UNIVERSITY OF EDUCATION, WINNEBA

WASTE DISPOSAL PRACTICES AT WINNEBA: AN INVESTIGATION INTO RESIDENTS' ATTITUDES.

VIDA AMANKWAAH KUMAH

2015

UNIVERSITY OF EDUCATION, WINNEBA

WASTE DISPOSAL PRACTICES AT WINNEBA: AN INVESTIGATION INTO RESIDENTS' ATTITUDES.

VIDA AMANKWAAH KUMAH

(8120140010)

A Thesis in the Department of Social Studies Education, Faculty of Social Sciences Education, submitted to the School of Graduate Studies, University of Education, Winneba in partial fulfillment of the requirements for the award of the Master of Philosophy (Social Studies) degree.

SEPTEMBER, 2015

DECLARATION

STUDENT'S DECLARATION

I Vida Amankwaah Kumah, declare that this Thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE:……

DATE……

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Thesis as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR:

SIGNATURE:……

DATE……

ACKNOWLEDGEMENTS

It would amount to gross ingratitude if I fail to register my sincere appreciation to all those who assisted me in diverse ways to successfully complete the programme. My first appreciation goes to the Almighty God, by whose grace I have been able to come this far in my educational journey.

I am particularly grateful to Dr Anthony Baabereyir, my supervisor for his immense help, in spite of his numerous activities, responsibilities and assignments, his patience, critical comments and constructive criticisms and suggestion on every page gave meaning to this research work, without which this work would not have been possible.

I also wish to express my gratitude to the following people for their diverse help in the successful completion of this programme Dr. Vincent Azaheli-Mensah (University of Education Winneba), Mr. Cletus Ngaaso, Mr. Ignatius Kofi Obeng and Madam Lucy Efe Atom (Lecturers Department of Social Studies Education- UEW).

I would like to express my sincere and profound thanks to my parents Nicholas Aboagye and Christiana Mensah, my siblings whose advice, steadfast love, guidance and keen oversight saw this work started and completed.

I also owe a debt of gratitude to Mr. Stephen Ebo Sam (Mathematics Tutor Swedru School of Business), Mr. Shani Iddrisu (Director, Environmental Health and Sanitation Dept. - EMA), Nana Mmra (Operations Manager- Zoomlion Ghana Ltd.) and Mr. Ernest Appraku (Technical Officer- Health Information Trauma and Specialist Hospital, Winneba) for their selfless devotion and assistance in helping me gather information for my work. Last and not the least, to all my friends, I say, thank you for your moral support and encouragement, and may the good Lord bless you all.

DEDICATION

This piece of work is dedicated to my lovely sons, Nhyiraba Nana Aboagye and Papa Yeboah Aboagye. The work is also dedicated to my husband Mr. Stephen Aboagye and my uncle Mr. Donald Gordon (Kwadwo Yeboah) for their unrelenting support and prayers towards a successful completion of this work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

GLOSSARY

Abbreviation/Acronym	Full Meaning
AMA	Accra Metropolitan Assembly
DESSAPs	District level Environmental Sanitation Strategies and Action Plans
EHSDs	Environmental Health and Sanitation Departments
EPA	Environmental Protection Agency
ESP	Environmental Sanitation Policy
EAP	East Asia and Pacific region
ECA	Europe and Central Asia region
EMA	Effutu Municipal Assembly
GIM	Ghana Innovation Market Place
GSS	Ghana Statistical Service
ISWM	Integrated Solid Waste Management
KMA	Kumasi Metropolitan Assembly
Ltd	Limited
LCR	Latin America and the Caribbean region
MENA	Middle East and North Africa region
MLGRD	Ministry of Local Government and Rural Development
MMDAs	Metropolitan, Municipal and District Assemblies
MSW	Municipal Solid Waste

NESP	National Environmental Sanitation Policy
OECD	Organisation for Economic Co-operation and Development
SAR	South Asia region
SWM	Solid Waste Management
TRA	Theory of Reasoned Action
TSH	Trauma and Specialist Hospital
UNEP	United Nations Environmental Programme
USEPA	United States Environmental Protection Agency
WMD	Waste Management Department

ABSTRACT

The study aimed to investigate Winneba residents' attitudes towards waste disposal. It analysed the underlying factors affecting effective solid waste disposal in the municipality and suggested possible measures to tackle the problem. The design used by the researcher for the study was a survey research design. It is a report that is concerned with findings on societal issues, phenomena or problems and trying to make some suggestions and recommendations that are aimed at improving, minimizing or halting the issue, phenomena or problem. Generally, the researcher made use of questionnaires, interviews and observation as instruments in the collection of data. During the research activity, the following key findings were established.

- Inadequate skip supply for storing waste.
- Lack of routine collection of waste.
- The peoples' attitudes towards waste generation and its disposal is not the best as many people throw of rubbish indiscriminately in the environment.
- Inadequate resources for waste management institutions to effectively collect the waste generated.

To effectively tackle the problems enumerated, the following measures are recommended: provision of adequate skips and dustbins, regular collection of waste, proper management of landfill, adequate resourcing of waste management institutions and adequate monitoring and education of residents.

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

Among the most lasting evidences of human occupation of earth are the garbage produced and discarded by all societies everywhere (Quashigah, 2003). The greater the society's population and material wealth, the greater the amount and variety of waste generated (Mariwah, Kendie & Dei 2010). We produce enormous volumes of solid waste in our societies and there is an increasing problem of how to dispose of such waste in an environmentally safe manner.

In Ghana, environmental issues, especially problems associated with waste disposal, are a big problem that government has had to deal with in the urban centres. Problems of waste in urban areas in Ghana can be better understood in the light of recent rapid urbanization worldwide. Rapid population growth, and to a larger extent, rapid urbanization of the country from the 20th through to the 21st century have led to the concentration of population in cities. Urbanization introduces society to a new way of life, pre-packed foods, changing lifestyles such as use of canned soft drinks, mobile phones, and disposable diapers (movement towards a "consumer society" in general). This situation has posed special waste management challenges, as waste management systems in developing countries are incapable of frequent adjustment to match these lifestyle changes. This new wave of urbanization as Rabinovitch (1998:16) concludes, has led to, "a radical transformation in the structure of cities in many parts of the developing world, accompanied by complex social, economic and environmental changes". The problem of waste management is much centred on the cities and it is not a new issue to society, but the volume generated and the adopted

solution in different countries have changed over time. However, with the increasing human population, urbanization and industrialization being accompanied by high level of consumption have brought about many changes to the environment whereby the generation of waste now outstrips the rate of safe disposal in the developing countries (Eshun, 2002). The rising production and consumption of products is generating waste in all the cities in Ghana. This coupled with the weak capacities of metropolitan and municipal authorities to plan and manage the environment and provide infrastructure for adequate collection and disposal of waste is also leading to waste accumulation in cities. Indeed, a visit these days to some towns and cities in Ghana will reveal aspects of the waste management problem such as heaps of uncontrolled rubbish bags, polythene bags and disposal sites constituting a health hazard to residents who live near the dumping sites (Appiah, 2014).

