

**PUBLIC PERCEPTIONS, ATTITUDES AND CHALLENGES TOWARDS SOLID
WASTE MANAGEMENT IN GHANA: THE CASE OF MAMOBI COMMUNITY**

BY

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DECLARATION

I, Afua Bonsu Sarpong-Anane, do hereby declare that except for references to other works which have been duly acknowledged, this work is the result of field work carried out by me under the supervision of Dr. Akosua Darkwah and Dr. Dan-Bright Dzorgbo in the department of sociology. I further declare that as far as I am aware, this work has not been presented in part or in full anywhere for a degree or certificate.

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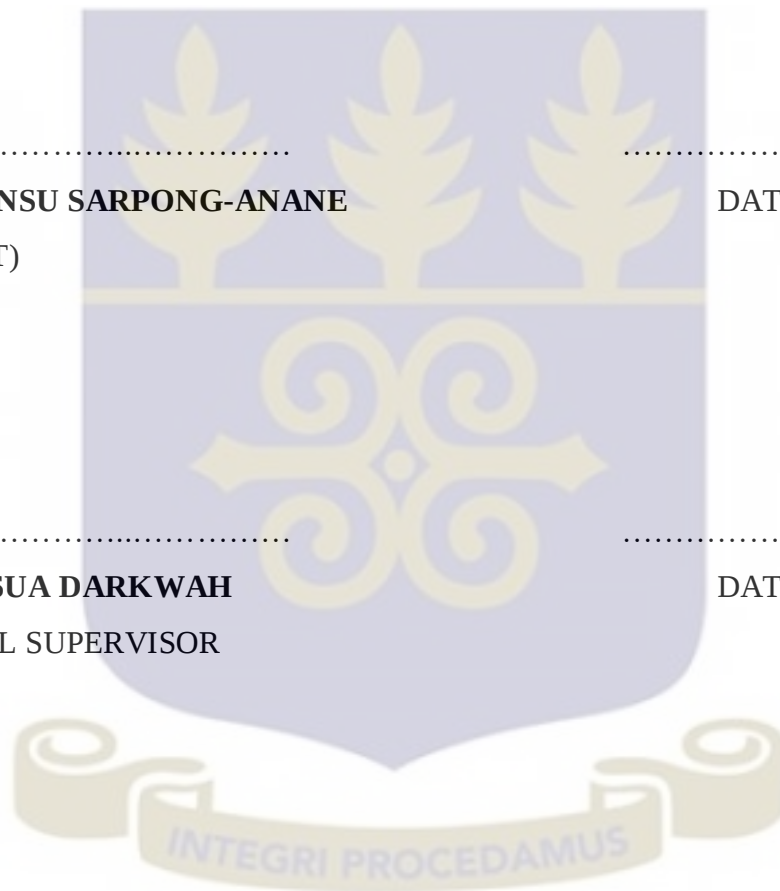
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DEDICATION

This thesis is dedicated to my lovely daughters Mariah and Shaniah Freduah-Agyemang.



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I am very grateful to God Almighty for His Grace to have completed this thesis. I wish to express my profound gratitude to my supervisors, Dr. Akosua Darkwah and Dr. Dan-Bright Ddzorgbo for their invaluable contribution to this work. I really appreciate their time, advice, encouragement and healthy criticisms to ensure that this work comes out refined.

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ABSTRACT

The study examined factors affecting solid waste management in Mamobi community. Specifically, it sought to: (i) identify perceptions and attitudes of people and institutions towards waste management; (ii) ascertain the types of waste management practices the people engaged in; (iii) examine the challenges confronting the people and institutions on waste management in the community; and (iv) recommend policy interventions to address the sanitation situation. The study dwelled on the theory of reasoned action and the theory of planned behaviour as espoused by Martin Fishbein and Icek Ajzen. The theory of reasoned action is a model for the prediction of behavioural intention that covers predictions of attitude and predictions of behaviour and the theory of planned behaviour which is a theory that predicts deliberate behaviour since behaviour can be deliberative and planned. Both qualitative and quantitative approaches were employed. Through a combined survey approach, 200 household heads were purposively selected and interviewed using structured questionnaires. Interviews were organised for the waste management company, waste management department and the two assembly men of the community. Focus group discussion was also organised on a selected number of people and analysis was done using SPSS as well as thematic analysis. The study uncovered that little or no respect is accorded the management of waste as well as waste workers. Again, there is total disregard for the by-laws and regulations. It is also a common attitude and practice to see waste dumped in gutters and gullies near peoples' houses and unoccupied lands. Irresponsible behaviour of the people and lack of appropriate disposal sites are great challenges faced. On the basis of the findings, these recommendations are made; (i) sanctioning waste collection companies who do not perform their duties on time (ii) considering recycling as the best alternative for waste disposal; and (iii) educating to change peoples' attitudes and perceptions as well as vigorously enforcing existing laws and regulations.

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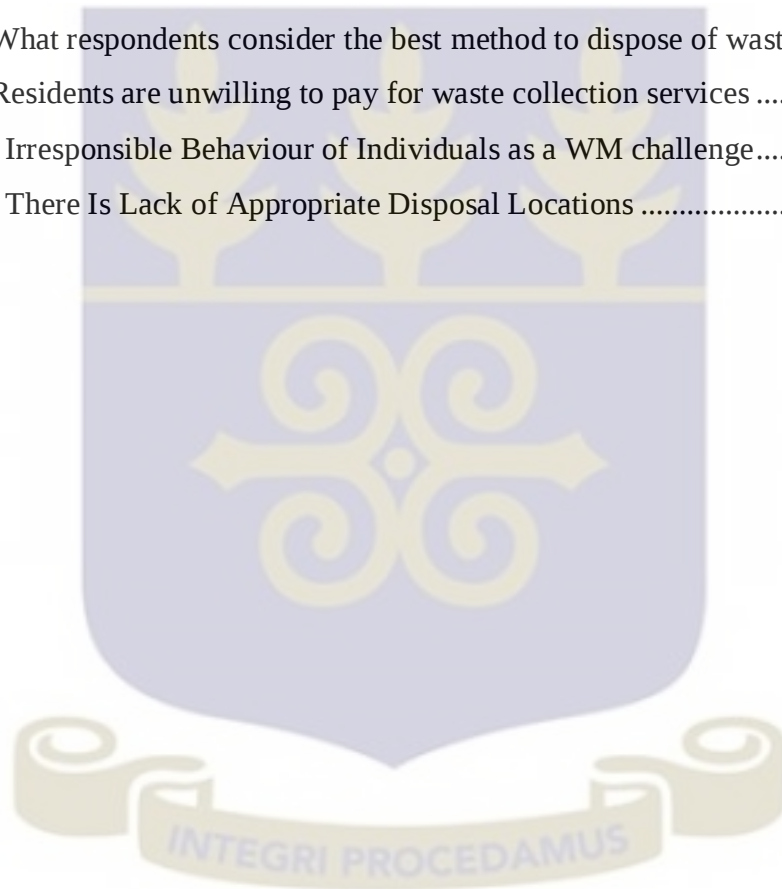
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LIST OF ACRONYMS

AMA	-Accra Metropolitan Assembly
DCO	-District Cleansing Officer
DESSAPs	- District Level Environmental Sanitation
EHSD	-Environmental Health and Sanitation Departments
EPA	-Environmental Protection Agency
ESICOME	-The Expanded Sanitary Inspection and Compliance Enforcement
FGD	-Focus Group Discussion
KMA	-Kumasi Metropolitan Assembly
MESTI	-Ministry of Environment, Science, Technology and Innovation.
MLGRD	-Ministry of Local Government and Rural Development
MMDA	-Metropolitan Municipal and District Assemblies
NESP	-National Environmental Sanitation Policy
NESPoCC	-National Environment Sanitation Policy Co-ordination Council
OECD	-Organisation for Economic Co-operation and Development
SI	-Severity Index
SPSS	-Statistical Package for Social Sciences
SWM	-Solid Waste Management
SWRMR	-Solid Waste Resource Management Regulations
SWS	- Solid Waste Services
UN	-United Nations
WM	-Waste Management
WMD	-Waste Management Departments
WMS	-Waste Management Services

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Due to its perilous impact on health and the environment, waste has, in the past few years drawn serious attention all over the world. Both developed and developing nations see waste management as a problem worth prioritising. This is evident in its place in the Millennium Development Goal Seven which talks about ensuring environmental sustainability. These concerns are also heightened because of the fact that the municipal solid waste is generated typically in large urban areas. Similarly, a study by the World Bank and the Accra Metropolitan Assembly (AMA) showed that solid waste management was viewed by residents as the third-most important urban service, behind sanitation (including toilets) and drainage (World Bank, 2010).

Kim and Gopalan (1997) and Holmes (2000), among many authors, see waste as a recent phenomenon in historical terms. Thus, a problem they classify as an effect of recent development and civilisation (Kim and Gopalan, 1997), a trace of the growth in industrialisation (Holmes, 2000). Yet again, Shafiul and Mansoor (2004) say that the “disposal of waste became problematic with the rise of towns and cities where large numbers of people started to congregate in relatively small areas in pursuit of livelihoods” (p. 468). Kofoworola (2007) further acknowledges that the unwholesome disposal of solid waste is one of the greatest challenges that developing countries are faced with which also led to the United Nations Environment Programme (2004) espouse that problems that arise as a result of waste exist where there are human inhabitants.

Management jurisdictions and institutions have defined waste in different terms. However, one theme that cuts across all attempts at defining the term is the fact that

waste is often unwanted and of no value to the generator therefore informing the need for its disposal. Solid waste as defined by the American Solid Waste Act (1963) is garbage, refuse and other discarded materials including all materials resulting from all kinds of land use. Similarly, the United States Environmental Protection Agency described solid waste as any unwanted or discarded material with insufficient liquid content to be free-flowing.

While industrialised countries generate and dispose between 0.7 – 1.8 kilograms of solid waste per person per day, middle income countries like Ghana generate and dispose between 0.5 - 0.9 kilograms. The above statistics notwithstanding, the industrialised countries have developed well established systems for handling the solid waste whereas the same cannot be said of Ghana and other lower middle income and low income countries. Although Accra's waste generated per day comes nowhere near those of New York and other cities in the developed economies (Kingston, 2000), the capacity to handle this waste poses a great challenge to city authorities for which this is a great problem (Asomani-Boateng, 1999). In the year 2002, when Ghana's population was an estimated 20 million, the country produced a daily per capita waste of approximately 0.45 kilograms and an annual solid waste generation of 33.3 million tons (EPA 2002). Records show that approximately 2,200 metric tonnes of waste are generated daily, but only 1,500 - 1,800 tonnes are properly collected per day in Accra currently by private waste service providers (Oteng-Ababio, 2010a).

As has been stated earlier, although the industrialised societies generate a chunk of the world's waste, they handle, store, collect, transport and finally dispose of their waste effectively with the help of modern technology. In the urban cities of Africa, waste collection and disposal have been cited as sources of serious health and environmental

problems (Asomani-Boateng, 1999). Managing solid waste is very essential owing to its environmental and health implications. Poor waste management can be very detrimental to human beings if they are exposed to such unsavoury conditions. Cholera, typhoid, malaria and other related diseases are consequences of poor waste management and this affects the economic workforce needed for the development of the country. Proper waste management can be expensive in terms of time and resources and so it is necessary to understand what alternatives exist for handling waste in an effective, safe and sustainable manner (El-Haggag, 2007). Additionally, preventive measures such as proper sanitation and adequate waste management are often less costly than curative measures such as medication and building of healthcare facilities.

With the Accra Metropolitan Assembly (AMA) experiencing rising urbanization from a population of 1,658,937 (2000 Population and Housing Census) to 1,665,086 (2010 Population and Housing Census), which represents 42 per cent of the regions total population and the highest with an average household size of 3.7 (2010 Population and Housing Census), the preventive measures are favourable.

Waste management also involves a varied range of stakeholders from the government or top to the street or bottom level. Different stakeholders have different roles in producing a cohesive and efficient solid waste management system that identifies and encourages mutual best results. A number of institutions have been recognized by some researchers as stakeholders interested in proper solid waste management. Those identified include, national and local governments (Shekdar, 2009); municipal authorities, city corporations, non-governmental organizations, households (Sujauddin et al., 2008); private contractors, ministers of health, environment, economy and finance (Geng et al., 2009) as well as recycling companies (Tai et al., 2011). Snel and Ali (1999) however argue that

there are primary stakeholders who are directly affected, either positively or negatively, by the implementation of a project or programme and secondary stakeholders who play some intermediary role and may have an important effect on the project/programme outcome. The external stakeholders are not directly involved, but may nevertheless be affected by a specific project or programme. In addition, results from a study by Guerrero et al. (2013), detected that educational and research institutions, political parties, police, religious leaders and the media are often less mentioned when speaking about stakeholders in waste management. These can all be grouped largely as public sector (government), whose role is to provide a regulatory framework and setup institutions. The private sector (business) who will provide technical innovation, financial share as well as backward and forward linkages. Lastly is the community (citizens) whose role will be to lead environmentally friendly lifestyles and pay for waste management services willingly. These divisions notwithstanding, stakeholders will not always fall into the above or specific categories. Whether a group is classified as primary, secondary or external largely depends on the specific plan objectives.

To be able to manage solid waste adequately extends beyond technological or scientific responses. It involves social, institutional, legal, and financial aspects and entails establishing and handling a large labour force and teaming up with all the stakeholders involved as well as the general public (Leonard, 2005). Problems encountered in managing waste are directly connected with society, its beliefs, and its attitudes. Although socio-cultural reactions to handle the waste are supposedly sound, their practical application has not been as rewarding as globally expected (Strong and Hemphill, 2006). The current practice of collecting, processing and disposing municipal solid wastes is also considered to be least efficient in the developing countries. The typical problems include low collection coverage and irregular collection services, crude

open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and control of informal waste picking or scavenging activities (Bartone, 1995). With the same land surface area of the Greater Accra region being 3,245 square kilometres, the population density in the year 2000 was 895 as compared to the year 2010 which is 1,236 (2010 Population and Housing Census). The amount of waste generated by the populace has also increased tremendously. Solid waste management has consequently become a necessity for keeping the cities clean, healthy and habitable.

1.2 Statement of the Problem

Accra is faced with an enormous challenge when it comes to managing its tons of waste generated. Numerous efforts have been put in by the government, non-governmental organizations and some individuals to help curb the problem but not much has availed from it even with the assistance of some private waste companies. For instance, the late vice president of the Republic of Ghana, Alhaji Aliu Mahama initiated the famous anti-littering campaign. Further, in September 2012 and January 2013 President John Dramani Mahama and the Accra Metropolitan Assembly launched the sanitation task force and the sanitation courts respectively to help curb indiscipline.

As would be appreciated in the waste management literature, although solid waste has received much attention, the information, according to Morrison et al. (2000) and Lutui (2001), has been sporadic and not comprehensive. Many of these studies have had to deal basically with recycling and ways of reducing waste which is often to the neglect of the perceptions, opinions and attitudes that underpin people's behaviour towards waste generation and disposal. For example, according to a news item published on Ghana web on April 1 2011, it was established that Ghana adopts Chinese technology in addressing

waste management. This technology involved recycling which is a technical solution that may probably function better in the Chinese environment as Ghana lacks the capacity to engage in such a solution at the moment.

Again, much of the research done in relation to solid waste management has been concentrated on aspects such as poverty reduction for people working with waste (Baud, 2002); privatization (Obirih-Opareh, 2002) and public health challenges (Van Naerssen, 2001; Benneh et al., 1993). Furthermore, in developing countries, the approach to waste management has mainly focused on getting rid of the trash (Poerbo, 1991; Cointreau, 1982).

In spite of the wide range of studies that document solid waste management in Ghana (Songsore et al., 2009; Post, 1999), not much attention has been given to the human or behavioural factor. That is not to suggest that the behavioural approach to waste management has not been done. The point is that the behavioural perspective has received little attention. The purpose, thus, is to explore a sample of the people's perceptions and attitudes regarding why they have been unable to manage the solid waste they generate.

1.3 Research Questions

- What are people and institutions perceptions and attitudes towards waste management in Mamobi community?
- What type of waste management practices do the people engage in?
- What are the challenges confronting people and institutions on waste management?

- What policy interventions can be used by the Accra Metropolitan Assembly and the people of Mamobi to ensure a clean environment?

1.4 Research Objectives

The main objective of the study is to examine the factors affecting the effective management of solid waste in Mamobi community.

The specific objectives are;

- To identify people and institutions perceptions and attitudes towards waste management in Mamobi community.
- To ascertain the type of waste management practices the people are engaged in.
- To examine the challenges confronting people and institutions on waste management in Mamobi community.
- To recommend policy interventions to address the sanitation situation in Mamobi community.

1.5 Significance of the Study

Mamobi is one of the most densely populated areas of Accra with a population of 61,724, households of 14,477 and 3,349 houses (2010 Population and Housing Census). Accompanying this high population is the problem of waste management. It is believed that no better place could have been found to mirror the problems of waste management in Ghana than Mamobi hence the decision to select it as the case study. This study is expected to help deepen the understanding of waste management in Ghana as well as understand why the problem persists despite efforts to solve it. It is also anticipated to put forward some key recommendations and suggestions that will contribute to the nation's ability to attain the millennium development goal seven which talks about

environmental sustainability. The results will again compliment the on-going efforts of different governments and development agencies to promote good solid waste management practices. The study will also serve as an academic literature for further interrogation and exploration.

1.6 Theoretical Framework

As a civilized nation with reasonably educated people, we constantly litter our environment with solid waste almost engulfing both humans and animals. This section dwells on the theories of reasoned action and planned behaviour by introducing and explaining how they are used in the study.

