, plastic scrap, dirt, carpets and, glass from windows and doors and other materials (New Jersey State Department, 2002).

2.3.4 Agricultural Waste

Agricultural waste is one of the categories of municipal waste and can be explained as waste that is produced by the rearing of animals and the production or harvesting of crops or trees. Agriculture and Bioresources Engineering Department, (2016). According to the US Environmental Protection Agency (2014), agricultural waste is made up of those materials such as manure and animal output, in both solid or liquid form, from poultry and other livestock, harvest remains from grains, oil seed, vegetable and crops.

2.3.5 Commercial Waste

Commercial waste consists of paper, plastics, wood, food wastes, construction and demolition materials, ashes, special wastes which comes from sources such as stores, hotels, restaurants, markets, office buildings, print shops, auto repair shops, medical facilities, institutions etc. (Tchobanoglous et al., 1993). Waste management is be said to be the process by which solid wastes are treated and variety of options given for recycling items that do not belong to trash. It involves how garbage is used as a valuable resource. Waste management is an essential practice for every household and business owner in the world.

Electronic Waste

Electronic waste is one of the increasing type of waste streams in the third world countries in develop nations. Electronic waste comprises of all object of electrical and electronic gadgets and its parts that have been disposed by the consumer. It is also referred to as WEEE (Waste Electrical and Electronic Equipment) or electronic waste, and includes almost any household or business item with circuits or electrical components using power or battery supply. It was estimated that 41.8million metric tonnes of electronic waste is discharge into the world with mostly ended-of-kitchen, laundry and bathroom equipment like microwave ovens, washing machines and dish washers (Periathamby,2015).

According to Obeng-Ababio (2012), electronic waste describes electronic waste as old, end-of-life electronic and electrical equipment or waste generated from any equipment running on electricity or a battery including computers, laptops, TVs, DVD players, mobile phones, MP3 players, which have been disposed by their original users. It has been categorized into three main groups, and these are; large household appliances like refrigerator and washing machine; information technology IT and telecom like a personal computer, monitor and laptop; and consumer equipment like television sets. These include metals, compressors, plastics, glasses, wiring/electrical, transformer, circuit board, fluorescent lamp.

2.4 Household Solid Waste Management Practices

According to Tchobanoglous et al. (1993), the most common early Practices of solid waste management were:

- dumping on land
- food scraps to animals,
- opening burning, and
- house-to- house collection.

Dumping on land; placement of solid waste in landfills is the oldest and definitely the most prevalent form of ultimate waste disposal (Zerbock, 2003). Disposal of solid waste on land is by far the most common and one of the oldest method of SWMP in Ghana and probably accounts for more than 90 percent of the world's municipal refuse. Sanitary landfill is one of the cheapest satisfactory means of disposal, but only if suitable land is within economic range of the source of the waste; typically, collection and transportation account for 75 percent of the total solid waste management (Liyana,2012).Sanitary land filling includes confining the waste, compacting it and covering with soil. It not only prevents burning of garbage but also helps in reclamation of land for valuable use (Centre for Environment and Development, 2003)Open burning is the burning of unwanted materials in a manner that causes smoke and other emissions to be released directly into the air without passing through a chimney or stack. This includes the burning of outdoor piles, burning in a burn barrel and the use of incinerators which have no pollution control devices and as such release the gaseous by products directly into the atmosphere (Department of Environmental Quality,2006).

Open burning has been practiced by a number of urban centres because it reduces the volume of refuse received at the dump and therefore extends the life of their dumpsite. Garbage may be burnt because of the ease and convenience of the method or because of the cheapness of the method. In countries where house holders are required to pay for garbage disposal, burning of

waste in the backyard allows the householder to avoid paying the costs associated with collecting, hauling and dumping the waste (World Bank,2019).

Food Scraps were given to animals which is the third tier of EPA's Food Recovery Hierarchy. Diverting food scraps to animals is a household solid waste management practice adopted by rural folks for centuries and remains one of the oldest management practices. With proper and safe handling, anyone can donate food scraps to animals. Food scraps for animals can save farmers and companies money. It is often cheaper to feed animals food scraps rather than having them hauled to a landfill. Companies can also donate extra food to zoos or producers that make animal or pet food. There are many opportunities to feed animals, help the environment and reduce costs, (United States Environmental Protection Agency, 2017).

2.5 Household profile and Solid Waste Management

According to Panyanko et al, (2015), gender has a significant effect on people's attitude towards the physical environment i.e on their acquiring and development of lands, handling of waste from their households and their management of drains near their compounds and disposal of solid waste and garbage from households and construction sites. The observed significant effect meant that gender was a strong determinant of the respondent attitude towards their physical environment. Multiple data source also showed that gender was a predictor of homeowners' environmental attitude. Research showed that women are more involved in waste segregation as compared to men at the household level. Women are known and decide what is wasteful (Banga, 2013). Household head's age also has a significant impacts on their management of drains near their compound and handling of waste water from households. This attributed to an understanding that older people tend to more risk averse than younger ones, hence they would site homes and dispose of waste in such a way as to minimize disaster risk (Panyoko et al., 2015).

2.6 Challenges of Solid Waste Management

Waste management has over some time now been a challenge not only in Ghana, but globally. There are however unlikeness in generation so far as rural and urban areas are concerned. It is generally regarded to be an urban issue due to the population and purchasing power of urban dwellers. The situation has worsened mostly due to technological advancement, making the speed at which waste is generated even faster than urbanization (Modak, 2011). The need for capacities such as procurement, contract management, professional and labour management has also made waste management an intensive service (Hoorweg & Bhada-Tata, 2012). An estimated 11.2 billion tonnes of solid waste are collected worldwide on a yearly basis and decay of the organic proportion of solid waste is contributing to about 5 percent of global Greenhouse Gas (GHG) emissions (Modak, 2011).

According to Environment Protection Agency (2014), Waste management has become a growing concern and challenge to developing countries, including Ghana on Increased population growth and rapid urbanization have resulted in increased generation of volumes of waste in our cities. Accra has grown very rapidly with a population of about 5 million inhabitants and has an annual growth rate of 4% making it one of the fastest growing metropolises in Africa. This phenomenal growth has contributed to the myriad of municipal waste management problems facing the country.

Solid waste management system in a developing country display an array of problems, including low collection coverage and irregular collection services, opening dumping and burning without air and water pollution control. Major urban cities are today fighting to clear mounting heaps of solid waste from their environments. These strategic centers of beauty, peace and security are being overtaken by the messy nature of over flowing dumps, unattended heaps of solid wastes emanating from household or domestic or kitchen sources by- products of process lines or materials that may be required by law to be disposed of (Okecha, 2000). Solid wastes have become recurring features in our urban environment. It is no longer in doubt that our cities

are inundated with the challenges of un-cleared solid wastes. Thus, urban residents are often confronted with the hazardous impact to their collective health and safety. The hue and cry over the health consequences of exposed and fermenting rubbish have not been quantified, although their impact is noticeable. These challenges are categorized into technical, financial, institution and social constrains.

2.6.1 Technical Restriction

According to Ogawa (2005), in most developing countries, there are inadequate human resources at both the national and local levels with technical expertise necessary for solid waste management planning and operation. Many officers in charge of solid waste management, particularly at the local level, have little or no technical background or training in engineering or management.

