Institute of Statistical, Social and Economic Research

University of Ghana

THE POSITIVE AND NEGATIVE EFFECTS OF DUMP SITES ON ECONOMIC LIVELIHOOD OF PEOPLE. A CASE STUDY OF THE ABOKOBI DUMP SITE.

BY

Dawaare Tobias

(10442197)

This dissertation is submitted to the University of Ghana, Legon in partial fulfilment of the requirement for the award of a Master of Arts in Development Studies degree

December, 2014

DECLARATION

I hereby declare that except for references to other people's work which have been duly acknowledged, this thesis is the work of Dawaare Tobias, carried out at the Institute of Statistical, Social and Economic Research (ISSER), University of Ghana under the supervision of Doctor Martha Awo Adimabuno (ISSER).

I further affirm that this thesis has neither in whole nor in part been published at any educational institution or presented for another certificate.

…… DATE …….....

DAWAARE TOBIAS

(STUDENT)

…….. DATE ……..……..…….....

DR. MARTHA AWO ADIMABUNO

(SUPERVISOR)

DEDICATION

This work is dedicated to the Almighty God for making it possible for me to successfully complete this programme.

ACKNOWLEDGEMENTS

First, I am highly thankful to God for the wisdom, good health, favour, guidance and above all Grace to complete this dissertation.

I also express my profound and infinite gratitude to my supervisors, Dr. Martha Awo Adimabuno of the Institute of Statistical Social and Economic Research (ISSER) for her wholehearted guidance and counselling that saw the completion of this work. I say thank you for your valuable contributions. I wish to appreciate Mr. Anku of Ga-East Municipal Assembly and Mr, Jonathan of the Zoomlion Waste Management Company for providing me with information while in the field..

I am also grateful to my friends and colleagues of the ISSER 2014 MA Class especially to Togbe Tsali IV, Genevieve Dasoberi, Justice Kwesi Baah and Karl Yaw Osei Afoduo for their support and contributions in diverse ways to the completion of this work. I further acknowledge the advice of other lecturers at the Institute of Statistical, Social and Economic Research (ISSER) and the supporting staff for the typing of introductory letters needed for data collection and to Michael Kodom for his assistance.

Finally, I would like to show greater appreciation to Mr. Joe. Ben. Dawaare and Miss. Leticia Wanya Mwinuore for their care, parental guidance and advice. Special thanks also go to all my siblings for their support.

To you all I say, thank you and may God bless you.

Table of Content

CONTENT **PAGE**

Declaration..... i

Dedication ii

Acknowledgements..... iii

Table of content..... iv

List of Tables..... vii

List of Figures..... vii

List of Plates vii

List of Abbreviations..... viii

Abstract..... ix

CHAPTER ONE

1.0 BACKGROUND OF THE STUDY

1.1 Introduction 1

1.2 Problem Statement..... 2

1.3 Research Questions 4

1.4 Objectives of the Study 4

1.5 Organization of the study 4

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction..... 6

2.2 Waste 6

2.2.1 Solid Waste 7

2.2.2 Solid waste collection and disposal in Ghana..... 8

2.3 Classification of Landfills..... 9

2.3.1 Dump Sites Management..... 11

2.4 Negative and Positive effects of Dump sites 13

2.5 The Drivers, Pressures, State, Impact and Response (DPSIR) Framework 16

2.5.1 Concepts of the DPSIR framework..... 17

CHAPTER THREE

3.0 RESEARCH METHODOLOGY AND PROFILE OF THE STUDY AREA

3.1 Introduction..... 20

3.2 Research Methodology..... 20

3.2.1 Study population..... 20

3.2.2 Sampling Techniques and sampling size..... 21

3.2.3 Sources of data collection..... 22

3.2.4 Research Instruments 22

3.3 Methods of Data Analysis..... 23

3.4 Field challenges..... 23

3.5 Profile of the Study area..... 24

3.5.1 Location and Size of the Ga East Municipal assembly..... 24

3.6 Demographic Characteristics..... 25

3.6.1 Population Growth..... 25

3.6.2 Population Density..... 26

3.7 Economic Activities 26

3.8 Developmental Challenges..... 27

3.8.1 Waste Management..... 27

3.8.2 The Abokobi Dump Site..... 27

3.9 Housing and development control..... 28

CHAPTER FOUR

4.0 DATA ANALYSIS AND DISCUSSION

4.1 Introduction 29

4.2 Factors that serve as Driving forces at the Abokobi dump site..... 29

4.3 Resulting Pressures and State of the dump site 31

4.4 Impacts of the dump site to livelihood..... 35

4.4.1 Non-waste Pickers 35

4.4.2 Demographic data of Non-waste Pickers 35

4.4.3 Effects of the dump sites on Non-waste Pickers..... 37

4.5 Measures undertaken to minimise the effects of the dump site 41

4.5.1 Waste Pickers..... 41

4.5.2 Marketing of picked waste 45

4.5.3 Conclusion..... 51

CHAPTER FIVE

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECCOMMENDATION

5.1 Introduction 53

5.2 Summary of Findings 53

5.3 Conclusion..... 55

5.4 Recommendation 56

References..... 58

Questionnaires..... 64

List of Tables

Table 2.1 Types of landfill sites..... 11

Table 4.1 Challenges posed by the dump site on Respondent..... 37

Table 4.2 Prices of the various items picked at the Abokobi Dump site..... 46

List of Figures

Figure 1 Diagram of the DPSIR Framework..... 17

Figure 2 The Ga East Municipal area map..... 24

Figure 3 Population of the Ga East Municipal Assembly from 2010-2013..... 30

Figure 4 Ages of Respondents..... 35

Figure 5 Educational Level of respondents 36

Figure 6 Effects of the pollution from the dump site on respondents 37

Figure 7 Number of Years involved in waste picking by respondents..... 42

Figure 8 Number of days worked by waste pickers..... 43

List of Plates

Plate 1 Air pollution from dump site..... 32

Plate 2 Burning of electronic waste by pickers..... 32

Plate 3 State of the dump site..... 32

Plate 4 Vicinity filled with smoke from the site..... 33

Plate 5 Pockets of water around the dump site that aids in the breeding of Mosquitoes 34

Plate 6 Items retrieved from the Abokobi Dumpsite by waste pickers for their livelihood..... 47

List of Abbreviations

APO- Asian Productivity Organisation

DPSIR- Drivers, Pressures, State, Impact and Response

GEMA- Ga East Municipal Assembly

RCEP- Royal Commission on Environment Pollution

WMD- Waste Management Department

ABSTRACT

Globally, developing economies have relatively high production and consumption patterns which produce huge amounts of waste which normally ends up at dump sites. This study therefore sorts to identify further the positive and negative effects of the Abokobi dump site on livelihood. In all, 122 respondents were interviewed using self administered questionnaires and interviews. They were made up of 60 waste pickers, 60 non waste pickers and two officers, one each from the municipal assembly and the Abokobi dump site. The Drivers, Pressures, State, Impact and Response framework was used in the analysis to assess the dump site and its effects on livelihoods in four thematic areas; Factors that serve as drivers at the Abokobi dump site, resulting pressures and state of the dump site, Impacts of the dump site to livelihoods and Measures undertaken as a response to minimise management of dump sites.

Results of the study showed that the Abokobi dump site is managed by the Zoomlion Waste Management Company and management is done with the use of a bulldozer, a compactor and an excavator therefore burning of refuse is not a method of management but happens as a result of combustion of gasses. The dump site aids in the breeding of mosquitoes, houseflies and rodents aside the air pollution and all these pose negative effects on livelihood but it again serves the livelihood of waste pickers.

As a recommendation to the study, a composting facility should be constructed at the dump site which will be responsible for turning waste into other products such as fertilizers and that capping of gases in order to ensure a balanced situation between non waste pickers and waste pickers.

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

In every growing economy where there is relatively high production and consumption, the environment suffers great damage due to the fact that it serves as the source of resources needed for development and also as a sink for waste generated from both production and consumption. The daily activities of humans in order to satisfy their basic needs and nutritional requirements to sustain a healthy life generate a lot of unwanted materials known as waste. Waste may be in the form of solid, liquid and gas which when left without proper management, have serious consequences on the environment and it's living organisms. Nyang'echi (1992) defined solid waste as the unwanted remains, residues, discarded materials or by-products which are no longer being used.

Globally, solid waste is sent to a final disposal site or landfill site mostly located far from inhabitants. A landfill is therefore a large area of land that is designed and built to receive waste. Land filling is a common practice for waste disposal all over the world (Environmental Protection Agency, 2002;
Lim & Missios, 2007; Parker, 2003; World Bank, 1999 as cited in Owusu et al 2012).

Advanced countries such as Hong Kong, Chile and Brazil as part of the practices of landfill practiced active pumping of landfill gas such as methane which is a useful gas. While there are potentials for productive uses of landfill gas, only a few landfills in Chile make use of this resource (Johannessen and Boyer, 1999).

In Africa, except for South Africa most countries in practice dump their final waste in open dump site (Johannessen and Boyer, 1999). Ghana is therefore not an exception in this case as

landfills have been highly recommended (World Bank, 1999) and is the means of solid waste disposal.

Landfill sites serve a disadvantage to habitants around it as dangerous gases emiting from these sites, cause air pollution, contribute to global warming and could pollute streams with toxins seeping through the ground (Ayomoha et al, 2007) none-the-less, they also act as an employment zone for others to earn a living through waste picking (Abdelatif, 2001; Hassan and Sapari, 1996; Strange, 2002, cited in Gwisai et al. 2014). Studies have concentrated on the negative aspects of dump sites but with governments call for recycling of waste, this study will examine the likely positive benefit of dump sites and will be conducted in the Ga East Municipal in the Greater Accra Region of Ghana specifically, in Abokobi, the Municipal capital where the dump site is located. The statement of problem below will help in the appreciation of the issue concerning this study in the Ga East Municipality.

1.2 **Problem Statement**

Waste management did not pose difficulty in the early times as population was low resulting in low production and consumption and relatively low waste generation. It became challenging with the increase in population which led to the rise of urban areas where large numbers of people moved from less developed areas into the cities for mainly economic reasons (Shafiul and Mansoor, 2003). Population growth coupled with rapid urbanisation in Accra has therefore worsened the problems of Municipal Solid Waste Management (Owusu et al. 2012). According to UN-HABITAT (2010), the population of Accra in the 2000 Population Census, was about 1.7 million people with a growth rate of 4.3 percent. (cited in Millennium Cities Initiative-University of Ghana, 2010, p.7). This, according to the 2010 Housing and Population Census, rose to 4,010,054 representing 16.3% of Ghana's total population by 2010 hence recording a population growth rate of 3.1% annually Oteng-Ababio

(2010) also stated that waste keeps increasing as a result of an increase in population as well as a change in the lifestyle of people especially in the increased use of disposable materials. In developing countries the most common method of disposal of waste collected is at open dump site which is left to develop into heaps and periodically burnt as a form of management due to the lack of recycling plants to recycle the waste (Gwisai et al 2014).

The huge waste situated in Abokobi is as a result of the site serving many municipalities with waste generated on a large scale daily. According to the Zoomlion Waste Management Company, a Ghanaian waste management company, about sixty trucks offload waste daily at this site from different places with Abokobi generating about 313 tonnes per month. The site is a crude dump site, that is, it is not engineered and has no recycling plant for the recycling of refuse which has over the years contributed to the huge heap of refuse on the site (Ga East Municipal Assembly, 2013). The huge pile of refuse found in Abokobi with a heavy stench has over the years, posed dangers to the inhabitants of Abokobi as periodic combustions of gases cause fire and smoke often engulfed the entire town and sometimes spread to nearby communities about 18km from Abokobi.

In recent times, inhabitants around the Abokobi dump site have called for its closure due to the pollution it causes. Nonetheless, the site also has positive effects which are mostly undermined. It serves as a source of livelihood for other locals who will lose their economic livelihood should the site be closed down. The focus of this study is to examine further, both positive and negative effects of the Abokobi dump site on peoples livelihood in Abokobi. In order to understand and explain better the situation, the following questions are posted.

1.3 Research Questions

1. What are the positive and negative effects of landfill sites on economic livelihood of people living in Abokobi?
2. What are the solid waste management practices and challenges at the dump site in Abokobi?
3. In which ways do the location of the dump site affect the income generation of people in the community?

1.4 Objectives of the Study

The main aim of this study is to examine the positive and negative effects of the landfill sites on economic livelihood of people living in Abokobi

The specific objectives are:

1. To identify the solid waste management practices and challenges at the dump site in Abokobi.
2. To examine the positive effects of the dump site on economic activities of people in Abokobi.
3. To ascertain the possible livelihoods that is made out of the landfill site by beneficiaries.

1.5 Organization of the study

This study is presented in five chapters. Chapter One dealt with the introduction and focused on the background, problem Statement, objectives and research questions, scope of the study, conceptual framework and organisation of the study. Chapter Two was on literature review. Chapter Three looked at the research methodology, population and sampling procedure, instrument and the mode of analysis of the data. Chapter Four dealt with

the analysis of the data and findings whiles Chapter Five focused on the discussion, summary of the findings, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Solid waste generation is normal in every economy, thus it is an inevitable phenomenon. The more an economy grows the more waste generated or likely to be generated and the more waste generated, the huger waste dump site become. It is therefore important to manage the solid waste in such a way that it does not affect habitats and the environment as a whole. In recent times solid waste management has been a growing concern as the environment and its inhabitants are beginning to face the adverse effects of improper management of solid waste.

In Ghana, the municipal assemblies are responsible for waste management and there are waste dumping sites where all solid waste within an area is finally dumped. One of these dump sites is the Abokobi dump site which is a hub of refuse to many municipalities. This chapter reviews literature on waste collection, classification of landfills, dump site management and, the negative and positive effects if dump site.

2.2 Waste

There are so many definitions for waste by different authorities McDougall et al (2008) defined waste as, "the by-product of human activity. It contains the same material as are found in the useful products; it only differs from useful products by its lack of value" (McDougall et al, 2008, p.1). According to Royal Commission on Environmental Pollution (1984),, Waste is described according to the Royal Commission on Environmental Pollution (1984), as " unwanted residues that are usually perceived to be of negative value" (cited by Hamer 2003, p. 72). Gourlay, (1992) also pointed out that a thing can become waste when it loses its usefulness to the owner or fulfils its purpose and no longer of any use to the owner.