1.6.1 The Theory of Reasoned Action

Martin Fishbein and Icek Ajzen (1980) developed the theory of reasoned action. It was derived from a previous research that began as the theory of attitude and behaviour. According to (Hale et al., 2002), the theory was “born largely out of frustration with traditional attitude-behaviour research, much of which found weak correlations between attitude measures and performance of volitional behaviours”. The theory of reasoned action is a model for the prediction of behavioural intention, which covers predictions of attitude and predictions of behaviour. This theory proposes that a person’s behavioural intention lies in the person’s attitude about the behaviour and the subjective norm. The theory has three general components which are behavioural intention, attitude and subjective norm.

To the proponents, behavioural intention measures a person’s relative strength of intention to perform behaviour. Attitude comprises beliefs about the consequences of performing the behaviour multiplied by his or her evaluation of these consequences.

Subjective norm is a combination of perceived expectations from relevant individuals or groups along with intentions to comply with these expectations (Fishbein and Ajzen, 1980). Fishbein and Ajzen however make a suggestion that attitudes and norms are not weighted equally in predicting behaviour. For instance, you might not be the kind of person who considers what other people think. If that is the case, the subjective norm would carry little weight in predicting your behaviour (Miller, 2005).

Miller (2005) defines the three components of the theory as follows making use of the example of embarking on a new exercise program for illustrations. According to him, behavioural intention is a function of both attitudes toward behaviour and subjective norms toward that behaviour which has been found to predict actual behaviour. That is, your attitudes about exercise combined with the subjective norm about exercise, each with their own weight will lead you to your intention. He defines attitude as the sum of beliefs about a particular behaviour weighted by evaluations of these belief. For instance, an individual might have the belief that exercise is good for his/her health and looks but it takes too much time and is uncomfortable. These beliefs can be weighted if one's health issues are important than time and comfort. Finally, subjective norm according to Miller (2005) looks at the influence of people in one's social environment on his or her behavioural intentions. For example, if your friends are ardent exercisers but your spouse is against it, the beliefs of these people weighted by the importance you attribute to each of their opinions will influence your behavioural intention to exercise or not.

Simply, this theory seeks to establish that a person's attitude toward behaviour consists of a belief that a particular behaviour leads to a certain outcome and an evaluation of the outcome of that behaviour. If the outcome is beneficial to the person, he or she may actually participate in that particular behaviour. Also included in the person's attitude

towards the particular behaviour is the concept of subjective norm which is a person's perception of what others around them believe that the individual should do. People may also be inclined to participate or not in behaviour based upon their desire to comply with others. Laws or rules that prohibit a particular behaviour may have an impact on one's attitude toward participating in a particular behaviour.

Consequently, the theory of reasoned action interprets social behaviour at the level of individual decision making. The study using the theory above will enable us understand if a person's attitude and perception towards solid waste is based on the benefits he or she will gain, what the people they look up to engage in and approve of them to do or that it is established rules that shapes their perceptions and attitudes.

1.6.2 The Theory of Planned Behaviour

The theory of planned behaviour was proposed by Icek Ajzen in 1985 through his article "from intentions to actions: a theory of planned behaviour". This theory is an extension of the theory of reasoned action because it has inculcated within it the concept of perceived behavioural control. Icek Ajzen realised that the theory of reasoned action was particularly valuable when one was describing people's behaviour which were totally volitional. In the absence of practical constraints, an individual has total control to the adoption of a given behaviour. On the other hand, if the adoption of a particular behaviour requires resources or skills that are currently lacking, the individual has complete lack of control. The theory posits that performance of behaviour is a joint function of intentions and perceived behavioural control.

The theory of planned behaviour proposes three determinants of intention. The first is the attitude toward the behaviour and refers to the extent to which a person has a favourable

or unfavourable evaluation of the behaviour in question. The second determinant is the subjective norm which refers to perceived social pressure to perform or not to perform a particular behaviour. The third is the perceived behavioural control which is defined as “the person’s belief as to how easy or difficult the performance of the behaviour is likely to be (Ajzen and Madden, 1986). The theory of planned behaviour is a theory that predicts deliberate behaviour since behaviour can be deliberative and planned. Below is a diagrammatic presentation of the theory.

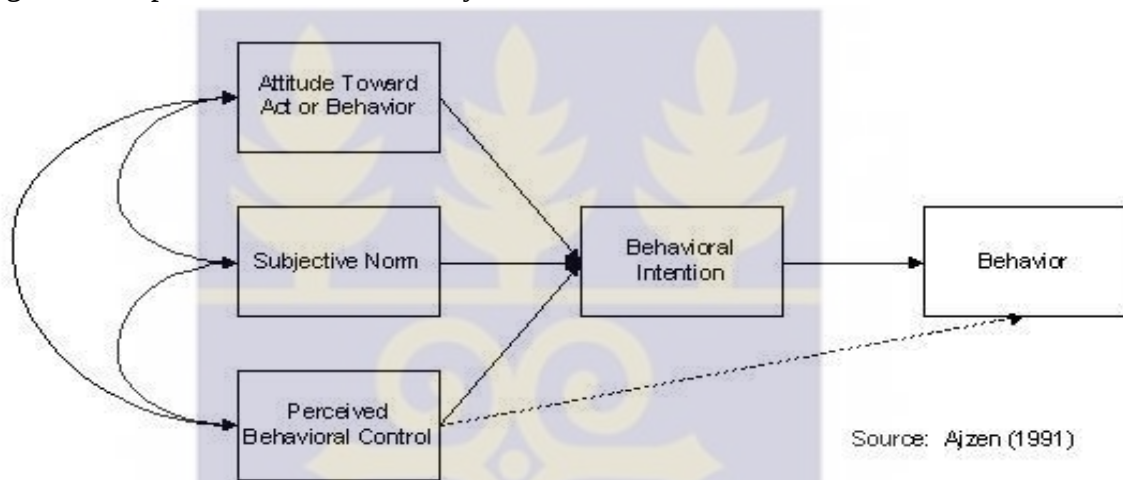


Figure 1.1 Theory of planned behaviour

This theory therefore is suitable to predict a person’s intent to participate in a particular behaviour in relation to solid waste management in the sense that it will enable us establish if the individual needs resources or skills in order to manage his or her solid waste or not or it is just an attitudinal problem. Again, as a framework in understanding, explaining and predicting behaviour, these theories are also useful as a guide for instituting policies to maintain or alter a particular behaviour.

1.7 Definition of Concepts

HOUSEHOLD: a person or a group of persons, who live together in the same house or compound and shared the same house-keeping arrangements. In general, a household consisted of a man, his wife, children and some other relatives or a house help who may

be living with them. However, it is important to remember that members of a household are not necessarily related (by blood or marriage) because non-relatives (e.g. house helps) may form part of a household.

HOUSEHOLD HEAD: a male or female member of the household recognised as such by the other household members. The head of household is generally the person who has economic and social responsibility for the household. All relationships are defined with reference to the head.

ATTITUDE: for the purpose of this study it is defined as the extent to which people are aware of, care about and view solid waste management in their areas.

PERCEPTION: a way of seeing, understanding or interpreting something.

1.8 Chapter Organization

This work is organized into five chapters. Chapter one comprises the background of the study, problem statement as well as its significance, the objectives and research questions, theoretical framework within which the findings are discussed, definition of concepts and organization of the work. The chapter two covers the review of literature on the subject of solid waste management pointing out relevant arguments and gaps if any. Chapter three contain the research methods used for the study. Chapter four presents the findings and discussion of the processed data collected from the field. Chapter five summarizes the key findings for the study. It also presents the recommendations and the general conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Incompetent management of waste in Ghana and specifically in Accra have brought about quite a number of implications which affect the environment and public health. The management of solid waste which is acceptable environmentally has however become a global challenge due to the issues of rapid urbanization, limited resources and increase in population among others. This chapter seeks to review literature on solid waste management by examining key concepts of waste, approaches to measuring attitudes and perceptions, waste management as practiced in some selected countries, attitudes and perceptions towards waste management options, challenges of solid waste management among others.

2.1 Concepts and Definitions

i. Municipal Solid Waste

This is more commonly known as trash or garbage which consists of everyday items we use and then thrown away such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances and batteries excluding materials that may also be disposed in landfills but are not generally considered municipal solid waste such as construction and demolition materials, municipal waste water treatment sludge and non-hazardous industrial wastes (U.S. Environmental Protection Agency). In similar fashion, Tchobanoglous and Kreith (2002) define municipal solid waste as the waste that is produced from residential and industrial (non-process wastes), commercial and institutional sources with the exception of hazardous and universal wastes, construction and demolition wastes and liquid wastes (water, waste water, industrial processes).

Cointreau (1982) also contends that municipal solid waste is non-air and sewage emissions created within and disposed of by a municipality including household garbage, commercial refuse, construction and demolition debris, dead animals and abandoned vehicles. In Nova Scotia, municipal solid waste is defined through the Solid Waste Resource Management Regulations - SWRMR (1996) which states that municipal solid waste ‘includes garbage, refuse, sludge, rubbish, tailings, debris, litter and other discarded materials resulting from residential, commercial, institutional and industrial activities which are commonly accepted at a municipal solid waste facility but excludes waste from industrial activities regulated by an approval issued under the Nova Scotia Environment Act’ (SWRMR, 1996). These explanations of municipal solid waste basically have a theme running through all the definitions which is something unwanted and therefore discarded.

ii. Solid Waste

The United States environmental protection agency described solid waste as any unwanted or discarded material with insufficient liquid content to be free flowing. Miller (1994) further defines solid waste as any unwanted and discarded material that is not liquid or gas. According to Mantell (1975), solid wastes are those materials that result from man’s activities and are not in the form of liquid or gas but are compacted and substantial which are thrown away for the fact that they are no longer in use, these materials are both in organic and inorganic form as well as differ in shapes, sizes, forms and compositions. To the Ghana Innovation Market Place (2009), solid waste is neither wastewater discharges nor atmospheric emissions, arising from domestic, commercial, industrial and institutional activities in an urban area. Solid waste is any material that arises from human and animal activities that are normally discarded as useless or unwanted (Tchobanoglous et al., 1993). Zerbock (2003) said solid waste includes non-

hazardous industrial, commercial and domestic waste comprising household organic trash, street sweepings, and institutional garbage as well as construction wastes. All the definitions above establish that solid waste has been used and has been discarded after serving its purpose. However, there is no singular and acceptable definition of solid waste.

iii. Solid Waste Management

Tchobanoglous et al. (1993) explain solid waste management as that discipline associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations and that is also responsive to public attitudes. With this in view, it can be said that solid waste management includes generation, reduction, reuse, recycling, handling, collection, transfer and transport and finally disposal. Solid waste management is concerned with how actors get organized for the collection, transportation and disposal, reuse, recycling, and composting of solid waste materials (Obirih-Opareh, 2002).

To OECD (2001), solid waste management refers to the supervised handling of waste material from generation at the source through the recovery processes to disposal. Tchobanoglous et al. (1993) make us understand that for solid waste management to be accomplished in an efficient and orderly manner, fundamental aspects and relationships involved must be identified and understood clearly. Othman (2002) also refers to solid waste management as the control of waste generation, storage, collection, transfer and transport, processing and disposal of solid waste consistent with the best practices of public health, economics, finance, engineering, administrative, legal and environmental

considerations. According to Skinner (1995), solid waste management in its broad sense means integrated systems for waste generation, gathering, storage, collection, transportation, recycling, energy recovery, treatment and disposal. Solid waste management is recognized as a major feature of the indigenous community organization and traditional home management; hence every house has a designed area for solid waste collection (Sanda, 2008). It can be said that these writers are in sync with the definitions of solid waste management and agree that waste management is necessary and must be performed in a particular way that adheres to best practices and principles.

2.1.1 Classification of Waste

Every day, large quantities of waste are produced throughout the world. In order to treat this waste, it must be classified so that it can be directed toward the appropriate treatment facility. Gupta et al. (1998), argue that the composition of waste depends on diverse factors such as food habits, cultural traditions, lifestyles, climate and income, among others. The variations are due to factors found across different countries as well as across different regions within one country. However, the variations within region are not as marked as those across different countries. Variation also occurs within a region over the years as a consequence of economic and social changes. The department of Environment, Climate Change and Water of New South Wales tout that waste is classified by its source and by its components. They have six groups of waste which include special waste, liquid waste, hazardous waste, restricted solid waste, general solid waste (putrescible) and general solid waste (non-putrescible).

Special waste is a class of waste that has unique regulatory requirements. They include clinical related waste, asbestos waste and waste tyres. Liquid waste is any waste that has an angle of repose of less than 5 degrees above horizontal or becomes free-flowing at or

below 60 degrees Celsius when it is transported, or is generally not capable of being picked up by a spade or shovel. Hazardous waste includes coal tar pitch waste, lead–acid, lead paint among others while restricted solid waste contains asbestos. General solid (non-putrescible) are those that do not readily decay under standard conditions, does not emit offensive odours and does not attract vermin or other vectors (such as flies, birds and rodents) and general solid (putrescible) are those that contain organic matter capable of being decomposed by microorganisms and of such a character and proportion as to cause obnoxious odours and to be capable of attracting or providing food for birds or animals (NSW-EPA, 2014).

The European Union classifies its waste not only based on the type of waste but also its origin, how it was collected and which authority is in charge of it. Classifying waste depends on what kind of waste it is and its impact on humans or the environment. The European Union has the hazardous waste that is waste which contains varying quantities of toxic or hazardous elements that may have an impact on human health and the environment. It may be organic (solvents, hydrocarbons, etc.), mineral (acids, metal hydroxide sludge, etc.) or gaseous. To them, hazardous waste can further be classified into three subcategories to include special industrial waste, special household waste and medical waste. Hazardous wastes are typically classified by product type. As such, they typically require special disposal techniques to eliminate or reduce the hazards they pose (Meakin, 1992).

Additionally, there is the non-hazardous waste. Some of this waste is recyclable and can include wood, household packaging, ferrous metals, plastics, glass, and paper while others are compostable or biodegradable such as bio waste, green waste among others. Inert waste is also mentioned by the European Union to be waste that does not

decompose, does not burn and produces no other physical or chemical reaction with the environment. It is not biodegradable and poses no danger to humans or the environment for instance backfill or rubble. Inert waste is derived from extractive industries and the building and public works sector. Mineral materials comprising stone, marble, sandstone, slate as well as concrete, bricks, glass, and even soil are included.

With all these differences in classifications, it is important for countries to note that the designation of materials into specific categories can differ by region and therefore organizations in charge must ensure that waste is separated according to local area by-laws.



2.1.2 Sources and Types of Solid Waste

Tchobanoglous et al (1993), classified types of solid waste in relation to the sources and generation facilities.

Table 2.1: Sources and Types of Solid Waste

Source	Typical waste generators	Types of solid waste
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g. bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes.
Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants	Food wastes, ashes, rubbish demolition and construction wastes, occasionally hazardous wastes.
Commercial/ Municipal	Stores, restaurants, markets, auto repair shops and medical facilities and institutions.	Food wastes, ashes, rubbish demolition and construction wastes, special wastes occasionally hazardous wastes.
Open areas	Streets, alleys, recreational areas, parks, vacant plots, playgrounds and beaches.	Special wastes, rubbish.
Treatment plant sites	Water, waste water and industrial treatment processes.	Treatment plant wastes principally composed of residual sludge.
Agricultural	Field and row crops, orchards, vineyards and farms.	Spoiled food wastes, rubbish, hazardous wastes.

Source: Tchobanoglous et al. 1993 p. 52-53.

2.2 Overview of Solid Waste Management Practices in some Selected Countries.

Solid waste management is one of the tasks generally performed by local governments in a number of developing countries (Van Dijk, 2006). When this duty is properly carried out, it is often taken as an indicator of the success of urban reform (Van Dijk and Oduro-Kwarteng, 2007). According to Sujauddin et al. (2008), solid waste generation is regularly associated to the size of family, their level of education and the monthly income. This in turn affects the management of solid waste. South Korea, Malaysia, Nigeria and Ghana are being reviewed to understand their mode of solid waste management since the World Bank 2012 categorises them under high middle income, upper middle income, lower middle income and lower income countries respectively.

Malaysia which is classified as an upper middle income country by the World Bank (2012) had its waste-generation rates increase averaging 1.2 kg per capita per day. The Malaysian government also spent almost 80% of its budget per year on urban solid waste services and management. To the World Bank, solid waste management is one of the major problems faced by Malaysian municipalities (World Bank, 1999). They are faced with a number of implementation problems such as low collection coverage on average owing to the inaccessibility by vehicles of some areas. Again, irregular collection services, inadequate equipment used for waste collection, crude open dumping and burning without air and water pollution control, institutional deficiencies, inadequate legal provisions and resource constraints affects Malaysia's solid waste management with institutional deficiencies acknowledged as a major problem in solid waste management. Generally, the local communities generate 16,000 tons of domestic waste per day with the amounts per capita varying from 0.45kg to 1.44 kg per day depending on the economic status of the areas concerned (GAIA Global Meeting, 2003). The Malaysian government launched a recycling campaign in December 2000 which set the

long term target of recycling 22 % of the waste generated by 2020 (Malaysia Country Report 2001). The Malaysian government made it a national policy that all clinical waste must be incinerated (GAIA Global Meeting, 2003). Currently, 5 % of their waste is being recycled, though the government aims to have 22% of the waste recycled by 2020 (Malaysia Environment-Current issues-Geography, 2010). The Malaysian government, as well as its consumers, have a sense of environmental awareness. The government has adopted a National Strategic Plan for Solid Waste Management with emphasis on the upgrading of unsanitary landfills as well as the construction of new sanitary landfills and transfer stations with integrated material recovery facilities. A new Solid Waste Management Bill was adopted by their parliament in June 2007. The bill is to significantly change the structure of solid waste management in Malaysia and to open up for the development of a completely new business sector.