2.6.2 Financial Limitation

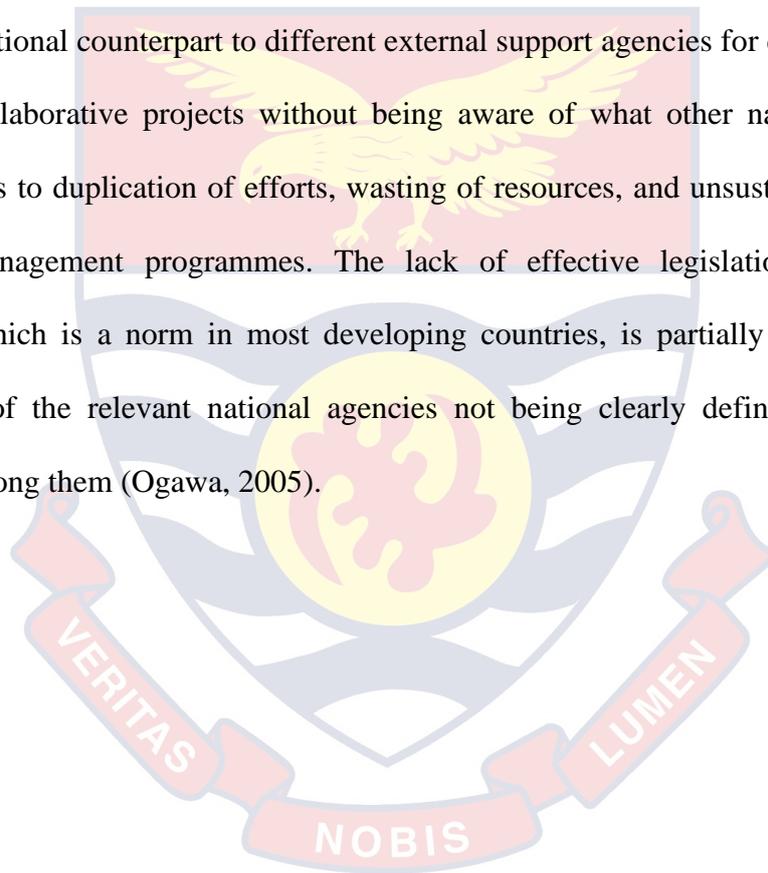
Ogawa (2005) intimated that, solid waste management is given a very low priority in developing countries, except perhaps in capital and large cities. As a result, very limited funds are provided to the solid waste management sector by the governments, and the levels of services required for protection of public health and the environment are not attained. The problem is acute at the local government level where the local taxation system is inadequately developed and, therefore, the financial basis for public services, including solid waste management, is weak. This weak financial basis of local governments can be supplemented by the collection of user service charges. However, users' ability to pay for the services is very limited in poorer developing countries, and their willingness to pay for the services which are irregular and ineffective.

According to Zurbrugg et al (1998) open on uncheck disposal is one of the most common technique of solid waste disposal in developing nations. In spite of the environmental impacts which are often obvious, the challenges are really dealt with. Inadequate programmes to tackle to bottle necks are due to low political will and priorities, Inadequate resource allocation and

lack of no-how regarding to alternative measures for operating and managing land dumps. To enhance the current situation, a well-furnished institutional and financial model for disposal activities must be developed and applied. A well-structured financial budget for waste management program prerequisite that enables municipalities to make decision about their programmes with regards to cost minimizing and better planning for the future

2.6.3 Institutional Constrains

There is lack of coordination among the relevant agencies often results in different agencies becoming the national counterpart to different external support agencies for different solid waste management collaborative projects without being aware of what other national agencies are doing. This leads to duplication of efforts, wasting of resources, and unsustainability of overall solid waste management programmes. The lack of effective legislation for solid waste management, which is a norm in most developing countries, is partially responsible for the roles/functions of the relevant national agencies not being clearly defined and the lack of coordination among them (Ogawa, 2005).



CHAPTER THREE

METHODOLOGY

The previous chapter provided a review of literature on solid waste and its managerial related issues. This chapter is devoted to the research methodology that was used in the study. It discusses the method for the addressing the research question of the study, towards achieving the research objective.

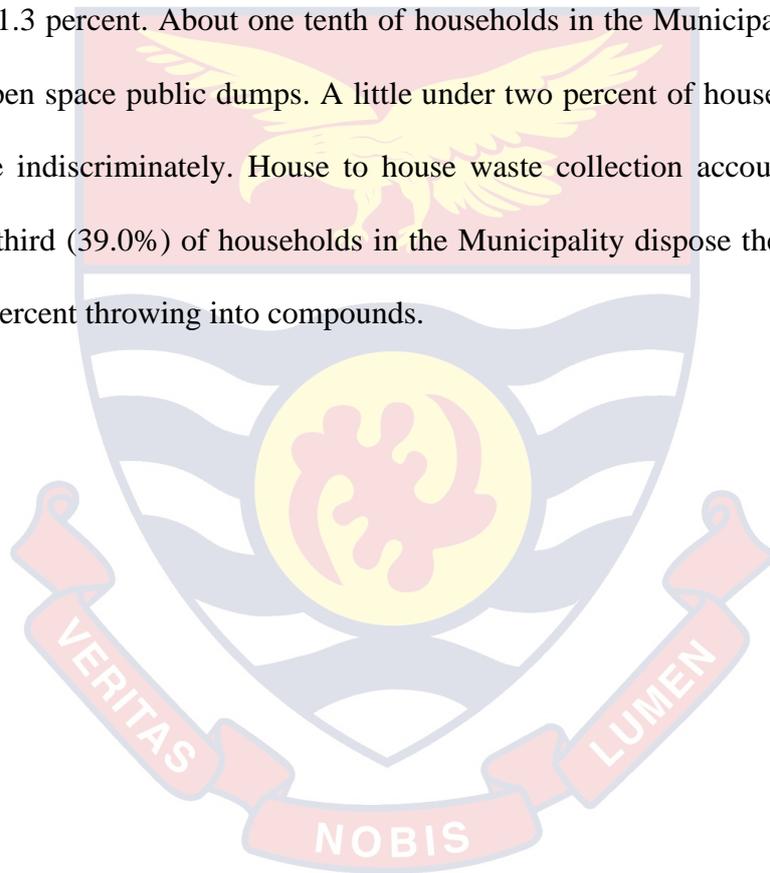
According to Kallet (2010), research methodology describes the rationale for the application of the specific procedures or techniques used to identify, select, and analyse data applied to understanding the research problem. This allows readers to critically evaluate the study's overall validity and reliability. Furthermore, Babbie (2010) indicates that the methodology includes the design, setting, sample, limitations, and the data collection and analysis techniques employed in a study. This section therefore presents the research design adopted approach, sample frame, sampling procedure and sample size determination to assess the solid waste management practices among the household and suggest possible measures to tackle the problem in the New Juabeng Municipality. Data needs and their sources, data collection tools and techniques as well as data analyses and presentation techniques are emphasized in this section.

3.2 Description of Study Area

According to Population and Housing Census (2010), the population of New Juabeng Municipality, according to the 2010 Population and Housing Census, is 183,727 representing 6.9 percent of the Eastern region's total population of 2,633,154. Males constitute 48.3 percent and females represent 51.7 percent. More than 90 percent of the population in the Municipality live in urban localities. About 66.4 percent of the population aged 15 years and older are economically active while 33.6 per cent are economically not active. Of the economically active population, 92.7 percent are employed while 7.3 percent are unemployed. For those who are economically not active, a larger percentage of them are students (62.1%), 12.4 percent perform

household duties and 3.9 percent are disabled or too sick to work. About 63 percent (62.8%) of the unemployed are seeking work for the first time.

Majority (51.2%) of the working population are into service and sales, followed by craft and related works. A higher percentage of females (35.7%) are into service and sales than males (20.1%). Majority of male workers (27%) are rather into craft and related works. Wholesale and retail is the predominant industry for both male (19.6%) and female (42.5%) workers in the Municipality. The most widely method of solid waste disposal is by public dump into containers accounting for 61.3 percent. About one tenth of households in the Municipality dispose of their solid waste in open space public dumps. A little under two percent of households (1.8%) dump their solid waste indiscriminately. House to house waste collection accounts for 5.1 percent. More than one- third (39.0%) of households in the Municipality dispose their liquid waste into gutters with 25 percent throwing into compounds.