(Gourlay, 1992 cited in Freduah, 2004). According to the three definitions, things are regarded as waste when they lose their value to the owner; hence, their services are no longer required and wanted by their owners thus disposed off. From the three definitions waste can be any substance or material that appears to any person, as of no use in the short term and its presence to the owner has no value. However it does not mean that waste is entirely of no value. Even though it may appear to be no value in the short term, in the long term, it can b2e recycled to gain value.

Waste can be classified based on different attributes which take into account the original use, physical state, physical properties, origin, material type and safety level (McDougall et al 2008). Waste can be in the form of liquid, solid and gas and is dumped into the environment, either in water bodies, on land or released into the atmosphere causing pollution of the environment which adversely affects people and their ability to earn a living. Solid waste is therefore the focus of this study and will be discussed in the next section of the review.

Wastes are classified into different categories by different people depending on the area being studied. These can be classified by their decomposable nature; which includes biodegradable or decomposable wastes and non biodegradable or non-decomposable wastes and classification based on source which could be municipal waste (residential and commercial) and industrial wastes (Ayomoh et al, 2007, p. 108). This study therefore focuses on municipal solid wastes at dump site and its effect on economic livelihoods.

2.2.1 **Solid Waste**

Any tangible material discarded as useless or unwanted as a result of human and animal activities would be considered as solid waste (Tchobanoglous et al 1993). Zerbock (2003) states that solid waste includes non-hazardous industrial, commercial and domestic waste including household organic trash, street sweepings, institutional garbage and construction

waste. Khan (2003) defines solid waste as "a material that is cheaper to throw away than to store or use"(as cited in Chirisa, 2013, p.2). Operationally, solid waste will be defined in this context as any tangible material resulting from human activities be it domestic or industrial and regarded as no longer important or of no value and therefore disposed off.

2.2.2 **Solid waste collection and disposal in Ghana.**

In Ghana, district assemblies are responsible for the management of sanitation and waste and they are supported by other institutions and organisations such as the Environmental Protection Agency (EPA) which gives technical support by setting environmental standards and guidelines. According to UN-HABITAT (2009), Accra is separated into 16 waste collection zones and contracted to different waste management firms who are responsible for solid waste collection and disposal with the Accra Metropolitan Assembly (AMA) as a supervisory body. The AMA supervises the collection of waste, monitoring of the public-private partnership and management of final disposal or dump sites (UN-HABITAT, 2009).

According to Tsiboe and Marbell (2004), there are basically three methods of household waste collection in Accra. These involve collection by waste trucks outside households. This is normally done in compactor trucks and on weekly basis in high-income residential areas like Roman Ridge, Airport and Cantonments. The second method is the use of a general community bin which is placed at vantage points and serves a number of households. This is normally seen in low income areas and in market centres. These containers are normally collected by the Waste Management Department to the landfill site when they get full. The last method is the Door-to-door collection services in middle-income (Stephens et al 1994, cited in Tsiboe and Marbell, 2004).

In recent times, the Zoomlion Company Limited is an institution which is mainly in charge of waste management within the country. The work of the Zoomlion is therefore complemented

by private organisations that come round once in awhile depending on agreements reached between these organisations and the individual and it is normally done on a door-to-door basis.

2.3 Classification of Landfills

Landfill is a general term used to refer to the final point of solid waste after it has been collected and transported from the various points of generation. Even though a general term, landfill sites are further categorised into various types. The open dump approach is a category of landfill which according to Johannessen and Boyer (1999) is an old system of landfill and mostly practised in developing countries. These are usually opened areas with no regulations thus disposal of waste is done in a random nature with limited measures and resources to control operations and activities on them. Because there is no regulation of such sites, all manner of activities including defecation and indiscriminate burning are done on such dump sites. These also include all activities related to the environmental pollution and other effects of landfills (Johannessen and Boyer, 1999).

A much upgraded version of the open dump is the operated or semi-controlled landfill. In recent times countries that had open dumps are moving towards this type of dump site. They do so by putting such dump sites under the waste management departments who take over responsibilities for their operations including its inspection and its maintenance. According to Johannessen and Boyer (1999), this type of landfill is often the first stage in a country's efforts to upgrade its landfills. Practices in such landfills include records of incoming wastes, practice of compaction of waste as a form of management, and sometimes the application of soil cover as a form of waste burial. In most cases these dump sites are less capable of

managing contaminant released neither do they take into account advisory measures like leachate and methane gas management (Johannessen and Boyer, 1999).

According to Johannessen and Boyer (1999) there is also the engineered landfill, sanitary landfills as well as the Controlled Contaminant Release Landfill. These are built dump sites that are capable of reducing odours, dust, leachate and methane gas. The landfills that are generally used in advanced countries and engage in waste compaction and the application of daily soil cover to reduce all pollutants. These dump sites are mechanised and control leachate and other pollutants, thus they have less effects on the environment as compared to the open and semi controlled or operated landfills. Most advanced countries who practise these kinds of landfills practices engage in waste separation for the purpose of recycling. Countries who use these kinds of landfills also put in place additional facilities such as recycling factories and other factories that are capable of capping gas for other purposes (Johannessen and Boyer, 1999). Table 2.1 shows the various types of landfills and the measures used in their engineering, their leachate management system, gas management system and their operational measures as well.

Table 2.1: Types of landfill sites

	Engineering Measures	Leachate Management	Landfill Gas Management	Operation Measures
Semi-Controlled Dumps	None	Unrestricted contaminant Release	None	Few, some placement of waste –still scavenging
Controlled Dump	None	Unrestricted contaminant Release	None	Registration and placement/ compaction of waste
Engineered Landfill	Infrastructure and liner in place	Containment and some level of leachate treatment	Passive ventilation or flaring	Registration and placement/ compaction of waste; uses daily soil cover
Sanitary Landfill	Proper sitting, infrastructure; liner and leachate treatment in place	Containment and leachate treatment (often biological and physic-chemical treatment)	Flaring	Registration and placement/ compaction of waste; uses daily soil cover. Measures for final top cover
Controlled Contaminant Release Landfill	Proper sitting, infrastructure, with low-permeability liner in place. Potentially low permeability final top cover	Controlled release of leachate into the environment, based on assessment and proper sitting	Flaring or passive ventilation through top cover	Registration and placement/ compaction of waste; uses daily soil cover. Measures for final top cover

Source: Johannessen and Boyer (1999)

2.3.1 **Dump Sites Management**

According to Hamer (2013), management of solid waste includes the reduction, separation, recycling, treatment, disposal and other simple methods such as dumping in landfills or

dumping into both fresh and marine waters and uncontrolled burning. However it is acknowledged that none of the management methods is a safe system for humans (Hamer, 2013, p.72-73). These simple methods of dumping into both fresh and marine waters and uncontrolled burning as a way of waste management, is not environmentally friendly and rather will destroy the environment other than sustain it. In Ghana, waste is normally dumped in open dump sites and hardly any recycling is done. This is one of the most practised methods of solid waste disposal. About 95% of Municipal Solid Waste collected worldwide finally ends up in landfills (El-Fadel et al. 1997). In Accra for instance, the Waste Management Department are responsible for the management of the solid waste disposal sites at Mallam, Oblogo and Abokobi (World Bank, 1999).

In many developing countries, greater proportion of the budget meant for of solid waste management, is in most cases allocated to the collection and transportation of solid waste to the detriment of the development of proper disposal sites, acquisition of equipments, and maintenance of dump sites (Cointreau-Levine, 2000). This has placed importance on collection and transportation of waste alone but to a larger extent management and control in the development of dump sites needs very urgent attention. In many cases when waste gets transported safely to the dump site it is taken that waste has been successfully managed but management must extend beyond collection and transportation alone.

Management of dump sites is therefore more complex than the collection and transportation process of waste management. Its starts from waste treatment before disposal, to waste compacting and methane gas management, stench management, also leachate treatment and management and management of fires at dump sites (Asian Productivity Organisation, 2007; Gugssa, 2012; world Bank, 1999; Hoffman, 2005) . This kind of management is normally found in Controlled Contaminant Release Landfill (Johannessen and Boyer, 1999)

Scavengers are found on these sites in these open dump areas in their attempt to collect plastic containers and metals for sale to ready buyers (Adeyemi et al, 2001). Economic activities such as the sale of food and the provision of other services within the area are sometimes near these facilities in order to make a living. The activities go on amidst the stench and houseflies that emanate from these dump sites. Poor dump site management therefore has the tendency of destroying businesses located in the vicinity of the dump site. Dump sites in general has many effects on the livelihoods of people living around them especially in developing countries where due to population increase in big cities has led to the spread in human settlements as far as living close to dump sites.

2.4 Negative and Positive effects of Dump sites

Dump site are known for the final disposal of unwanted materials but they pose lots of environmental hazards (World Bank, 1999). According to the Royal Commission on Environmental Pollution (1984), waste disposal at every point brings about pollution therefore it is impossible to separate the two. Pollution therefore describes both the act of polluting and the consequences or effects of that act (Hamer 2013, p. 72). Pollution according to the RCEP (1984), is, "the introduction into the natural environment by humans of substances, materials or energy that cause hazards to human health, harm to living resources and ecological systems, damage to structures and amenities or that interfere with the legitimate uses of the environment" (cited by Hamer, 2003, p.72). This therefore implies that the act of dumping at a particular point in itself is pollution and the management practices at that point also cause pollution in various ways. Common pollutions associated with dump sites therefore involves air(smoke, stench and gas), land and water (surface and ground water) but commonly experienced by people around dump sites is air pollution; that is, the smoke that emanates from burning waste and the strong stench that comes as a result of the decay of some waste. According to the United States Environmental Protection Agency

(2012), uncontrolled dumping of waste causes a lot of health implications due to the release of certain pollutants.

According to APO (2007), not only does dump sites produce foul odours and air pollution which adversely affect the environment and the people within it, but also they attract rodents and other insects which spread certain harmful micro organisms in its surrounding areas thereby putting both inhabitants and the workers especially at dump sites at a great risk of attracting diseases (APO, 2007).

A report from Environmental Protection Agency (2013) indicated that garbage collected at none engineered dump sites has very high risk of leachate, a liquid formed by decomposing waste, soaking into the soil which goes to contaminate ground water making it toxic for human consumption. This substance is fast aided into the soil and has wider spread during the rains. The US. EPA (2012) also raised concerns of leachate not only affecting ground water but also its movement to and contamination of surface water hence putting life at risk whiles also endangering the lives of communities that source water from such water bodies. With the attraction of these insects and rodents, there is a high risk of them moving into homes and exposing habitants near such facilities to health risk and hazards. Disease carrying insects such as houseflies and mosquitoes that are among the insects from the dump sites pose the risk of cholera and malaria especially in African countries (Hamer, 2013).

Hoffman (2005), also indicated that waste fires at dump sites, pose serious risks to the environment and some can be difficult to put out. Fires at dump sites spreads rapidly due to the presence of certain gases and creates thick smoke which make it extremely difficult to extinguish. Uncontrolled burning of wastes and improper incineration contributes significantly to urban air pollution (World Bank, 1999).

This negative environmental impact, as a result of fires at dump sites if not controlled from the onset, brings about heavy smoke and this affects the health of people living in nearby communities around the dump site. Public Health Service identified 22 human diseases that are linked to improper solid waste management (Hanks, 1967. Cited in Tchobanoglous et al., 1993). Waste workers and pickers especially on dump sites in developing countries hardly ever protect themselves from direct contact with wastes and dust stemming from disposal practices posing serious health problems to them (Tchobanoglous et al., 1993).

According to Gugssa (2012), the major reason for the start of fire at the landfills is the methane gas that results from the decomposition of piled up waste. Accumulated waste causes the combustion of such flammable gasses which brings about landfill fires. The World Bank (1999) published a report that categorised dump site fires into two: surface and sub-surface fires. Surface fires can be caused from waste that arrived to the site already flaming or contain materials that can easily catch fire or from smoking on the site. In open dumps, scavengers may start fires to find valuable materials to recycle, such as metal and if such fires are not controlled, they can spread and result in pollution (World Bank, 1999). The negative effects of dumpsites to the environment are therefore by way of pollution and the bringing about of disease causing rodents and insects.

Dump sites do not only serve as the final place or points for waste, they also serves as a source of livelihood for people and also for the production of energy as gas can be tapped from them to produce electricity and for other domestic purpose through the process of waste-to-energy (Global Alliance of Waste Pickers, 2012). Tevera (1994) considered waste picking as a means for waste pickers to make their livelihood hence the importance of dump site to these groups of people. Waste picking is practised in different parts of the world with some being a method of controlling large quanties of waste as well as promoting recycling.

Dump site therefore is one of the major places for this activity. It provides a source of livelihood for less privileged people both males and females who decide to engage in waste picking. Njoroge et al (2013) in Kenya realised that males were dominant in waste picking activities as a means to feed their families and this was done as their only source of livelihood. The dominance of men as compared to women in this activity is as a result of men being the head of the family. The cultural attribution placed on women as being in charge of the home. Again, waste picking at dump sites, is a tedious job or task for women to engage in due to the nature and conditions at these sites. These people, due to the presence of dump sites collect items which they exchanged at recycling companies for money. In Nairobi, sale of these items is done to a large recycling company which is solely responsible for the buying of any material from waste pickers (Baud and Post, 2003).

Studies by the Global Alliance of Waste Pickers (2012) show that there are about 1.5 million waste pickers in India, 18,000 in Colombia, and 15,000 in Uruguay who all make their livelihoods from dump sites. This indicates the importance of dump sites to the livelihoods of these individuals. None-the-less, the engagement in waste picking may not entirely improve livelihood in all cases even though it is a source of income generation. This study is situated within the context of the Drivers, Pressures, State, Impact and Response framework which can explain better the situation under study in order to gain deeper underatanding.