South Korea is classified under the high middle income countries (World Bank, 2012). South Korea has historically had its municipal solid waste generated disposed of at open landfill sites (Korean Waste Movement Network 2001). Nonetheless, during the past ten years there has been recognition of the issues associated with environmental protection and as a result, poorly located and operated disposal facilities are being closed and replaced by modern regional disposal facilities (Korean Waste Movement Network 2001). Municipal solid waste is gradually viewed as a potential resource with a strong trend toward implementation of recycling, composting, and combustion technologies. In South Korea, waste is managed through a dual system where local governments are responsible for the final disposal of municipal waste and dischargers are responsible for the final disposal of industrial waste (Korean Waste Movement Network 2001).

Municipal solid waste is managed using a Volume-Based Waste Collection System and the Extended Producer Responsibility System (GAIA Global Meeting, 2003). To

encourage South Korean citizens to reduce waste by requiring them to pay fees in proportion to the amount of waste discharged, the volume based waste collection system was introduced in 1995 (Korean Waste Movement Network 2001). Through the volume-based waste collection system, households or dischargers have to buy a designated plastic bag for waste collection. The five recyclable products which are electronic devices, fluorescent lamps, lubricating oil, tires and packaging material are separated and collected for free with the collection of all other waste charged according to volume (GAIA Global Meeting, 2003). The waste packed in the authorized bags are collected and sent to incinerators or other disposal areas by municipal vehicles. Recyclable products are sent to recycling companies. Under this system, waste packed in bags other than the designated bags are not collected (Korean Waste Movement Network 2001). In South Korea, recycling is a preferable method for waste disposal due to its efficiency in waste reduction.

Nigeria as a country is placed in the lower middle income bracket (World Bank, 2012). There are two major approaches to waste management in Nigeria (Uwadiogwu and Chukwu, 2013). They are private and public arrangements. With the private arrangements, an agreement is reached between the waste generators and an individual or group of persons who undertake waste disposal as a business venture. According to them, this system is common among the high and medium income households who can afford the charge. On the other hand, the public system is more conventional where the government establishes a waste disposal agency whose responsibility is to collect waste from waste generators and dispose them at a waste disposal site. Some cities adopt the combination of the two systems especially when the public system is unable to cope with the volume of waste generation; the private system is adopted to compliment the efforts of the public arrangement. The hybrid system has many attributes which support its

adoption. While the public system is under the control of government, the private system because of its profitability nature attempts to offer satisfactory service so as to get more customers and enlarge its area of operation. However, it not uncommon to see informal waste collectors using local vehicles (push carts) for collection services from door to door in some parts of Nigerian cities. The informal recycling sector is very active in waste management system in Nigeria (Tobore, 2012). They are either roving waste buyers or scavengers with their eyes set on valuable materials such as plastics, paper, used electrical equipment, glass and metal among others. A draft policy on Municipal and Agricultural Wastes was reviewed in August, 2012 and a comprehensive legislation is expected and possibly a plan that will tackle the issue of waste management in the country (Tobore, 2012).

Ghana is in the lower income bracket according to the World Bank (2012). According to EPA, when Ghana's population was an estimated 20 million in the year 2002, the country produced a daily per capita waste of approximately 0.45kg and an annual solid waste generation of 33.3 million tons (EPA2002). To Tsiboe and Marbel (2004), there are basically three methods of household waste collection in Accra. The first is waste management department (WMD) curb side collection by trucks directly outside each house. To them, this collection method was provided weekly in the high-income residential areas by compactor trucks. The next is waste collected from communal containers to which people must bring their own waste. These were limited to low-income. The third is the door-to-door collection services in middle-income areas. However, in some middle and low income areas as well as some rural areas, waste is dumped indiscriminately in the open and some disposed of in open pits whereas others are burned. Again, according to Anomanyo (2004), solid waste collection in Accra was carried out both on franchise and contract basis. On the franchise basis, a house-to-house

collection was performed in high income areas and the contractors charged the households some fees with weekly collection frequency. Here, the areas are well-planned with access roads. Each household had plastic containers with covers. The wastes are then sent by the contractors to AMA dump sites for disposal where tipping fees are paid. On contract basis, waste contractors are paid by AMA to perform both block and communal container collection. Block collection is done in middle-income residential areas and central communal skip collection done in low income high population density where houses are not well planned with poor or even no access roads. Market places were also covered under this arrangement. Waste generators here did not pay user charges. Pay-as-you dump initiatives have been tried to afford more proceeds for improved service delivery but these policies have been unsuccessful as residents have avoided the central collection containers (CCC) in favour of illegal dumping spots including ditches and drains (Boadi and Kuitunen, 2005). Waste in Ghana is not dumped in properly engineered dumpsite. In Accra, wastes were dumped at a site at Mallam which was, however, stopped in late 2001 as the dump exceeded its capacity. It then shifted to Djanman which lasted three months as it was filled to capacity. Another site at Oblogo in the McCarthy Hills was identified. The site had no engineered control of leachate. AMA managed to compact the waste to guarantee some level of proper dumping hence the site was seen as a place where dumping was controlled rather than a properly engineered landfill (Anomanyo, 2004). On the other hand, according to KMA, a well-engineered sanitary site was used at Dompase where waste was placed, compacted and covered at the site (KMA, 2006). A weighbridge is also available, attached to a control room where the waste is weighed and inspected before being accepted into the landfill. A maintenance bay and offices are also at the site. Heavy-duty equipment are also available for spreading of waste, compaction and covering. Grading and gravelling of access roads are other vital activities at the landfill site (KMA, 2006).

Overall, even though several agencies are involved in waste management, they often have no clear functions in relation to waste management and there is no single agency designated to coordinate their projects and activities. The lack of coordination among the appropriate agencies often results in duplication of efforts in the management of waste, misuse of resources and unsustainability of overall waste management programmes (Jahi, 2002). Thus, SWM is not only a technical problem but it is also strongly influenced by political, legal, socio-cultural, environmental and economic factors. Moreover, these factors have interrelationships that are usually complex in the waste management system. What these dynamics of waste production and management demonstrate is that there are disparities between higher-income and lower-income countries in the volume of waste generation and management strategies.

2.3 Solid Waste Management and Environmental Health

Solid waste has turned into a key public health and environmental problem in many developing countries as a result of the rapid urbanization which has heightened political awareness (Henry, Yongsheng and Jun, 2006). Human activities produce waste and it is the methods by which these waste are handled, stored, collected and disposed of which can pose dangers to the environment and public health (Zurbrugg, 2003). Less than half of the solid waste generated in urban Africa is collected with about 95 per cent of that being neither contained nor recycled (Policy brief, Africa Institute of South Africa, 2012). The wastes are dumped indiscriminately on temporary sites, in gutters and virtually on any available space. These inefficient methods of solid waste disposal have grave health and environmental implications which spread beyond their places of origin polluting nearby water bodies and serving as grounds for breeding insects which in turn causes various diseases.

Health impacts basically include being exposed to deadly chemicals through the air, water and soil; contacting infections and other biological contaminants; being stressed due to exposure to odour, noise and insects; risk of fire outbreaks, explosions, spills, accidents and transport emissions (Dolk, 2002). Furthermore, a lot of the microorganisms found in compost are respiratory sensitizers that can lead to a range of respiratory symptoms including allergic rhinitis, asthma, and chronic bronchitis (Swan et al., 2003). Studies conducted by UN-Habitat indicate that in places where waste is not frequently collected, the incidence of diarrhoea is twice as high and acute respiratory infections six times higher than in areas where collection is frequent (UN-Habitat, 2009). Recycling also poses health and environmental risks. During sorting, workers are often exposed to high concentrations of dust, bio aerosols and metals which commonly cause them to experience itching eyes, sore throats and respiratory diseases (Gladding, 2002). Among the low-income economies, this situation is worse as there is abundant release of gaseous toxic substances into the environment which jeopardizes the health of scavengers as a result of burning. Through contacts with smokes from burning of solid wastes and gaseous discharge from dumpsites, quite a lot of diseases have been documented especially in Nigeria (Oyelola et al., 2009).

According to Benneh et al. (1993) about 42% of the households in the Accra metropolis leave their waste uncovered and these do not meet sanitary standards. Due to high content of the organic substance and moisture level with high temperature, the waste decays very fast and this attracts vermin and other creatures which pose health and environmental issues. In many slums, the communal waste containers are not emptied and replaced in time which causes the containers to be filled in excess with surplus waste dumped on the ground. This is outright detrimental to the environment.

Again, neglected or old landfill sites are of great worry due to their threat to human health and pollution of underground water through leaching. When wastes are exposed to the prevalent high temperatures and rains, there is a high possibility for the spread of infections through run offs during rains and contamination of underground water. As espoused in a Government of Ghana report (2003), problems of leachate happened at the abandoned waste dumping site at Mallam a suburb in Accra. The leachate was seen spurting out from the base of the waste dump after a heavy downpour which entered into the compounds of residents. These leachates often contain pathogens which are risky to human health and a source of pollution to ground and surface waters. EPA conducted a study where they discovered that parasites called “ascaris eggs”, which need more oxygen for their growth, are in various water bodies in Accra (EPA, 2001). Proximity of the current landfill site to the Densu River at Weija, a suburb of Accra which is a main source of drinking water in Accra metropolis, is of great concern. The stagnant waters in the clogged drains and gutters become breeding grounds for mosquitoes, which transmit diseases such as malaria (EPA, 2002). However, a study carried out by Al-Yaquot et al. (2002) surveyed the public perception on the landfilling and its public health impact in Kuwait. The study revealed that less than fifty percent of the respondents had any knowledge of the public health impact of the landfilling with the visual appearance of the landfill scoring the lowest in importance.

The practice of occasionally feeding organic waste to livestock nonetheless leads to the reduction of the amount of household waste that needs to be disposed of and also reduces indiscriminate dumping in the city. However, human beings are easily contaminated through transmission from the animals. When solid waste infected with human excreta is ingested by the animals, they can become a source for later infection of humans (Cointreau-Levine, 2000). Improper waste disposal also produces greenhouse

gases which contribute to climate change. (U.S. Environmental Protection Agency 2002). Gases released from compost piles which are improperly maintained affect the environment negatively. These effects result due to improperly aerated piles of waste. During the process of decomposition, carbon dioxide, methane, volatile organic compounds, bacteria and fungi among others are released into the environment. Sonkoh et al. conducted a study on the environmental and health impact of solid waste disposal on human settlement in Granville Brook dumpsite in Freetown, Sierra Leone. Questionnaires were used to collect data from 631 households with 398 households closer to the dumpsite and 233 being far away. Results indicated that residents suffered from malaria, diarrhoea, chest pains and cholera among others due to the location of the dumpsite. The chest pains were as a result of the burning of the waste during the dry season. During the raining season, offensive and disease-carrying odours as well as ground water pollution were also eminent (Sonkoh et al., 2013).

2.4 Approaches to Measuring Attitudes and Perceptions

Quite a number of approaches have been employed to the measuring of attitudes and perception in waste management studies.

Research by Litui (2001) to study the waste management practices, perceptions and attitudes in Tonga located in the South Pacific in the region of western Polynesia used the quantitative approach. To Litui, even though attitudes and perceptions could be ascertained from being an observer and listening to what people had to say which apparently leaned towards the qualitative approach, the results could not be substantiated and also raised ethical issues. Litui therefore used anonymous questionnaire survey and the Likert scale method of attitude measurement as well as check list ranking types of questions employed to enable respondents rank their preferences. A random sample of

220 households was selected from 3 villages in this study with just about 172 questionnaires being responded to. The stratified sampling method was used based on gender and age in a bid to be representative of males and females as well as the different age groups. The survey responses were then coded and entered by using Microsoft Access which was then imported into Stat View for analysis. Here, results showed that waste management practices, perceptions and attitudes seemed not to be influenced by any of gender, age, household size, educational level, occupation, income and place of residence.

Another study performed by Kumar and Nandini (2013), in Bangalore city, India sought to find information on solid waste management practices and public perception on solid waste. A sample size of 400 households among the community was selected randomly with the respondents divided into three socio-economic strata namely high, middle and low-income groups constructed out of the state's socio-economic status index. The study employed direct questionnaire administration and personal interviews of the members in a focus group in order to obtain information on respondent's opinion on attitude and perception on household waste handling and management services. Results showed that about 82.5% of the households preferred to segregate waste into different bins if the bins are provided by Government/ Non-Governmental Organisations.

Desa et al. (2011) conducted a study to assess the knowledge, attitudes, awareness status and behaviour concerning solid waste management among students at the Kebangsaan University in Malaysia. The questionnaire used was self-administered with 589 first year students accessed from eight faculties. Binary scale which is a uniform scale of notation whose ratio is two was used with data analysed using the Statistical Package for Social Science (SPSS) software. Here, attitude was measured by considering the mean score.

The outcome was that, the students' knowledge, attitudes, awareness status, behaviour and practice concerning solid waste management was moderate. Quite a number of students had knowledge concerning solid waste management but it was not consistent with their attitudes towards solid waste management.

Longe et al. (2009) performed a survey to seek information on existing household solid waste management practices and public perceptions on the effectiveness of the current system by which waste is collected in Ojo local government area in Nigeria. A sample size of 60 respondents was chosen using random sample of multi-persons households in single family dwelling. The data were collected from eleven selected residential areas which were divided into three socio-economic strata namely high, middle and low-income groups based on the state's socio-economic status index. Direct questionnaire administration, personal interviews as well as focus group discussion were used to obtain data. Likert scale was used to measure attitude and all data collected were analysed using statistical tools for simple percentages, frequency analysis and severity index calculations. According to Longe et al. the answers to the questions were displayed on a 0 to 4 point Likert scale with the severity index (SI) calculated using the equation after Al-Hammed and Assaff (1996). Results established waste management behaviour among the respondents on solid waste management systems, patronage of services and cost recovery methods.

A study on public concerns and behaviours towards solid waste management in Italy was conducted by Sessa et al. (2009). Here, anonymous questionnaires were self-administered to investigate knowledge, perceptions of the risks to health associated with solid waste management and practices about waste management. Cross-sectional study was conducted on a random sample of 1181 parents of students from five public schools

which were randomly selected in the geographic area of Caserta and Naples, Italy. A sealed envelope containing a letter, an informed consent form, a questionnaire and a self-addressed envelope was given to each randomly selected to be delivered to their parents. A Likert scale from 1 to 10 with the higher scores representing high perception was used to measure. A total of 777 questionnaires were returned. Results indicated that respondents with a higher perceived risk of developing cancer due to solid waste burning were females, younger and with an educational level lower than university.

2.5 Attitudes and Perceptions towards Waste Management Options

In the world today, a number of waste management options exist to help curb the growing menace. They include recycling, re-use, reduce, composting, incineration, landfilling amongst many others. However, there are varying reactions concerning the usage of any of these methods.

Concerning landfilling, negative reactions are evident even without detailed knowledge because of the idea that things are going to be buried in the ground with stuffs popping up the earth surface especially plastic bags. Nonetheless, evidence abounds from the work of Pokhrel and Virarghavan (2005) that, local people in Nepal prevented trucks carrying solid waste from entering landfill sites to dispose of the waste due to the fact that it affected public life and tourism in the area. The landfill site was however closed for almost 2 years but was reopened and operated for a period of 3 years. The government then developed a sanitary landfill site about 26 kilometres away from the previous which is expected to operate for the next 50 years (Mishra and Kayastha, 1998). Mostly, people prevent landfills from being sighted close to them because of the stench and the environmental problems associated with it. This situation in Nepal can be elaborated further with the study performed by Oteng-Ababio in Kwabenya where he

explained that residents prevented the construction of a landfill in the area. The residents went to the extent of even embarking on strings of demonstrations at the World Bank Offices in Accra whilst ill-treating officials who went to the site (Oteng-Ababio, 2011). This supports what was stated by Zeiss (1991) that residents tend to show more negative attitudes to unfamiliar facilities of which they have no experience compared with similar facilities that already exist. Generally, peoples' attitude and perception towards landfilling is bad.

Kumar and Nandini (2013) performed a study in Bangalore in India to find out the community's attitude and willingness to solid waste management. A total of 400 households among the community were selected randomly. A focus group discussion, structured interviews and questionnaires were used to collect data. Results obtained showed that, 97.8% of households preferred daily collection of solid waste and 82.5% of the households desired to separate out the waste into different bins if the bins were provided by Government /Non- Government Organizations. A number of the households about 71% were willing to use recyclable products. However, when asked about the recycling of the waste only 5.5% of the households were motivated and involved in recycling whereas remaining 94.5% of the households were not recycling their waste because they were not aware and did not have time. 85.5% of households had no information on waste management and so disposed their waste as it is into the nearby open spaces. Furthermore, Huhtala (1997) studied optimal recycling rates for municipal solid waste using a model that included recycling costs and consumer preferences. Here, results suggested that a recycling rate of 50% was achievable, economically justified and environmentally preferable. Marans and Lee in their study, "Linking recycling behaviour to waste management planning: A case study of office workers in Taiwan" sampled 1788 workers from 32 offices. Using self-administered questionnaires, they sought to explore

what determined recycling behaviour among office workers in Taipei, the capital of Taiwan. The study realized that employees in organizations with recycling programs were more active than those without and also private sector workers were more active in recycling than those in the public sector.

Incineration is not viewed as a complete method of disposal but its main advantage is that, it produces a residue that is substantially reduced in volume and may be relatively inert (Suess, 1985). Incineration is, however, expensive and supplementary fuel may be required if the moisture content of the waste is high and its combustible content low. Lima (2006) in a study on predictions of attitudes towards the construction of a waste incinerator in a two case study found varying responses. Random samples of 450 and 300 from Lisbon and Oporto respectively were interviewed using structured questionnaires. The incinerator was to be sited in a suburban area in Lisbon with high literacy levels and that in Oporto to be sited in a rural suburban town with older, less educated residents. Results indicated that residents in Lisbon rejected the incinerator more strongly than in Oporto. According to the study, this was because residents in Lisbon had lower levels of acceptability which was sustained by enhanced risk perception and a sense of unfairness process of the distribution of the project whereas in Oporto, residents had high levels of acceptability sustained by a sense of fairness of the process, trust in politicians and technicians and positive expectancy towards the project. As mentioned by Terry, Hogg and McKimmie, people in different groups may hold different attitudes and actually this may come about due to a process of accentuation of intergroup differences (Terry et al., 2000).