Visible evidence exists to show how 'ordinary' citizens are contributing to filth and chocked gutters resulting from indiscriminate waste disposal practices which have exacerbated floods, but there is little knowledge about citizens' attitudes towards the environment. The poor attitudes of people could be attributed to the failed educational system where much emphasis was not placed on environmental education in the past. So the bulk of the population have grown up without that proper environmental attitude. The effects are the increasing cholera outbreaks and malaria in major cities in Ghana (Appiah, 2014). The attitudes of residents therefore play an important role in curbing environmental problem as Schubeller, Wehrle and Christen, (1996) rightly opine

> ...waste generation is conditioned, to an important degree, by people's attitudes towards waste: their patterns of material use and waste handling, their interest in waste reduction and minimisation, the degree to which they

> separate wastes and the extent to which they refrain from indiscriminate dumping and littering (Schubeller *et al*., 1996:35).

Problems of waste in urban areas are not only specific to Ghana but can be better understood in the light of recent rapid urbanization worldwide. This rapid urbanization in African countries and by the same logic, a rapid accumulation of garbage is what Onibokun and Kumuyi (1999: 2) have likened to "a monster that has aborted most efforts made by city authorities, urban planners, states and federal governments", to manage or at least contain it. According to Lyse, 9 out of every 10 African cities are facing serious waste disposal problems (Lyse, 2003:1).

This research proposed to investigate Winneba residents' attitudes towards waste disposal, drawing on the self-interest model which holds that citizens favour strict environmental regulations if their local environment is polluted (Rohrschneider, 1988).

1.1. Statement of the Research Problem

The population of the Effutu Municipality has increased tremendously in recent years. In 1970 and 1984 the population of the Municipality was 32,315 and 32,523 respectively. In 2000, the population increased to 46,574. The population growth rate for the Municipality between 1984 and 2000 represents 2.2%. According to the 2010 Population and Housing Census (PHC), the Municipality had a population of 68,597 (Ghana Statistical Service, 2012). This population increase is evident in Table 1.1 below.

Table 1.1: Population of the main Settlements in the Effutu Municipality

YEAR	1970	1984	2000	2010 EST.
Winneba	30,778	30,852	40,017	49,864
Gyangyenaze	363	259	420	523
Ateitu	137	102	225	280
Osubunpeyin	-	49	154	192
Gyahadze	966	646	574	715
Warabeba	-	-	296	369
Akosoa Village	71	84	630	785
Nsuakyir	-	477	715	891
Sankor	-	-	2,683	3343
Atekyedo	-	54	161	201
Ansaful	-	-	350	436
New Winneba	-	-	220	274
Ekroful	-	-	49	61
Silver Akura	-	-	80	100
Total	**32,315**	**32,523**	**46,574**	**58,034**

Source: Ghana Statistical Service (2002) 2000 Population & Housing Census: Special Report on 20 Largest Localities, Accra: Ghana Statistical Service, P. 14

The increase in population as seen in Table 1.1, have resulted in the increase in production and consumption coupled with the fact that every product or item you purchase today is packaged, have further resulted in an increase in the tones of waste generated on a daily basis in the municipality. The municipal authorities have not been able to keep pace with the rapid accumulation of waste and now the authorities are overwhelmed by the waste situation in Winneba. This has resulted in waste being found in gutters, drains and on pavements or streets in Winneba.

These practices have created an unhealthy environment resulting in diseases such as malaria and cholera among the citizens. Winneba, a town that used to pride herself with long clean, white, breezy beaches that provide serene and congenial

atmospherefor tourism cannot today boast of these nice places because filth has taken over these beaches. The situation is an eyesore and a worrying. Although both residents in Winneba and municipal authorities are well aware of the waste problem, the question however, remains as to whether the residents and the authorities really understand the problem. This is what makes the waste problem in Winneba rather unique and complex. Whilst there are obvious success stories in terms of waste collection in rich neighborhoods, the same cannot be said of the poor areas. The challenge of ensuring a clean and healthy environment is also centered on the attitudes of residents.

This brings us to the important question about attitudes and waste disposal problems in Winneba. The attitudes of the Effutu Municipal Assembly (EMA) and the population at large are important issues, which influence how seriously the waste problem can be resolved. Unfortunately, individuals and communities continue to make choices that contribute to the decline of natural environments as evident in figure 1.1 below. The beautiful sight of the beach at Wonsom is no longer the same due to constant dumping of refuse at the shores. This research is an attempt to investigate residents' attitudes towards waste disposal in Winneba to examine the implications for national efforts towards environmental protection.

Figure 1.1: Scene of the waste problems at Wonsom

1.2. Purpose of Study

This purpose of the study was to investigate Winneba residents' attitudes towards waste disposal, to establish whether there exist any correlation between attitudes and pro-environmental behaviour.

1.3. Objectives

The study sought to achieve the following objectives:

- To describe the solid waste disposal situation in the Winneba township.
- To identify the causes of indiscriminate solid waste disposal practices in Winneba.
- To examine the effects of indiscriminate solid waste disposal practices in Winneba.
- To examine the attitudes of residents of Winneba towards waste disposal.

1.4. Research Questions

The overarching questions that this study sought to answer were;

- What is the solid waste disposal situation in Winneba?
- What are the causes of indiscriminate solid waste disposal practices in Winneba?
- What are the effects of indiscriminate solid waste disposal practices in Winneba?
- What are Winneba residents' attitudes towards waste disposal?

1.5. Significance of the Study

For policy formulation on environmental protection, the findings of this research intend to provide guidelines to the Effutu Municipal Assembly. The findings may provide the Assembly with useful knowledge to design initiatives for public environmental education. The focus of the research is on residents' attitudes towards waste disposal as an opening that will direct the attention of the Assembly to formulate policies that will motivate people to change their attitude on waste management practices. This will help find effective ways of disposing of solid waste. Thus understanding people's attitudes and perception provides an opportunity for effectively planning and implementing efficient solid waste management technologies.