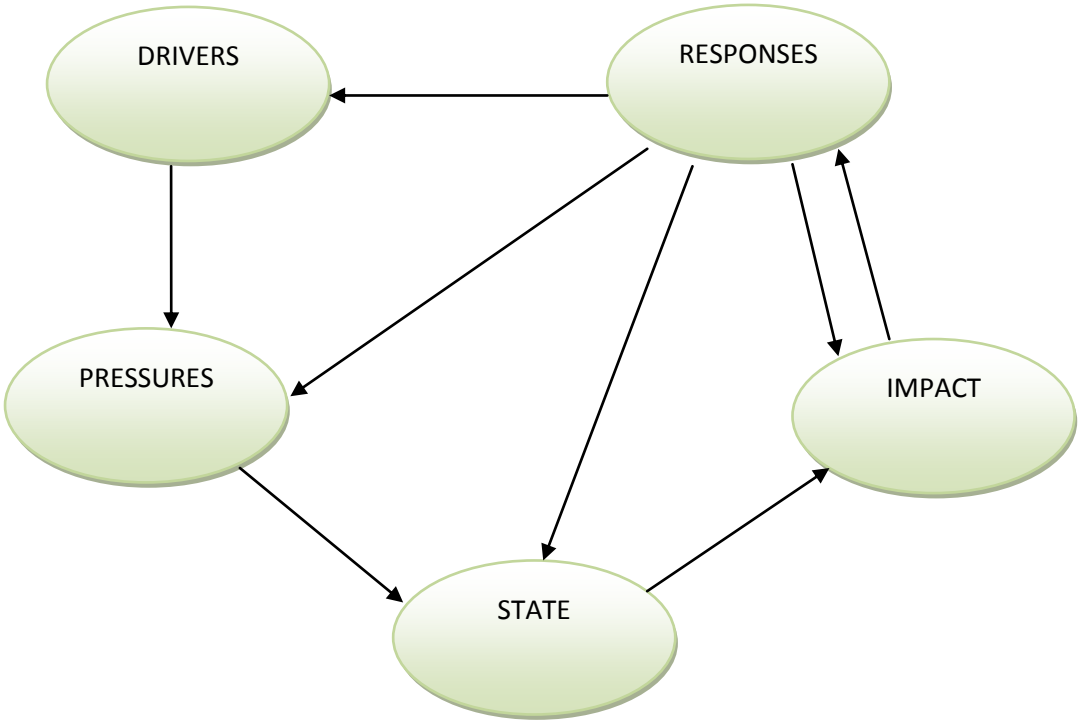
2.5 The Drivers, Pressures, State, Impact and Response (DPSIR) Framework

This is a framework which distinguishes Driving forces, Pressures, State, Impact and Responses. This was an adopted framework by the European Environment Agency on how to proceed with the development of a strategy for Integrated Environmental Assessment and this has been accepted and used more widely as an integrated approach for reporting. The DPSIR shows key components of the multidimensional, spatial and temporal chain of cause-and-

effect that forms the interactions between the human society and the environment (Kristensen, 2004).

This framework draws the relationship between the Drivers, Pressures, State, Impact and Response of environmental mediums. This tool will be appropriate to critically analyse the environmental conditions in relation to the dump site, bringing out the key issues that are relevant for discussions. The DPSIR framework as an analytical framework will be used for assessing the Abokobi dump site and its effect on livelihoods of both waste pickers and household. This allows a comprehensive assessment of the issues through examination of the relevant **D**riving forces and **P**ressures on the environment, the consequent **S**tate of the environment and its **I**mpacts, and the **R**esponses undertaken, and of the interlinkages between each of these elements.

Figure 1 Diagram of the DPSIR Framework



Source: Kristensen, 2004.

2.5.1 **Concepts of the DPSIR framework**

Driving forces: These are the fundamental processes in society that influence activities with a direct impact on the environment. This is sometimes referred to as the causes of environmental pollution. These include: demographics; economic processes (consumption, production, markets and trade); scientific and technological innovation; cultural, social, political and institutional processes.

Pressures: Elements that directly cause environmental changes, or, bring about the changing state in an environmental medium or situation. These include emissions of substances (pollutants or waste); external inputs (e.g. Fertilizers, chemicals); land-use patterns; patterns of resource extraction

State or trend: This refers to the temporal condition of a system, situation or environment medium at a particular time, exerted on it by the pressures. Examples include the quality of water, sediment, species composition, habitat structure and atmosphere. This also includes the trends in the state of whatever medium that is been studied.

Impacts: which are the direct and indirect effects of the state of that environmental medium on the social, economic and political sectors which causes a change in the outcome of situations or in peoples' lives.

Responses: These are actions in response to the drivers, pressures, state and impacts. They address issues such as vulnerability of both people and the environment, and provide opportunities for reducing human vulnerability and enhancing human well-being. Example: through science, policy, law and strong institutions.

For the purpose of this research, the DPSIR framework will be adopted and put into four **main** themes, which include, Factors that serve as drivers at the Abokobi dump site, resulting

pressures and state of the dump site, Impacts of the dump site to livelihoods and Measures undertaken as a response to minimise the effects of the dump sites.

CHAPTER THREE

RESEARCH METHODOLOGY AND PROFILE OF THE STUDY AREA

3.1 Introduction

This chapter is in two sections. The first section is about the methodology used for this study whiles the second section focuses on the profile of the Ga East Municipal Assembly where the study took place.

3.2 Research Methodology

The study determines the extent to which the landfill site affects the life of the people living in these communities. This section therefore describes the sample and sampling technique, the instruments for data collection and data analysis procedures.

Research methodology is relevant in every study because it serves as an outline of the research procedure(s) needed in addressing the research questions (Ahiadeke, 2008). It also serves as a guideline to the approach employed by the researcher to address the research problem (De Vaus, 2001).

3.2.1 Study population

The National Population and Housing Census (2010), estimated the population of the Ga East Municipal Assembly had a population to be 244 226 with a projected population for the years 2011, 2012 and 2013 to be 249 708, 255215 and 260,746 respectively (MPCU, Ga East Municipal Assembly, 2013).

The study population therefore comprised residents of the Ga East Municipal assembly and drawn from habitants around the dump site and also from waste pickers who pick from the

Abokobi dump for a living. Again the study involved the dump site manager and the Ga East Municipal Environmental Health officer. The selection of the Ga East Municipal Assembly for this study was because of the presence of the dump site in Abokobi, the municipal capital.

3.2.2 **Sampling Techniques and sampling size**

Purposive sampling, Snow ball and the convenience sampling techniques were used to select the respondents for this research. The dump site manager and the Environmental health officer of the Ga East Municipal Assembly for the purpose of their work at the dump site and with sanitation issues in the municipality respectively, were interviewed. The interview of these officers was necessary due to their direct job relation and knowledge about the Abokobi dump site and activities around it.

Non waste-picker respondents were selected based on their proximity to the dump site. Respondents in this category, who owned, worked in or operated businesses close to the dump site were selected using the snow ball sampling technique on how the proximity of the dump site affects their livelihoods. This was done by asking respondents to point out or direct the researcher to other respondents who operated businesses or have ever operated businesses close to the dump site. This was done to help the researcher find the effect of the dump site on such businesses.

Convenience sampling was also used in the selection of the waste pickers at the dump site on how the management of the dump site affects their economic activities which promotes their livelihoods. The unavailability of a reliable document bearing details of waste pickers informed the decision to use the convenience sampling method. Waste pickers were therefore selected based on them being present at the time of the administration of questionnaires. Hence this was done on the dump site and with waste pickers. Based on how convenient it was to meet the target respondents, questionnaires was sent in the early hours of the day

when waste pickers were present to pick waste. The questionnaires were therefore administered to the waste pickers based on how willing they were to partake in the study.

For the purpose of this research, 122 respondents were interviewed using questionnaires and interview guides. The 122 respondents comprised 60 waste pickers, 60 none waste pickers, the dump site manager and the Ga East Municipal Environmental Health Officer.

3.2.3 **Sources of data collection**

Both primary and secondary sources of data were used in this research. Primary data was obtained through observation, face-to-face interviews with the use of questionnaires and interview guides and self administered questionnaires.

Secondary data was used to complement primary data that was obtained from the field through interviews conducted on respondents. This was therefore obtained from reviewing books, articles, journals, publications from institutions and other internet sources to review literature in chapter two. Secondary data was also obtained from the Municipal Assembly on the profile and the dump site.

3.2.4 **Research Instruments**

Semi-structured questionnaires which consisted of open ended and close ended questions were used in the collection of primary data. The close ended questions provided respondents with options that best answered the questions to select from whiles with the open ended questions, respondents provided responses in their own opinion in the space provided. This enabled respondents to express themselves in varied views with regards to the study. Questionnaires were self-administered by the researcher with proper explanation provide. Questions were therefore translated into the local language in cases where the respondent did not understand English and responses written as being said by the respondent. Interviews

were conducted face-to-face with the environmental health officer and dump site manager with the aid of an interview guide.

3.3 Methods of Data Analysis

The study placed emphasis on both qualitative and quantitative techniques for the analysis. The qualitative data analysis was in the form of text materials which was used in the description of the data obtained from the respondent. This was done in the form of quotes and explanations of responses received. This method was used to better explain and discuss open ended questionnaires administered to respondent. The quantitative data analysis is in frequency distribution tables. This was done by the use of the Statistical Package for social Sciences (SPSS) where responses of respondents were put into the SPSS format and frequency tables were generated to obtain the regularity of responses for a clearer discussion.

Data analysis was analysed using the Statistical Package for Social Sciences (SPSS). The researcher basically employed a descriptive statistical method such as tables bar charts and frequencies to present the findings from the study. This was used to compute percentages and generate frequency distribution tables. Tables were generated to show the trends or pattern in responses and how they inform the research.

3.4 Field challenges

During the data collection exercise, female waste pickers were not comfortable and therefore not cooperative. No amount of persuasions could make them change their minds. The researcher employed the services of one of the key persons at the site but that did not work. They were of the view that people come with the same aim and ended up putting videos of them on national television which they did not like. However, only a few of them took part in the survey.

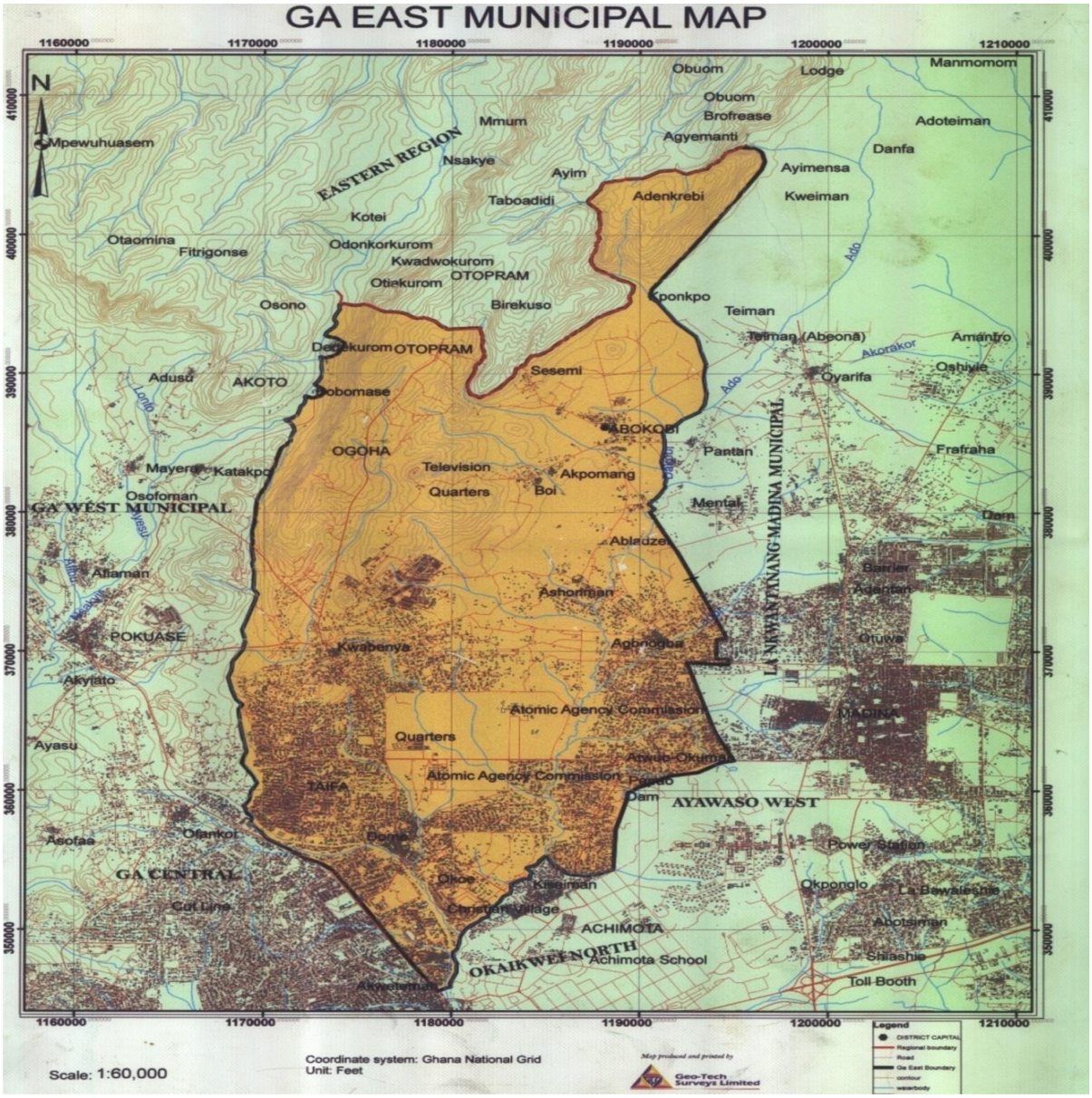
Again due to the nature of the study which involved waste pickers as part of the respondents, the researcher had to visit the dump site in order to collect data from this group of respondents. The hash condition of the dump site posed as a great challenge especially during combustion periods. This exposed the researcher to the adverse effects at the dump site and also delayed the data collection process as work had to come a halt in such times.

3.5 PROFILE OF THE STUDY AREA

3.5.1 Location and Size of the Ga East Municipal Assembly

The Ga East Municipal Assembly is located at the northern part of Greater Accra Region. It is one of the Sixteen (16) Districts in the Greater Accra Region and covers a Land Area of about 96km and boarded to the west by the Ga West Municipal Assembly (GWMA), to the east by the La - Nkwantanang Municipal Assembly (LaNMA), the south by Accra Metropolitan Assembly (AMA) and to the north by the Akwapim South District Assembly. The capital of the Municipal Assembly is Abokobi and the Municipality is sub divided into two administrative Zonal Councils; the Abokobi Zonal Council and Dome Zonal Council (Ga East Municipal Assembly, 2013)

Figure 2 **The Ga East Municipal area map.**



Source: Ga East Municipal Assembly, 2013

3.6 Demographic Characteristics

3.6.1 Population Growth

According to the National Population and Housing Census (2010), Ga East Municipal Assembly had a population of 244 226 with a growth rate of about 4.2%. The projected population for the years 2011, 2012 and 2013 is therefore 249 708, 255215 and 260,746

respectively. The growth of the population is mainly due to the influence of migration inflows (MPCU, Ga East Municipal Assembly, 2013).