2.6 Legal and Regulatory Framework for Waste Management

Sustainable waste management is the ultimate goal of any piece of waste legislation produced today. To the Ministry of Local Government and Rural Development (MLGRD 2004), general waste management in Ghana is their responsibility, which is to supervise the decentralized Metropolitan, Municipal and District Assemblies (MMDAs). The ministry however indicates that, regulatory authority is entrusted in the Environmental Protection Agency (EPA) under the auspices of the Ministry of Environment, Science, Technology and Innovation. The Metropolitan, Municipal and District Assemblies are responsible for the collection and final disposal of solid waste through their Waste Management Departments (WMDs) and their Environmental Health and Sanitation Departments (EHSD). The policy framework guiding the management of hazardous, solid and radioactive waste includes the Local Government Act (1994), Act 462, the Environmental Protection Agency Act (1994), Act 490, the Pesticides Control and Management Act (1996), Act 528, the Environmental Assessment Regulations 1999, (LI 1652), the Environmental Sanitation Policy of Ghana (1999), the Guidelines for the Development and Management of Landfills in Ghana as well as the Guidelines for Bio-medical Waste (2000). These Acts and Regulations are derived from the National Environmental Action Plan (MLGRD, 2004). The National Environmental Sanitation Policy (NESP) has also been published by the ministry since May 1999. Consequently, the policy looks at the basic principles of environmental sanitation, problems and constraints. Out of the National Environmental Sanitation Policy, the MLGRD has also developed a technical guideline document titled 'The Expanded Sanitary Inspection and Compliance Enforcement (ESICOME) Programme guidelines. The programme guidelines which are implemented by the MMDA's, on a regular basis looked at four broad areas which are effective environmental health inspections (Sanitary Inspections), dissemination of sanitary information (Hygiene Education), pests/vector control and law

enforcement. In general, the National Environmental Sanitation Policy Co-ordination Council (NESPoCC) is responsible for coordinating the policy and ensuring effective communication and cooperation between the many different agencies involved in environmental management in their respective Districts (MLGRD, 2004). The Ministry further indicates that in an effort to address the problem of waste management, Government has over the years put in place adequate national policies, regulatory and institutional frameworks. Due to this, the Environmental Sanitation Policy was formulated in 1999. The Ministry also collaborated with the Ministry of Environment, Science, Technology and Innovation (MESTI), EPA and the Ministry of Health to prepare the following guidelines and standards for waste management:

- National Environmental Quality Guidelines (1998)
- Ghana Landfill Guidelines (2002)
- Manual for the preparation of district waste management plans in Ghana (2002)
- Guidelines for the management of healthcare and veterinary waste in Ghana (2002)
- Handbook for the preparation of District level Environmental Sanitation Strategies and Action Plans (DESSAPs).

From above, it can be concluded that there are a number of regulations on sanitation in Ghana which informs us on how to deal with our waste issues. They however appear to be one too many. Sohail et al. (2001), make us understand that regulations are to be used as a tool for the greater good of society. This notwithstanding, the solid waste menace in the country persists with no solution in sight soon.

2.7 Challenges of Solid Waste Management

The management of solid waste has increasingly become a formidable task for municipal assemblies in the country as a result of a myriad of problems.

The UN Habitat (2010) identified institutional, technical and financial constraints at the national and local levels as well as the private sector as challenges facing solid waste management. Boadi and Kuitunen (2004) pointed out that weak institutional capacity and lack of human and capital resources are challenges facing Ghana. To them, the collection of waste is restricted to high and some middle income areas while the poor are left to cope with the problem on their own. This often leads to indiscriminate dumping of waste in rivers, streams, gutters and absolutely anywhere which is not their home creating unsanitary and unsightly environments in many parts of the city. Laffont (2005) also maintains that flaws in institutions make regulation complicated in developing countries. Additionally, MLGRD (2004) gave an explanation of the challenges of solid waste management in Ghana as poor planning for waste management programmes; inadequate equipment and operational funds to support waste management activities; inadequate sites and facilities for waste management operations; inadequate skills and capacity of waste management staff and negative attitudes of the general public towards the environment in general. Sujauddin et al. (2008) also talks about the unwillingness of users to pay for services of waste collection as a challenge facing waste management. Again, politicians ascribe little relevance to solid waste compared to other municipal activities (Moghadam et al., 2009). The type of waste management option subscribed to by the country for the people are often not relevant to the context. For instance, Shekdar (2009) argues that many composting plants have been shut down primarily because of the incompatibility of plant design and the characteristics of solid waste generated. Poor roads and number of vehicles for waste collection are a challenge (Henry et al., 2006). Finally, Tadesse et al. (2008), in analysing the factors that influence household waste disposal decision-making claimed that inadequate supply of waste bins and long distances to communal containers created a problem for waste management.

2.8 Conclusion

From the review of the literature above, it can be acknowledged that behavioural studies of waste management have been dealt with. However, very few studies were conducted on attitudes, perceptions and challenges to solid waste management which can be identified as critical issues in the bid to manage waste. Again, various studies were conducted in developed countries with very few in developing countries. Furthermore, there are hardly any studies which have been conducted in the Mamobi community to assess peoples' attitudes, perceptions as well as challenges regarding solid waste management and that make a study of this nature vital.



CHAPTER THREE

RESEARCH METHODS

3.0 Introduction

This section describes the various methods that were employed in arriving at the data for the study. It outlines the research design and the various approaches adopted. It also contains some description of the research setting and the population of interest.

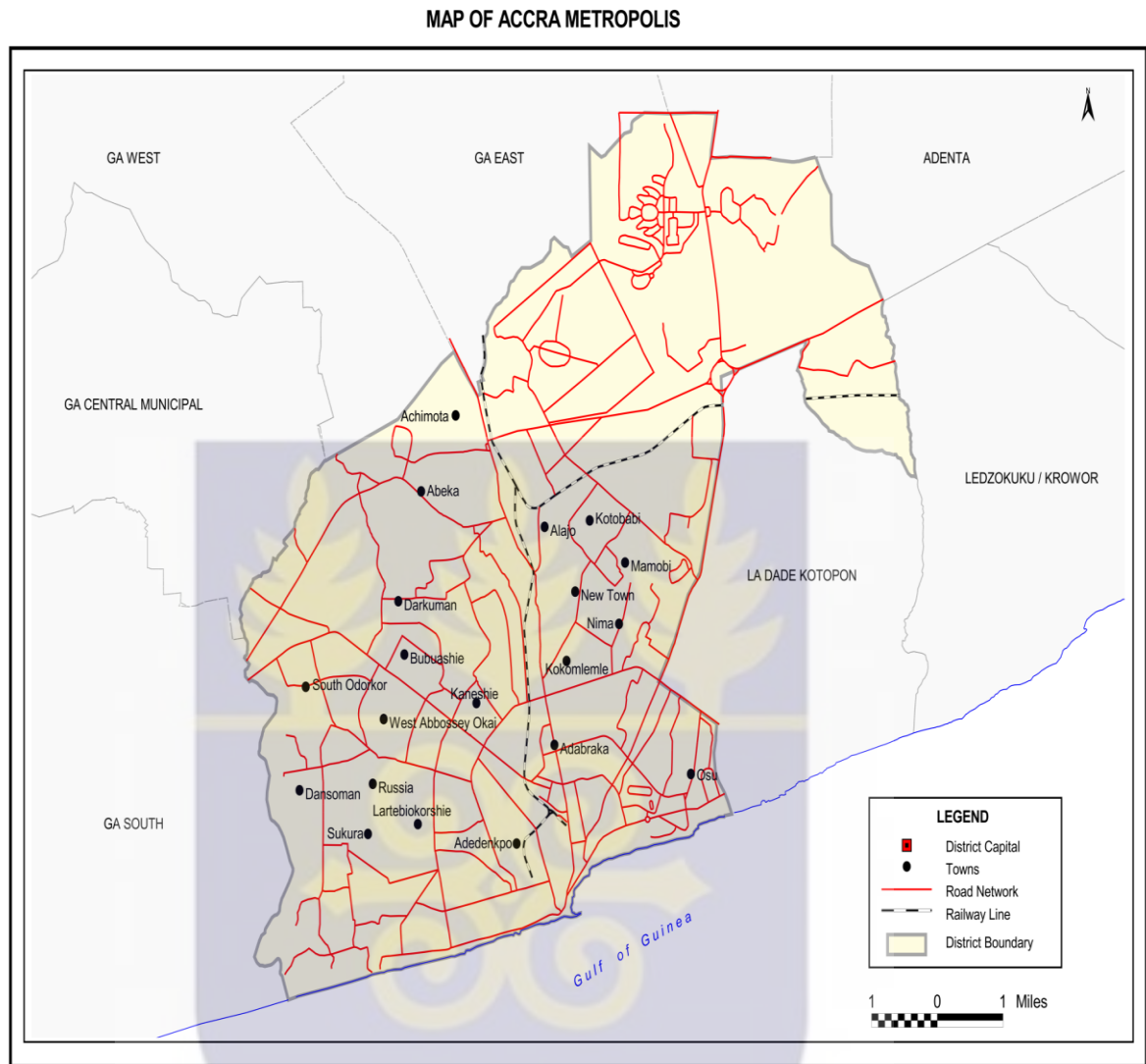
3.1 Research Design

The mixed method approach, which incorporates both qualitative and quantitative design, was employed in this study. This was necessitated due to the fact that a single approach in a study such as this seemed inappropriate in covering extensively all that the study sought to achieve. The quantitative approach therefore became suitable in gathering much information on the subject matter from a wider section of the population within a relatively short time. The survey approach was used with the assistance of a structured questionnaire. This approach has been opposed by some scholars as not being entirely appropriate for studying human behaviour especially attitudes. This view is rooted in the argument that human behaviour and for that matter, reality, cannot be well accounted for in numerical classifications which has been the norm in quantitative research. Considering this genuine challenge and the need for a more detailed understanding and appreciation of the problem under investigation (Agyeman, Brown and Awusabo-Asare, 1990), the study also employed a qualitative research design. Qualitative approach is mainly descriptive and involves the collection and analysis of data that are concerned with meanings, attitudes and beliefs, rather than quantitative method that results in numerical counts from which statistical inferences can be drawn (Ogier, 2002). The qualitative design adopted was in-depth interviews, observation and

focus group discussions (FGDs) to gather detailed information and seek for clarifications on themes that emerged in the survey.

3.2 Study Area

The study was conducted in Mamobi in the Ayawaso East sub-metropolitan assembly of the Accra Metropolitan Assembly (AMA) in the Greater Accra region of Ghana. Mamobi is divided into Mamobi East and Mamobi West and according to the 2010 Population and Housing Census; its population was 61,724 with 3,349 houses. It has an average household size of 4.8 (2000 Population and Housing Census). Mamobi is a poor urban neighbourhood in Accra mainly made up of old houses and a few modern ones which are mostly of the compound house type. Poorly planned, the area is densely populated with narrow roads and no proper drainage system. Visitors trying to walk through the neighbourhood may end up in someone's room as it is difficult to find your whereabouts in the community due to the haphazard nature of buildings. Most residents are traders, drivers of commercial vehicles or office workers. The streets are lined with shops, forex bureaus and offices including banks. Mamobi market as well as the Mamobi hospital is located in this vicinity as well. The area is quite noisy and busy with an active night life and heavy traffic with inadequate parking space.



Source: Ghana Statistical Service

Figure 3.1: Map of Accra Metropolis

3.3 Target Population

The study used as its population of interest, household heads or adults who are eighteen (18) years and above as that is the constitutionally recognized age for voting in Ghana where one is considered as an adult and able to take decisions.

3.4 Sampling Frame

The study participants were drawn from a population of 49,812 (2000 Population and Housing Census). This was due to fact that the district level breakdown of the 2010 Population and Housing Census was not available at the time of research.

3.5 Sampling Design

The selection of the sample for the survey was in two stages. In the first stage, the households were identified from a list of households following the mapping of the 2000 Population and Housing Census. After the selection of the households for the study, a household head/adult each of the sampled households was selected to be a respondent. A conscious effort was made based on the stratified sampling technique to select respondents from across the two sex and different age categories. A more purposive approach was employed in identifying some key informants (assembly men for Mamobi East and West) to respond to questionnaires. Purposive samples are designed to be as diverse as possible, such that all vital groups and units are chosen on the basis of being represented. This is because they hold a characteristic that is known or expected to be salient to the research study (Ritchie and Lewis 2003).

In the qualitative approach, the researcher conducted in-depth interviews, focus group discussions as well as observation. These participants included members of individual households and opinion leaders. A focus group discussion is deemed appropriate when the objective of the research is to explore attitudes or reactions of a group or community in response to some commonly experienced aspects of their environment (Ulin et al., 2005).

3.6 Sample Size

The sample size was apportioned among the household due to unavailability of data on the number of households they contained at the time of study. Upon assigning an equal number of households to be interviewed, the questionnaires were administered. A random sample totalling 200 households were interviewed with samples of 100 households each taken from Mamobi East and Mamobi West respectively. This sample size was deemed appropriate because of time and financial constraints. Due to the unreliable and sometimes unavailable house numbering system in Ghana and for that matter Mamobi, a serpentine movement was used to select every house based on the first point of contact. The purposive sampling technique was used to select the particular household in a house to be interviewed since there was more than one household in a house. The head of household or a person eighteen years and above was interviewed.

In-depth interviews were conducted with the Sanitation Officer of the Waste Management Department of the Accra Metropolitan Assembly (AMA) and the Waste Collection Company in charge of Mamobi area which is the Zoomlion Waste Management Company. Additionally, two (2) different focus group discussions were held each with thirteen (13) participants for men and nine (9) participants for women. These numbers of men and women were selected for the focus group discussions because women were not willing to participate unless they were given permission from their husbands, thus, their number.

3.7 Methods of Data Collection

The data were collected from both primary and secondary sources. These include documents, the use of questionnaire, in-depth interviews, observation and focus group discussions.

3.7.1 Secondary Data Sources

The secondary data utilized were based on existing documents. These were collected from published and unpublished reports, regulatory frameworks, census reports and other relevant historical materials. Internet sources and other published literature, academic journals and resources were also used.

3.7.2 Primary Data Collection

The primary data were obtained through preliminary field investigations. These data were gathered through the use of both qualitative and quantitative methods.

In the quantitative enquiry, a detailed structured questionnaire containing both open-ended and close-ended questions were constructed and administered through an interview to the respondents. The questionnaire was divided into three major parts (Appendix 1). The first section was designed to elicit the socio-demographic characteristics of the respondents including name, age, sex, educational level, number of people in the household as well as occupation, religious affiliation, marital status and length of stay in the vicinity (Appendix 1). Questions eliciting personal information do not only describe the characteristics of the survey sample but also provide important information for data analysis and interpretation. The perception and attitude of the people and their waste management practices may be related to their social, economic and demographic characteristics. The information provided by this section is indispensable for understanding the subsequent two parts.

The second section was designed not to only uncover current practices of solid waste management at the household level but to also identify their waste generation, perceptions and attitudes to waste management. The questions were focused on waste

generation, waste handling, waste storage, waste disposal, transportation of waste and waste minimization. A variety of question types were utilized. A five-point Likert-type scale questionnaire with anchors ranging from I strongly agree, agree, I don't know to I disagree were used. Further, binary scale (Yes/ No) and general information questions were utilized. Examples of these can be found in questions B.7, B.13, B.16 and B.19 (Appendix 1). The open-ended questions were also used which assisted to solicit respondents' views on key issues. Some of the open ended questions can be found in B.8, B.11, and B.14 (Appendix 1).

The third section sought respondents' general knowledge on the kind of constraints affecting waste management in the community and the ways such constraints could be addressed by a list of stakeholders in their opinion. Similarly, a four-point Likert-scale also ranging from major problem, slight problem to minor problem, not a problem at all as well as open-ended questions was used to obtain responses (Appendix 1). The participants who could read and write were given the questionnaires and asked to respond on their own or with the assistance of a trained interviewer. For those who could not read and write, the questions were read to them and their responses duly recorded by the researcher onto the questionnaire. The questionnaire was administered in English and two Ghanaian languages (Twi and Hausa). The trained assistants did the Hausa translation where necessary. In the end, all 200 questionnaires were responded to from both Mamobi East and Mamobi West.

To be able to gather more information on the subject matter and seek clarification on emerging themes, a more in-depth interview was conducted. Interview guides (Appendix 2) were designed for this purpose. This instrument was considered appropriate for respondents to elicit detailed responses which could otherwise not have been captured in

the questionnaire and also convenient for respondents who (due to a busy schedule) found the answering of questionnaires burdensome. Face-to-face interviews were conducted with the two assembly men at Mamobi East and Mamobi West respectively. These interviews were made possible with the help of the interview guide. However, the officer in charge of sanitation at the Accra metropolitan assembly and the officer in charge at Zoomlion requested to take the interview guide and provide answers to the questions posed at their convenience. Telephone interviews were used to clarify all lingering questions with them.

Focus group discussions (FGD) were organized for thirteen (13) males and nine (9) women respectively. A guide (Appendix 3) was used for the FGD. Observations were also made and relevant pictures taken to enhance the study. Pairwise ranking (Appendix 4) was used as well during this session to seek the groups' common waste management constraints posing two particular constraints at a time in a systematic way.

3.8 Data Handling

The quantitative data were edited, coded and analysed with the Statistical Package for Social Scientists (SPSS version 20). Parametric and non-parametric statistics were used and the outcome presented in simple percentages with graphs and tables in chapter four for data analysis and discussion. In this study, the qualitative data including the focus group were recorded and transcribed. A couple of open-ended questions which were posed were responded to in writing. The individual responses, face-to-face interviews were compared and categorised with the results of transcription of the focus group discussion, and subsequently triangulated and interpreted to draw conclusions. These methods were combined to partly overcome the deficiencies that the employment of one

method could produce. As such, both qualitative and quantitative data analysis are reported and findings discussed in detail.