Most likely, this research will contribute to available literature on residents' attitude towards waste disposal and its implications for national efforts towards environmental protection. Furthermore, the finding of this research will serve as the basis for further research. To serve as an important addition to the existing literature

on the subject matter and as a springboard for other researchers to enable people have a fair idea on how to effectively manage solid waste at Winneba.

It is hoped that, the findings will show that with pre-knowledge on the impact of improper waste disposal, residents will know what they should do with waste. The study will also contribute to both the theory and practice of urban solid waste management in poor countries generally. This situation is a good indicator that residents have the potential to change their attitude towards behaviour in order to have a good intention and high-quality behaviour on waste management. This will enable residents support fully any initiative aimed at protecting the environment since they will understand fully the benefits of proper waste disposal practices.

1.6. Justification for the Research

Currently, as far as the management of environmental sanitation is concerned, Ghana can be described as a nation facing "sanitation crisis". This is due to a long period of neglect of the sector and the lack of attitudinal change that did not accompany economic development (EPA, 2007:5). Even where waste collection services are provided by municipal authorities, user cooperation is essential regarding such factors as proper storage of household waste, waste separation, placement of household containers and discipline in the use of public collection points.

Solid waste has already become a serious environmental dilemma in Ghana in general and in Winneba in particular. Concern has been expressed by many stakeholders including the president, various government organizations, environmental NGOs and the public at large. There is the need to find a solution to this problem to save the environment and human health. This research is essentially

meant to contribute to the ongoing endeavours to finding a sustainable way of managing the solid waste menace in Winneba and Ghana at large.

1.7. Delimitations of the Study

My study is limited to attitudes towards Municipal Solid Waste disposal (MSW) in Winneba Township. There are several towns in the Effutu Municipality but the study concentrated in Winneba. MSW is the garbage produced by households and small businesses that are picked up by the Effutu Municipal Assembly or the private waste contractors, thus other types of waste such as liquid, industrial and radioactive waste will not be investigated in my project. This is a deliberate effort on my part to make my work manageable given the time and resources available to me to complete the project.

1.8. Limitations of the Study

There were difficulties in obtaining current and detailed information from the residents and some institutional heads. Some felt reluctant sharing their views with me because they said people always come around and ask them series of questions but no solutions came out of it. I was also told by the institutional heads that for confidentiality sake some information could not be given to me.

When I sent a letter to EMA to obtain permission, it took close to three months before a response was given.

The main barrier was how to explain some questions to some residents of Winneba since I don't understand their main language (Effutu).

To address the obstacles above, I told my respondents that their participation is not going to disadvantage them in any way but will rather help in finding a long lasting solution to the waste problem. I also stressed on the importance of the research

in order to convince them to answer the questionnaires as quickly as possible to prevent the situation of the questionnaires being misplaced.

However, on the issue of interpretation, a friend who knew how to speak the language was consulted to assist me with the interpretation.

In spite of these limitations, it could be said that the survey approach was appropriate for the study. It was suitable for answering the key research questions set out in the introductory chapter, and allowed Winneba residents attitudes towards waste disposal to be investigated.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2.0. Introduction

Solid waste is produced in the course of human activities. Getting around with this waste frequently appears to have no solution in most of the cities of the developing countries (Gilbert, Stevenson, Giradet & Stren, 1996). Solid waste management (SWM) is a significant environmental health service, and is included as part of basic urban services which need adequate attention to minimize. This chapter consists of the review of the literature on concept in waste management, solid waste disposal and management practices, perception and attitudes of people towards solid waste, its effect on the environment and the theoretical framework for the study is also discussed. Issues such as definition and classification of waste and solid waste, solid waste management practices, challenges of solid waste management and the effect of poor solid waste disposal in relation to the environment and health will be discussed.

2.1. Defining Waste

The concept of waste is at first sight easily understood by almost everyone. However, a precise definition of what waste really is, is probably impossible to make. Although there have been lots of research on the waste phenomenon but nevertheless the definition for the concept of waste seems not to be given much attention.

The notion of waste is relative in two main respects. First, something becomes waste when it loses its primary function for the user. A waste is relative to this primary function. Waste can be defined as materials considered as unwanted goods or seen as materials for which there are no further use (Peavy, Rowe, &

Tchobanoglous, 1986; Anderson, 1999). Wastes as opined by Oluwade (2009) are refuse (empty containers, papers rubbish) sewage (faeces, water urine) and industrial waste (chemical nuclear) that result from the manufacturing of certain substances, materials and equipment. Merriam-Webster Dictionary defines *waste* as "refuse from places of human or animal habitation. These definitions reflect a widespread attitude that does not recognize waste as a resource.

However, in this second perspective, what is considered waste with regard to this primary function may be useful for a secondary function. In other words, somebody's waste is often somebody else's (secondary) raw material. Nature is an excellent example of this reality since, for example, in many cases; the defecation of mammals is used as food by some insects. This fact is independent of any specific definition one can draw. A waste is a discarded material, which has no consumer value to the one who disposed of it. Once another person picks it up and puts it to use it becomes a resource (Botkin & Keller, 2003). From the above definitions and for the purpose of this study, it can rightly be deduced that waste is any substance or object which the holder discards or intends or is required to discard. These materials are discharged to, deposited in, or emitted to an environment in such amount or manner that causes a harmful change.

2.1.1. Solid Waste

According to Tchobanoglous, Theisen, and Vigil (1993), solid wastes comprise all the wastes arising from human and animal activities that are normally discarded as useless or unwanted. It is seen by Milter (2008) as any useless unwanted or discarded materials that are not liquid or gas. It is a great mixture of substances including fine dust, metal, glass, paper and cardboards, textiles, vegetable materials and plastic characterize solid waste (Simmens, 2001). It is generated by domestic,

commercial, industrial, healthcare, agricultural and mineral extraction activities and accumulates in streets and public places. The words “garbage”, “trash”, “refuse” and “rubbish” are used to refer to some forms of solid waste”.

In the view of Zerbock (2003), solid waste includes non-hazardous industrial, commercial and domestic waste including:

- Household organic trash
- Street sweepings
- Institutional garbage and
- Construction wastes.

The Ghana Innovation Market Place (2009) popularly known as ‘GIM` defines solid waste as neither wastewater discharges nor atmospheric emissions, arising from domestic, commercial, industrial, and institutional activities in an urban area.