The population is made up of about 51% males and 49% females. There are about 52 settlements in the district with an average household size of 4.6. The population is concentrated mainly along the urban and peri-urban areas of the Municipality particularly along the border with AMA. These include Dome, Taifa and Haatso among others (Ga East Municipal Assembly, 2013).

3.6.2 **Population Density**

The estimated 2010 population results shows a density of 1,214 persons per sq km much higher than the national density of 79.3 and the regional density of 895.5 persons per sq. km. This indicates a great pressure of population on land and other resources (Ga East Municipal Assembly, 2013).

3.7 **Economic Activities**

The Ga East Municipal Assembly has great opportunities for both private investment and joint ventureship with the public sector. There are four main economic activities in the District which are commerce, agriculture, service and industry. All these sectors produce waste in their line of duties which is all dumped in Abokobi. Farming therefore forms about 55% of the population in the Ga East Municipality. Abokobi is therefore made up of both private and public ventures. Petty trading is commonly noted in the town hence the dump site present in this town has some effects on these traders and their income generation (Ga East Municipal Assembly, 2013).

3.8 Developmental Challenges.

3.8.1 Waste Management

Waste management in the municipality is a huge challenge and a matter of concern to the Assembly. An estimate of about 385 tonnes of solid waste is generated monthly out of which 261 tonnes, representing 67% is collected leaving a substantial amount of backlog that creates various kinds of inconveniences including health hazard to people in the municipality. Out of the 261 tonnes collected the private sector collects about 81% through door-to-door collection (Ga East Municipal Assembly, 2013).

Apart from the door-to-door collection, waste is collected in containers placed at vantage points by the Assembly. The absence of proper engineered final disposal site is a major constraint.

3.8.2 The Abokobi Dump Site

The dump site was opened about thirteen (13) years ago as a temporary dump site which is now a major site for waste disposal and serves as the receptacle of waste for Ga-East and West, Ledzokuku Krowor, La Nkwantanang, and Adenta Municipalities. (Ga East Municipal Profile, 2013). According to the Zoomlion dump site manager, So far, about eleven waste management companies have been registered to dump their refuse on this site and the facility is been managed by Zoomlion Waste Management Company for about four (4) years now. The dump site is not an engineered landfill nether is there a recycling plant to recycle refuse to other uses. This has contributed to the piling up of waste of different kinds over the years resulting in the emanation of a heavy stench and smoke from the refuse burning a trend that has become a nuisance to the residents around the site who have to contend with the smoke and stench amidst fears of ill health.

3.9 Housing and development control

The urban areas of the municipality is also faced with the problem of inadequate housing units which has among other things, contributed to overcrowding, development of illegal structures, conversion of commercial facilities to residential use, streetism and pressure on social facilities and amenities. This has resulted in the development of slums in areas such as Dome, Taifa, Kwabenya and Haatso. The result of these is the creation of an insanitary environment with no drains and properly demarcated sanitary sites. Waste is therefore disposed off indiscriminately and liquid waste flows freely on the already poorly demarcated streets.

Farming is the major economic activity for about 55% of the economically active population. About 70% of the rural population depends on agriculture as their main source of livelihood with about 95% of them being small holders. The major agricultural activities are crop production and livestock production.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter deals with the data analysis and discussions of findings from the field. The discussion is done using the DPSIR framework and under four main themes with the sub-headings; Factor that serve as drivers at the Abokobi dump site, resulting pressures and state of the dump site, impacts of the dump site to livelihoods and measures undertaken as a response to minimise the effects of the dump sites.

The first theme will only discuss the factors identified as drivers of the Abokobi dump site. The second theme will also involve the discussing of the pressures exerted on the dump site as the result of the drivers mentioned in the first theme and the current state of the dump facility and how it leaves the environment. This theme therefore seeks to fulfil the first objective listed in the first chapter of this write up. The third theme will therefore concentrate on the effects the dump site has on the livelihoods of non-waste pickers whiles the final theme discusses the benefits of the facility to waste pickers. The third and forth themes also cater for the second and third objective stated in chapter one.

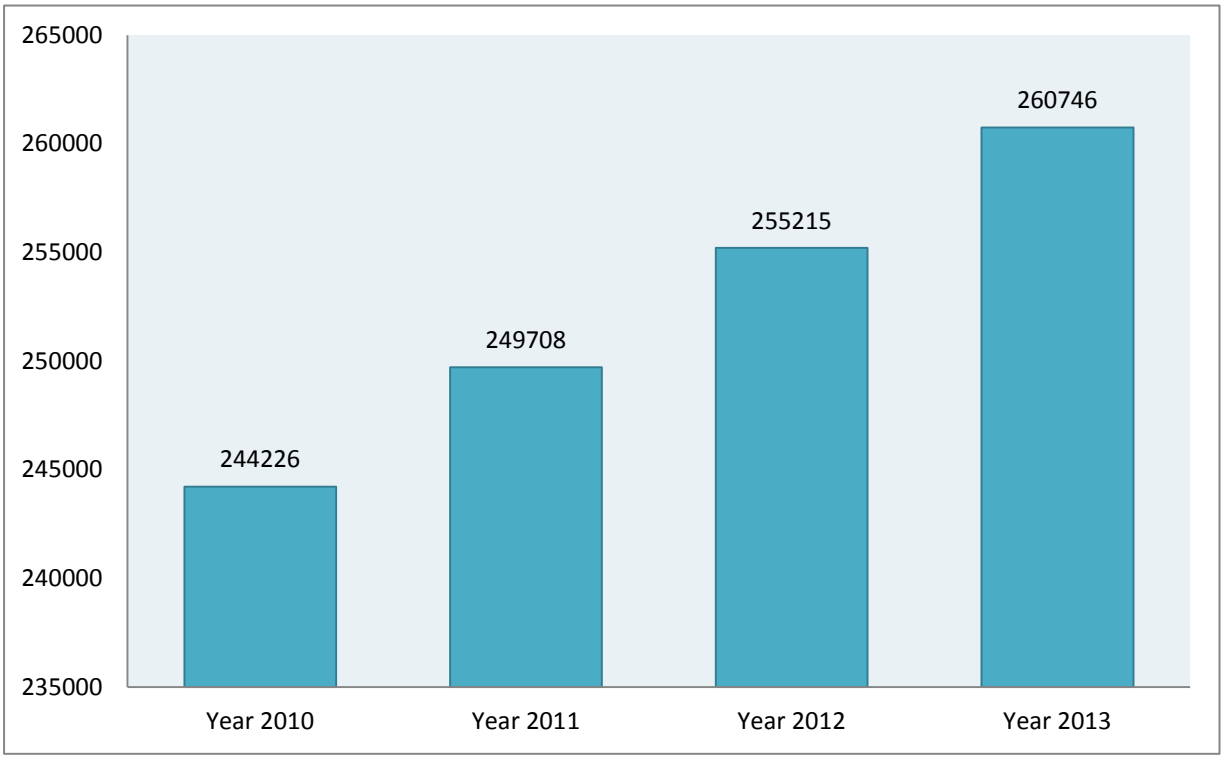
4.2 Factors that serve as Driving forces at the Abokobi dump site

Demographic factors and economic processes are all drivers of the Abokobi dump site. These include factors such as migration and population increase. The movement of people into Accra the nation's capital is a driver of the Abokobi dump site because it leads to an increase in population; a phenomenon that influences the daily activities of man and this has a great impact on the Abokobi dump site. Increased population leads to an increase in consumption which as a result increases the generation of waste. The Abokobi dump site manager stated that the site serves as a receptacle of waste to other municipalities close to Ga East including

La Nkwantanang Madina Municipal, Adenta Municipal, Ga West and South Municipal and Accra city all located in the Greater Accra Region. This indicates that waste generated by these populace are brought to the Abokobi dump site. The dump site manager stated that, *' this dump site receives solid waste from 11 registered private waste management companies all over the capital and an average of 7000 tonnes of waste is dumped here monthly'*.(Interview with Mr. Jonathan, (June, 2014))

Population increase has also led to an increased settlement hence the gradual closing up of people to areas that have been marked for other purposes. This is a similar situation with settlements around the Abokobi dump site which should have been far from human settlement to avoid its adverse effects. As shown in Figure 3, the increasing population in the Ga East Municipality therefore shows the extent to which waste is likely to be generated as a resultant case in increasing consumptions. Currently, the municipality generates an average of 313 tonnes of waste monthly as indicated by the dump site manager. This means that majority of waste dumped in Abokobi is generated outside the municipality. Figure 3, indicates the 2010 population of the municipality and the projected population to 2013 which indicates an increase over the years. DID YOU QUOTE THE MANAGER?

Figure 3 Population of the Ga East Municipal Assembly from 2010-2013



Source: Ga East Municipal Assembly, 2013

Aside demographic factors, economic processes such as markets and trade also drive the increase in solid waste dumped. Trading is a common activity carried out in the municipalities that dump waste in Abokobi therefore markets are located in these municipalities and major among them is the Madina market. Markets are among the centres of waste generation. Activities such as trade in polythene bags, papers, foodstuffs and operation of lorry stations influences the generation of solid waste resulting in the dumping of huge quantities of waste.

4.3 **Pressures and State of the dump site**

The presence of and size of the Abokobi dump site is as a result of the demographic and economic factors as explained as drivers. These factors lead to human activities that exert pressure in the form of an increase in waste generation. Collected waste from the various municipalities including the Ga East is brought to the Abokobi dump site for disposal. The

main pressures associated with the dump site is the emission of smoke stench, noise and leachate to air, water and land and the influx of insects such as houseflies and mosquitoes and also of rodents.

As shown in Plate 1 and 2, it was made known by the site manager, that fires on the dump site that brings about the smoke was as a result of combustion of gases produced due to the accumulation and compacting of waste. As stated by Gugssa (2012), accumulated waste causes the combustion of flammable gasses which can cause landfill fires, a phenomenon also realised by the Abokobi dump site manager, as been the major cause of fires on the Abokobi dump site. In certain cases, these uncontrolled combustions leads to the burning of greater part of the refuse on the site which courses thick smoke to engulf the vicinity causing discomfort to homes and other business ventures around the site, a result also found in the World Bank publication (1999).

The decay in the waste leads to the seeping of harmful liquid into the soil which has a risk of ground water contamination. This was confirmed by the Ga East Municipal Health officer as he stated that because the dump site is not an engineered landfill; leachate from it especially during rainy season cannot be collected hence it seeps into the ground and contaminates ground water causing water pollution. The decay in waste also results in the strong stench and influx of houseflies and rodents. Plate 1and 2 shows the extent of both land and air pollution that occurs as a result of the presence of the dump site.

Plate 1: Air pollution from dump site

Plate 2: Burning of electronic waste by pickers

Source: Field survey, 2014

As a result of the drivers discussed in sub section 4.2 of this chapter, huge quantities of waste are dumped on the dump site each month. According the to the dump site manager, the huge volumes of waste makes management of the site difficult because they do not have the requisite equipment as such management is done by the use of a bulldozer, a compactor and an excavator which he described as a normal practice in landfill sites.

This has led to the current state of a huge dump site with a total area coverage of 14,800 sq kilometres (Ga East Municipal Assembly, 2013) as shown in Plate 3. Combustion of refuse on the site, also leads to a current state of the presence of smoke as shown in Plate 4, which fills the vicinity and disturbs respiration. The strong stench as a result of the decay in organic waste, attracts lots of houseflies, and poses the risk of food related disease for inhabitants. These factors in the long run have a high risk of affecting health thereby hindering the livelihoods of people around the facility. This result therefore occurred in the study of Njoroge et al, (2013) who also argued that fire at dump sites poses a constant danger to habitant near such facilities. The current state of the dump exposes not only dump site

workers to risk, but also exposes entire vicinity to respiratory tract risk. Plate 3 and 4 below, show the state to which the dump site leaves the vicinity.

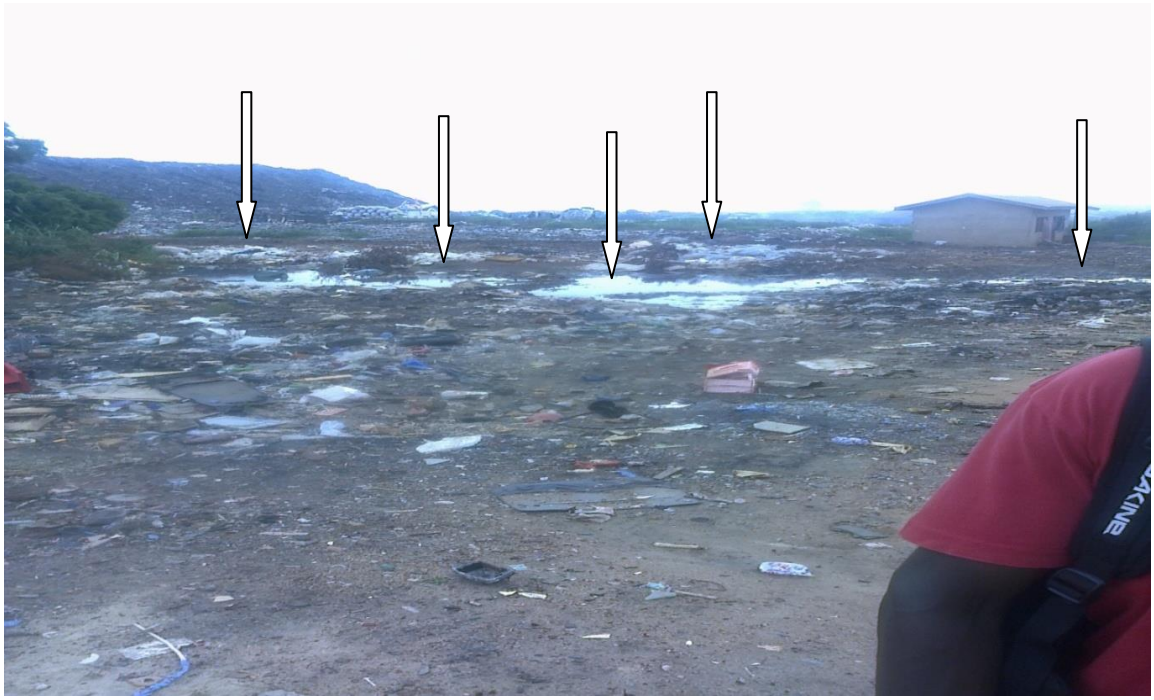
Plate 3: State of the dump site

Plate 4: Vicinity filled with smoke from the site

Source: Field Survey2014

The presence of the dump site currently hinders the free flow of rain water which has left the dump site with pockets of water as shown in Plate 5 which aids in the breeding of mosquitoes hence contributes to an increase in mosquitoes.