The main concepts of the objectives of the research were used to examine the data. This was done to establish consistency or otherwise in the data and how the outcomes clarify the research problem and its objectives. Relevant relationships which appear in the data are noted and clear reasons for the relationships explained.

3.9 Ethical Considerations

Permission was sought from the Ethics Committee for the Humanities at the University of Ghana. Informed consent of the participants prior to the interviews was also sought and they were briefed on the objectives of the study and how the resulting data was to be utilised. The participants were further made aware of their rights to terminate their participation in the study at any point they felt the need to do so. Anonymity and confidentiality was also assured the participants. In line with this, pseudonyms are used when referring to particular respondents in the data analysis and discussion.

3.9.1 Limitations of the Study

The following are what hindered the smooth completion of the study;

- Most of the household heads were unavailable during the weekdays. As such, questionnaire administration had to be done during weekends which prolonged the time scheduled for questionnaire administration.

- In households where the men were not around, a lot of the women declined to speak because they needed to seek permission from their husbands. This also extended the process and reduced the number of women available to talk to.
- Some prospective respondents wanted compensation for time spent in responding to the questionnaire. This resulted in longer time being spent with a respondent since more explanations had to be made.



CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents the results of the survey. The first section provides a description of the socio-demographic characteristics of the respondents. The analysis of the respondents' practices, attitudes and perceptions to solid waste management (handling, storage, transportation and disposal) is presented in the second section. The third part presents the behavioural and institutional challenges as regards solid waste management in the study community.

4.1 Socio- Demographic Characteristics of Respondents

4.1.1 Sex

The total number of respondents surveyed was 200 with 100 from Mamobi East and an equal number of 100 from Mamobi West. Table 4.1 shows the percentage of sex composition of the total sample. Males are slightly over represented considering their number in the population which according to the Ghana Statistical Service 2010 population and housing census, all ages for male in the Ayawaso sub metropolitan assembly is 88,235 compared to their female counterparts which is 95,263.

The over representation was mainly because the women of the Mamobi community were basically uncomfortable responding to the questionnaire without permission from their husband even though the women were seen by the men as being responsible for waste collection and management in general. In instances where the husbands were not available to give the go ahead, the women declined to answer and this can be attributed to the sought of result generated. Again, this trend may be attributed to the fact that men are seen as the heads of most households in Ghana.

Table 4.1: Sex of respondents

Sex	Frequency	Percentage
Male	111	55.5
Female	89	44.5
Total	200	100

Fieldwork by Author (2015)

4.1.2 Age

With age being a demographic component, it will assist us to know if there are any waste management perceptions and attitudes that are representative of a particular age group which can be essential for decision-making. Table 4.2 shows the age distribution of the respondents in the survey. The age cohorts (25- 34) are the highest represented. These age groups are largely responsible for managing waste in the household. It is probably they who evolved and determined the waste management practices. Again, age is expected to play a significant role as maturity could affect level of awareness on environmental health and sanitation (Bradley et al., 1999; Eagles and Demare, 1999).

Table 4.2: Age Distribution of respondents

Age (Years)	Frequency	Percentage
18-24	32	16
25-34	91	46
35-44	46	23
45-54	20	10
55+	10	5
Total	199	100

Fieldwork by Author (2015)

4.1.3 Education

A rather high number of the people sampled in Mamobi community have attained some level of education ranging from the primary school to the secondary school (73.4%) as seen in table 4.3. This notwithstanding, only 9% have managed to reach the tertiary level of education. This situation as well as those without any form of education (16.1%) may be associated with their financial constraints.

Table 4.3: Educational level of respondents

Education	Frequency	Percentage
No Education	32	16.1
Primary	20	10.1
Junior High	52	26.1
Senior High	74	37.2
Tertiary	18	9.0
Other	3	1.5
Total	199	100

Fieldwork by Author (2015)

4.1.4 Religion

Religious beliefs are one set of the major belief systems that have been identified to influence behaviour (Darley and Blankson, 2009; Roundy 2009). Muslims are known to be predominant in Mamobi. This survey attests to that with Muslims representing 58% of the sample. However, the Christians in the community are not significantly low. At 41% of the sample, they can be said to have a good representation in the community with only about 1% being traditionalists.

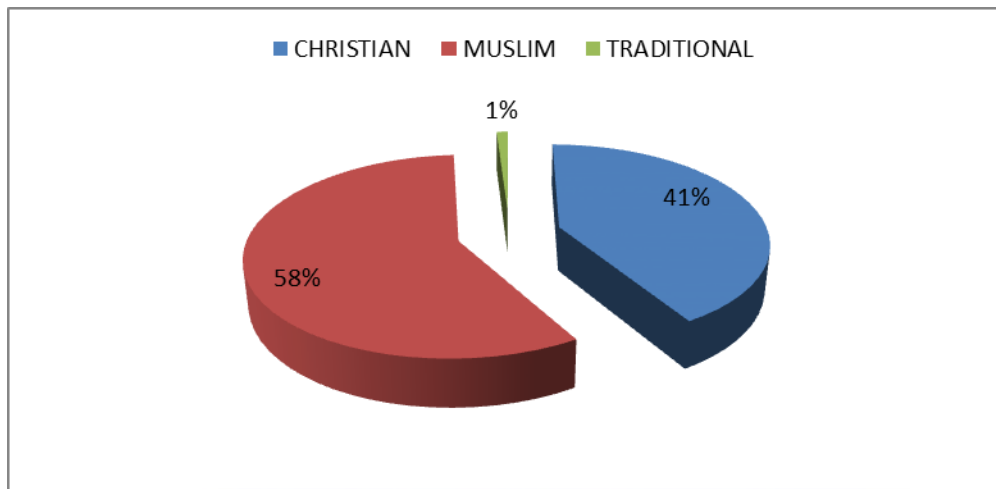


Figure 4.1: Respondents' religious affiliation

Fieldwork by Author (2015)

4.1.5 Marital Status and Household Size

The percentage of respondents in Mamobi who are single (47%) is high than those who are married (46%) though not significantly. This may be that the aspirations and way of life of the individuals in the community may not be conducive to a life of more or less permanent union. Nonetheless, 4% of the respondents were widowed with 2% and 1% separated and divorced respectively.

The average household size of the study area was about 8.4 which is quite higher than the national household size of 4.4 and even much more than that of the Greater Accra Region which is 3.7 (GSS, 2010). These disparities may be attributable to the presence of extended family members. Some of the respondents had children who still lived together with their parents and grandparents because the girls had the children out of wedlock and so their parents had to step in to assist. These statistics have obvious implications for the population density of the area and therefore poses a challenge to waste management efforts in the community.

It is important to note that while the present study does not necessarily carry out rigorous statistical analysis on the demographic variables here, earlier studies which were more quantitative in approach have depended on variables such as household size, age distribution, income levels and the prices of goods consumed to analyse the measure and effects of waste discarded. Jenkins (1993) for example developed a model for some of these analyses which have been good for estimating the responsiveness of consumers to disposal charges for solid waste services (SWS).

4.2 Waste Generation, Storage and Disposal Practices

Waste management encompasses a number of practices including waste generation, handling, storage, transportation, minimisation and disposal. This section presents responses on the practices and attitudes towards waste management.

4.2.1 Household Waste Generation

This section of the survey was designed to determine what in respondents' viewed were the major waste items (category) they generated. The table 4.4 depicts how much waste they generated for paper, polythene bags (non-degradable), garden waste, tin cans and food waste.

Table 4. 4: Category and Amount of Waste Generated at the Household Level

% of HH Waste	Paper		Polythene		Garden		Tin can		Food	
	F	%	F	%	F	%	F	%	F	%
0%	14	7.2	0	0.0	53	27.0	7	3.6	0	0.0
1-20%	131	67.9	58	29.3	137	69.5	149	75.6	168	84.8
21-40%	37	19.1	53	26.8	6	3.0	38	19.3	27	13.7
41-60%	6	3.2	66	33.3	1	0.5	3	1.5	2	1.0
61-80%	5	2.6	20	10.1	0	0.0	0	0.0	0	0.0
81%+	0	0.0	1	0.5	0	0.0	0	0.0	1	0.5
Total	193	100 %	198	100 %	197	100 %	197	100%	198	100 %

Fieldwork by Author (2015)

Non-degradable (polythene bags) is clearly the most common form of waste generated in all of the households sampled. According to a majority (66%) of the respondents in this study, the non-degradable polythene waste constitutes between 41% and 60% of the waste generated at the household level. For a significantly high number of people, their polythene waste constitute just a little lower than 40% of the waste they generate. The high proportion of non-degradable waste generated could find explanation in the fact that most of these respondents traded in food items, charcoal and sachet waters which are all conveyed in plastic bags and polythene to the buyer.

Garden waste appears to be the least of all the waste generated which may be due to the fact that most of these respondents generally lived in crowded neighbourhoods which do not support planting of grass, hedging as well as flowers because the people are already

struggling to get space to build. As such, most of these people had no gardens at all. This is a neighbourhood in which one can mistakenly walk into someone's bedroom in a bid to find an exit route. That is to say, the houses are so close to each other making it almost impossible to have lawns and grasses to generate garden waste. Figure 4.2 gives a view of how that neighbourhood looks like in terms of structure.



Figure 4.2: A picture showing closeness of compound houses in Mamobi

Again, some of the distributions are skewed showing the responses for those cohorts are less numerous, for instance paper, tin can and food wastes. It may be that respondents hardly cook their meals or even if they do, prepare just enough so that not plenty goes to waste. In another vein, they may just buy enough from food vendors and as such hardly generate tin can and food wastes. The about 145 respondents who generate paper waste may include teachers, tailors, seamstresses, fish mongers and probably students who generally use paper in their daily activities.

4.2.1.1 The New ‘Guys’ on the Blog –E-Waste

Upon entering Mamobi, one cannot help but notice the surge in the use of different electronic gadgets most of which are near their ‘death’ and subsequent disposal as waste. What I seek to say is that one common (and yet elusive to residents) composition of waste in Mamobi is what we refer to as e-waste. While some residents locally classify it as scrap, others have no idea how to call this kind of waste; yet another set of people do not even want to consider it as waste. This, according to the many who hold this view, is because these “products” usually have the ability to be turned around. One cannot fault them because in Botkin and Keller (2003), a waste is a discarded material, which has no consumer value to the one who disposed of it. Once another person picks it up and puts it to use it becomes a resource.

Indeed while technology is helping deal with the problem of waste, it is a known reality that transfer of technology and the new global wind has had its bad side when it comes to solid waste management difficulties in developing economies. Kwawe (1995) in line with this made the following observation:

“Technology alone has not been able to effectively control waste generated in communities worldwide. Rather, it appears that new technologies bring new types of waste into the environment to add to the complex accumulation puzzle” (Kwawe, 1995, p. 53).

This worrying observation by Kwawe (1995) is heightened in the decade following when the export of technology engineered equipment and gadgets from Europe to developing countries surged upwards. For instance, the shrinking of the average life span of computers from 6 years in 1997 to some less than 2 years as at the year 2005 generated a flourishing import trade in second hand computers from developed countries. This is

evident in their use among the youthful population in Mamobi. One other serendipitous discovery in the area is the conspicuous display of used and debilitated air conditioners and fridges in both middle and low income households. This local patronage in used electronics is probably what is driving the import of these products into this part of the world. According to a report by Oteng-Ababio (2012) citing UNEP (2005), up to about 75% of these shipments are normally unusable.

The contention therefore is that these products take a few months, weeks and in some cases days to become e-waste in the communities. This resultant waste poses a serious challenge in both disposal and recycling and as such creating ugly solid waste management (SWM) scenes (Oteng-Ababio, 2012) in the society as can be seen in the figure 4.3.



Figure 4. 3: Pictures depicting some e-waste

As could be deduced throughout this thesis report, handling the normal (known) solid waste from households already appears a very challenging task (Oteng-Ababio, 2010).

One cannot therefore disregard the complication the so called e-waste presents to our already insurmountable solid waste management problem.

4.2.2 Waste Storage and Disposal Practices of Residents

At the household level, waste generated is stored in a wide range of ways before they are finally disposed of. These include closed containers, open containers, piling of waste in the yard, dugouts with the yard, and plastic bags among many others. Prominent among the means of storage is storage in containers (both closed =69% and open=15%).

Table 4.5: How Households Store Waste Generated

Storage type	Frequency	Percentage
Closed containers	138	69.0
Opened containers	30	15.0
Pile in the yard	7	3.5
Dugout/dump in the yard	2	1.0
Plastic bags	12	6.0
Others	11	5.5
Total	200	100

Fieldwork by Author (2015)

This is followed by a common storage practice in which waste is kept in plastic bags and other packages. Some of these packages are depicted in figure 4.4.



Figure 4.4: A picture of some common solid waste storage methods in Mamobi

In a few of the cases, the waste was piled in the yard or kept in dugouts in the yard or compound. When it comes to waste disposal, while a majority of the households (75%) cite dumping as the practice they engaged in, a considerable minority (19%) said they resort to burying or burning of waste generated. This is depicted in table 4.6.

Table 4.6: How waste generated is disposed of by households

Means	Frequency	Percentage
Burn	28	14.3
Bury	9	4.6
Dump	150	76.5
Other	9	4.6
Total	196	100.0

Fieldwork by Author (2015)

Figure 4.5 shows the practice of the people in Mamobi when the waste skips are not emptied when full.



Figure 4.5: Waste skip overflowing with rubbish

Although it is encouraging to find that most of the households did actually resort to dumping their solid waste, a further interrogation of the responses reveals that some of them dumped at unauthorised and unapproved places. “... *I prefer to dump in the big gutter because it is free of charge*” was the response of one survey respondent when she was asked why she dumps refuse in the gutter instead of the dumpsite.

Although 96% of the respondents acknowledged the existence/availability of waste skips, only 63.5% accessed them while the rest said they were inaccessible. When probed to know why they did not have access, they explained among other things that the skips were too far from their houses. This concurs with what Tadesse et al. (2008) said when they analysed the factors that influenced household waste disposal decision-making. Here, they claimed that inadequate supply of waste bins and long distances to communal containers created a problem for waste management. Again, the waste

collection schedule was not reliable so one could get there sometimes and the skips will be so full that they are unable to add theirs. As such, they preferred to resort to other means in getting rid of the waste. In an interview, one of the assemblymen in an answer to the question ‘What happens to waste from households when skips become full or are not emptied on time?’ said: *“it’s covered so that the people do not dump on the full skip. They manage till the truck comes for it... but the people dump in gutters /drains especially at night”*. It was also found that combustible items such as papers and hard cards (30.2%) were often burnt with garden waste in 37.1% of the cases fed to animals.

It is common practice to find refuse dumped in gutters, gullies near people’s houses and unoccupied lands in Mamobi. The practice according to this section of residents was their own way of checking erosion. To a considerable number of the respondents erosion is eating away at their buildings hence the habit of filling the open drains and gullies with household waste. The following quote is representative of the many sentiments expressed during the interviews. *“My landlord directed all the tenants to dump waste in the big gutter in order to check erosion”*.





Figure 4.6: Refuse dumped in gutters and drains in a bid to check erosion

Another respondent said *“I dump in the big gutter behind my house because erosion is eating up the walls of our houses”*. This was quite a popular approach which had the backing of some assembly members at the time of the interview. This is what one Assemblyman said in an interview on the subject:

“...people dump in the gutters because the contractor constructing the gutter left it half-way and peoples building are collapsing. That is the only way to get their buildings standing and it’s been so for about 2 years”

So clearly, these practices appear entrenched. From the theory of reasoned action, it is stated that if the outcome of a particular behaviour is perceived to lead to a certain outcome and the evaluation of that outcome is perceived to benefit the individual, he/she will participate in such an act. Here, people dump in gullies to prevent erosion from washing away their homes and they do so with all boldness. This is because they have

the support of the people around them such as their land lords and friends who provide the concept of the subjective norm of what they perceive the individuals should do.

It is also important to reiterate that how the waste is handled, is sometimes dependent on the type of waste. The results showed that people predominantly discarded their waste at the dumpsite. This was the case especially with plastics and other polythene products (59%), food waste (58%), glass (58.3%) and tin cans (60.8). For example, residents were likely to burn papers, hard cards and garden waste than they do with food waste and scrap metals. While 58% of the respondents would carry their food waste to the dump site, the same cannot be said of garden waste. Only 33% of the households handle garden waste in that manner. They prefer to burn or use the waste to fill open drains near their homes or feed them to animals where applicable.

It was discovered during the interviews that in terms of scrap metals, households preferred to keep and sell them to the scrap dealers popularly known here as ‘goro boys’. In table 4.7, one would recognise that while 16.5% and 36% of the scrap metals were disposed through the local authority’s dumpsite and the waste collection agencies respectively, as much as 44% of the scrap went to scrap dealers to fetch income.

Table 4.7: Disposal of metals (scrap) waste

Method	Frequency	Percentage
Burn	1	.5
Dump-unoccupied land	3	1.5
Dump-in bush	1	.5
Dump site	33	16.5
Waste collectors(truck)	72	36.0
Reuse	2	1.0
Other (Scrap dealers)	88	44.0
Total	200	100.0

Fieldwork by Author (2015)

The findings present palpable evidence on the possible effect of a waste management approach in which waste generated by households could be sold to recycling plants.

When asked to indicate the best method to dispose of waste generated in the community, 57% of the respondents indicated recycling, 12% preferred landfilling, 17% mentioned burning while another 12% believed that dumping in gullies created by erosion is the best way to effectively handle waste.