Solid waste is any solid material that comes from domestic, commercial, industrial, agricultural and demolition activities, and is regarded as unwanted by those who own it. This leads us to the sources of solid waste.

2.1.2. Classification of Waste

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. Wastes can be classified for disposal or transport. A number of criteria are usually employed to classify wastes into their sources, physical state, material composition and the level of risk associated with the waste substances. Baabereyir, (2009:14) provides an elaborate classification of waste.

Table 2.1: Classification of waste

Criteria for waste classification	Examples of waste types
Sources or premises of generation	Residential, commercial, industrial, municipal services, building and construction, agricultural
Physical state of waste materials	Liquid, solid, gaseous, radioactive
Material composition of waste	Organic food waste, paper and card, plastic, inert, metal, glass, textile
Level of risk	Hazardous, non-hazardous

Source: Baabereyir, (2009:14)

Another classification of the source of waste is provided by Tchobanoglous *et al*., (1993). They classified types of solid waste in relation to the sources and generation facilities, activities, or locations associated with each type. These included

Table 2.2 is presented to summarize the various sources of wastes, the locations and the types of wastes.

Table 2.2: Typical Waste Generation Facilities, Activities, and Locations associated with various source of Solid Waste

Source	Typical location	Types of Solid Waste
Residential	Single-family and multifamily dwellings, low-medium, and high-rise apartments.	Food wastes, rubbish, ashes, special wastes
Commercial/ Municipal	Stores, restaurants, markets, office buildings, hotels, motels, print shops, auto repair shops, medical facilities and institutions.	Food wastes, rubbish, ashes, demolition and construction wastes, special wastes, occasionally hazardous wastes
Industrial	Construction, fabrication, light and heavy manufacturing, refineries, chemical plants, lumbering, mining, demolition.	Food wastes, rubbish, ashes, demolition and construction wastes, special wastes, occasionally hazardous wastes.
Open areas	Streets, alleys, parks, vacant plots, playgrounds, beaches, highway and recreational areas.	Special wastes, rubbish
Treatment plant sites	Water, wastes water, and industrial treatment processes.	Treatment plant wastes, principally composed of residual sludge
Agricultural	Field and row crops, orchards, vineyards, dairies, feedlots and farms.	Spoiled food wastes, agricultural wastes, rubbish, hazardous wastes

Source: Tchobanoglous *et al*., (1993:52-53).

Tchobanoglous *et al*., (1993) has further explained the types of solid waste which include food waste, rubbish, ashes and residues and special waste.

2.2. The Concept of Solid Waste Management

Municipal Solid Waste Management (MSWM) is major responsibility of local government. It is a complex task which requires appropriate organizational capacity and cooperation between numerous stakeholders in the private and public sectors (Schubeller *et al*., 1996). The concept of waste management has been defined differently by various scholars depending on their philosophical underpinnings and backgrounds. For instance, the Sanitation Connection (2002) defines it as all activities that seek to minimize the health, environmental and aesthetic impacts of solid wastes. Kumah (2007: 2) defines solid waste management as "the administration of activities that provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of waste". A much more comprehensive definition has been provided by Tchobanoglous *et al*., (1993), which states that solid waste management is

> "...that discipline associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations and that is also responsive to public attitudes" (Tchobanoglous *et al*., 1993:7).

This definition holds the solid waste management process, which includes wastes generation, storage, collection, transfer and transport, processing and disposal of the wastes. Also included here is the way the wastes are handled until they are stored in storage containers.

Waste management is the collection, transport, processing or disposal, managing and monitoring of waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. The management of wastes treats all materials as a single class, whether solid, liquid, gaseous or radioactive substances, and try to reduce the harmful environmental impacts of each through different methods. It can rightly be said that waste management practices differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Management for non-hazardous waste residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator.

2.2.1. The Goals of Waste Management

According to Baabereyir, (2009:18-19) the United States Congress in 1976, enacted the Resource Conservation and Recovery Act (RCRA) which mandated the EPA to regulate waste management and disposal practices. The goals of waste management that were set by the RCRA included:

1. the protection of human health and the environment from the hazards posed by waste disposal
2. the conservation of energy and natural resources through waste recycling and recovery
3. reducing or eliminating the amount of waste generated, and
4. ensuring that wastes are managed in an environmentally-safe manner (RCRA, 1976)

Other writers agree with these objectives of waste management. For example, Schubeller *et al*., (1996) mentioned that the goals of municipal solid waste management (MSWM) are

1. To protect environmental health,
2. To promote the quality of the urban environment
3. To support the efficiency and productivity of the economy
4. To generate employment and income.

The first goal of MSWM is to protect the health of the urban population, particularly that of low-income groups who suffer most from poor waste management. Secondly, MSWM aims to promote environmental conditions by controlling pollution (including water, air, soil and cross media pollution) and ensuring the sustainability of ecosystems in the urban region. The third goal of MSWM supports urban economic development by providing demanded waste management services and ensuring the efficient use and conservation of valuable materials and resources. The last but not the least aim is to generate employment and incomes in the sector itself (Schubeller *et al*., 1996).

Similarly, the Ghana Environmental Protection Agency has noted that waste management is essential in the present day context for the following reasons:

1. To protect human health against waste-related hazards and risks
2. To prevent pollution of the environment and its natural resources like air, water and land
3. To produce energy that could be an alternative for the fast depleting fossil fuels and other conventional sources of energy
4. To make optimum use of the waste generated

5. For a better and sustainable future.

(Ghana EPA, 2002 cited in Baabereyir, 2009)

It can, therefore, be concluded from the above that the main objective of waste management is to protect public health against waste-related hazards and risks, and to maintain ecosystem services by preventing the pollution of the natural environment and its resources such as land, water and air as well as the aesthetic quality of the environment.

To achieve the above goals, it is necessary to establish sustainable systems of solid waste management which meet the needs of the entire urban population, including the poor. The essential condition of sustainability implies that waste management systems must be absorbed and carried by the society and its local communities. These systems must, in other words, be appropriate to the particular circumstances and problems of the city and locality, employing and developing the capacities of all stakeholders, including the households and communities requiring service, private sector enterprises and workers (both formal and informal), and government agencies at the local, regional and national levels (Schubeller *et al.,* 1996:19) . This means that there is a need for different approaches to handling waste, which will accommodate for both the rich and the poor areas but it is not supposed to be different solutions but one that is all embracing and takes into account contextual factors operating in rich and poor areas alike.