Plate 5 **Pockets of water around the dump site that aids in the breeding of mosquitoes**



Source: Field survey 2014

4.4 Impacts of the dump site to livelihood

4.4.1 Non-Waste pickers

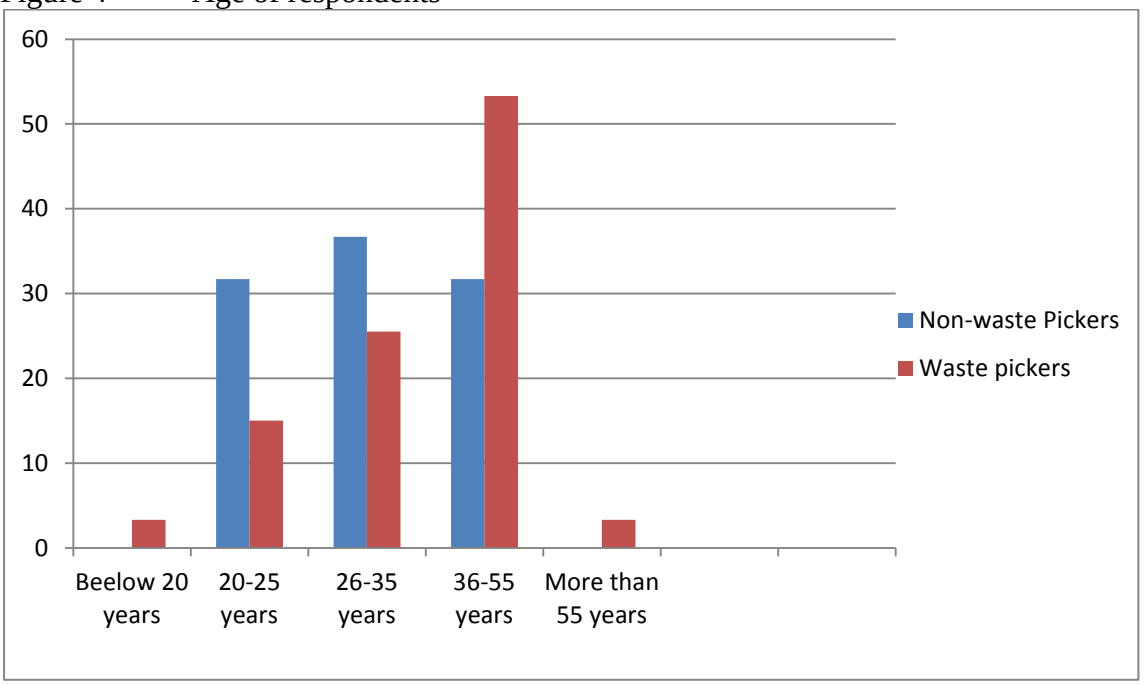
This section concentrates on non-waste pickers engaged in businesses within the vicinity. The dump site therefore has certain effects on this group of people and their various activities. Therefore, based on the data in Table 4.2, this section will concentrate on the negative effects that the site has on Non-waste pickers.

4.4.2 Demographic characteristics of Non-waste pickers

Out of the 120 respondents, 60 were non-waste pickers and the other 60 are waste pickers. Among the 60 non-waste pickers who took part in the survey, females formed 60% whiles males formed 40%. As shown in Figure 4, majority of non-waste pickers fall within the age

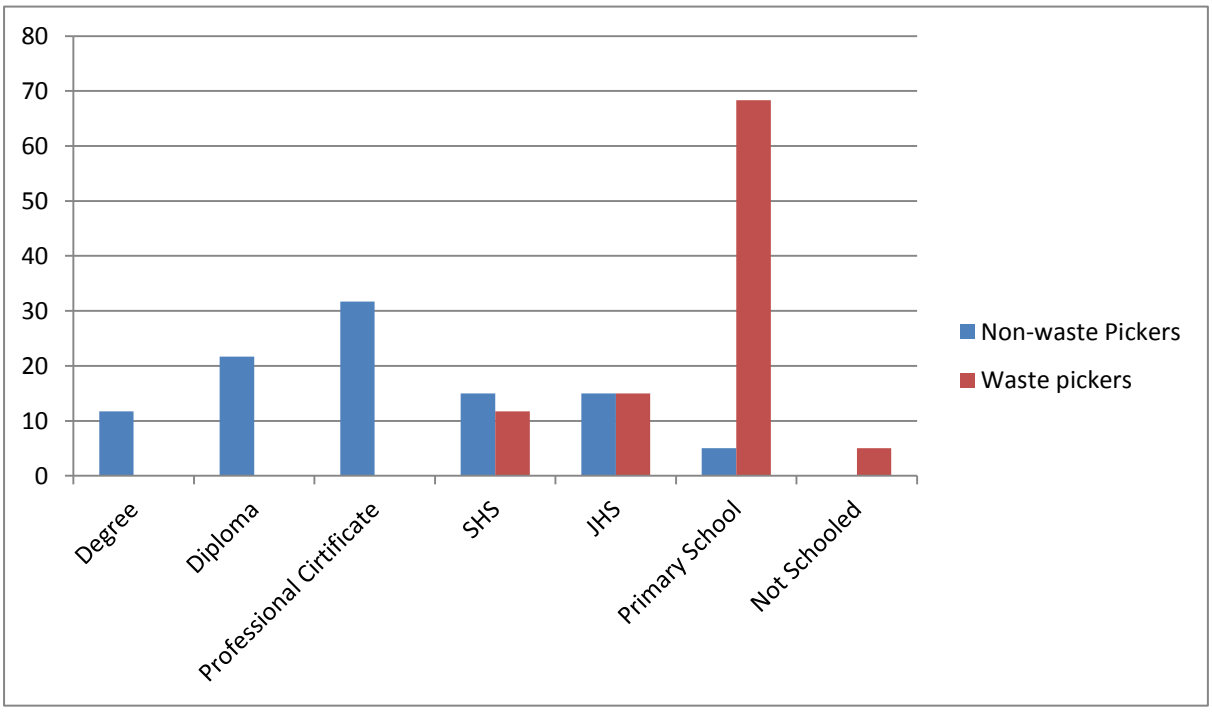
range of 26-35 with a percentage of 36.7% and overall, all non-waste pickers interviewed fell in the ages of 20-55. The age range of these respondents indicates that respondents are in the active age and form part of a strong work force. All were involved in informal activities such as food vending, hair salon, carpentry, operation of provision stores, concrete tile makers, and metal workers of welders. These respondents are self employed and depend on the daily sales made from their jobs to feed themselves and their families. Figure 5 also indicates the educational levels of the respondents and from this figure, the highest level of education of non-waste pickers is a degree with majority of non-waste pickers having a professional certificate in their various fields of work who were mostly beauticians and caterers.

Figure 4 Age of respondents



Source: Field Survey, 20014

Figure 5 Educational levels of respondents



Source: Field Survey, 2014.

4.4.3 **Effects of the dump site on Non-waste Pickers**

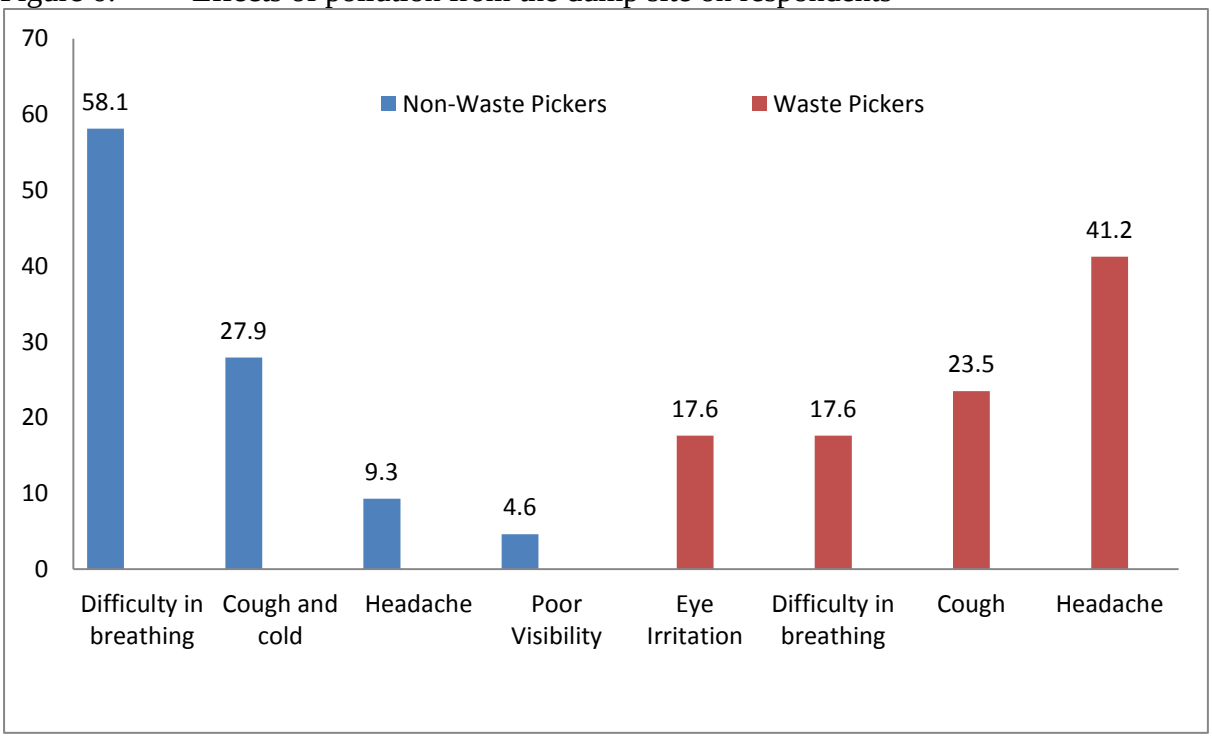
The pressures on the dump site which result in the pollution of the vicinity causes a lot of challenges to non-waste pickers. Table 4.1 shows the responses of respondents on the kinds of pollutions they suffer from the dump site whiles Figure 6 illustrates the responses on the effects of the various pollutions mentioned in Table 4.1 by respondents. From the survey, it was realised that 46 out of 60 non-waste picker respondents complained that the dump site posed challenges to them. The remaining 14 stated that the effect was not significantly felt in their businesses due to the distance they live away from the dump site. These people had their homes and businesses about 2 kilometres away from the dump site hence, they not being affected much by the pollution may be in most cases as a result of the direction of the wind which non affected respondents stated the direction wasn't towards them in most cases.

Table 4.1 **Challenges posed by the dump site on Respondent**

Non waste Pickers			**Waste Pickers**		
Kinds of pollution	**Frequency**	**Percentage**	**Kinds of pollution**	**Frequency**	**Percentage**
Dust	3	6.5	Smoke	17	100
Smoke, stench and Noise	43	93.5			

source: Field Survey, 2014

Figure 6: Effects of pollution from the dump site on respondents



source: Field Survey, 2014

Among the 46 non-waste picker respondents who suffer the effects are as follows, 93.5% stated that they were affected by the smoke stench and noise from the dump site. The noise was as a result of the machines that worked on the dump site as well as the trucks that brought waste to be dumped. Figure 6 shows the effects of the pollution on respondents.

The following disease symptoms were reported from those who suffered from the dump site; difficulty or shortness in breath (58.1%), cough and cold (27.9%) and headache (9.3%). This affects the health of these respondents and in so doing hinders them from attending to their businesses as they require to. Respondents complained of frequent visiting of hospitals as a result of recurrent illness and most of their income is spent on medication hence less income to be used for other household needs such as payment of their utilities. One respondent stated that she relocated her food vending business into the town far from the dump site in order to stay away from its effects. She further declared her movement as a result of the dump site affected her business positively because she experienced an increase in her daily sales. "*Initially, I was located close to the dump site but the stench and flies prevented customers from buying food so I relocated my business here. Business here is far better than when my previous location. My health is also not affected health now that I am here*". (Interview with a respondent June 20th, 2014)

Others stated that due to the effects of the dump site, they develop lazy attitudes towards work and also believe these factors prevent customers. A respondent stated,

"this is where my business is and as u can see, I am very close to the dump. With all this stench and smoke I feel very reluctant to come to work and even when I do, I am forced to close early to avoid falling sick" (Interview with a respondent June 20th, 2014)

Nonetheless, other business operators close to the site stated that they had nothing to do about the situation and try to live with it. A female petty trader stated that,

"the dump site poses a great discomfort to me and my business but I have nowhere to move to. I just close when the effect is too much and move around with what I sell. There's little I can do about the situation" (Interview with a respondent June 20th, 2014)

Again, influx of houseflies due to the decay of waste, mosquitoes and rodents in the vicinity also hinder the peoples livelihood. Respondents stated that, the dump site prevents or drives away their customers, affects their health and hinders productivity. Food vending respondents also stated that rodents and houseflies caused food contamination which affected sales any time that happened.

Housefly infested food vending joints discouraged customers due to the fear of the contraction of food related disease and this deprives the sellers of their livelihoods. Mosquitoes on the other hand, also prevent small food vendors and night sellers to engage in their activities and in most cases forces them to close against their will. In some cases respondents stated that they sometimes close their shops when the effects from the site is intense and work from home. This affects them because they lose some customers who come to meet their absence at their shops.

The General reaction by non-waste pickers therefore was that effects from the dump site disturb their economic activities in terms of poor health which prevents them from working and again makes them spend lots of their income on medication and hospital expenses. It was also observed that food vending businesses were not located in the immediate surroundings of the dump site as effects of the site gets minimal with distance.

Generally according to the non-waste pickers, the dump site has no benefit to them even though they acknowledge its services to waste pickers. Therefore during the survey non-waste pickers were of the view that if the assembly is unable to adequately manage the site to prevent its adverse effects, then it should be closed down.