Table 4.8: What respondents consider the best method to dispose of waste

Method	Frequency	Percentage
Landfilling	21	13.9
Recycling	87	57.6
Burning	25	16.6
Other	18	12
Total	151	100.0

Fieldwork by Author (2015)

4.3 Assessing the Sanitation Challenge: Perceptions of Respondents

Participants at the two FGDs admitted that the sanitation in Mamobi is generally poor and highly unbearable as the area is almost always scattered with filth. According to the participants, most people indiscriminately defecated in gutters and drains which had become a worrying common phenomenon in the area. The solid wastes were often disposed of by women and children within the households. To determine what caused the community to be unclean, many of the respondents stated that waste handling was generally their challenge. In probing further, they claimed that the skips were too far from their houses, waste skips become very full and the waste collection companies don't show up to clear them, and also monies charged were too high. Averagely, GH¢ 2 is charged at the dumpsite or based on the discretion of the collector at post; any amount can be quoted to you.

Again, from figure 4.7, the respondents in Mamobi perceive plastics (polythene bags) and paper as a major problem. Conversely, while glass was a minor problem to them, scrap (metal) and garden waste were seen as no problem at all. Plastics are deemed as an abundant waste generated in Mamobi and also perceived as probably the single most important sanitation concern in the community. While paper wastes are not considered as an abundant waste type generated, it is however perceived a problem in Mamobi.

Plastic waste as was noted earlier is the waste that is most generated in the households sampled in this study. While 32% of the respondents ranked polythene waste as posing some problem of a sort, to a significant majority (63%) of the respondents, polythene waste poses a major problem in the community. This is one category of waste that residents have trouble managing both at the household and community level. Apart from the non-degradable plastics, waste in the paper category ranks second in the problem it

poses to residents and this was followed by food waste which according to 30% of the respondents, is a major challenge.

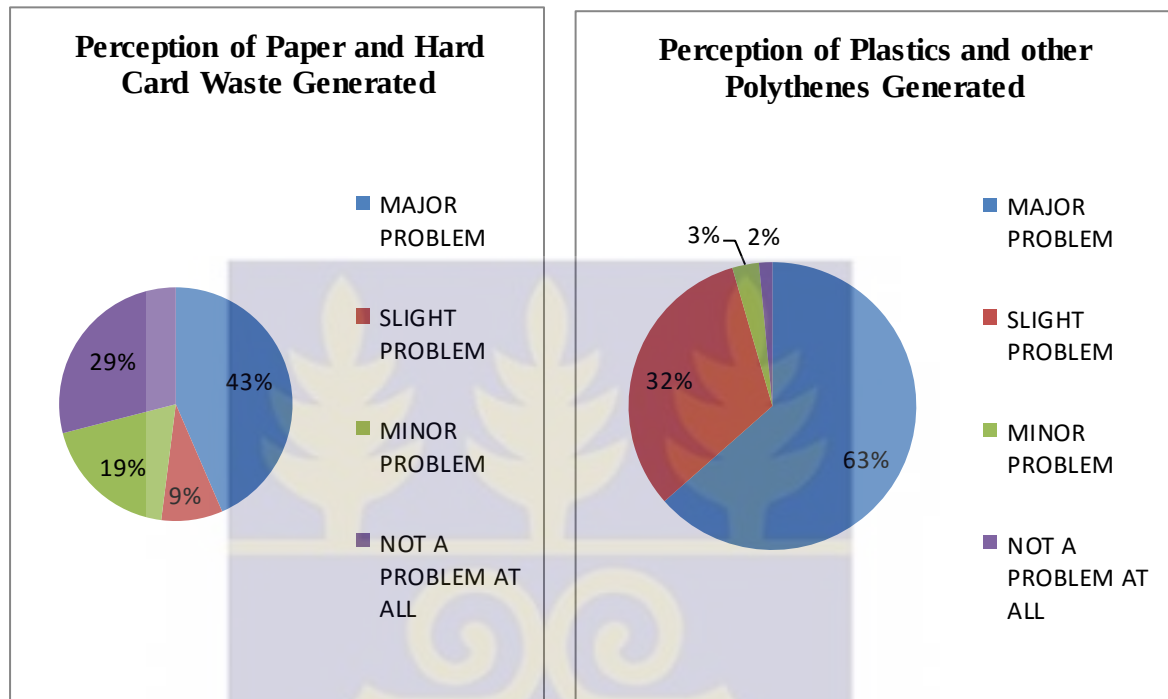


Figure 4.7: Perceptions of respondents on problems posed by polythene and paper waste

Fieldwork by Author (2015)

Garden wastes according to the respondents are not considered a problem at all. Other common categories of waste in Mamobi are metals (scrap) and food waste. These are however not perceived as sources of solid waste challenges in their communities.

4.4 Willingness to Contribute to Appropriate Waste Collection and Disposal

Sterner and Bartelings (1999), in an analysis of waste disposal, recycling and composting in a municipality in south-west Sweden reported that in 1994, Varberg introduced a weight-based billing system for household waste charging 1kr/kg of waste and at the

same time recycling centers were set up and a “green shopping” campaign was launched. This initiative led to a significant reduction in waste collection and increased recycling.

While refuse collection privatisation has been argued to be the way to go, research has shown to a very great extent that the success of any such privatised refuse collection efforts depends on the full cooperation and in some cases participation of residents (Post, 1999). Clearly, sanitation appears to be one of the main concerns of citizens in the Mamobi community. The data shows a strong willingness on the part of these residents to contribute in cash and labour to the proper collection and disposal of waste in Mamobi. This revelation concurs with earlier findings in similar studies both locally and internationally (Post, 1999; Archer et al., 1997). Of particular relevance to the present discussion is that of Post in Kumasi which revealed that waste collection ranked among the top priorities of residents of Kumasi when it comes to neighbourhood upgrading. In the same report residents usually exhibited a strong willingness to contribute cash or as the case may be, labour to proper waste collection (Post, 1999).

While this is encouraging, one must rely on this data cautiously. This is particularly because a further analysis of the data revealed that while respondents touted their own willingness to pay for WMS including recycling of waste, as outlined in table 9, well over half of the respondents (52.5%) bemoaned residents unwillingness to pay for waste collection services as one of the WM challenges of the community.

Table 4.9: Residents are unwilling to pay for waste collection services

Responses	Frequency	Percentage
I Strongly Agree	16	8.0
Agree	89	44.5
I Don't Know	40	20.0
I Disagree	51	25.5
I Strongly Disagree	4	2.0
Total	200	100.0

Fieldwork by Author (2015)

To 71% of the respondents, this attitude of residents could be attributed to wide spread hardship and financial constraints. So, as the popular Ghanaian saying goes “sé Òkwaterekwa se Òbéma wo ntoma a tie ne din” (literary cautioning that if the one who has no cloth to wear promises to give you a cloth, observe his condition/name). This caution is not misplaced.

When asked whether they would be available and willing to participate in communal labour when organised to clean the environment, 82% of the respondents answered in the affirmative. While 12% said they would not be able to join any such exercises, 6% indicated they were not sure whether or not they could take part provided they are called. Some of the people who indicated their unwillingness to partake in communal labour indicated that they were too busy on their jobs. Some of the attitudes expressed towards such organisations and their effectiveness could be summarised in the following quote: “I will not have the time to attend communal labour. Even if I partake in communal labour, the community will still be dirty. This is Mamobi.”

From the theory of planned behaviour, agreeing to partake in communal labour for instance depends on the person's belief as to how easy or difficult the performance of the behaviour is likely to be. Some respondents claim they will engage in such acts as a form of exercise, socialization and so on. Others view such an act as a problem because they have work to do, a clean-up won't improve anything in the community. The theory of planned behaviour predicts deliberate behaviour since behaviour can be deliberative and planned. Person's attitude towards the behaviour is usually the extent to which they have a favourable or unfavourable evaluation of the behaviour in question. Here, they see it as a waste of time and nothing much varying within their community hence not finding it essential to assist in the communal labour or clean up exercises.

Similar to earlier arguments advanced by Post (1999), clearly, the present findings do not imply that community members would just actively involve themselves in waste management efforts. As was the case in his Kumasi study, positive as the responses by individuals in Mamobi may be, it will require a strong community mobilisation /organisation before any such local efforts could yield positive results. Although Ghana has a long tradition of development through community-based organisations (CBOs) which in the past have proved to be highly effective in mobilising and pooling resources and labour to implement projects in general, these organisations have become less effective, especially in the urban setting.

Obviously urban populations are socio-economically heterogeneous. This profound reality coupled with increased urban individualism and the deep rooted belief that the state and in this case AMA and 'Zoomlion' are responsible for the provision of urban solid waste services (SWS) has reduced, if not eroded this hitherto community spirit.

People were quick to share their lack of interest based on their previous not-so-pleasant experiences with the politicisation of every event including CBOs in their community. It is thus understandable earlier reports by Heyman and Langendijk in 1997 that people of Ayigya and Pankrono, both low-income districts in Kumasi, were highly pessimistic when it comes to the prospects of community participation in solid waste management (p. 27).

As was suggested by Post (1999), it will not be wise to wholly entrust waste collection services in the hands of CBOs in the urban area. While the phenomenon of establishing community-work cooperatives to clean gutters and container sites and collect refuse disposal charges may be sociologically plausible, it does not appear a prudent approach in the urban communities at the moment.

4.5 Solid Waste Management Challenges in Mamobi

The study sought to ascertain what respondents perceived to be the challenges facing the management of solid waste in Mamobi east and west. The challenges uncovered by the survey could be grouped into two broad categories. These are behavioural and institutional challenges. To as many as 98% of the respondents interviewed in this study, residents irresponsible behaviour is one of the greatest challenges to waste management in Mamobi. The marginal as pertains to these sentiments are outlined in table 4.10.

Table 4.10: Irresponsible Behaviour of Individuals as a WM challenge

Response	Frequency	Percentage
Strongly Agree	121	60.5
Agree	75	37.5
Don't Know	2	1.0
Disagree	2	1.0
Total	200	100.0

Fieldwork by Author (2015)

Affirming the above, men and women during the FGDs organised in the community cited inadequate supply of waste collecting skips/ containers and irresponsible behaviour of people as the two most important factors accounting for the uncleanliness in the community.

One other important obstacle identified by respondents is the popular/ open disrespect for waste management workers in the communities. To some 57% of the people interviewed the utter disregard for waste management work and service providers are one major obstacle to effective waste management in the area. It is common to find people ridicule waste management services workers in Mamobi on any normal day. People tend to call them names and treat them with no dignity at all. People generally consider waste collection and other related services as less dignifying which could explain why only a few private people ever show interest in WMS. One can cite the popular use of the word “Zoomlion” to denigrate anyone in the business of waste collection and its related services.

Other challenges include, poor government waste management policies, lack of appropriate disposal locations, lack of resources, professional incompetence, wide spread poverty, unwillingness to pay for WMS, and inaccessible community road networks.

The lack of appropriate disposal locations which respondents view as one of the major obstacles is both a local and national problem in Ghana. It has been the often cited challenge of both local and city authorities when it comes to the problem of waste management. According to the survey results in table 4.10, when asked whether respondents perceive the lack of appropriate disposal locations as a challenge to solid waste management in Mamobi, 92.5% answered in the affirmative. This was further confirmed during the pairwise ranking when the respondents ranked lack of appropriate disposal sites and low priority given by the state to waste management as first and second constraints respectively. Moghadam et al. (2009) confirmed this when they said that politicians ascribe little relevance to solid waste compared to other municipal activities.

Table 4.11: There Is Lack of Appropriate Disposal Locations

Response	Frequency	Percentage
Strongly Agree	82	41.0
Agree	103	51.5
I Don't Know	4	2.0
I Disagree	11	5.5
Total	200	100.0

Fieldwork by Author (2015)

There are open contestations over landfill sites in the country. Probably due to perceived health implications, local residents have always contested openly and in some cases, violently, attempts to site landfill sites close to their communities. Due to this challenge, waste management service providers always default in lifting up waste collected from the locality.

As has been noted earlier, most of the e-waste disposed of in developed countries eventually arrives in our country through both legal and illegal means (Oteng-Ababio, 2010). These are further processed under very risky conditions by poor and marginalised populations as could be seen at Agbogbloshie and other such places. These people face toxic health and other environmental dangers. One can sympathise with resident who contest the siting of these landfill sites near their communities because as was recognised by Oteng-Ababio (2010), in the absence of proper mechanism, regulations and standard procedure of disposal, some of the high-tech products often end up in the 'normal' waste stream meant either for recycling or landfilling (Oteng-Ababio, 2010).

Service providers cite the limited availability of final disposal sites and the distance travelled to the few sites available as major challenges they have had to grapple with. They presently travel a minimum of 30km to the final disposal site. If distances travelled to disposal sites are far, collection costs increase and trucks spend more time due to queuing at disposal sites. These problems affect the frequency of waste collection since trucks tend to make fewer trips than their normal trip to Kpone which is currently their final disposal site. They also cite delays in payment for services delivered and other delays in administrative tasks as other common challenges they face as waste management companies.

This is a worrying situation particularly because studies cited in China and India have shown that unregulated disposal of such wastes can contaminate soil, groundwater, and air, affect all those involved in their processing, as well as the communities nearby (Oteng-Ababio, 2010; Brigden, Labunska, Santillo and Johnston, 2008). Clearly these are the very livelihoods of the people we often seek to cite our landfill sites near.

4.5.1 Interventions by Accra Metropolitan Assembly and People of Mamobi

The Accra Metropolitan Assembly (AMA) has lately concentrated its efforts on a waste incineration/waste-to-energy project as a potential means to minimize the city waste stream. Monthly national sanitation days and clean-up exercises have also been instituted to clean the city. The AMA also does health education of the community members.

The respondents however had a lot of ideas on the kind of interventions that they as well as the AMA had to put in place to check the solid waste management menace. Among what they expected from AMA included the enforcement of sanitation by-laws and provision of waste skips at vantage points. They should also provide equipment whenever clean-up exercises are organized. They must also form a task force to visit the community periodically to inspect and ensure that the community is clean. Further, they want AMA to ensure waste containers at dumpsites are regularly collected on time and the construction of more public toilets and drains as well as ensure that those toilet facilities are always well maintained or kept clean.

To the community members they expect them to desist from defecating in open space, gutters and drains, indiscriminate littering at unauthorized places. Again, they want the

community members to change their attitude towards cleanliness and report people who engage in indiscriminate littering of solid waste in the community.

All these notwithstanding, the residents' sometimes organise clean-up exercises while waiting for the government to come to their aid. They also routinely sweep their various homes and wait for the waste collectors to come. Others further said they had no option than to walk quite a distance to dispose of refuse but they sometimes burn their refuse in their homes whenever waste collectors fail to remove filled skips at dumpsites. Finally, those who live close to the big drains also use their refuse to fill holes that have been created by erosion thus they use refuse to check erosion which is eating up most of the walls of houses close to the drain.

4.5.2 Enforcement of Waste Management Regulations and By-Laws

Another important challenge revealed in this study was the enforcement of the waste management regulations and by-laws. The study revealed a total disregard for the by-laws and regulations of both the local authorities and the sub-metro. This, according to the Assembly's officials, residents and some opinion leaders were largely responsible for the worsening sanitation situation in the Mamobi area. Laffont (2005) maintains that flaws in institutions make regulation complicated in developing countries which is not far from the truth in what pertains in Ghana and Mamobi, specifically. There are a lot of different policies and guidelines on sanitation and waste management. These are also situated in a number of ministries and agencies. For instance, the Ministry of Local Government and Rural Development has the responsibility to supervise the decentralized MMDA's. However, regulatory authority is entrusted in the Environmental Protection Agency under the auspices of the Ministry of Environment, Science, Technology and

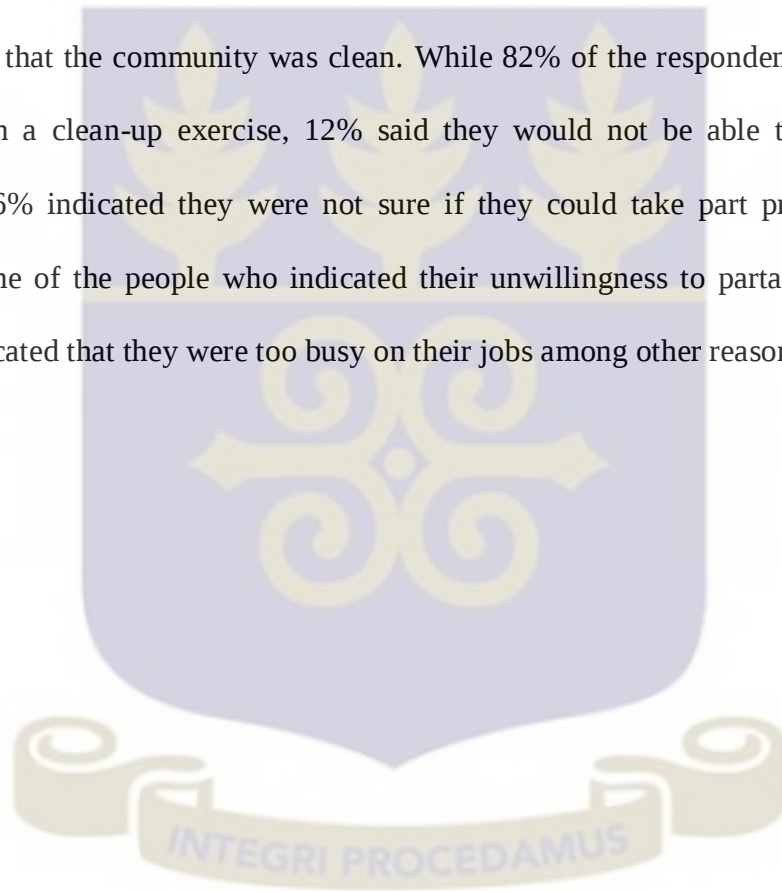
Innovation. The Ministry of Health also has a role it plays. With all these institutions available, enforcement of the regulations leaves much to be desired.