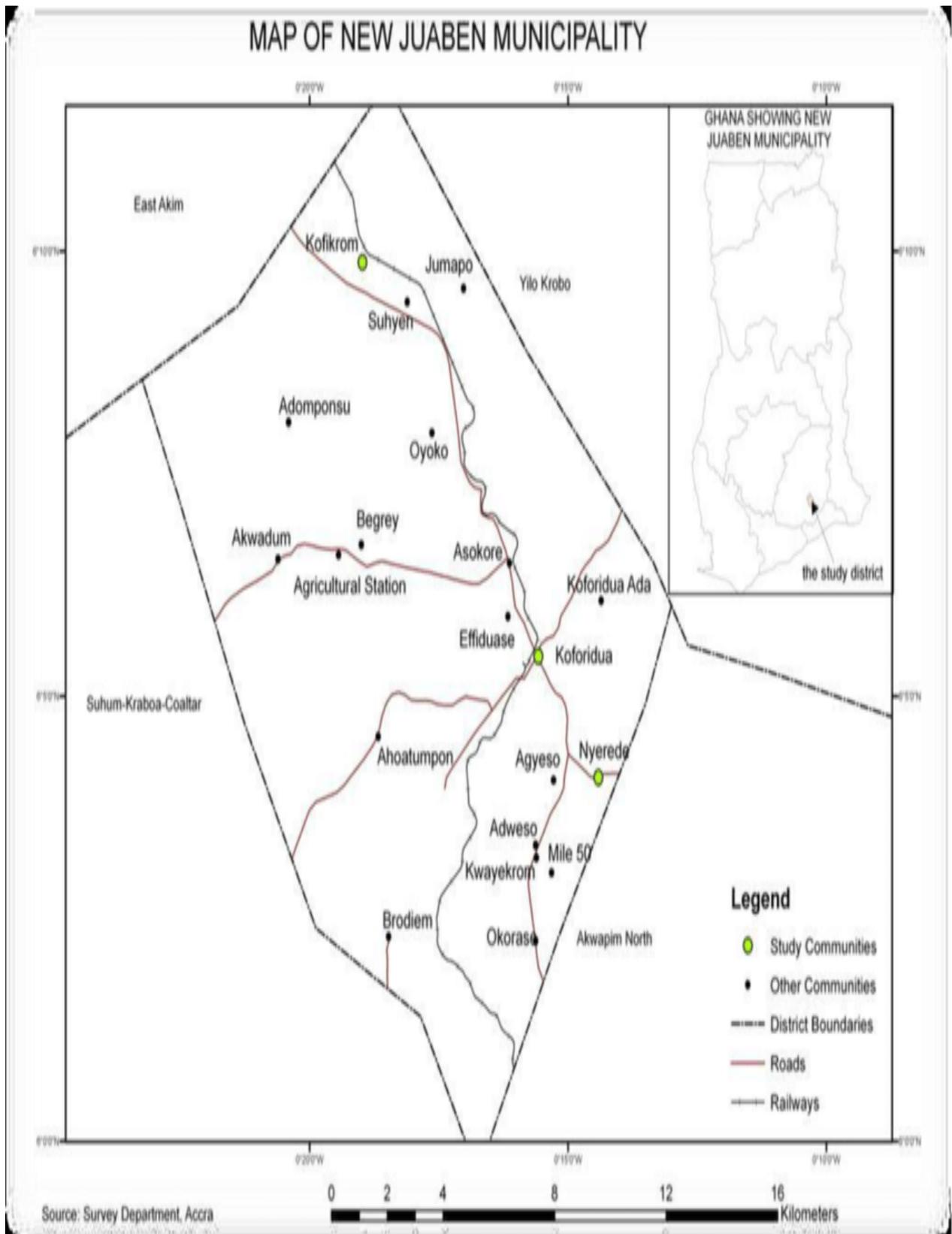


Figure 1. (Source: Ghana Statistical Service, 2018)

3.3 Epistemological Foundation

Epistemology is the philosophy of research related with how researchers know what they know or the true (Carnaghan, 2013). Subjective evidence is gathered based on individual views and perceptions from research conducted in the study area. Epistemological foundation to research represents the researchers way of knowing the reality and how to draw conclusions about knowledge, truth, and authority (Reybold, 2010). This study is to inquire the “truth” of how telecommunication masts are sited in relation to planning provisions and the factors that contribute to compliance and noncompliance to planning standards. The study is devoted to “search for truth” in the pragmatism epistemology. Pragmatic epistemic principles will allow the research to focus on outcome by combining approaches that best address the research problem (Onwuegbuzie et al., 2009). Reality is seen as what is practical and works (Ontology). The research has the freedom to use of both qualitative and quantitative methods and approaches to collecting and analysing data.

The study was therefore focused on employing variety of useful methods and approaches to solicit and analyse data to assess the solid waste management practices among the household and possible measures suggested to tackle the problem in the New Juabeng Municipality

3.4 Research Design

According to Kothari (2004), research design is the arrangement of conditions for collection and analysis of data in a way that aims to combine relevance to the research purpose. In other words, it is a conceptual structure within which research is conducted. A research design is further regarded as an empirical process of linking data collection to the research objectives and finding solutions to address them. The research design selected for a particular study should be in line with the research topic and the questions the study seeks to address.

The research employed cross-sectional survey design to select relevant respondents to assess the solid waste management practices among the household and suggest possible measures to tackle

the problem in the New Juaben Municipality. The research adopted a mixture of qualitative and quantitative research approach to investigate the phenomenon. Mixed method to research is an inquiry involving gathering both qualitative and quantitative data, integrating the two classes of data, and using different designs. The main assumption behind this form of investigation is that the mixture of qualitative and quantitative approaches offers more comprehensive understanding of a research problem than either approach in isolation (Creswell, 2014).

The mixed method according to Ellingsen, Størksen and Stephens (2010) provide the researcher the technique to study systematically qualitative features of human subjectivity in a manner that reduces the interference of the researcher's presumptions. Qualitative methods or designs are mostly "used in preliminary and exploratory studies to allow researchers gain insight on people's perceptions, attitudes, and opinions and based on interpretation of data collected for the purpose of clarification" (Orodho, 2009, p. 12). Qualitative research is also a way of exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014). Kothari (2004) also adds that qualitative research approach deals with subjective assessment of attitudes, perception, opinions and behaviour. It generates results which are not subjected to rigorous quantitative analysis. In this study, for instance, qualitative data is capable of providing rich and in-depth process.

The qualitative and quantitative methods were used to make useful insights and analytical generalizations out of the data collected on the solid waste practices adopted by the households, the types of waste generated by the households, the means of waste disposal by households (place of disposal) and the challenges with the solid waste management practices.

3.5 Study Population

Study population is defined as any group of individuals that have one or more characteristics in common that are of interest to the researcher (Creswell, 2014). The population may be all the individuals of a particular type or a more restricted part of a group (Mugo, 2010). Simply, it is

the larger group from which individuals are selected to participate in a study. For the purpose of this study, the population and units of enquiry have been organised under three methods for the collection of data in the study; cross-sectional survey and key informant interviews. The targeted population of the study were members of households who have dependents and above 18 years made up of either sex. It was expected that the respondents have the needed knowledge regarding the subject under investigation and will be able to provide responses that helped to answer the research questions.

3.6 Sample size and sampling technique

Kothari (2004) defines sampling as the process of obtaining data about an entire population by examining only a part of it. The purpose of sampling is to make generalizations or to draw inferences about the population. The probability sampling technique was employed to interview units of inquiry. The selected areas were stratified into low class, middle class and high class categories in the Municipality. Systematic sampling was used in selecting households and random sampling method was used in selecting the respondents for the interview with a sample size of 130. However, the relevant institutions mandated to ensure effective solid waste management were purposively sampled and interviewed on the research objectives. The household heads were conveniently (based on availability and willingness to participate in the survey) sampled and interviewed.

3.7 Sources of Data

A combination of primary and secondary data was used to address the research questions. The secondary data were obtained through a review of various literature which include peer-reviewed journals, conference proceedings, book chapters, magazines and newspapers. The other sources of secondary data were published and unpublished documents such as books, project reports, journals, government policy documents and unpublished documents (such as project reports and students' theses) on social vices or deviant behaviours among students in

basic schools. The secondary data was gathered with the aid of a checklist which was prepared to cover the following areas: types of household wastes, solid waste disposal and management practices, challenges in managing solid wastes, among others.

The primary data was gathered through a systematic process of interview schedule design through pre-testing to the administration of interview schedules and interviewer-administered questionnaires. The primary data was obtained through direct observation and face-to-face interviews with the units of inquiry.

3.7 Data Collection Instrument and Procedure

The data collection instruments were questionnaire, interview guide, and observation checklist administered through semi-structured and key informant interviews. However in this survey interview guide and observation was during the research.