4.5 Measures undertaken to minimise the effects of the dump site

Due to government's concern about waste reduction and management, calls for recycling has been made an important part of waste management therefore making waste picking an important activity for some people who earn a livelihood through the picking of waste from dump sites.

In order to assess the positive effects of the dump site, waste pickers who earn a living from the facility were interviewed. This section therefore concentrates on how the dump site contributes to the livelihoods of waste pickers whiles promoting recycling.

4.5.1 Waste Pickers

Waste pickers formed 60 of the total respondents of which 78.3% were males and 21.7% were females. The survey recorded few females due to the unwillingness of 12 female waste pickers to take part in the survey. Their reason being that in previous times, secrete coverage of them were taken in similar researches and aired on national television which had the tendency of disgracing them before family members who least suspected they were pickers of waste. That act discouraged them from taking part in all other researches. None-the-less, in the findings of the study of Njoroge et al (2013) in Kenya, it was realised that males were dominant in the waste picking activity and this was associated with the nature of the job as being too difficult and societal and cultural ascription to females but then again, contradicts Huysman (1994) who argued that women are at a disadvantage hence tend to dominate the waste picking sector owing to their low educational levels compared to men. This study therefore indicates that of the respondents, men are more than women in waste picking. This may also be due to the strenuous and harsh nature of this activity due to the conditions of the dump site which may not be favorable for women.

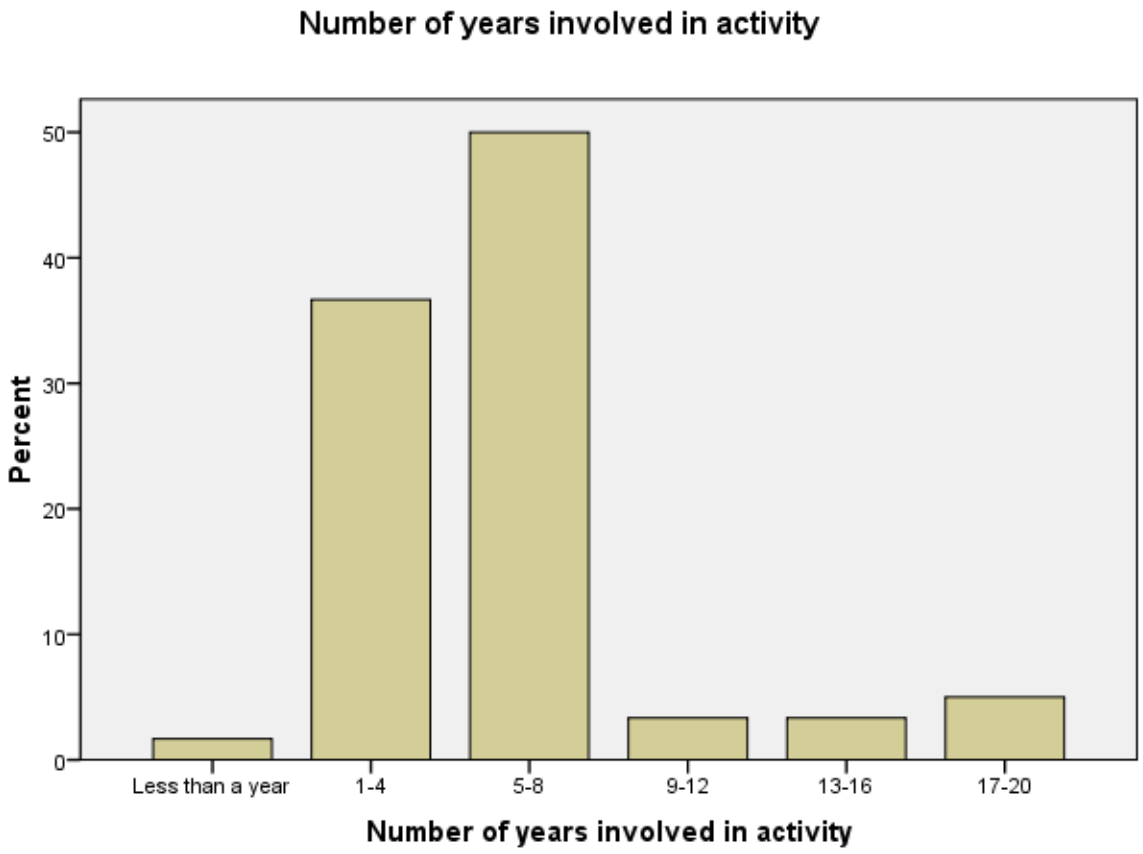
As shown in Figure 4, among the waste pickers, majority of them are people within the age range of 26 which are groups that are within the working class age and are responsible. The noticeable presence of the youth below the age 20 and the elderly above 55 among the scavengers perhaps is a pointer to the level of poverty in the society when there is no other means of support. This age group falls within the responsible age brackets who have families to cater for and with the current unemployment situation in the country, they engage in waste picking in order to generate income for their livelihood.

With the level of education of the respondents, it can be drawn from Figure 5 that overall, waste pickers involved in the survey had secondary education as the highest level of education with majority of them only ending with primary education. This therefore suggests that, these pickers possibly ended their education at this level because of poverty and therefore joined waste picking because it is a lucrative venture especially for respondents between the ages of 20-25, who may still wish to continue with their education or with other trades. Waste picking as seen by people as a demeaning job may also account for the high involvement of less educated people especially at dump sites. During the survey, some respondents, as part of their reason for joining in waste picking indicated that because of their low educational levels, there was no other job they could find other than to collect waste to feed their families.

The bar chart in Figure 7 shows a summary of the responses of waste pickers as to how long they have been involved in waste picking. Majority of the waste pickers interviewed picked waste only at the Abokobi dump site whiles others picked from the Abokobi site and from other places where they find heaps of refuse. Considering the number of years they have been involved in this activity, 50% of the waste pickers stated 5-8 years, 3.3% each both stated 9-12 and 13-16 years whiles 36.7% indicated they have been involved in waste picking

between 1 and 4 years. The remaining 1.7% and 5% have been involved in waste picking less than a year and 17-20years respectively. From Figure 7, it can be concluded that majority of waste pickers that took part in the survey have been in the waste picking business for 5-8 years. It was realised that all respondents who had been working on the dump site for 13 to 20 years had taken after their parents who were also waste pickers. This therefore explains the importance of waste picking to the livelihoods of such families which has now made it a family activity. Again the fact that majority of waste pickers interviewed had been in the activity for 5-8 years at the Abokobi dump site, indicates how long the Abokobi dump site in particular have benefited pickers and their families by providing them with their livelihood.

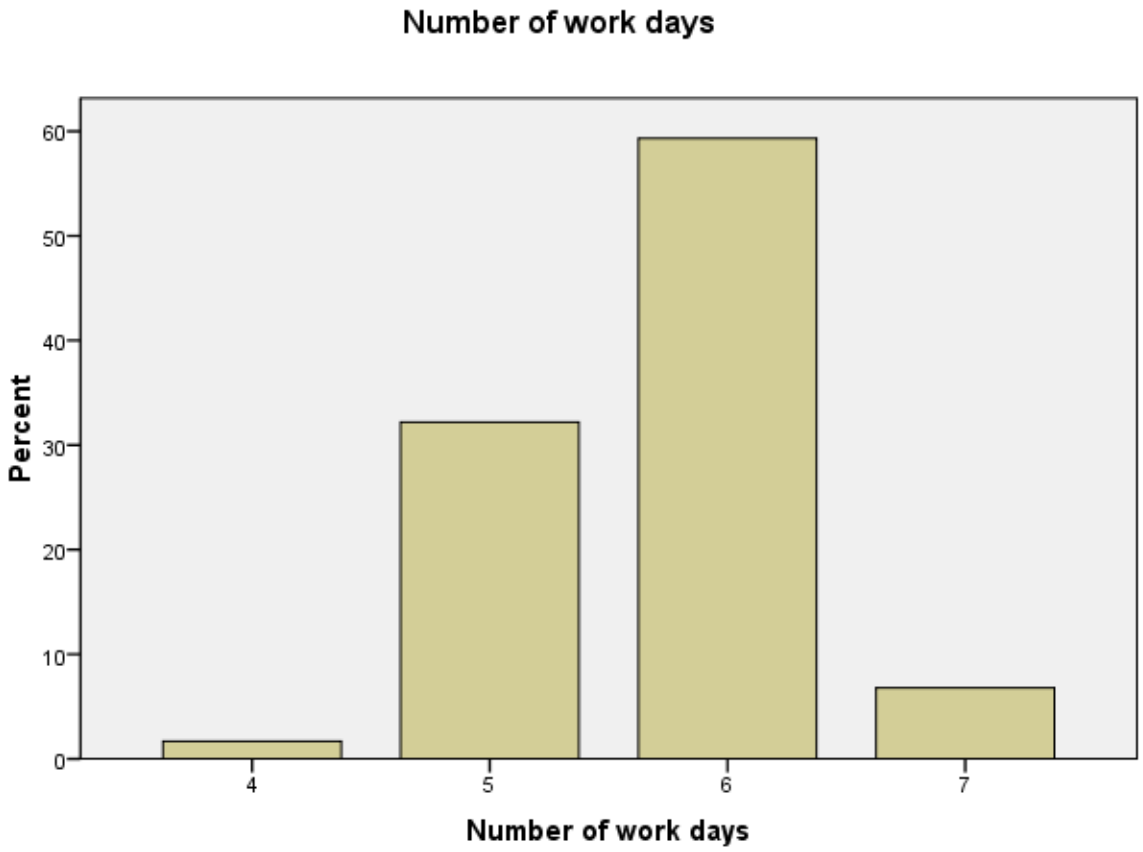
Figure 7 **Number of Years involved in waste picking by respondents**



Source: Field survey 2014.

Respondents also stated the number of days they work as pickers which ranges from 4-7 days. Figure 8 therefore is a graphical representation of data collected from respondents in regards to this. They involved 1.7% working 4days in the week, 32.2% working 5 days, 59.3% working 6 days and 6.8% working all through the week. This indicates that majority of waste pickers based on this survey, work 6 days in the week of which included holidays and weekends . It was therefore discovered from the study that, the work days of pickers depended on whether waste was dumped or not as well as how favourable the weather condition was. This is because they do not work on rainy days. This therefore contradicts the study of Gwisi et al. (2014) and other studies which indicated that waste pickers even worked in the rains. It was also discovered in this study that waste picking served as the only source of income for majority of the waste pickers (76.6%) who were involved in the survey. The others who constituted 23.3% were involved in other jobs such as masonry and security guards in addition to waste picking. It can be drawn from this that even though these pickers are into other activities, waste picking is still found to be lucrative and provides an extra livelihood for these pickers.

Figure 8 **Number of days worked by waste pickers**



source: Field Survey, 2014

4.5.2 **Marketing of picked waste**

In order to get income from items picked from the dump site, items needs to be exchanged. Marketing of these items is therefore very important to pickers. According to some waste pickers, marketing was done to special buyers who come to the site to buy them and on several occasions, waste pickers trade among themselves by buying each other's items to make up the quantity they require to make the amount of income they target. On other occasions, items are sent to specific industries in Accra, Tema and some as far as Kumasi where they get market for their items. Waste pickers confirmed that items such as water sachets and paper bags are sold to Trashy Bags, a recycling company in Osu that use the

water sachets for bags whiles others are sent to Circle to a company headed by a foreigner nick named, "Ibrahim Boola". Bottles are sold to Winera Company Limited for the use of bracelets and necklaces. Paper bags are also sent to Super Paper Products and Universal Royal Paper, also paper recycling companies in Accra and Tema for the use of other paper products including toilet rolls. Metals and scraps are taken to Ferro Fabrik Limited and the Tema Steel Company all located in Tema for sale. Others also trade their picked items with middle men in various locations who in turn make market of them elsewhere.

The findings of this study suggest that waste pickers of the Abokobi dump site have common points for the sale of specific waste as done in Nairobi where Baud and Post (2003) stated that there is a common large company which is responsible for the buying of any given material from waste pickers but in this case specific wastes are sold to specific recycling companies.

With regards to income generated from the sale of these items, out of the 60 respondents interviewed, 1.7% of the respondents stated their income below GH¢ 100 monthly, 60% makes an income between GH¢ 100-400 monthly whiles the remaining 38.3% make above GH¢ 400 monthly. Table 4.2 shows the prices of the various items picked at the Abokobi Dump site. From Table 4.2, the ability of the waste picker to make more money depends on the type of waste collected coupled with the number of hours one works and the amount of waste dumped in a day. Waste pickers who earned between GH¢ 100-400 monthly picked an average of 256 kilos and more of plastics, paper bags and tin materials. To earn above GH¢ 400, an average of 1,142 kilos of plastics, paper bags and tin materials must be recovered monthly. In terms of income from bottles, an average, of 900 bottles must be picked from the dump site. In order to earn between GH¢100 and GH¢ 400, an average of 3,333 bottles is

picked. The difficulty to pick this much of a particular category of material in a month makes most of the waste pickers pick all kinds of material that has market value.

Majority of respondents interviewed fell within the income brackets of GH¢ 100-400. Therefore taking into consideration the family size of the waste pickers, drawing clues from the 48.3% who form the majority of waste pickers, with children between 1-3, this amount as stated helps cater for their families and other responsibilities. Respondents therefore indicated they had no alternative to making a livelihood and to them the dump site is where they make their livelihood for their families. This compares again to the study of Njoroge et al, (2013) where most of the respondents pick waste as the only source of livelihood support.

Table 4.1 **Prices of the various items picked at the Abokobi Dump site.**

Material	Price (GH ¢)	Qty. of waste picked to earn GH¢100	Qty. of waste picked to earn GH¢300	Qty. of waste picked to earn GH¢400
Metals:				
Tin materials	10 pesewas/kilo	1000 kilos	3000 kilos	4000 kilos
Paper bags	5 pesewas/kilo	2000 kilos	6000 kilos	8000 kilos
Bottles :				
Vita milk bottles	5 pesewas/bottle	2000 bottles	6000 bottles	8000 bottles
Mineral bottles	10pesewas/bottle	1000 bottles	3000 bottles	4000 bottles
Beer/Guinness bottles	20pesewas/bottle	500 bottles	1,500 bottles	2000 bottles
Plastics:				
Water sachet	30 pesewas/kilo	333 kilos	1000 kilos	1,333 kilos
Gallons	60 pesewas/kilo	166 kilos	500 kilos	666 kilos
Bowls	90 pesewas/kilo	111 kilos	333 kilos	444 kilos

Source: Field survey, 2014.