According to Sohail et al., 2001, regulations are used as a tool for the greater good of society but in Mamobi, this cannot be said to be the case. When the assembly men were asked if people who litter the area are arrested and prosecuted, they said no and that they rather sensitise and educate them since that is not the duty of the assemblyman and again if they prosecute them, they are the same people who will vote for them. An opinion leader in the area fumed saying; “AMA doesn’t bite, AMA health officers do their own things, Politicians are also part and do not allow offenders to be prosecuted”. He also exclaimed that “who will catch them unless AMA forms task force; moreover, people dump during the night and during rainfall”.

The theory of reasoned action also references the fact that laws have an impact on what individuals should do. Attitude comprises beliefs about the consequences of performing the behaviour multiplied by his or her evaluation of these consequences. The people attest to the fact that the law enforcers don’t bite as such they usually disregard the laws and regulations. On the other hand, if the adoption of a particular behaviour requires resources or skills that are currently lacking, the individual has complete lack of control. For instance, some residents in their quest to keep a clean environment walk to the dumpsite to dispose of waste in skips. However, if the resources needed, in this case waste skips are often full or unavailable, and then they cannot do what is required of them. Thus, the laws, resources as well as the individuals own volition is required for a particular behaviour to be exhibited and in the case of Mamobi, although volition might be high, the laws and resources to allow this behaviour to be manifest are not available.

4.6 Conclusion

Having evaluated and examined the results of the study, it was identified that sanitation is a major problem in the community. The people and institutions all had different attitudes and perceptions about the situation. A significant majority (63%) of the respondents claimed polythene waste poses a major problem in the community. This is one category of waste that residents have trouble managing both at the household and community level. However, not all the people were ready to embark on practices that will ensure that the community was clean. While 82% of the respondents were ready to take part in a clean-up exercise, 12% said they would not be able to join any such exercises, 6% indicated they were not sure if they could take part provided they are called. Some of the people who indicated their unwillingness to partake in communal labour indicated that they were too busy on their jobs among other reasons.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter provides a summary of the study conducted depicting the major findings, conclusion and recommendations for policy formulation. It highlights issues that were revealed during the research with regards to the perceptions and attitudes to solid waste management, the challenges faced by institutions and the people to solid waste management, among others.

5.1 Summary

The continued persistence of littering and mismanagement of solid waste led to the study of the factors influencing these phenomena in Mamobi. To achieve this objective, the study sought to, among other things, identify people and institutions perceptions and attitudes towards waste management in Mamobi, ascertain the type of waste management practices the people engaged in, examine the challenges confronting the people and institutions in waste management in the community as well as recommend policy interventions to address the sanitation situation in the area. The study dwelled on the theory of reasoned action which proposes that a person's behavioural intention lies in the person's attitude about the behaviour and the subjective norm and the theory of planned behaviour which predicts deliberate behaviour since behaviour can be deliberative and planned.

The study area, Mamobi, is a community in the Ayawaso East sub-metropolitan assembly of the Accra Metropolitan Assembly (AMA) in the Greater Accra region of Ghana. The area is divided into Mamobi East and Mamobi West and it's a densely

populated poor urban neighbourhood in Accra mainly made up of old houses and a few modern ones which are mostly of the compound house type.

By way of design, the study employed the mixed method, which incorporated both qualitative and quantitative designs into one unified research plan. This was primarily due to the fact that a single approach in this study did not seem appropriate enough in covering extensively all that the study sought to achieve. The survey approach was employed using the instrument of a structured questionnaire with which 200 household heads or adults that were eighteen years and above were interviewed with 100 each from Mamobi east and west respectively. The qualitative design which employed a combination of in-depth interviews, observation and some focus group discussions sought to get a more detailed understanding and appreciation of the problem under investigation. To have a comprehensive appreciation of the problem under investigation, two separate FGDs were conducted to complement the in-depth interviews with Waste Management Companies, Waste Management Department and some Assemblymen of the area.

Waste management is a concept that encompasses a number of practices including the waste generation, handling, storage, transportation, minimisation and disposal. As would be clear by now, the study primarily concerned itself with the perceptions, practices and attitudes towards waste management in the study community.

The major findings in the study show that;

Residents admitted that sanitation in Mamobi is generally poor and highly unbearable and that the area is almost always scattered with filth. People's attitude to waste management was to, indiscriminately, according to the participants, defecate in gutters

and drains which has become a worrying but common phenomenon in the area. The data as was discussed in the previous chapter show a strong willingness on the part of these residents to contribute in cash and labour to the proper collection and disposal of waste in Mamobi. While this revelation is encouraging, one must rely on that section of the data cautiously. This is particularly because a further analysis of the responses revealed that while respondents touted their own willingness to pay for WMS including recycling of waste, well over half of the respondents (52.5%) bemoaned residents unwillingness to pay for waste collection services as one of the WM challenges of the community.

As has been recognised in previous studies, over reliance on this show of willingness could be problematic because the present finding does not imply that community members would just actively involve themselves in waste management efforts. Any such efforts will require a strong community mobilisation before it could yield any positive results. In fact, some of the people indicated that they would not be able to partake in any communal labour if one should be organised. They were either simply not interested or explained that they were too busy on their jobs. Some also had the perception that no matter the kind of effort they put in to clean up the area, it will still be filthy.

Among all the categories of waste in Mamobi, respondents in this study perceive plastics (polythene bags) and papers as the ones that pose a major problem. Conversely, scrap (metal) and garden waste were seen as no problem at all. Plastics are deemed as an abundant waste generated in Mamobi and also perceived as probably the single most important sanitation concern in the community.

Regarding the type of waste generated, the non-degradable (polythene bags) waste was recorded as the most common form of waste generated in all of the households sampled.

This kind of waste alone constituted between 41% and 60% of the total waste generated in 66% of all the households sampled in both Mamobi East and West. Garden waste is the least of all the waste generated in Mamobi. Other wastes generated include paper, tin can, food waste, metals (scrap) and e-waste.

As could be deduced throughout this thesis report, handling the normal (known) solid waste from households already appears a very challenging task (Oteng-Ababio, 2010). One cannot therefore disregard the complication e-waste presents to our already insurmountable solid waste management problem. While technology is helping to deal with the problem of waste, the transfer of technology and the new global wind has its bad side when it comes to solid waste management challenges in Mamobi. An unusual widespread display of used and debilitated air conditioners, fridges and other electrical appliances was observed in the community; and very much in line with Oteng-Ababio's (2012) report that up to about 75% of these imports are normally unusable, as such, they easily become e-waste on the shoulders of the drains of Mamobi.

Similar to an earlier appraisal by Tsiboe and Marbel (2004), some basic methods of household waste management practices were uncovered in this study. The first is waste management department curb side collection by trucks directly outside each house. This method was provided weekly (but rarely regular) in a few houses. This was limited to a few of the well to do in the community. The second and the main one was from communal containers to which people must bring their own household waste at pay a fee between 0.50 – 2.00 Ghana cedis. The third is the door-to-door collection services which could rarely be differentiated from the first type in this community.

At the household level, waste generated is stored in a wide range of ways before they are finally disposed of or carried to the containers for final disposal. The methods included storage in closed containers, open containers, piling of waste in the yard, dugouts within the yard, and plastic bags among many others. Prominent among the means of storage is storage in containers (both closed & open). This is followed by a common storage practice in which waste is kept in plastic bags and other packages.

When it comes to waste disposal, while a majority of the households (75%) cite dumping as the practice they largely engaged in, a considerable minority (19%) said they resort to burying or burning of waste generated. The interviews and FGDs revealed that some residents often dumped waste at unauthorised and unapproved places. Despite the existence/availability of waste skips, not all the residents in this community accessed the skips. The few skips available were either too far from the houses of these residents or the waste collection schedule was not reliable so one could get there and the skips will be so full that they are unable to add theirs.

Consequent to the above, the study found a resort to other means of getting rid of waste generated in some households. To some respondents it is their own way of “managing” when the skips are full. In fact, the practice is that whenever the skips are full, they are covered to prevent people from dumping on the full skips. As such, borrowing the words of an Assemblyman of the area, “...they manage till the truck comes for it” This partly resulted in dumping in gutters /drains especially at night. It was also found that combustible items such as papers and hard cards were often burnt with garden waste.

A widespread perception that accompanied the practice of dumping refuse in gutters, gullies and unoccupied lands in Mamobi was that this practice helps to check erosion. To

a considerable number of the respondents erosion is eating away at their buildings hence the habit of filling the open drains and gullies with household waste. Unfortunately, their representatives at the assembly approved of this act citing the government's inability to do anything to help save their houses from collapse.

The study also revealed that how waste is handled, is largely dependent on the type of waste. The results showed that people predominantly discarded their waste at the dumpsite. This was the case especially with plastics and other polythene products, food waste, glass and tin cans. Residents were however likely to burn papers, hard cards and garden waste than they will food waste and scrap metals. It was discovered that in terms of the scrap metals, many residents preferred to sell to the scrap dealers for income. This finding in particular suggests that any waste management approach in which waste generated by households could be sold to recycling plants would have a great impact. While refuse collection privatisation has been argued to be the way to go, research has shown to a very great extent that the success of any such privatised refuse collection efforts depends on the full cooperation and in some cases participation of residents (Post, 1999).

The study sought to understand the challenges or problems residents faced in the handling of the various categories of solid waste in the community. The analysis was to determine what type of waste the respondents have trouble managing in the area. To many of the respondents waste handling was generally a challenge in Mamobi. Plastic waste was the waste that is most generated in the households sampled in this study. While 32% of the respondents ranked polythene waste as posing some problem of a sort, to a significant majority (63%) of the respondents, polythene waste poses a major problem in the community. Apart from the non-degradable plastics, waste in the paper

category ranks second in the problem it poses to residents and this was followed by food waste which according to 30% of the respondents, is a major challenge.

The study uncovered two main categories of challenges in solid waste management in Mamobi. They are behavioural and institutional challenges. The greatest challenge found is residents' irresponsible behaviour towards waste management in the community. Others include inadequate supply of waste collection skips/ containers, poor government policies, lack of appropriate disposal locations, lack of resources, professional incompetence, wide spread poverty, unwillingness to pay for WMS, and inaccessible community road networks.

Another important challenge revealed in this study is the enforcement of the waste management regulations and by-laws. The study revealed a total disregard for the by-laws and regulations of both the local authorities and the sub-metro. This, according to the assembly officials, residents and some opinion leaders, were largely responsible for the worsening sanitation situation in the Mamobi area. Offenders are not prosecuted neither are they ever arrested.

Service providers, among other things, cited the limited availability of final disposal sites and the distance travelled to the few sites available as major challenges they have had to grapple with. They presently travel a minimum of 30km to the final disposal site. If distances travelled to disposal sites are far, collection costs increases and trucks spend more time due to queuing at disposal sites. These problems affect the frequency of waste collection since trucks tend to make fewer trips than their normal trip. They also cite delays in payment for services delivered and other delays in administrative tasks as other common challenges they face as waste management companies.

It was noted from the study that some interventions which are being made by the AMA include monthly national sanitation days and clean- up exercises in the city. The AMA again does health education for the community members. The residents in the community also stated that they do routine sweeping and clean up exercises. Some also walk the long distances to the waste skips whereas the others dump anywhere or in gutters to check erosion.

5.2 Conclusion

Clearly, when it comes to the problem of solid waste management in Accra and Mamobi in particular, this study has shown that the perceptions and attitudes of residents as well as the activities and actions of city authorities are important issues. They actually influence how seriously the appraisal of the problem is done and how its resolution would be. The rapid accumulation of waste appears to have overwhelmed the municipal authorities and the waste collection agencies. The resultant effect has been the disposal of waste into gutters, drains, and other unapproved places in our communities –a practice which has its own attendant challenges.

As I sit to write this conclusion, Accra has been hit with what can be described as the worst tragedy ever occasioned by floods in the country's history. The 3rd June, 2015 floods that hit Accra and its accompanying fire outbreak at a Goil filling station at the Kwame Nkrumah circle claimed over 150 lives and the nation is still counting its losses. Obviously, the indiscriminate handling of solid waste in Accra is culpable in this tragedy. Nima, a neighbourhood very close to Mamobi (the study community) was one of the hardest hit areas in terms of the floods and their devastating effects to the extent that it occasioned a visit of the President of the Republic to the area.

Quite clearly, the disposal of household waste has become a major problem for all urban and peri-urban communities. The present study has revealed the challenge and its appreciation by all stakeholders. In line with this, the AMA and the local authority have instituted a few interventions to ensure a clean environment in the community. The AMA organises monthly national sanitation days, clean-up exercises as well as health education of the community members. The residents' also sometimes organise clean-up exercises while waiting for the government to come to their aid. It is important to note that all that has been revealed in this study was happening while these interventions are in place.

While the phenomenon of establishing community-work cooperatives to clean gutters and container sites and collect refuse disposal charges may be sociologically plausible, it does not appear a prudent approach in the urban communities at the moment. That is to say it will not be wise to wholly entrust waste collection services to CBOs in the urban area. The socio-economic heterogeneity of the urban community, urban individualism and the deep rooted belief that the state is responsible for the provision of urban solid waste services (SWS) has reduced, if not eroded the hitherto communal spirit that made community efforts effective.

Most often than not, public policy has also been driven towards mass communication which is focused on changing household attitudes through information campaigns. However, research has recognised a very complex link between environmental attitudes and actions. As such, the low impact of these policy actions over the years could be due to the top-down nature of these approaches aside their simplistic nature. These information campaigns are most of the time not home-grown. They are decisions taken in offices and rolled out in the communities. The assemblies often lack community

involvement when it comes to policy generation. It appears that communities are only thought of when it comes to policy implementation. This in my view is ineffective. From the theory of planned behaviour, agreeing to partake in any activity depends on the belief by the person as to how easy or difficult the performance of the behaviour is likely to be. As such, bringing policies to be implemented without involving the people in its preparatory stages proves to be quite a daunting task. The theory of reasoned action also seeks to establish that a person's attitude toward behaviour consists of a belief that a particular behaviour leads to a certain outcome and an evaluation of the outcome of that behaviour. Community members will, therefore, engage in keeping their community clean if they think the pros outweighs the cons.

5.3 Recommendations

The study recommends, based on its findings, that:

- Government needs to reprioritise their agenda by focusing and placing more serious attention on waste management issues as well as consider the instantaneous actions that should be taken to reduce the vulnerability of Mamobi to the detrimental effects of mismanaging waste practices now in place.
- Waste collection companies employed by the AMA should be sanctioned by curtailing their services whenever they do not go to the community on scheduled times to pick up the waste.
- Recycling has been considered as the best disposal alternative for waste that is recyclable. As there are very few recycling initiatives in the country presently, further research is needed by research institutes and academics to explore the possibility of running economically viable recycling programs, not only for the economic benefit but also for a better waste management.

- Since laws and regulations for proper waste disposal exist already, its enforcement must be tackled vigorously but before that, awareness programs to educate the citizenry to change their attitudes, perceptions and practices must be pursued by the AMA. It will be worthy to first explore, through surveys, the best methods and means through which the citizenry could be informed before such an awareness programme is embarked upon in Mamobi community.



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APPENDIX 1

PUBLIC PERCEPTIONS, ATTITUDES AND CHALLENGES TOWARDS SOLID WASTE MANAGEMENT IN GHANA: THE CASE OF MAMOBI COMMUNITY.

This study titled *Public Perceptions, Attitudes and Challenges towards Solid Waste Management in Ghana: The Case of Mamobi Community* is carried out by Ms Afua B. Sarpong-Anane, a graduate student of the Department of Sociology in the University of Ghana, Legon. It is in partial fulfilment of the requirements for the award of Master of Philosophy Degree in Sociology. Your response to this survey is much needed strictly for academic purposes and will be kept highly confidential. You are very much appreciated. Thank you.

A. SOCIO-DEMOGRAPHIC CHARACTERISTICS

A.1 Name of respondent:

A.2 Sex: Male () Female ()

A.3 Age of respondent.....

A.4 Marital Status: a) Single b) Married c) Divorced d) Separated e) Widowed

A.5 What is your highest level of education? No education () Primary () Junior High () Senior High () Tertiary () Other (specify).....

A.6 What is the size of your household?

A.7 What major occupation are you engaged in?

A.8 For how long have you been living in this community?

A.9 Religion: Christian () Muslim () Traditional () Other (specify)

B. WASTE GENERATION, ATTITUDE, PERCEPTION AND MANAGEMENT

B.1 What percentage of the waste generated by your home are: a) Papers b) Food waste..... c) Garden waste d) Non degradable (polythene bags)..... e) Tin cans.....

B.2 Please describe (tick) how your household stores waste generated?

- a) Closed container
- b) Opened container.
- c) Pile in the yard
- d) Dugout/damp in the yard

- e) Plastic bags
f) Others (specify).....

B.3 How do you manage waste generated by your household? a) Burn b) Bury c) Dump

d) Others (specify)

B.4 Please describe specifically how you dispose the following waste generated by your household (*please tick*)

Types of waste	Burn	Bury	Dump				Waste Collectors (truck)	Reuse	Compost	Other (Specify)
			Gutter	Unoccupied land	In bush	Dump site				
Papers and hard cards										
Garden waste										
Food waste										
Plastics and other Polythene products										
Metals (scrap)										
Glass										
Tin cans										

B.5 In your opinion what is the best method to dispose of waste a) Landfilling b) Recycling c) Burning d) Other (specify)

B.6 How do you perceive the level of waste generated in this community?

Types of waste	Major problem	Slight problem	Minor problem	Not a problem at all
Papers and hard cards				
Garden waste				
Food waste				
Plastics and other Polythene products				
Metals (scrap)				
Glass				
Tin cans				

B.7 Are there waste collectors in your community? Yes () No ()

B.8 If Yes, do you access their services? Yes () No () Give reasons.....