3.7.1 Questionnaire administration

Semi-structured questionnaires were administered, through direct interviews (face-to-face) with the 130 household heads. The questionnaire captured information on the demography of respondents, perceptions of respondents on the solid waste practices adopted by the households, the types of waste generated by the households, the means of waste disposal by households (place of disposal) and the challenges with the solid waste management practices. The questionnaire was administered by the researcher and research assistant was employed because she familiar with the locals and to ensure data credibility and quality.

For the purpose of achieving accuracy and quality of data questionnaires was administered in the evening.

This provided the opportunity to probe deeper for more relevant information on the subject.

3.7. Key Informant Interviews

Interviews were used to obtain data from experts and the relevant institutions (specifically, the Waste Management Department). Authors like Kumar (1989) have discussed the benefits of key informants in research work. Key informant interviews often provide data and insight that cannot be obtained with other methods. This is because data from key informants comes directly from knowledgeable people. The key informants thus comprised heads of the Waste Management Department and Planning Unit of the New Juaben Municipality. The interviews took the semi-structured format where the researcher initiate the conversation with the topics of interest and encouraged the interviewees to elaborate. The survey largely employed open ended questions which brought to bear respondents' own knowledge, personal experience and perceptions. Following the study five (5) heads were engaged and out the five two were assembly members while three opinion leaders and they were interviewed based on conveniences. This helped to obtain meaningful data on the phenomenon under study. The use of open-ended questions also ensured that the perspectives of interviewees are captured more fully and accurately.

3.7. Focus Group Discussions

Yuen et al. (2009) argue that focus groups provide specific and pertinent data. With such group interactions, there is an advantage of obtaining more information than individual interviews. The researcher conducted two group interviews of households for this research. A focus group discussions was conducted with a minimum of seven and a maximum of 9 participants. The focus group discussions for this study took the semi-structured form which is the same technique adopted for the key informant interviews. The focus group interview provided different perspectives than one-on-one interviews as participants raised opposing viewpoints but at the end tackle problematic issues with each other, and resolved conflicting perceptions. For the focus group interviews, there were "brainstorming" during the interviews to ensure that the

outcome is a balanced description of actual occurrences. By this practice, the accurate understanding of issues of interest with regards to the solid waste practices adopted by the households, the types of waste generated by the households, the means of waste disposal by households (place of disposal) and the challenges with the solid waste management practices. During these interviews, the researcher always acted as a facilitator of the discussion and remained neutral without supporting or rejecting participant's opinions on issues.

The responses were handwritten, after seeking consent from respondents. Handwritten notes provide further explanation to the interviews. Prior to the interviews, informed consent was sought for from participants.

3.8 Data Analysis and Presentation

The purpose of data analysis according to Kelley *et al* (2003) is to summarise data such that it is easily understood and deliver answers to research questions. It encompasses breaking data into components, combining and recombining the components to identify patterns, evaluate, describe, examine or explain a phenomenon after careful investigation in consonant with research questions (Akinyoade, 2013). The data obtained from face-to-face interviews and questionnaire were thoroughly scrutinised to ensure consistency and accuracy. Editing was done to ensure that the data are accurate and consistent with other data obtained. The data was well arranged to facilitate coding and tabulation. Coding is the assignment of numerals to responses in a limited category of the data. Close-ended questions were assigned codes to ensure easy entry and analyses using statistical tools. All the survey instruments were reviewed for completion and accuracy and compiled in a database, prior to data analysis. Analysis of the quantitative data from the 130 household heads was preceded by coding and designing a template for analysis. The data collected was scrutinized and edited for errors before entering responses for the closed ended questions into the template of the statistical software used. The

open-ended questions were analysed manually. The quantitative analysed data was presented in descriptive forms as well as graphical illustrations in the form of pie charts and bar graphs.

With respect to the qualitative data from the relevant institutions and participants of the 3 focus group discussions, the thematic and content analyses basically analysing for key themes was adopted to analyse the responses from the respondents through an inductive and deductive coding process (Rubin & Rubin, 2005). This process was facilitated by the use of the NVIVO 10 software package for coding the data and developing categories. Audio responses were transcribed, and categorised under the various themes, examined, tabulated and interpreted. While codes were inductively developed from the research participants' perspectives on issues such as the solid waste practices adopted by the households, the types of waste generated by the households, the means of waste disposal by households (place of disposal) and the challenges with the solid waste management practices. However, guided by the inconsistencies that might arise in the analysis process (Bryman & Burgess, 1994), relationships were established by reconciling and refining codes and categories into more conceptual categories based on common relationships. This process increased the understanding of the whole data set, as the research participants' perspectives on study phenomenon. The analysis was done based on the context, consistency, intensity and specificity of the responses to the questions.

3.9 Validity of Findings

Validity in empirical studies is commonly concerned whether a particular finding generated from research represents a good estimation to the true inference or conclusion (Roe & Just, 2009)

Internal validity is the degree to which research design and methods are free from errors and any variation in measurement is attributed to independent variable and not the measurement in itself (Surbhi, 2017). Internal validity will be ensured by gathering data from diverse groups and institutions using appropriate data collection tools. Data will be collected from 130 household

heads, who have different solid waste management practices and challenges, as well as the Waste Management Department and the Planning Unit of the New Juaben Municipality.

External validity according to is the ability to generalize findings and relationships that emanate from a particular study to other peoples, periods and settings (Roe & Just, 2009). External validity will also be enhanced by the representativeness of samples, the suitability of the sampling techniques and the combination of methods of data collection to make the findings appropriate for generalization to larger populations and applied to different, economic, social and political settings.

3.10 Triangulation

Triangulation refers to use different methods and approaches to generate and analyse data for a study in order to increase confidence and credibility findings (Salkind, 2010; Heale and Forbes, 2013). The study ensured data triangulation by acquiring data through different sampling strategies. Methodological triangulation will also be utilised by using different methods in field survey, observation, interview and questionnaire for data collection.

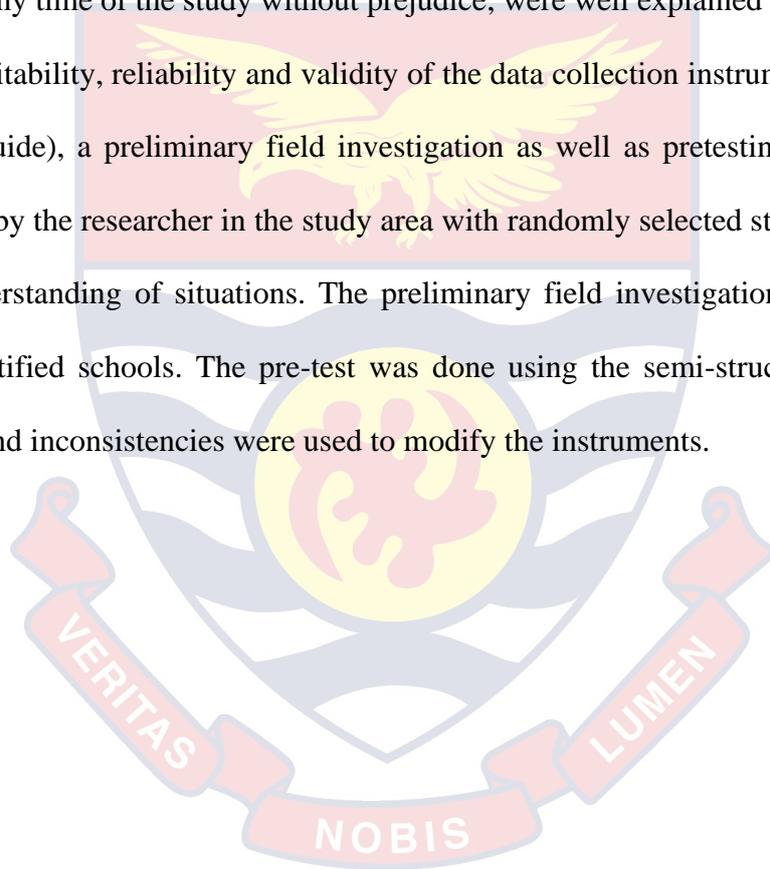
3.11 Research Ethics

Research ethics according to Bell (2005) is about being explicit about the nature of agreement you have entered into with your research respondents or subjects. It also involves getting the consent of those you are going to question, interview, observe or claim materials from, explaining how data generated from them is going to be used and how its final analysis will be disseminated or reported. Ethical consideration of the study will start with review of questions to do away with sensitive issues in the questionnaire and interview guide and those that will be detected to be sensitive during the pre-testing will be rephrased for the main data collection.