Plate 6, shows some items recovered from the dump site by waste pickers waiting to be transported by their owners to their respective industries for sale. These items are tin materials, water sachets, paper bags, bottles, metal containers, bowls and gallons. This proves the positive effect of the dump site for waste pickers as it serves as the livelihood hub for them and their families.

Plate 6 Items retrieved from the Abokobi Dump Site by waste pickers for their livelihood

(a) Tin materials

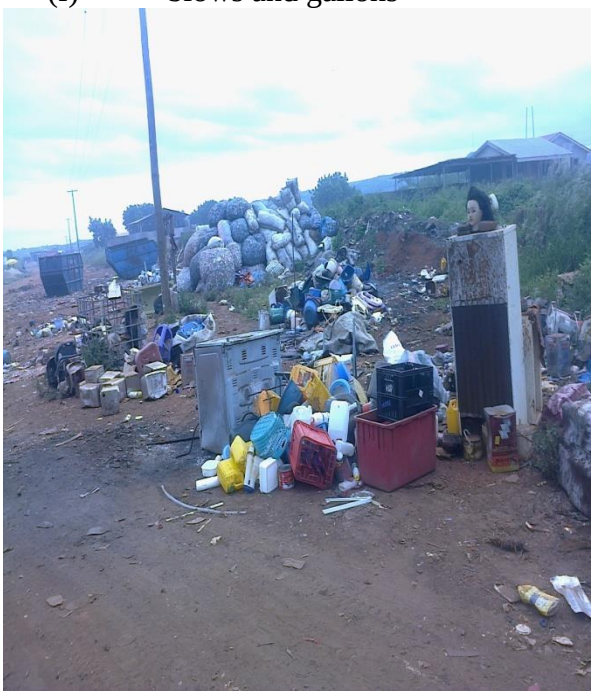
(b) Water sachets

(c) Paper bags

(d) bottles

(e) Metal containers

(f) blows and gallons



source: ISSER Class Field Survey, 2014

Currently the Ga East Municipal Assembly, as a way to minimise the effects of the dump site, is preparing a road map to decommission the Abokobi dump site whiles plans are underway to build a recycling plant to recycle materials, convert waste into compost and to tap gas for energy. This if done, will make it easier and accessible for waste pickers to trade their picked items without having to travel far which will help save their income.

Various strategies including fire fighting on the site and periodic spraying are also done occasionally to deal with the pollution from the dump site. The dump site manager during the survey said,

"We engage in periodic spraying of the site to control the stench and reduce houseflies and mosquitoes...and try to fight the fire with the use of the excavator". (Interview with Mr. Jonathan, June, 2014)

Even though the dump site poses lot of challenges to the inhabitants around it, to the waste pickers income is made out of it through waste picking and this helps them cater for their families and other needs.

4.6 **Conclusion**

Aside the mentioned pollutions and other effects of the dump site, noise was also recognised as a serious effect. This was as a result of the machines that worked on the dump site which includes the bulldozer, excavator and compactor. These machines worked all day at the site and this creates lots of noise. Waste trucks which also bring waste from other locations also contribute to the creation of noise. This gets intensified when trucks from other dump sites in Accra are redirected to dump their refuse in Abokobi due to a technical fault in the operation of those dumps.

Waste pickers even though earn a living from the dump site still face a lot of challenges while doing so. Out of the 60 respondents, only 17 stated that the effects of the dump site posed challenges and also mentioned the smoke as the major challenge to their activities stating eye irritation, shortness in breathing couth and headache as the disease symptoms related to the effects of the dump site as shown in Figure 6. With the waste pickers these disease symptoms could be as a result of the long hours they spend on the dump site coupled with weather and the hash working conditions without protecting their eyes, nose and mouth. The findings of this study can be compared to Gwisi et al (2014) where scavengers faced similar disease symptoms as a result of their activities on dump sites. It can therefore be concluded that the Abokobi dump site serves as a source of income for a group of people but it's harmful effects affect both beneficiaries and non beneficiaries.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. Introduction

This chapter is in three sections. The first involves a summary of the key findings of the study, followed by the conclusion of the entire work. The final section entails the recommendations on the basis of the results obtained.

5.2 Summary of Findings

This chapter outlines a summary of the main findings, conclusion and recommendations. In order to address the objectives stated in chapter one, the snowball and convenience sampling technique were used to select 120 respondents and interviews were conducted with the Environmental Health Officer and the dump site manager in Abokobi. The study involved two groups of respondents; waste pickers and non-waste pickers who form the two broad groups of people whom the dump site affects. This study therefore involved a sample of 60 respondents each, from these two groups.

Concerning the first objective of identifying the solid waste management practices and challenges at the dump site in Abokobi, the study indicated that the dump site is managed by the Zoomlion Waste Management Company through a service contract between GEMA and Zoomlion and management is done with the use of a bulldozer, a compactor and an excavator. This is done by spreading the waste with the bulldozer and compacting it with the compactor to create way for more waste. The site is also periodically sprayed to control the stench and also reduce the house flies.

The study therefore found out that burning is not part of the management practices at the dump site. Therefore the smoke that fills the town is as a result of combustion of gases in the waste and sometimes the negligence of waste pickers who burn electronic waste for copper wires or who drop cigarette during their waste picking activities. None-the-less, the zoomlion tries to fight these fires with the use of the excavator. Per the practices and state of the dump site, it was noted that the Abokobi dump site falls under the categorisation of a controlled dump site as categorised by Johannessen and Boyer (1999) thus the unrestricted release of pollutants that affected livelihood.

The second objective was to examine both positive and negative effects of the dump site on economic activities of people in Abokobi. It was realised that the effects of the dump site is mostly emission of smoke and serious stench (pollution), the breeding of mosquitoes, influx of houseflies and rodents all of which affects the health of respondents and hinders their productivity. This makes them spend most of their income on medical bills and treatments. The site due to the water dotted around it breeds mosquitoes which drives away traders who wish to sell at night. Houseflies and rodents also cause losses when they cause the contamination of food that is meant to be sold for income generating purposes. Due to the dump site which brings about lots of houseflies, customers fail to buy food from food vendors for the fear of food related diseases. All these factors affect the income generation of non-waste pickers and also affect their health negatively

In spite of these negative effects, the dump site serves as a business zone for waste pickers who make their livelihood from picking of waste. Livelihood is generated when items such as paper bags, bottles, scraps, tins, water sachets and other plastics are collected and traded off to recycling institutions for income. It could be said that dump sites not only has negative effects but also provides others with a livelihood. Therefore even though it was stated that the

site hinders non-waste pickers in income generation, it's also a potential source of income generation for others.

The study also showed that majority (60%) of waste pickers who benefit from the dump site by way of waste picking make an income of between GH¢ 100-GH¢ 400 and more monthly depending on the type and quantity of waste picked within the month. Sale of items picked was also done among waste pickers and to waste buying companies within and outside Accra. This fulfils the third objective which is to ascertain the livelihoods that is made out of the landfill site by beneficiaries.

5.3 Conclusion

Waste is inevitable in every economy and therefore needs to be managed in a way to reduce it adverse effects on inhabitants at the same time provide income for waste pickers. The Abokobi dump site therefore poses lots of dangers to people living around it not only through pollution but also aids in the breeding of mosquitoes, increased houseflies and brought about rodents. Notwithstanding all these negative aspects of the site, it also serves as an income hub for waste pickers to make their livelihoods.

It was therefore interesting to note that 43 waste pickers indicated the dump site does not pose any challenge to them. This may be due either to the long periods to which they have been involved in waste picking which has caused them to build resistance for the dump site effects or the failure to recognise the effects due to the benefit derived from the dump site.

The Ga East Municipal Assembly over the years have received complaints from non-waste pickers about the effects of the dump site which includes air pollution as a result of the smoke, complaints about the stench, rodents, insects and also about flying objects especially from moving waste trucks that come in to dump waste from other places. According to the

Ga East Environmental Health Officer, the site has so many implications on the peoples economic activities as it brings about diseases, ground water pollution and has also caused low land property values but also has it's positive side of providing jobs for scavengers or waste pickers.

5.4 **Recommendations**

As a form of recommendation to this study, there needs to be the establishment of a composting facility at the dump site that will be responsible for turning waste into other products such as fertilizers in order to generate revenue for the development of the Abokobi township as a form of compensation for the damage the site causes to them. This facility will also serve as a source for employment for people in the vicinity and an alternate to their various businesses in order to ensure a balanced situation between non waste pickers and waste pickers.

Again, there is the need to set up a gas plant or a waste-to-energy facility that will tap gas from the dump site for energy. This will help reduce the combustion that occurs and creates the emission of smoke whiles also serving as a source of income as it will create jobs for the people. This way, the waste will serve as a resource for energy production. By doing these, the negative effects of the dump on the livelihoods of non waste pickers will be reduced whiles enhancing the living conditions of people in the vicinity.

There is also the need for the education of waste pickers to obtain protective cloths in their activities, and the proper disposal of cigarettes to avoid fires on the dump site. Waste pickers should also be put in an association and taken through proper training with the necessary facilities provided them to help them in their activities. Open burning of domestic waste must also be stopped as Annepu et al (2013) attested that, it constitutes a major threat to public

health due to the release of dioxin and particulate emissions. To a larger extent, education and awareness on waste separation should be made to enhance waste picking activities.

Again the Zoomlion should intensify the spraying exercise of the dump and extend it to the towns to help control the stench, houseflies, and mosquitoes that come about as a result of the dump site. The site should also be fenced to prevent rodents from moving into the town and into homes.

References:

Ahiadeke, C. (2008). *Research methodology: theory and practice in the Social Sciences.* Accra: Sundel Services.

Adeyemi, A. S., Olorunfemi, J.F. & Adewoye, T.O. (2001). Waste scavenging in the third world cities: A case study of Ilorin, Nigeria. *The Environmentalist 21*(2) pp 93-95. Retrieved 21st February, 2014 from http://link.springer.com/article/10.1023/A%3A1010655623324#page-1

Addo K. (2013). *Solid waste management in Ghana: a case study of Effiduase and Asokore in the Sekyere East District* (Master's thesis, Kwame Nkrumah university of Science and Technology, Kumasi, Ghana) Retrieved on 21st February, 2014 from http:// dspace.knust.edu.gh:8080/xmlui/bitstream/handle/123456789/5400/Addo%20Final%20thesis -COMPLETE.pdf?sequence=1

Asian Productivity Organisation (2007). *Solid waste management: Issues and challenges in Asia. Environmental management centre, Mumbai India*. Asian Productivity Organisation.

Annepu R. and Themelis N. J. (2013). *Analysis of Waste Management in Accra, Ghana and Recommendations for further Improvements*. Earth Engineering Center, Columbian University. WTERT.

Ayomoha, M.K.O., Okeb, S. A., Adedejic, W.O., Charles-Owabad, O.E. (2007). An approach to tackling the environmental and health impacts of municipal solid waste disposal in developing countries. *Journal of Environmental Management 88* (2008) 108–114. doi:10.1016/j.jenvman.2007.01.040

Boadi, K. O. & Kuitunen, M. (2004). Municipal waste management in the Accra metropolitan area. Ghana. *The Environmentalist, 23*, 211-218. Retrieved on 2nd February

2014 from

http://www.researchgate.net/publication/226113492_Municipal_Solid_Waste_Management_in_the_Accra_Metropolitan_Area_Ghana/file/504635277398531d16.pdf

Baud, I.S.A. and Post, J. (2003). 'Between Markets and Partnerships: Urban Solid Waste Management and Contributions to Sustainable Development?' *Global Built Environment Review*, Volume 3, Issue 1, pp. 46-55

Chirisa I. (2013). Solid waste, the 'Throw-Away' culture and livelihoods: Problems and prospects in Harare, Zimbabwe. *Journal of Environmental Science and Water Resources* Vol. 2(1), pp. 001 - 008. Retrieved on 21st January, 2014 from

http://www.wudpeckerresearchjournals.org/JESWR/pdf/2013/January/Chirisa.pdf

Coffie M. F. (2010). *Landfill sites management challenges: the perceived effect and willingness on the part of the people in the Ga East and South municipalities to pay for improvement* (Master's thesis, Kwame Nkrumah university of Science and Technology, Kumasi, Ghana) Retrieved on 29th January, 2014 from

http://dspace.knust.edu.gh/jspui/bitstream/123456789/314/1/fulltxt.pdf

Cointreau-Levine, S. (2000). *Occupational and environmental health issues of solid waste management, with special emphasis on developing countries*. Retrieved on 1st March, 2014 from http:// www.integracionxxi.net.uy/medioambiente/Cointreau2.doc.

Cointreau-Levine S. and Coad A., (2000). Private sector participation in municipal solid waste management, Part 1, Executive Overview, Swiss centre for development cooperation in technology and management.

De Vaus, D. A. (2001). *Research design in social research.* London: SAGE.

Dijk, M. P. van (2006). Managing cities in developing countries. Theory and practice of urban management. Cheltenham: Edward Elgar.

El-Fadel, M, Findikakis, A. N. and Leckie, J. O., (1997). Environmental impacts of solid waste land filling. *Journal of Environmental Management*.50(1) Retrieved on 10th March, 2014 from http://www.sciencedirect.com/science/article/pii/S0301479785701314

Freduah, G.(2004). *Problems of solid waste management in Nima, Accra*. University of Ghana, Legon.

Ga-East Municipal Assembly (2013). Municipal Profile. Abokobi.

Ghana Statistical Service (2002) *2000 Population and housing census: summary report of final report*. Ghana Statistical Service, Accra, Ghana.

Ghana Statistical Service (2010) 2010 *Population and housing census: Summary report of final results.* Ghana Statistical Service, Accra, Ghana.

Ghana Statistical Service (2012) 2010 *Population and housing census: Summary report of final report.* Ghana Statistical Service, Accra, Ghana.