B.9 Whose responsibility is it to handle waste generated in your household? a) Adult females

b) Adult males c) Young females d) Young males

B.10 How often do you dispose of waste in your household? a) Daily b) Weekly c) Bi-weekly d) Every other week e) other (specify)

B.11 In your opinion do you think waste handling is a major problem in your household?

Yes () No (). Give reasons for your answer

C. WILLINGNESS TO PAY/PARTICIPATE FOR/IN IMPROVED WASTE MANAGEMENT

C.1 Are you willing to pay for an improved waste management system? a) Yes b) No

C.2 If yes what is the maximum amount you are willing to pay? GH¢.....

C.3 If there are no waste collectors in your community, are you willing to pay for the engagement of their services to reduce waste in the community? a) Yes b) No c) I don't know (*For those who answered No to B.7*)

C.4 What is the maximum amount you are willing to pay for such services? GH¢.....

C.5 Are you willing to cooperate with separation of waste into bags if a recycling program is set up? a) Yes b) No c) I don't know

C.6 If such a recycling programme is instituted, are you willing to pay for the pick-up service and how much are you willing to pay? a) Yes (GH¢.....) b) No

C.8. Will you be available to render your services if any communal labour is called upon? (Give reasons) a) Yes b) No c) I don't know

.....

D. CONSTRAINTS TO WASTE MANAGEMENT

Please state how well you agree with the following constraints affecting waste management in your community.

No.	Constraint	I strongly agree	Agree	I don't know	I disagree	I strongly disagree
1	Irresponsible behaviour of individuals					
2	Poor government waste management policies					
3	Lack of appropriate					

No.	Constraint	I strongly agree	Agree	I don't know	I disagree	I strongly disagree
	disposal locations					
4	Under funding of local authorities to manage waste					
5	Disrespect for waste management work					
6	Professional incompetence of waste managers					
7	Unwillingness to pay for collection services					
8	Financial constraint on the part of individuals					
9	Low priority given by the state to waste management					
10	Inaccessible road networks					

What are some of the ways in which these constraints could be addressed by the various stakeholders?

Stakeholder	Measures
Individuals	
Local Government	
Central Government	
Media	



A.8.What is your general assessment of environmental sanitation condition in the area?

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A.9.Which specific interventions have been implemented by your department since the year 2010?

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A.10.Which donor agencies support environmental sanitation in the area?

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A.11. Do you have plans with regard to waste from sachet water?

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A.12.What are such plans?

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A.13. How do you enforce the sanitation by laws in this area?

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A.14.What challenges impede the successful performance of your duties?

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A.15. How can the challenges be overcome?

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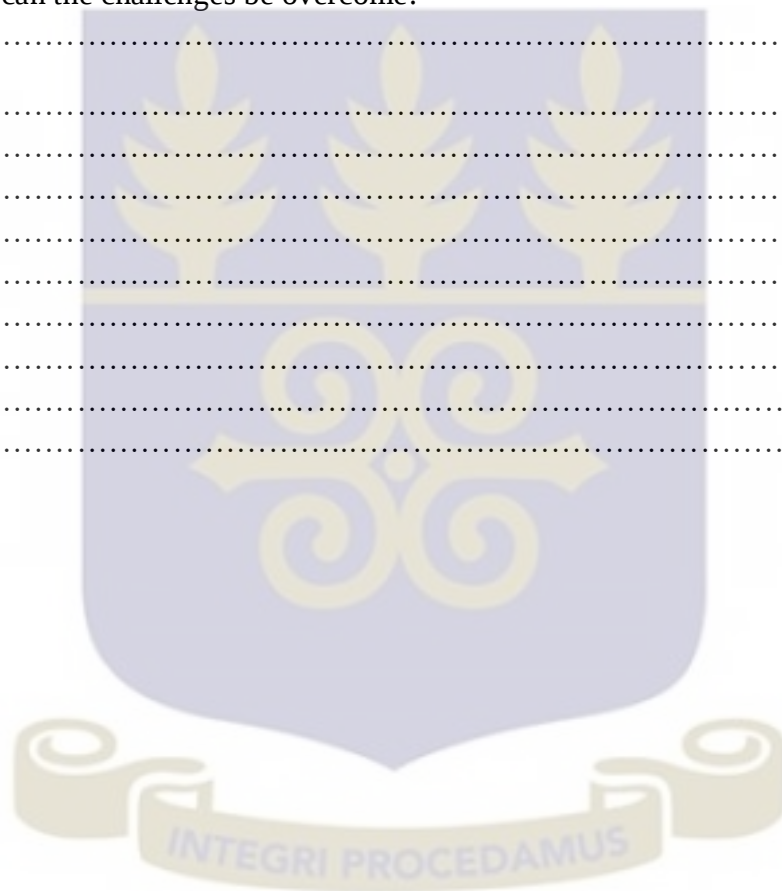
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University of Ghana

Department of Sociology

Public Perceptions, Attitudes and Challenges towards Solid Waste Management in

Accra: The Case of Mamobi Community

Interview Guide for waste collection company

This research is mainly for academic purposes. Responses will therefore be treated as highly confidential. Thank you.

Position of Respondent:

Date of Interview:

Q. SOLID WASTE COLLECTION AND DISPOSAL

Q.1. How much waste is generated in a day in tons?

Q.2. What are the types of waste commonly generated in the area?
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.....
.....
.....

Q.3. What is the percentage of the major component of waste generated in this area?
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.....

Q.4. What is the mode of collection of the waste?
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Q.5. How many times per week is waste collected in the area?
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Q.6. What is the cost of collecting waste per week from the area? ...
GH¢.....

Q.7. Have you provided waste collection bins, skips etc?

.....

Q.8. How many have you provided? (Skip to Q.9 if no)

.....

Q.9. If no, why?

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Q.10. How far away are the bins/ skips from the residences? (in kilometres)

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.....

Q.10. Where do you dispose of the waste?

.....
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.....

Q.11. What is the distance travelled to the final disposal site in kilometres?

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

Q.12. Is the distance travelled a problem? Why?

.....
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Q.13. How do these problems affect the frequency of waste collection?

[illegible]

R. SOLID WASTE MANAGEMENT AND CHALLENGES

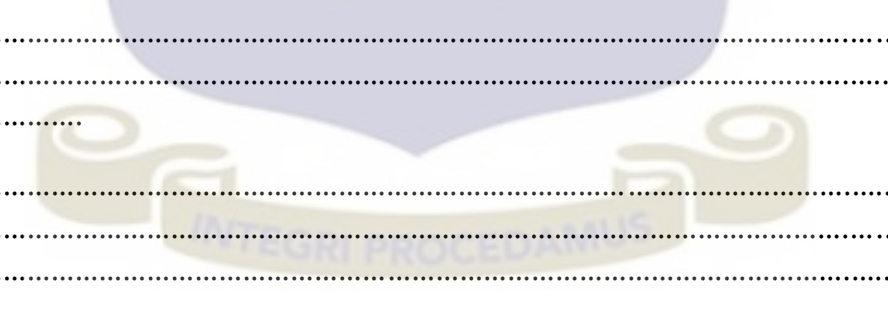
R.1. What methods do you use in managing the solid waste collected from the area?

.....

R.2. Why do you choose that method?

[illegible]

R.3. What equipment are available for waste collection and disposal?



R.4. How many each do you have?

[illegible]

R.5. How many each are required?

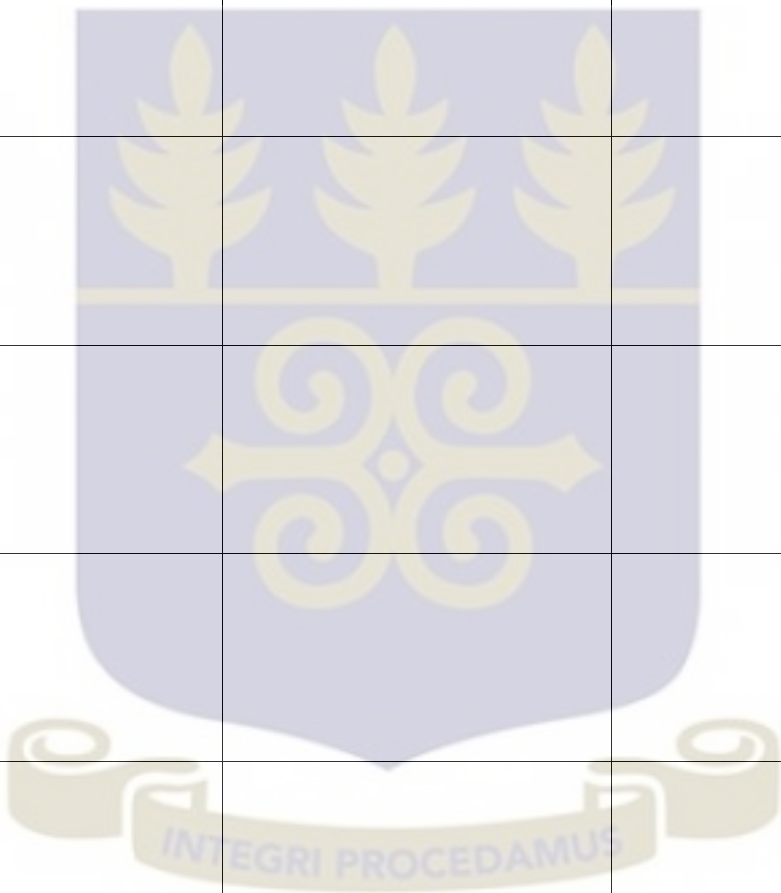
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R.6. Do you have qualified technical personnel for managing the waste?

Technical Personnel	Number	Qualification
		

R.6. What incentives do you provide for your staff?

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R.7. What are some of the challenges you face in carrying out your mandate?

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R.8. How can they be tackled?

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University of Ghana

Department of Sociology

Public Perceptions, Attitudes and Challenges towards Solid Waste Management in

Accra: The Case of Mamobi Community

Interview Guide for assembly member

This research is mainly for academic purposes. Responses will therefore be treated as highly confidential. Thank you.

Name of Respondent:

Name of Electoral Area:

Date of Interview:

A. Solid waste collection and disposal

A.1. What is the estimated population in the area?

.....

A.2. Are dustbins provided to households?

A.3. Are skips provided at vantage points to collect waste?

.....

A.4. Who provides them?

.....

A.5. Are they adequate?

.....

A.6. How far are they from the houses? (In kilometres)

.....

A.7. Which waste management institution does the collection of waste in the area?

.....

.....

.....

A.8. How many times does the collection occur?

.....

A.9. What are the modes of collection?

.....

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.....

A.9. What happens to waste from households when skips become full or are not emptied on time?

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A.10. Do people pay for the cost of collection of waste?

.....

A.11. If they pay, indicate the amount in
GHC.....

A.12. What is the mode of payment?

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A.13. Are the people able to pay?

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A.14. If No, why?

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A.15. What happens to the waste if they are unable to pay?

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A.16. Are people who litter the area arrested and prosecuted?

.....

A.17. If No, why?

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A.18. In your view, what are some of the factors affecting effective solid waste management in this area?

[illegible]

A.19. In your opinion, what should be the punishment if city authorities find filth in and around people's houses?

A.20. What is your general opinion of the environmental sanitation in the area?

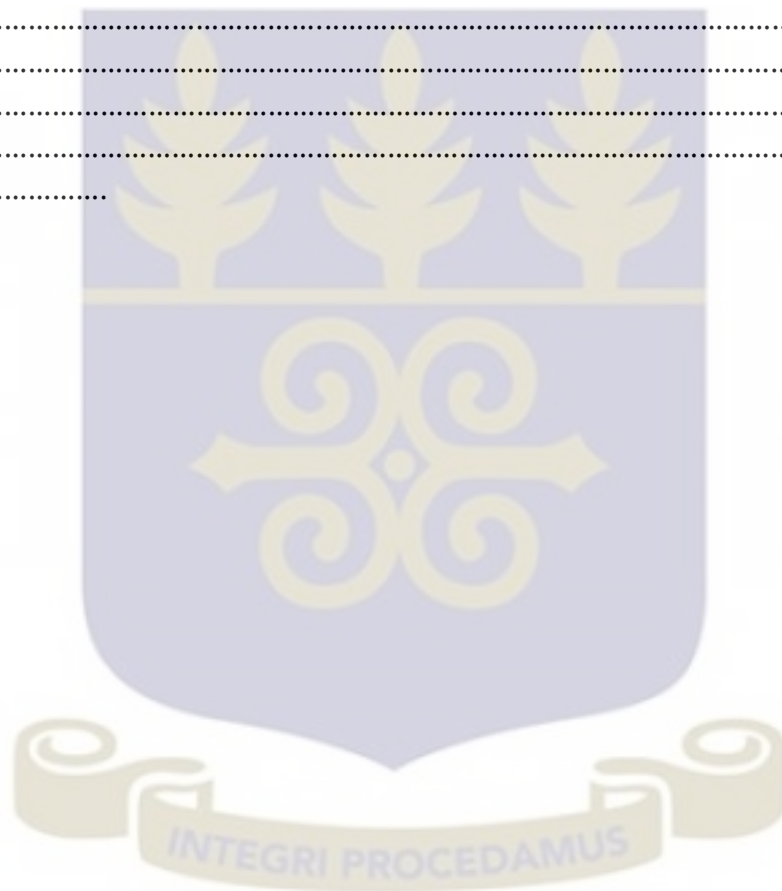
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.A.21. What can be done to ensure that the people engage in good environmental sanitation practices in the area?

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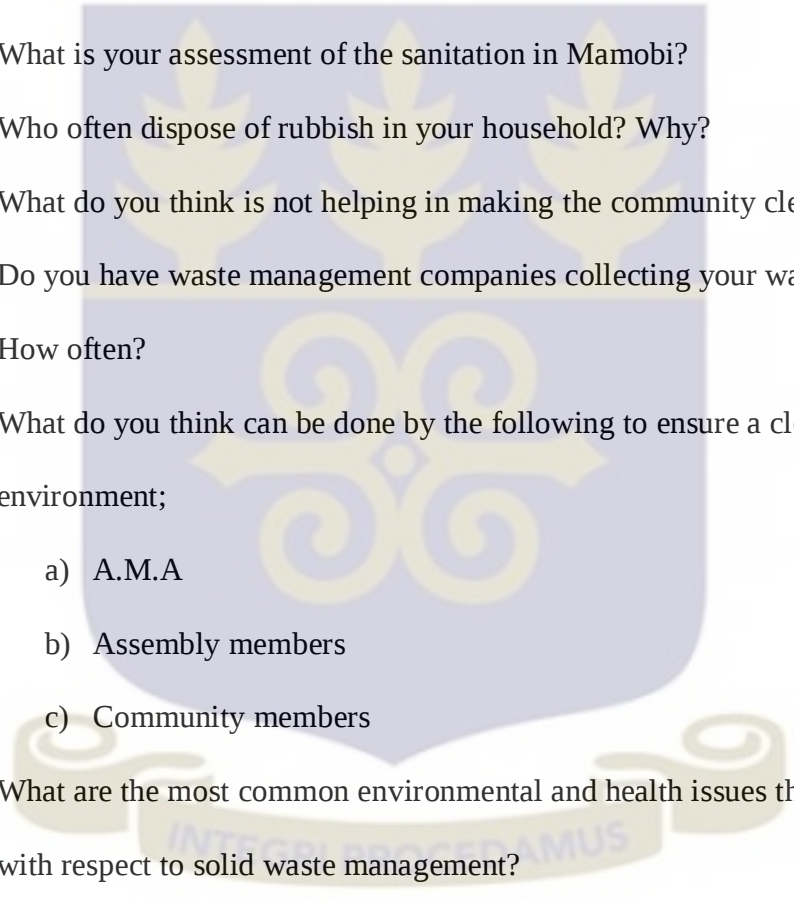
APPENDIX 3

University of Ghana
Department of Sociology

***Public Perceptions, Attitudes and Challenges towards Solid Waste Management in
Accra: The Case of Mamobi Community***

Focus Group Discussion

This research is mainly for academic purposes. Responses will therefore be treated as highly confidential. Thank you.

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- A. What is your assessment of the sanitation in Mamobi?
- B. Who often dispose of rubbish in your household? Why?
- C. What do you think is not helping in making the community clean? Why?
- D. Do you have waste management companies collecting your waste on time?
How often?
- E. What do you think can be done by the following to ensure a clean environment;
- a) A.M.A
 - b) Assembly members
 - c) Community members
- F. What are the most common environmental and health issues that you face with respect to solid waste management?
- G. What do you consider to be the most appropriate way for managing solid waste?
- H. Does the waste management department engage the community in the decision making process on solid waste management?
- I. What challenges do you face in ensuring a clean environment?
- J. How do you cope with these challenges?

APPENDIX 4

Pair-Wise Ranking of Constraints

No	Constraint	1. Irresponsible behaviour of individuals	2. Poor government waste management policies	3. Lack of appropriate disposal locations	4. Under funding of local authorities to manage waste	5. Disrespect for waste management work	6. Professional incompetence of waste managers	7. Unwillingness to pay for collection services	8. Financial constraint on the part of individuals	9. Low priority given by the state to waste management	10. Inaccessible road networks
1	Irresponsible behaviour of individuals										
2	Poor government waste management policies										
3	Lack of appropriate disposal locations										
4	Under funding of local authorities to manage waste										
5	Disrespect for waste management work										
6	Professional incompetence of waste managers										
7	Unwillingness to pay for collection services										
8	Financial constraint on the part of individuals										

No	Constraint	10. Inaccessible road networks		
		9. Low priority given by the state to waste management		
		8. Financial constraint on the part of individuals		
		7. Unwillingness to pay for collection services		
		6. Professional incompetence of waste managers		
		5. Disrespect for waste management work		
		4. Under funding of local authorities to manage waste		
		3. Lack of appropriate disposal locations		
		2. Poor government waste management policies		
		1. Irresponsible behaviour of individuals		
9	Low priority given by the state to waste management			
10	Inaccessible road networks			