2.2.2. The Principles of Waste Management

Schubeller *et al*., (1996) are of the view that, waste management should be approached from the perspective of the entire cycle of material use, which includes production, distribution and consumption as well as waste collection and disposal.

Whilst immediate priority must be given to effective collection and disposal, waste reduction and recycling should be pursued as equally important, longer-term objectives. They further identified three principles that should guide a sustainable and integrated solid waste management programme. According to their scheme, such a programme should:

1. minimise waste generation
2. maximise waste recycling and reuse, and
3. ensure the safe and environmentally sound disposal of waste.

Solid waste management goals cannot be achieved through isolated or sectoral approaches. Sustainable waste management depends on the overall effectiveness and efficiency of urban management, and the capacity of responsible municipal authorities (Schubeller *et al*., 1996:19).

2.3. Solid Waste Management Practices in Developing Countries

Developing countries need socially desirable low-cost, labour-intensive municipal solid waste management solutions that create income opportunities that reduce poverty, especially among the weaker sections of the society. The physical characteristics of cities in developing and industrialized countries differ significantly. Third World cities have large areas with substandard conditions like slums, narrow and unpaved streets. Many immigrants who cannot afford to purchase land occupy vacant land and become squatters. Most of the areas that lack refuse collection service are slum and squatter settlements as local authorities decline to provide refuse collection to squatters as they do not pay taxes and also due to poor road conditions.

Municipal Solid Waste Management (MSWM) is major responsibility of local government. It is a complex task which requires appropriate organizational capacity and cooperation between the numerous stakeholders in the private and public sectors. Although it is essential to public health and environmental protection, solid waste management in most cities of developing countries is highly unsatisfactory (Schübeler *et al*., 1996). Municipal solid waste (MSW) management has become a major issue of concern for many under-developed nations, however, especially as populations increase. Since the early 1970s SWM in developing countries has received increasing attention from researchers and policy makers concerned to establish a sustainable management system (Gerlagh, Goossen-van de Geijn, Fokkema, & Vereijken, 1999).

The problem is compounded as many nations continue to urbanize rapidly; 30-50% of populations in many developing countries is urban (Thomas-Hope, 1998) and in many African countries the growth rate of urban areas exceeds 4% (Senkoro 2003). Although developing nations do spend between 20 and 40% of municipal revenues on waste management (Schübeler et al., 1996, Thomas-Hope 1998, Bartone 2000), this is often unable to keep pace with the scope of the problem. In fact, when the governments of African countries were asked by the World Health Organization to prioritize their environmental health concerns, the results revealed that while solid waste was identified as the second most important problem (after water quality), less than 30% of urban populations have access to "proper and regular garbage removal" (Senkoro 2003). Experiences and lessons can be drawn from the different management measures adapted across the world – based on three perspectives: waste generation, collection and disposal, recovery and recycling (Begum: online).

Solid waste management is the collection, transportation, processing, recycling or disposal and monitoring of waste materials. The term usually relates to materials produced by human activity, and is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste management is also carried out to recover resources from it and it involves solid, liquid, gaseous or radioactive substances with different methods and fields of expertise for each.

2.3.1. Waste Generation

The waste generated by a population is primarily a function of the people's consumption patterns and, thus, of their socio-economic characteristics. At the same time, waste generation is conditioned to an important degree by people's attitudes towards waste (Schübeler *et al*., 1996). Waste generation encompasses those activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal (Momoh & Oladebeye, 2010). Currently, world cities generate about 1.3 billion tonnes of solid waste per year. This volume is expected to increase to 2.2 billion tonnes by 2025. Waste generation rates will more than double over the next twenty years in lower income countries (Hoornweg & Bhada-Tata, 2012). Waste generation in sub-Saharan Africa is approximately 62 million tonnes per year. Per capita waste generation is generally low in this region, but spans a wide range, from 0.09 to 3.0 kg per person per day, with an average of 0.65 kg/capita/day. Although in low-income countries' solid waste generation rates average only 0.4 to 0.6 kg/person/day, as opposed to 0.7 to 1.8 kg/person/day in fully industrialized countries (Cointreau 1982; Hoornweg & Bhada-Tata, 2012).

2.3.2. Storage

Tchobanoglous, Theisen and Eliason, (1977) explain storage to mean where solid waste is stored before it is collected. It could be stored in a skip or dustbins and not thrown away indiscriminately. According to them, storage is of primary importance because of the aesthetic consideration. Storage is a system for keeping materials after they have been discarded and prior to collection and final disposal. Where on- site disposal systems are implemented, such as where people discard items directly into family pits, storage may not be necessary. In emergency situations, especially in the early stages, it is likely that the affected population will discard domestic waste on poorly defined heaps close to dwelling areas. If this is the case, improved disposal or storage facilities should be located where people are able to use them easily. Improved storage facilities include:

- Small containers: household containers and plastic bins
- Larger containers: commercial bins and oil drums
- Shallow pits
- Commercial depots: walled or fenced in areas

2.3.3. Waste Collection

People's attitudes influence not only the characteristics of waste generation, but also the effective demand for waste collection services, in other words, their interest in and willingness to pay for collection services (Schübeler *et al*., 1996). In most industrialized countries, waste collection services have expanded to the extent that over 90 percent of the population (and 100 per cent of the urban population) have access to waste collection. This is not the case in developing countries (UNEP, 1991).

The failure to provide adequate collection services poses a serious threat to human health in many developing countries (WHO, 1992).

In most developing countries, urban SWM comes under the auspices of the local municipal bodies who are the main formal stakeholders responsible for the collection, removal and disposal of garbage from public places and for the maintenance of dumping grounds. Waste collection is the collection of solid waste from point of production (residential, industrial commercial, institutional) to the point of treatment or disposal (Hoornweg & Bhada-Tata, 2012). According to them, MSW is collected in several ways which include

1. House-to-House: Waste collectors visit each individual house to collect garbage. The user generally pays a fee for this service.
2. Community Bins: Users bring their garbage to community bins that are placed at fixed points in a neighbourhood or locality. MSW is picked up by the municipality, or it's designate, according to a set schedule.
3. Kerbside Pick-Up: Users leave their garbage directly outside their homes according to a garbage pick-up schedule set with the local authorities (secondary house-to house collectors not typical).
4. Self-Delivered: Generators deliver the waste directly to disposal sites or transfer stations, or hire third-party operators (or the municipality).
5. Contracted or Delegated Service: Businesses hire firms (or municipality with municipal facilities) who arrange collection schedules and charges with customers. Municipalities often license private operators and may designate collection areas to encourage collection efficiencies.