Global Alliance of Waste Pickers (2012). *Global Alliance of Waste Pickers.* Retrieved on May 2nd, 2014, from www.globalrec.org: http://globalrec.org/wp-content/uploads/2012/05/2012-04_newsletter-africa-english.pdf

Gugssa T. B. (2012) *The cycle of waste: a case study on the informal plastic and metal recovery system in Accra.* (Master's Thesis. Uppsala University) Retrieved on 21st January, 2014 from http://uu.diva-portal.org/smash/get/diva2:585668/FULLTEXT01.pdf

Gwisi D. R., Olusegun A. and Segosebe E. (2014). Respiratory and occupational health problems of scavengers and landfill employees in a municipal landfill site in Lobatse, Botswana. *Journal of Sustainable Development in Africa* (Volume 16, No.1, 2014). Retrieved on 10th April, 2014 from http://www.jsd-africa.com/Jsda/Vol16No1-Spring2014A/PDF/Respiratory%20and%20Occupational%20Health.pdf

Hamer, G. (2003). Solid waste treatment and disposal: Effects on public health and environmental safety. *Biotechnology Advances 22* (2003) 71–79. doi:10.1016/j.biotechadv.2003.08.007

Hoffman P.(2005). *The challenges of urban waste use as a means to enhance the livelihoods of peri-urban poor people. Development Planning Unit*. University college, London. Retrieved on 1st March, 2014 From http://r4d.dfid.gov.uk/PDF/Outputs/natressys/r8491annd.pdf

Johannessen M. L. and Boyer G. (1999). *Observations of solid waste landfills in developing countries: Africa Asia and Latin America*. Urban Development Division Waste Management Anchor Team. The World Bank. Washington DC.

Leitman, J. (1993), Rapid urban assessment: *Lessons from cities in the developing world*, Vol. 15 (Tools and Outputs), Urban Management and the Environment, The World Bank, Washington, DC.

McDougall, Forbes R. White, Peter R. Franke, Marina, Hindle, P., (2008). *Integrate solid waste management: A life cycle inventory*. Chichester: Wiley.

Millennium Cities Initiative and University of Ghana (2010). *Report on findings of the waste composition study for the Aryee Diki electoral area of Accra New Town, Accra.* Earth Institute, Columbia University and the University of Ghana, Legon

Njoroge S. K. et al (2013) Influence of Informal Solid Waste Management on Livelihoods of Urban Solid Waste Collectors: A Case Study of Nakuru Municipality, Kenya. *International Journal of Humanities and Social Science*. Vol. 3 No. 13

Nyang'echi, G.N. (1992*). Management of solid and liquid wastes: A manual for environmental health workers*. African Medical and Research Foundation.

Owusu G., Oteng-Ababio M., Afutu-Kotey L. R. (2012). Conflicts and governance of landfills in a developing country city, Accra. *Landscape and Urban Planning 104* (2012) 105– 113. Retrieved on 1st March, 2014 from http://www.sciencedirect.com/science/article/pii/S0169204611002933

Shafiul, A. A. and Mansoor, A. (2003). *Partnerships for solid waste management in developing countries: Linking theories to realities.* Institute of Development Engineering, Water and Development Centre (WEDC). Loughborough University, U.K.

Kristensen P. (2004). *The DPSIR Framework*. National Environmental Research Institute. Denmark

Tchobanoglous, G., Theisen, H. and Eliason, R. (1993). *Solid wastes: engineering principles and ,management issues*. McGraw-Hill Publishing Company, USA.

Tevera, D. S. (1994). Dump scavenging in Gaborone, Botswana: anachronism or refuge occupation of the poor? (G. Annaler, Ed.) *Series B, Human Geography , 76* (1), pp. 21-32.

Tsiboe, A. and Marbell Q. (2004) *A look at urban waste disposal problems in Accra, Ghana*. (Master's Thesis, Roskilde University). pp 13-14. Retrieved on 29th January,2014 from http://dspace.ruc.dk/bitstream/1800/322/1/A_Look_at.pdf

United States Environmental Protection Agency, (2002). *Solid waste management: A local challenge with global impacts.* Epa530-f-02-026 (5306W). Retrieved from http://www.epa.gov/solidwaste/nonhaz/municipal/pubs/ghg/f02026.

UN-HABITAT (2009). *Ghana: Accra urban profile*. United Nations human settlements Programme. Nairobi, Kenya.

World Bank (1999), *What a waste: Solid waste management in Asia*. (Volume 1 of Urban and local government working paper series). World Bank, Urban Development Sector Unit, East Asia and Pacific Region

Questionnaires

Institute of statistical Social and Economic Research

University of Ghana

MA. Development Studies

This a questionnaire to help come out with a write up on the topic, "Challenges of Solid Waste Management and its effect on economic livelihood. A case study of the dump site in Abokobi in the Ga East Municipality "

Household Questionnaires

The research is mainly for academic purpose. Therefore, answers given will be treated as confidential.

Thank you.

DEMOGRAPHIC DATA

1. Gender :

Male ☐ Female ☐

2. Marital Status:

Single ☐ Married ☐

3. Age:

21 -25 years ☐ 26 -30 years ☐ 31-35 years 36-40 years ☐

41- 45 years 46 -50 years ☐ 51 – 55 years 56 -60 years ☐ 61+ years ☐

4. Number of children (please specify):

None ☐ 1 – 3 ☐ 4 –6 ☐ 7 – 9 ☐ 10 –12 ☐ 13 or more ☐

5. Educational background/Qualification:

Degree ☐ Diploma ☐ Professional Certificate ☐ Senior High School ☐

Junior High School ☐ Primary School ☐

Others ☐ (please specify) ……..

6. Do you live in this vicinity?

Yes ☐ No ☐

7. If No, where do you live? .....

8. If yes, how long have you lived in this vicinity?

Less that 1 year ☐ 1 -5 years ☐ 6-10 years ☐ 11-15years ☐ 16 and above ☐

(a) Was the dump site in operation at the time you moved in to stay here?

Yes ☐ No ☐

9. If No, when did it get into operation? .....

OCCUPATIONAL DATA

10. What do you do for a living? .....

11. Have you ever had any business around here?

Yes ☐ No ☐

(a) If No, why?

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

(b) If yes,

12. Is the business still in operation?

Yes ☐ No ☐

What kind of business? .....

13. On average, how much do you make in a day? .....

14. How many days in a week do you work? .....

POLLUTION

15. What do you understand by pollution?

.....
.....

16. What kinds of pollution are you faced with?

.....
.....

17. How does the above mentioned pollution affect you?

.....
.....

18. During what time in the year do you experience the effect of the dump site more?

Between January and March ☐ Between April and June ☐
Between July and September ☐ October and December ☐

19. Have you as a group or as individuals said or done anything about the problems caused by the dump site?

Yes ☐ No ☐

(a) If No, why?

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

(a) If yes, what have you done about it

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

20. What do you wish should be done about the dump site to help you have a comfortable livelihood?

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

21. In what other ways has the dump site affected you? Whether in your health or economic activities.

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

IMPORTANCE OF THE DUMP SITE

23. Do you know of anyone in your vicinity whose business is affected by the dump site management?

Yes ☐ No ☐

24. Is the damp site in this municipality beneficial to any group of people living in this area?
Yes ☐ No ☐

25.Is the proximity of the dump site beneficial to you?

Yes ☐ No ☐

(a) If Yes, in which way?

.....

.....

.....

26. Do people pick from the dump site as a form of a job to make a living?

Yes ☐ No ☐

CHALLENGES OF THE SITE TO BUSINESS

27. Does the dump site pose any problem for your business?

Yes ☐ No ☐

(a) If Yes, what kind of problem(s)?

.....

.....

.....

.....

POLICY RECOMMENDATION

28. In your opinion, how can the problem posed by the dump site be solved?

.....

.....

.....

.....

THANK YOU FOR YOUR RESPONSE

END OF SURVEY.

Institute of statistical Social and Economic Research

University of Ghana

MA. Development Studies

This a questionnaire to help come out with a write up on the topic, "Challenges of Solid Waste Management and its effect on economic livelihood. A case study of the dump site in Abokobi in the Ga East Municipality "

Questionnaire for Waste Pickers

The research is mainly for academic purpose. Therefore, answers given will be treated as confidential.

Thank you.

DEMOGRAPHIC DATA

1. Gender

Female ☐ Male ☐

2. Age

below 20 ☐ 20-25 ☐ 26-35 ☐ 36-55 ☐ More than 55 ☐

3. Educational background/Qualification:

Degree ☐ Diploma ☐ Professional Certificate ☐ Senior High School ☐

Junior High School ☐ Primary School ☐

Others ☐ (please specify) …….

4. Marital status

Married ☐ Single ☐ Divorced ☐ Widowed ☐

5. Number of children (please specify):

None ☐ 1 – 3 ☐ 4 –6 ☐ 7 – 9 ☐ 10 –12 ☐ 13 or more ☐

6. Do you live in this vicinity?

Yes ☐ No ☐

7. If yes, how long have you lived in this vicinity?

Less that 1 year ☐ 1 -5 years ☐ 6-10 years ☐ 11-15years ☐ 16 and above ☐

(a) If Yes, was the dump site in operation at the time you moved in to stay here? Yes ☐

No ☐

8. Number of family members .....

OCCUPATIONAL DATA

9.Where do you pick the waste? .....

10. How long have you been involved in the waste picking activity?

a) Less than a year ☐ b) 1-4 years ☐ c) 5-8 years ☐

c) 9-12 years ☐ e) 13-16 years ☐ e) 17-20 years ☐

11. Why did you join this activity?

.....

.....

12. Are you a registered group? a. Yes ☐ b. No ☐

13. What kind of waste do you pick? (a) water sachets ☐ (b) Electronic waste ☐

(c) Metals or scraps ☐

14. How do you get market for the waste you pick?

.....

.....

15. What is your daily income? (GH₵).....

16. Did you have another work experience before joining this activity?

No ☐ Yes ☐

(a) If yes, what experience?

.....

17. Are you involved in any other business aside this? No ☐ Yes ☐

(a) If yes, what do you do aside this? .....

19. How long do you work per day? (In Hours)

a) 4 - 8 ☐ b) 8-12 ☐ c) 12-16 ☐ d) 16-20 ☐ Less than 4 years ☐

18. How many days do your work per week? .....

19. Does the management of the dump site pose any problem to your activities?

Yes ☐ No ☐

(a) If Yes, what kind of problem(s)?

.....

.....

.....

POLICY RECOMMENDATION

20. In your opinion, how can the problem posed by the dump site be solved in the mean time?

.....

.....

.....

.....

21. What do you wish should be done in future about the dump site to help you have a comfortable livelihood?

.....

.....

.....

THANK YOU FOR YOUR RESPONSE

END OF SURVEY.

Institute of statistical Social and Economic Research

University of Ghana

MA. Development Studies

This a questionnaire to help come out with a write up on the topic, "Challenges of Solid Waste Management and its effect on economic livelihood. A case study of the dump site in Abokobi in the Ga East Municipality "

Zoomlion Waste Management Company Limited

The research is mainly for academic purpose. Therefore, answers given will be treated as confidential.

Thank you.

BACKGROUND DATA

1.How many dump sites can be found in Accra?

2.How long has this site been in operation?

3.How long have you been in charge of this dump site?

4.How many trucks dump refuse here on a daily bases?

5.How much is paid by each truck for dumping refuse here?

6.Does this site serve only the Ga East municipal assembly?

7.If No, how many assemblies dump refuse here?

(b). Why do they prefer to dump their refuse here and not at other places?

8.What amount of waste (in tonnes) is dumped here daily in average?

9.What is the coverage of the waste site?

10.What are the common types of waste dumped here?

MANAGEMENT STRATEGIES

11.Does waste go through any treatment before it is dumped here?

12.Is waste separated before disposal? (Either into plastic, wood, metals, glass, food waste among others)

13.What methods do you use in managing the solid waste dumped on this site?

14.Why do you choose to use any of the method(s) for managing solid waste mentioned above?

15.Is the community engaged in the management of the dump site?

16. How is money generated for the management of the dump site?

(a) How is the money used to develop the dump site?

17.How many waste management companies are registered to dump their refuse here?.

18. Is there any collaboration or contractual arrangements between the assembly and Zoomlion in the management of the dump site?

CHALLENGIES OF WASTE MANAGEMENT

19.What are some of the challenges in managing this waste dump site?

20.How can the problems be solved?

21.Over the years what are some of the reasons for the increase in the size of refuse on the site? 22.In which ways do you think the dump site affects the people living around the vicinity? 23.What are the effects of the dump site on the economic activities of the people living in the vicinity?

24.Have there been complains from inhabitants about the site?

26.What is been put in place to address these problems or issues?

27.Are there plans to build a recycling factory to convert the waste to other uses?

28.What are the effects of the site to you and other workers here? 29. Is there any collaboration between Zoomlion and the government in the management of the dump site? 30. Is there any collaboration between Zoomlion and the chiefs and leaders of the Abokobi in the management of the dump site?

POLICY RECOMMENDATION

31. In your opinion, what can be done about dump site in order to provide a comfortable livelihood for people?

THANK YOU FOR YOUR RESPONSE

END OF SURVEY.

Institute of statistical Social and Economic Research

University of Ghana

MA. Development Studies

This a questionnaire to help come out with a write up on the topic, "Challenges of Solid Waste Management and its effect on economic livelihood. A case study of the dump site in Abokobi in the Ga East Municipality "

Ga East Municipal Environmental Health Officer

The research is mainly for academic purpose. Therefore, answers given will be treated as confidential.

Thank you.

BACKGROUND DATA

1. How long has the Dump site been present in Abokobi?

2. Which agencies are involved in the management of the site?

3.Does the site serve only Ga East Municipal Assembly?

MANAGEMENT STRATEGIES

4. Is waste treated before it is allowed to be dumped on the site?

5. How far are businesses supposed to be away from the dump site?

6. Are there plans to build a recycling factory to convert the waste to other uses?

.7. Is there any collaboration or contractual arrangements between the assembly and Zoomlion in the management of the dump site?

CHALLENGIES ON LIVELIHOOD

8. Have there been any complaints about the effects of the dump site on businesses within Abokobi?

10. What is been put in place to address these problems or issues?

11. What advantage do you think the location of the dump site has for the people? 12. Do you think the presence of the dump site has any implication on people in terms of their economic or social activities?

13.What is been done by the assembly concerning the challenges the dump site poses to inhabitants?

14.What are the effects of the site to you and other workers here?

POLICY RECOMMENDATION

15.In your opinion, how can the problems posed by the dump site be solved to create a comfortable livelihood for inhabitants?

THANK YOU FOR YOUR RESPONSE

END OF SURVEY.