A letter, introducing the researcher, was obtained from the Faculty of Development Studies, Presbyterian University College, Ghana. A duplicate copy of the introductory letter was given to the heads of the institutions covered in the study. The institutions were thus adequately informed

about the purpose of the study before interviews began. The units of inquiry and analyses covered by the study were also be given copies of the introductory letter. Prior to the interviews, the interviewees were briefed about the purpose of the study and the time needed to complete the questionnaire/interview guide. They were reassured that their responses would be treated with confidentiality. Participants were required to give their consents prior to the interviews upon agreeing to participate voluntarily in the study. The rationale and need for the study, procedures involved, rights of respondents, confidentiality, voluntary participation and the right to dissociate at any time of the study without prejudice; were well explained to participants.

To ensure the suitability, reliability and validity of the data collection instrument (questionnaires and interview guide), a preliminary field investigation as well as pretesting of the instrument were conducted by the researcher in the study area with randomly selected students to assess and have a fair understanding of situations. The preliminary field investigation involved informal visit to the identified schools. The pre-test was done using the semi-structured questionnaire administration and inconsistencies were used to modify the instruments.



CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter shows the overview of household management practices, the demographic characteristics of the various respondents, types of waste generated, means of waste disposal by households and challenges associated with household solid waste practices.

As highlighted by Barr et al.,(2001), the alarmingly ascending quantities of wastes generated by households are fast becoming a crucial environmental problem which is posing a very complex challenge for environmental policy especially in the urban centres not only in developed but also in developing countries around the world. Just as indicated already, waste from domestic sources is a major barrier to achieving environmental sustainability in the 21st century.

The case of solid waste management especially in the urban areas must be seen in the wider context of problems caused by rapid urbanization. In Africa a growing number of cities are faced with the challenge of providing their populations with adequate water supply, sanitation and solid waste services, due of the rapid rate of the urbanization process which is as a result of more people migrating from the rural areas to the urban areas mostly to look for means of survival. This process causes not only a strain on the natural resources in the urban settings but also on the infrastructural developments made in the urban areas. According to The United Nations 2006 projections, the rate of urbanization will increase from 24% in 2005 to 38% by 2030 which is quite alarming.

4.2 Demographic Characteristics of Respondents

Table 1 shows the sex distribution of the respondents with 30 (23.1%) of them being males and 100 (76.9%) being females. This is not strange since the cultural practices require women to be responsible for the cleaning and management of the home. Indeed this is highly gendered role dominated by women as a result of social roles they have been assigned to by the society, therefore, their views are very important in dealing with waste management at the household level. One interviewee, Maame Hannah, a house wife suggested said; “if you really wasn’t to get the true results of for this research, speak to the women. We are the people who can give you accurate answers relating to waste because we are mostly the ones who engage in domestic activities. The men only leave money in the house, veer off to their workplaces and return only when food is ready”. However, for the sake of the research not being bias, males were also interviewed to get a mixed results

Table 2: Sex distribution of respondent

Sex	Frequency	Percent
Male	30	23.1
Female	100	76.9
Total	130	100.0

Source: Field data, 2019

Table 2: Household size

Table 2 indicates the respective household sizes of the respondents. From the total number of respondents 57(43.8%) have a household size ranging from 2-4 members, fifty-five respondents have a range of 5-10 members. In the range of 11-15 members, nine people were indicated. Two people formed the range of 16-20 members whilst only one respondent answered to be above 20

in size. Six respondents didn't make any choice. This means that the vast majority of the households in the municipality range from 2-10 members which represent a total of 86.1%. The households in the municipality is mostly that of a nuclear family which is made up of husband, wife and their children. However, some have an extended household which include the nuclear family and a few other members from the extended family like the wife's mother or and nieces and nephews. Only a few have the round extended family household which is made up of almost all members of the extended family living under one roof and eating from one kitchen

Table 2: Household size

Household size	Frequency	Percent
2-4	57	43.8
5-10	55	42.3
11-15	9	6.9
16-20	2	1.5
above 20	1	0.8
Total	124	95.4

Source: Field data, 2019

4.1.3 Components of waste generated by individual households

Table 3 shows the components of waste generated by the individual households, fifteen respondents generate only plastics, four respondents generate only organic while only one respondent generate only glass. Thirty-five respondents generate both plastics and organic, forty-five respondents generate plastics, organic and paper while fifteen respondents generate

plastics, organics and cans. Three respondents generate fabrics and plastics whereas twelve respondents generate all five of plastics, organic, paper, glass and cans. %. This indication I can be widely affirmed with the number of plastic waste that dominate the streets of the New Juaben municipality. Mrs Boamah when interviewed said; “There is no way we can do without these plastic wastes. Everything you buy is put inside a plastic bag even 50 pesewas worth of bread. Toffees are wrapped in sachets, same with water, rice and others. Polythene bags here, food packs here, plastic bottles there. The only way is for these plastic bags to be banned from use in the country”. Mr Boamah who happened to be entering the house at that time laughed and said “Even if the government was to ban the use of plastic bags, the mismanagement of waste will cause paper to dominate the streets like plastic is doing now. The best way is good leadership and proper management”.

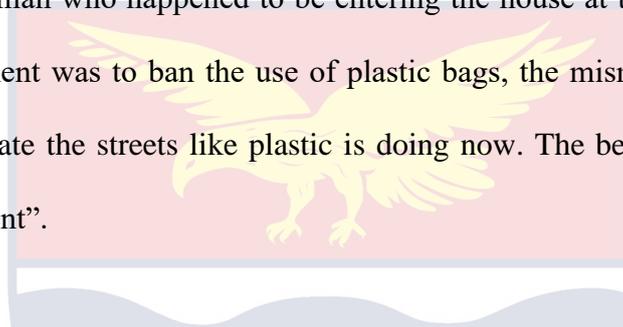


Table 3: The components of waste generated by the household

Components	Frequency	percent
Plastics only	15	11.5
Organic only	4	3.1
Glass	1	0.8
plastics and organic	35	26.9
all five	12	9.2
plastics and organic and paper	45	34.6
plastics organic and cans	15	11.5
plastics and fabrics	3	2.3
Total	130	100.0

Source: Field data, 2019

4.1.4 Quantity of waste produced in the household per day

For the purpose of achieving accuracy in measuring the quantity of waste produced by a given household in a day, a thirty-four gram bucket was used. At the end of the day, it was gathered that eighteen respondents produce less than half a bucket, thirty-seven produce half a bucket which represent 13.8% and 28.5% respectively. Twenty-three produce more than a half of the bucket representing 17.7% whereas forty-four respondents representing 33.8% produce one bucket full or more. Only 4.6% encompassing six members of the total respondents produce more than two buckets full of waste per day. This shows that the vast majority of the people produce from half a bucket to less than two buckets full of waste a day. The options for choosing the magnitude of waste a given household generates per day on the average were given as low, moderate and severe. These options are defined as such; all households which generate up to half a bucket of waste are low producers. All households which produce up to one or more buckets full are moderate producers whilst those households which produce more than two buckets full of waste are severe producers. Thus it can be said that most of the households in the municipality are moderate producers of waste. Out of the total respondents, 37.7% said they produce waste the most during festivities, 34.6%. Only 2.3% of the respondents said they produce waste most during festivities and weekends whilst 21.5% said they produce most waste during festivities and house cleanings.

When it came to how waste is stored, 3.1% indicated that they only burn their waste, 9.2% said they burn some of their waste and give others to animals and 23.8% said they keep their waste in either sacks, baskets or buckets. 2.3% dispose their waste directly at the dumping site and 20% said they store some of their waste in baskets and give others to animals. 38.5% store their waste in zoomlion bins. It shows that most of the respondents interviewed store their wastes in specific bins provided by Zoomlion Company Ghana Limited which is collected by the same company at least once every week for a fee that is paid by the beneficiaries at the end of the month. The

closest option to this is storing waste in sacks, baskets or buckets which is disposed off at the communal dumping when full. Notwithstanding this, some of the wastes generated especially organics are given to livestock and other animals as feed. Mrs. Annor, another interviewee commented saying; “Almost all of the organic wastes I produce are used as feed for animals. A man comes around every morning for these wastes more especially cassava and plantain peels as well as food remains. He gives them to his livestock and poultry and this really encourages me to the practice segregation”. Ante Maanah who had already indicated to producing organic waste the most said; “Since I mostly produce organic wastes, I seldom go to the dumping site since I use the waste to feed my goats and sheep”. Table 4 below highlights the quantity.