The percentage of Municipal Solid Waste (MSW) collected varies by national income and by region. Higher income countries tend to have higher collection efficiency although less of the solid waste management budget goes towards collection. In low-income countries, collection services make up the bulk of a municipality's SWM budget (as high as 80 to 90% in many cases), yet collection rates tend to be much lower, leading to lower collection frequency and efficiency typically one to two thirds of the solid waste generated is not collected (World Resources Institute, 1996; Hoornweg & Bhada-Tata, 2012). In high income countries, although collection costs can represent less than 10% of a municipality's budget, collection rates are usually higher than 90% on average and collection methods tend to be mechanized, efficient, and frequent. While total collection budgets are higher, they are proportionally lower as other budget items increase (Hoornweg & Bhada-Tata, 2012). The Figure 2.1gives a clear picture of waste collection by regions.

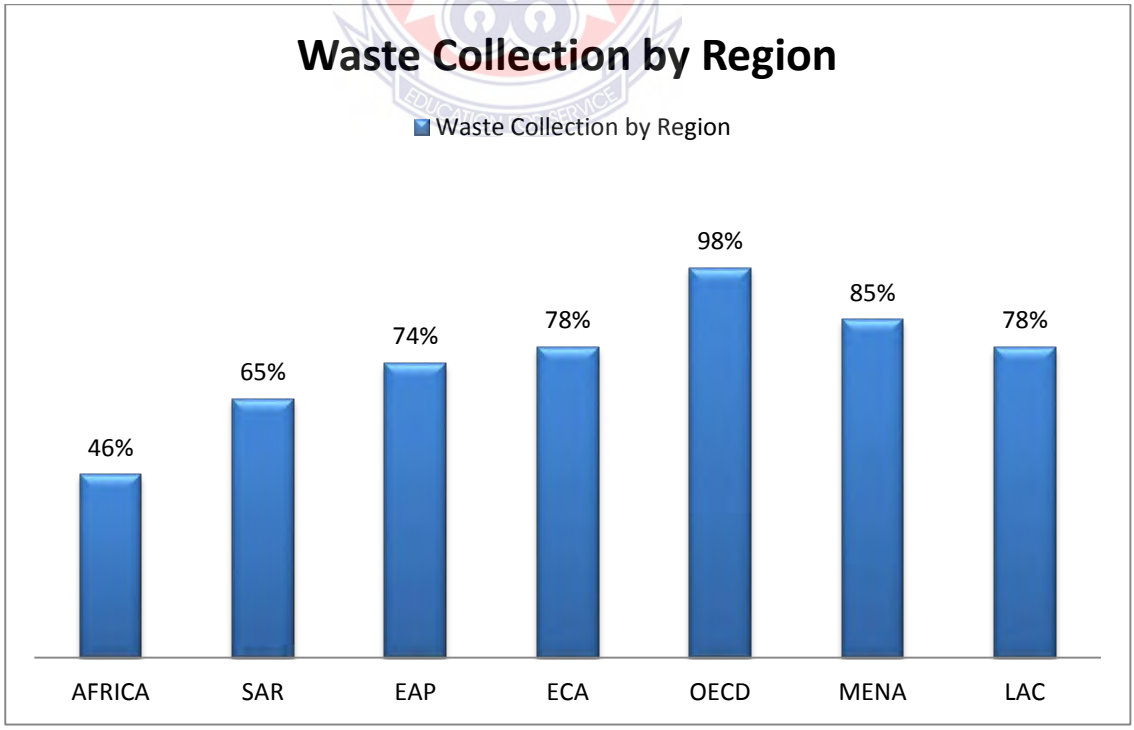

Fig.2.1: Waste Collection by Region

Source: Hoornweg and Bhada-Tata, (2012:15).

2.3.4. Transfer and Transport

Transport of waste from households, factories, and other generation sites is a growing problem. The rapid urbanization of much of the developing world leaves little space for adequate layout and planning; many of the most rapidly growing parts of cities are at the periphery of existing settlement. Garbage dumps, with their associated disease, odour and frequent fires (in some cases) would ideally be located on suitable land away from the most densely populated areas. These areas are becoming harder to find as population urbanize and municipal traffic increases; the transport of waste becomes longer and more time-consuming, therefore more expensive and less efficient. Many cities employ neighbourhood-level collection points, where households bear the responsibility for transport to the transfer point and the municipal or private enterprise transports the waste from there to the ultimate disposal location. The waste content in developing countries is highly organic and susceptible to rapid decay, the emphasis of the SWM process in these countries should be on the collection process. Studies have shown that expensive collection trucks and compactors developed and used in industrialized countries are difficult to operate and maintain, and are unsuitable for narrow lanes, the high traffic density and the nature of waste in developing countries (Begum: online). Transport also depends on operational vehicles, and frequent breakdowns coupled with shortage of parts can immobilize collection vehicles for extended periods of time. UNEP (1996) estimates that in cities in West Africa, up to 70% of collection/transfer vehicles may be out of action at any one time.

2.3.5. Processing and Recovery

This functional element of the solid waste management process according to Tchobanoglous *et al*., (1993), involves the recovery of separated materials, the separation and processing of solid wastes components, and the transformation of the solid wastes that occur primarily in locations away from the source of generation. In recent years there has been a surge of interest in waste recovery and recycling in both the developing and developed world. This functional element of the solid waste management process according to Tchobanoglous *et al*., (1993), involves the recovery of separated materials, the separation and processing of solid wastes components, and the transformation of the solid wastes that occur primarily in locations away from the source of generation. The methods used for recovery of wastes materials that have been separated at source include curbside collection, drop-off and buy back centers. The separation and processing of these wastes usually occur at recovery centers, transfer stations, combustion facilities, and disposal sites.

Developing countries are still grappling with the basic task of collecting garbage, recycling of waste is carried out in direct response to industrial demand for materials to use as raw materials; that is what is being recycled has some commercial sale value (Cointreau & de Kadt, 1991). An important feature of waste recovery and recycling in low income, developing countries is the involvement of the informal sector. Studies reveal that this sector is mainly engaged in the recovery and re-sale of most of the recyclables and is highly labour intensive. But notwithstanding their significant contribution to waste recovery and recycling process, their role in urban waste management is not recognized and their earnings continue to be meager (Cointreau & de Kadt, 1991). Waste recovery and recycling processes in poorer developing countries are based on market considerations, in the sense that it helps to

create economic value out of waste. In the resource poor developing countries, this has a positive impact on the economy. There is also the added benefit of providing a source of livelihood to many economically deprived persons who would otherwise be unemployed.

2.3.6. Solid Waste Disposal

Waste disposal data are the most difficult to collect. Many countries do not collect waste disposal data at the national level, making comparisons across income levels and regions difficult. Furthermore, in cases where data is available, the methodology of how disposal is calculated and the definitions used for each of the categories is often either not known or not consistent (Hoornweg & Bhada-Tata, 2012). In developing countries the prevalent methods of solid waste disposal is through uncontrolled dumping or burning on open ground or city streets (UNEP, 1994; Cointreau-Levine, 1997). This often results in more pollution and loss of salvageable economic value (UNEP, 1994; Beede & Bloom, 1995; Bartone, 2000).

According to Tchobanoglous *et al*., (1993: 17-18), the most commonly recognized methods for the final disposal of solid wastes were:

- dumping on land, canyons and mining pits
- dumping in water
- ploughing into the soil
- feeding to hogs
- reduction and incineration

Some of these unwholesome practices of solid waste identified during the early disposal practices still exist in cities, towns and villages today. Indiscriminate dumping on opened land and dumping in gutters particularly are clearly evident in towns and cities. The high moisture content and organic composition of wastes in the developing world may lead to problems of increased decomposition rates in areas with high average daily temperatures; high seasonal or year-round rainfall would only compound these problems, presenting additional challenges with insect populations and conditions conducive to disease. A higher solid waste density also has many implications for the 'traditional' methods of collection and disposal; collection and transfer trucks which are able to achieve compression rates of up to 4:1 in industrialized nations may achieve only 1.5:1 in developing countries, and landfill compression technology which averages volume reduction of up to 6:1 in industrial nations may only achieve 2:1 compaction with these increased waste densities (Cointreau, 1982). It is estimated that about 83% of the population dump their refuse in either authorised or unauthorised sites in their neighbourhood, and due to weak capacity to handle solid waste, unsanitary conditions are created.

Burning of dumps is also common in peri-urban and rural communities in Ghana and in many other less developed countries. A study carried out in Ado -Akiti in Nigeria by Momoh and Oladebeye (2010) showed that, the methods of solid waste disposal include dumping of waste in gutters, drains, by roadside, unauthorized dumping sites and stream channels during raining season and burning of wastes on unapproved dumping sites during the dry season. Another study conducted in Nairobi, Kenya by Muniafu and Otiato (2010) also revealed that, the end disposal of Nairobi's waste is open dumping at a site located at Dandora, in the Eastland's section of the city although there is a minimal amount of disposal by open burning and incineration,

the ash also ends up in Dandora open dumpsite. This has gone to confirm that the practices of solid waste disposal in the 1950s still exist today. In the contemporary era, the methods of managing solid waste include source reduction, sanitary landfills, composting, recycling, and incineration (Denison & Ruston, 1990 cited in Puopiel, 2010).

2.3.6.1. Source Reduction

Source reduction, also known as waste prevention, means reducing waste at the source. It can take many different forms, including reusing or donating items, buying in bulk, reducing packaging, redesigning products, and reducing toxicity. Kreith (1994), source reduction focuses on reducing the volume and /or toxicity of waste generated. Hoornweg and Bhada-Tata (2012) gave an elaborated definition when they noted that, waste or source reduction initiatives (including prevention, minimization, and reuse) seek to reduce the quantity of waste at generation points by redesigning products or changing patterns of production and consumption. It is agreed that, source separation and resource recovery is an important method in waste management. This is because there is nothing like waste on this earth. Examples of possible reduction at the consumption level include reuse of containers (including bags), better buying habits and cutting down on the use of disposable products and packaging.

2.3.6.2. Recycling and Materials Recovery

Recycling is the first of the three “recovery” processes in the waste hierarchy. Recycling recovers materials, by preventing them from being disposed of, and makes them into new goods. This can involve turning the old materials into a new version of the same thing, or materials can be recycled into something completely different. For

example, used glass bottle can be recycled into new bottles, or they can recycle into something different, such as materials used in road construction. According to Momoh and Oladebeye (2010: 1) recycling has been viewed as a veritable tool in minimizing the amount of household solid wastes that enter the dump sites. It also provides the needed raw materials for industries. According to them, it has been established that, it is the best, efficient and effective method of solid waste management system.

2.3.6.3. Aerobic Composting and Anaerobic Digestion

Composting process uses microorganisms to degrade the organic content of the waste. Aerobic composting proceeds at a higher rate and converts the heterogeneous organic waste materials into homogeneous and stable humus (Centre for Environment and Development, 2003). UNEP (2009) has also defined composting as a biological decomposition of biodegradable solid waste under controlled predominantly aerobic conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in agriculture. Composting with windrows or enclosed vessels is intended to be an aerobic (with oxygen) operation that avoids the formation of methane associated with anaerobic conditions (without oxygen).

When using an anaerobic digestion process, organic waste is treated in an enclosed vessel. Often associated with wastewater treatment facilities, anaerobic digestion will generate methane that can either be flared or used to generate heat and/or electricity. Generally speaking, composting is less complex, more forgiving, and less costly than anaerobic digestion. Methane is an intended by-product of anaerobic digestion and can be collected and combusted. Experience from many jurisdictions shows that composting source separated organics significantly reduces

contamination of the finished compost, rather than processing mixed MSW with front-end or back-end separation (Hoornweg & Bhada-Tata, 2012).

According to Zerbock (2003), a low-technology approach to waste reduction is composting. He further says that in developing countries, the average city's municipal waste stream is over 50% organic material (Hoornweg et al., 1999); studies in Bandung, Indonesia and Colombo, Sri Lanka have found residential waste composed of 78% and 81% compostable material, and market waste 89% and 90% compostable, respectively (Cointreau, 1982). Still, composting has not been overwhelmingly successful and widespread in practice throughout the developing world. Although well documented in China and other areas of eastern Asia, composting projects have had a spotty record throughout Africa, Latin America and elsewhere, and have had the largest number of failed facilities worldwide (UNEP 1996).