Table 4: quantity of waste produced in the household per day

Waste produce (34 grams)	Frequency	percent
Less than half	18	13.8
Half	37	28.5
More than half	23	17.5
One	44	33.8
more than two	6	4.6
Total	128	98.5
Missing	2	1.5
Total	130	100

Source: Field data, 2019

4.1.5 Periods or occasions during which waste is generated most

Forty-nine of the total respondents said they produce waste the most during festivities, forty-five answered that they produce waste the most during house cleanings. Only three respondents said they produce waste most during festivities and weekends whilst twenty-eight others said they produce most waste during festivities and house cleanings. Five respondents however didn't answer this question.

Table 5: In what periods or occasions are waste generated the most?

Occasion	Frequency	Percent
during festivities	49	37.7
during house cleanings	45	34.6
during festivities and weekends	3	2.3
during festivities and house cleanings	28	21.5
Total	125	96.2
Missing	5	3.8
Total	130	100.0

Source: 2019 field data

4.1.6 Components of waste most generated

Out of the total number of respondents, one hundred and ten said they produce plastic waste the most, eighteen said they produce organic waste the most whilst only two produce fabrics the most respectively.

Table 6: which of these waste components do you produce most

Component	Frequency	Percent
Plastic	110	84.6
Organic	18	13.8
Fabric	2	1.5
Total	130	100

Source: Field data, 2019

4.1.7 Waste management adopted by various households

When it came to how waste is stored, four respondents indicated that they only burn their waste, twelve respondents said they burn some of their waste and give others to animals and thirty-one respondents said they keep their waste in either sacks baskets or buckets. Three of the dispose their waste directly at the duping site and twenty-six respondents said they store some of their waste in baskets and give others to animals. Fifty of the respondents store their waste in zoomlion bins. Four respondents didn't respond to this question. These receptacles are collected when they become full by the municipal collection operator and disposed off at major landfill site at the outskirts of the municipality. This is followed by house to house collections which is done by Zoomlion Company Ghana Limited for those who have contracted them to and pay for their services at the end of the month.

Table 7: How do you store waste

Mode of storage	Frequency	Percent
Burning	4	3.1
burning and animal feed	12	9.2
kept in sacks or baskets or buckets	31	23.8
Dumping	3	2.3
kept in baskets and some used to feed animals	26	20.0
kept in zoomlion container	50	38.5
Total	126	96.9
Missing	4	3.1
Total	130	100.0



Source: Field data, 2019

4.1.8 Segregation of waste

Table 8 shows how respondents answered to the question of whether they segregate the waste they produce. 66 respondents indicated Yes, 58 respondents indicated No and only six respondents indicated sometimes. . Although the number of respondents who do not segregate waste are fewer than those who segregate waste, the gap is too little to be significant.

Table 8: do you segregate the waste produced

Segregation	Frequency	Percent
Yes	66	50.8
No	58	44.6
Sometimes	6	4.6
Total	130	100.0

Source: Field data, 2019

4.1.9 Necessity for waste segregation

Table 9 showcases respondents’ answers to the question of whether waste segregation is necessary. Out of the total number of respondents, 105 indicated Yes, 15 indicated No and only 2 respondents indicated Maybe. Eight respondents didn’t give any answer to this particular question. . Mr. and Mrs. Ayeh who do not segregate the waste they produce when interviewed said; “The fact that we do not segregate waste in this house does not mean we do not think it necessary. In fact, we tried it once but it was too much of a work and so it didn’t last. We will put in much effort and make sure we practice it to help in easy collection”. “Everything goes directly into the waste bin and I don’t get the benefit of even reusing what could have been

identified had I segregated the waste I produce, all because it is a bit hard to do” said Sister Ama.

Table 9: do you think it is necessary for waste segregation

Respondent	Frequency	Percent
Yes	105	80.8
No	15	11.5
maybe	2	1.5
Total	122	93.8
Missing	8	6.2
Total	130	100.0

Source: Field data, 2019

4.1.10 Waste disposal practice

Table 11 shows the various disposal practices the respondents engage in. Fifty-seven of the total respondents engage in communal dumping, forty-four of the respondents engage in house to house collection and only one respondent practice burning. A number of twenty-five respondents which engage in communal dumping as well as burning whilst three people engage in three methods namely communal dumping, burying and burning.

Table 11: which of the following waste disposal practices do you engage in

Disposal practices	Frequency	Percent
communal dumping	57	43.8
house to house collection	44	33.8
Burning	1	0.8
communal dumping and burning	25	19.2
communal dumping, burying and burning	3	2.3
Total	130	100.0

Source: Field data, 2019

4.1.12 Satisfaction to Service collection Operator

Table 12 shows highlights that of the total number of respondents, seventeen indicated that they are very satisfied with the services of the collection operator, fifty-eight respondents indicated that they are fairly satisfied whilst fifty-two indicated that they are not satisfied. Three respondents gave no account.

Although the number of people who are fairly satisfied with the collection operators slightly outweigh those who are not satisfied, the difference raises a level of concern that needs to be addressed as soon as possible. Hon. Issah, the Assemblyman at Zongo in the New Juabeng South electoral area, indicated that the best practice was house to house collection, however

since the bin comes at a cost along the monthly payments to be made, it leaves many people resorting to communal dumping sites

Table 12: based on your answer to question 17 how satisfied are you with the services of the collection operator

Satisfaction	Frequency	Percent
very satisfied	17	13.1
fairly satisfied	58	44.6
not satisfied	52	40.0
Total	127	97.7
Missing	3	2.3
Total	130	100.0

Source: Field data, 2019

4.1.13 How well waste is managed in the municipality

Table 13 shows how well waste is managed in the municipality. Three respondents representing 2.3% indicated that waste is very well managed, fifty which represent 38.5% indicated well managed, sixty-nine which represent 53.1% indicated poorly managed whereas seven respondents which represent 5.4% indicated that waste is very poorly managed in the municipality. Only one respondent representing 0.8% gave no account.

Table 13: how well is waste managed in the municipality

MWM	Frequency	Percent
very well managed	3	2.3
well managed	50	38.5
poorly managed	69	53.1
very poorly managed	7	5.4
Total	129	99.2
Missing	1	0.8
Total	130	100.0

Source: Field data, 2019

4.1.14 Challenges the municipality faces with waste management

Table 14 indicates the challenges faced by the municipality with waste management with thirty-three respondents which represent 25.4% choosing improper disposal of waste, twenty-two representing 16.9% chose late collection of waste produced and seventeen respondents representing 13.1% chose inadequate waste collection receptacles. Five respondents representing 3.8% chose both improper disposal of waste and late collection of waste produced and fifty respondents which represent 38.5% chose all three being improper disposal of waste, late collection of waste produced and inadequate waste collection receptacles. Three respondents which represent 2.3% gave no account. From the physical observations made in most parts of the municipality, it was seen that there were challenges faced by the municipality in relation to waste management and 25.4% choose improper

disposal of waste, 16.9% chose late collection of waste produced and 13.1% chose inadequate waste collection receptacles. 3.8% chose both improper disposal of waste and late collection of waste produced and 38.5% chose all three being improper disposal of waste, late collection of waste produced and inadequate waste collection receptacles. Mr. Ayeh again said; “The municipality has serious challenges facing them with regard managing waste. Many people do not adhere to dumping waste where they are supposed to and throw them about as they see fit. The number of receptacles the municipality has is nothing to contain the amount of waste produced by the people and even when they are full, you have to lament for about two weeks before these receptacles are carried away to be emptied at the landfill site. During the time when the receptacle is full, where do you expect the people to dump their waste? What do you think will happen?” he asked. Hon. Issah said “ We sometimes have to plead with the people to keep their wastes in sacks and keep them in their houses until they receptacles are taken away and emptied. Some of us have to turn ourselves into watch men and women just to prevent others from dropping wastes on the ground when these receptacles are full and the municipal collector hasn’t come for them. The insults we receive day in, day out from the people for not allowing them to dump waste around receptacles when they are full is appalling and so we resort to burning the waste around the receptacle in a bid to control them from decomposing and spreading bad smells around the surrounding houses and the community at large. There are only one receptacle for over three thousand registered population in his electoral area and less than twenty in the whole of New Juaben south. Hon. Issah again indicated that there was an outbreak of cholera and diarrhoea a year ago due to improper disposal of waste in the community. Miss Mills, a tertiary student who was interviewed lives very close to a dumping site and voiced her displeasure on how improper waste management affects the people. She said; “The odour that comes from the dumping site is really unbearable especially for those who live very

close by. We end up getting sick and sometimes our homes are invaded by animals like mice and cockroaches as well as flies. Its really a big concern for us”.

Table 14: what are some of the challenges the municipality faces with waste management

Challenges	Frequency	Percent
improper disposal of waste	33	25.4
late collection of waste produced	22	16.9
inadequate waste collection receptacles	17	13.1
all three	50	38.5
Improper disposal of waste and late collection of waste produced	5	3.8
Total	127	97.7
Missing	3	2.3
Total	130	100.0

Source: Field data, 2019

4.1.15 How the municipal handled these challenges

Table 15 represents how the municipal has handled the challenges in table 15 and twenty-three respondents indicated creation of dumping sites, seventy-three indicated shared containers whilst only two indicated block collection. Five respondents which indicated organization of communal labour to work on dumping sites whilst another two indicated house to house collection. Twenty-two respondents indicated that the municipality had done nothing in relation to the challenges and the remaining three gave no account. The unit committee member at Zongo lamented that the municipal does not care about the complaints they sent to the offices and as such have done nothing to tackle the issue of waste. He said; “It looks like they do not care about it else they would have done something about all the complaints we have sent to the various offices. They do not suffer directly from these things so they do not see the need to address them. They sit in offices doing nothing and if we (community members) do not take it upon ourselves and create solutions for ourselves, we would end up contracting diseases which we cannot afford to cure.”

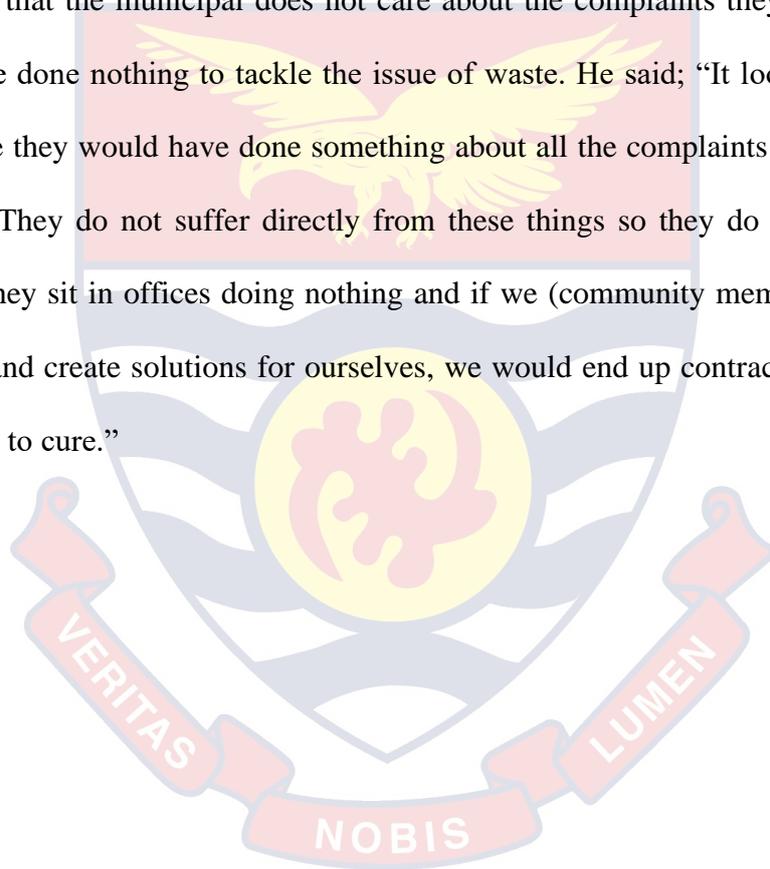


Table 15: how has the municipal handled these challenges

Mitigation measures	Frequency	Percent
creation of dumping sites	23	17.7
shared containers	73	56.2
block collection	2	1.5
Nothing	22	16.9
organize communal labour to work on dumping sites	5	3.8
house to house collection	2	1.5
Total	127	97.7
Missing	3	2.3
Total	130	100.0

Source: Field data, 2019

4.1.16 Effects of improper disposal of waste in the community

In table 16, seventy-two respondents said that health problems are the effects of improper disposal of waste in their communities. Another eighteen of the respondents chose invasion of rodents whilst thirty-nine others chose both health problems and invasion of rodents. Only one respondent gave no account.

Table 16: what are some of the effects of improper disposal of waste in the community

Effects	Frequency	Percent
health problems	72	55.4
invasion of rodents	18	13.8
health problems and invasion of rodents	39	30.0
Total	129	99.2
Missing	1	.8
Total	130	100.0

Source: Field data, 2019

4.1.17 Regularity of public education on sanitation in your community

Table 17 shows how often public education on sanitation in the community is done. Two respondents indicated once a year, thirteen chose twice a year, twenty-eight respondents chose once in a number of years and eighty-seven indicated never before. Ante Maanah said; “what can we do? Even the municipal does nothing or very little to tackle the issue of waste so we all just watch on and hope for the better”.

Table 17: how often do you have public education on sanitation in your community

Public education	Frequency	Percent
once a year	2	1.5
twice a year	13	10.0
once in a number of years	28	21.5
never before	87	66.9
Total	130	100.0

Source: Field data, 2019

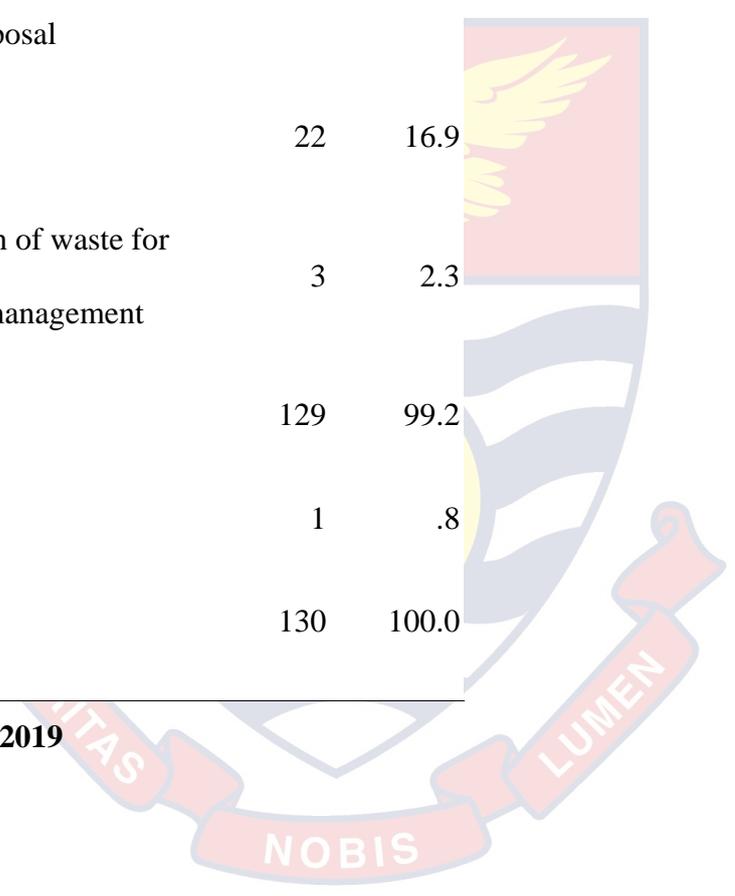
4.1.18 Contribution towards proper management of waste in the municipality

Table 18 shows that eight-one respondents practice personal hygiene, twenty three respondents advise and educate others on the need for proper disposal of waste, three people practice segregation of waste for effective management all to serve as contribution towards proper management of waste. Notwithstanding twenty-two people indicated that they do nothing whilst one respondent gave no account.

Table 18: what has been your contribution towards proper management of waste in the municipality

Management	Frequency	Percent
personal hygiene	81	62.3
advise and educate others on the need for proper disposal	23	17.7
Nothing	22	16.9
segregation of waste for effective management	3	2.3
Total	129	99.2
Missing	1	.8
Total	130	100.0

Source: Field data, 2019



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

In the New Juaben Municipality careless dumping, unregulated collections of waste and inadequate receptacles are the key problems in household solid waste management. Therefore, the main objective of the study was to assess the solid waste management practices among household and suggest possible measures to tackle the problem in the New Juaben Municipality.

5.2 Summary

The result of the study showed that 38% of the respondents indicated that they stored their waste in Zoomlion bins before collection, also 23.8% respondents stores their waste in sacks, buckets and buckets. The study also revealed 20% kept the food remains in baskets and used it to feed animals while the rest of the household respondents disposes their waste the community dumping sites.

Poor waste management on health, majority of the respondents were aware that poor waste disposal could cause disease, from this it was clear that with improper waste disposal methods respondents were aware of the health implication on the Municipality.

Challenges Affecting of Solid Waste Management and Recommendation

Therefore, all the objectives set were achieved and with regard to the main objective of the study it can be concluded that the following are indeed the key factors in the assessment of effective waste management in the Municipality. These include inadequate skip supply for storing waste; high population to skip ratio; lack of routine collection of waste, poor methods of waste management and inadequate resources for waste management institutions to effectively collect the waste generated.

To effectively tackle the problems enumerated, the following measures are recommended.

- Provision of adequate skips and dustbins
- Prompt collection of Waste
- Proper and effective Management of Landfill

- Adequate resourcing of Waste Management Institutions

If the above recommendations given are well taken and implemented, it will bring about effective solid waste management; ensure a clean environment and curb any possible outbreak in New Juaben Municipality.

5.3 Conclusion

In the study, the following objectives were set to be achieved. The first objective was to examine solid waste practices adopted by the households. Therefore, the survey established that solid waste practices were communal dumping, house to house collection, burning, and burying and food remains being used as animal feed being the most common solid waste practices in the Municipality. With the percentage of respondents being 43.8, it can be concluded that majority of the people in New Juaben practice communal dumping whereas very few practice burning of the waste they produce. Quite a significant number of people engage the services of Zoomlion Company Limited who offer house to house collection of the waste produced for free which is paid at the end of every month by households who have contracted them.

The second objective was to identify the types of waste generated by the households. The research revealed that the following were waste most common waste generated. They are:

- organic waste
- plastic waste
- fabrics
- glass
- paper

The average household produce at least two of these components with almost every household producing plastic waste. On the whole, the municipality produces plastic waste the most with plastic bottles and bags, food packs, water sachets dominating. This is evident with one hundred and ten out of the one hundred and thirty respondents representing 84.6% attesting to producing

plastic waste the most. Only a handful of people produce fabrics most which represent less than 2% of the total number of respondents.

Also, the third objective was to examine means to waste disposal households (place of disposal). The study however revealed that the most common place of waste disposal in the municipality was the communal dumping. The inhabitants of the New Juabeng Municipality mostly store their waste in baskets, sacks or buckets as well as bins provided by the Zoomlion Company Ghana Limited to those who have contracted them. However, most of the organic waste produced by the inhabitants of the municipality is used as feed for livestock and poultry.

The study also meant to analyse the frequency of solid waste collection. However, the collection is irregular.

The last objective was to identify the challenges with solid waste management practices. The research revealed that improper disposal of waste and late collection are the challenges the facing then Municipality.

From the research, it was seen that there were challenges in relation to waste management with 25.4% choosing improper disposal of waste, and 16.9% choosing late collection of waste produced. 13.1% chose inadequate waste collection receptacles and 38.5% chose all three being improper disposal of waste, late collection of waste produced and inadequate waste collection receptacles. Majority of the respondents representing 62.3% practice personal hygiene as their contribution towards waste management whilst 16.9% of the respondents do nothing to help in the waste management process. Others also educate others and also advise them on the need for proper disposal of waste. Thus it can be concluded that most of the people put in efforts to help in management of waste in the municipality.

5. Recommendations

Based on the findings of the research, the following recommendations were made;

- The municipality must provide more receptacles at the various dumping sites to match up the quantity of waste produced by the various communities and also help prevent waste from being dumped around the receptacles when they are full.
- The municipality should make sure that the receptacles as and when they become full should be collected and brought back on time by the collection operator.
- Regular education should be given to the inhabitants of the municipality on proper waste management practices and its importance as well as the effects of improper waste disposal in the municipality.
- I also recommend that the municipality also liaises with the Zoomlion Company of Ghana Limited to supply the various households with enough waste bins and also collect them at subsidized rates.
- Dumping sites should be created at locations which are distant from houses to curb the health threats the pose on people living in houses nearer and also engage the services of interested people who would help monitor and keep the sites from been littered.

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APPENDIX

PRESBYTERIAN UNIVERSITY COLLEGE

FACULTY OF DEVELOPMENT STUDIES

Department of Rural and Community Development

*This interview guide is to solicit information on **ASSESSMENT OF SOLID WASTE MANAGEMENT AMONG HOUSEHOLDS**: The information gathered is for academic purpose only and hence will be held **CONFIDENTIAL***

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. Name of Respondent
2. Sex of respondents (a) Male (b) Female
3. Age of respondent
- (a) 10-20 (b) 21-30 (c) 31-40 (d) 41-50 (e) 51 and above
4. Marital status a) Single b) Married c) Divorced d) Separated e) Others
5. Household size a) 2 -4 b) 5 – 10 c) 11 – 15 d) 16 – 20 e) 20 and above
6. Religion of respondent a) Christian b) Islamic c) other specify.....
7. Educational level attained a) Illiterate b) Basic school c) Junior High school/ middle d) Senior High school / vocational e) Tertiary f) Non Formal
8. Occupation of respondent a) farmer b) government worker c) artisan d) others specify.....

SECTION B

9. What is the magnitude of waste produced by the household per day on the average?
(a) Low (b) Moderate (c) Severe
10. In what periods or occasions are waste generated the most?

- (a) During festivities (b) during house cleanings (c) others
(specify).....

11. What type of waste is generated by the households?

- (a) Plastics (b) Organic (c) Paper (d) Glass (e) Cans

12. How do you store the waste produced?

- (a) By segregating the waste (b) not segregating them

13. Why do you think it is necessary for waste segregation?

- (a) for easy collection (b) for easy identification of what can be recycled or re used
(c) For effective management (d) not necessary.

14. Which of the waste management practices do you engage in?

- (a) Communal (b) block collection (c) house to house (d) others (specify)

15. How satisfied are you with the current waste management practices?

- (a) very satisfied (b) fairly satisfied (c) not satisfied

16. Based on your answer to question 13, how often is waste disposed or collected in your house? (a) Every day (b) at least once a week (c) twice a month (d) monthly

17. Based on your answer to question 13, how satisfied are with the collection operator?

- (a) Very satisfied (b) fairly satisfied (c) not satisfied

18. How well is waste managed in the municipality?

- (a) Very well (b) okay (c) poorly (d) very poorly

19. What are some of the challenges the municipality faces with waste management?

- (a) Improper disposal of waste (b) Late collection of waste produced (c) inadequate waste collection receptacles (d) others (specify).....

20. How has the municipality handled the challenges?

- (a) creation of dumping site (b) shared container (c) block collection (d) others (specify)
.....

21. What are some of the effects of improper disposal of waste disposal in the municipality?

(a) Health problems (b) invasion of rodents (c) others (specify).....

22. How often do you have public education on sanitary in the community? a) Once a year

b) Twice a year c) Once in number of yeas d) Never before

23. What has been your contribution towards proper management of waste in the municipality?.....

..