Zurbrugg (2003), adds that many large and small composting schemes have failed because not enough attention was given to the marketing and the quality of the product. Current promising developments can be observed in Bangladesh where local government authorities as well as the Ministry of Agriculture is supporting and promoting composting and the use of compost in agriculture. In India, the new solid waste legislation (Ministry of Environment and Forests, 2000) obliges municipalities to introduce household segregation of organic and non-organic waste (called "wet" and "dry" waste respectively) and to treat the organic fraction by composting or other appropriate means. Composting activities are becoming more and more common as well as pilot plants for biomethanation of organic wastes, however the challenge to establish a market and demand for the compost product has yet to be tackled (Zurbrugg, 2003).

2.3.6.4. Incineration

In the views of Hoornweg and Bhada-Tata, (2012) incineration of waste (with energy recovery) can reduce the volume of disposed waste by up to 90%. These high volume reductions are seen only in waste streams with very high amounts of packaging materials, paper, cardboard, plastics and horticultural waste. Recovering the energy value embedded in waste prior to final disposal is considered preferable to direct landfilling - assuming pollution control requirements and costs are adequately addressed. Typically, incineration without energy recovery (or non-autogenic combustion, the need to regularly add fuel) is not a preferred option due to costs and pollution. Open-burning of waste is particularly discouraged due to severe air pollution associated with low temperature combustion. Incinerators have the capacity to reduce the volume of waste drastically, up to nine fold than any other method (Kreith, 1994). According to him incineration can also recover useful energy either in the form of steam or electricity. He recognised that the main constraints of incineration are high cost of operation, relatively high degree of sophistication needed to operate them safely and economically as well as the tendency to pollute the environment through emissions of carbon dioxide. Nonetheless, it must be noted that due to the composition of wastes in many developing countries (high organic and moisture content), and the high investment and operating costs of the sophisticated technology, incineration is rarely a viable option (Schübeler *et al.,* 1996).

2.3.6.5. Landfill

The placement of solid waste in landfills is the oldest and definitely the most prevalent form of ultimate waste disposal (Zerbock, 2003). The waste or residue from other processes should be sent to a disposal site. Landfills are a common final disposal site for waste and should be engineered and operated to protect the

environment and public health. Proper landfilling is often lacking, especially in developing countries (Hoornweg & Bhada-Tata, 2012). An argument put forward by Zerbock suggests that, "landfills" are nothing more than open, sometimes controlled dumps. According to him the difference between landfills and dumps is the level of engineering, planning, and administration involved. Open dumps are characterized by the lack of engineering measures, no leachate management, no consideration of landfill gas management, and few, if any, operational measures such as registration of users, control of the number of "tipping fronts" or compaction of waste (Zerbock, 2003:16).

Disposing of waste in a landfill involves burying the waste, and this remains a common practice in most countries. Landfills were often established in abounded or unused quarries, mining voids or borrow pits. The open dump approach is the primitive stage of landfill development and remains the predominant waste disposal option in most of the countries (Johannessen & Boyer, 1999). A default strategy for municipal solid waste management, open dumps involve indiscriminate disposal of waste and limited measures to control operations, including those related to the environmental effects of landfills. As this is not an upgrading solution to landfill waste, the open dump approach will be mentioned, but not discussed further in this report. A properly designed and well-managed landfill can be hygienic and relatively inexpensive method of disposing of waste materials. At the most basic level landfill involves placing waste in a hole in the ground and covering it with soil. Today, the engineering of a modern landfill is a complex process, typically involving lining and capping individual "cells" or compartments into which waste is compacted and covered to prevent the escape of polluting liquid or gases. In newer landfill sites, systems are installed to capture and removed the gases and liquids produced by the

rotting rubbish. Hoornweg and Bhada-Tata, (2012) have stated that, landfilling usually progresses from open-dumping, controlled dumping, controlled landfilling, to sanitary landfilling.

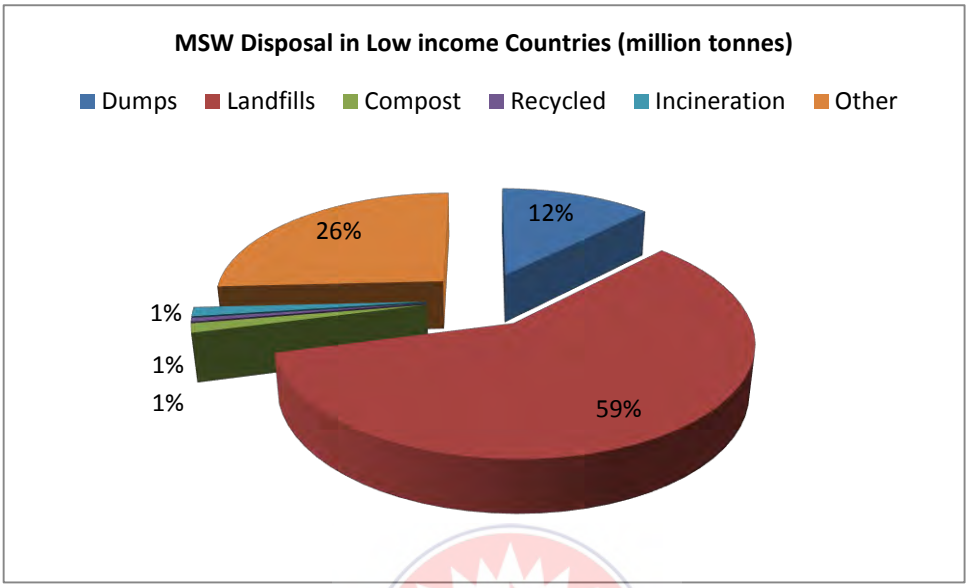

Fig. 2.2: Waste Disposal Practices in Low income countries

Source: Authors construction with reference to Hoornweg and Bhada-Tata, (2012).

2.4. Integrated Solid Waste Management

It was the environmental movement in the late 1960s which formally presented Integrated Solid Waste Management (ISWM) as a guiding principle for managing societies' refuse. ISWM is a very broad concept which has become a preferable approach to waste management in recent time. The approach involves the selection and application of appropriate technologies, techniques and management practices to design a programme that achieves the objectives of waste management (Tchobanoglous *et al*., 1993). Generally, ISWM does not need to be based on an economic framework or on technical solutions alone since it is a very broad concept. Essentially it implies that decisions about waste handling should take into account economic, environmental, social and institutional aspects not only in the waste production stage but also in its up and downstream stages. The integration can take

place at various levels: 1) the use of a range of different collection and treatment options, 2) the involvement and participation of all the stakeholders, and 3) the interactions between the waste system and other relevant systems such as industry (Lardinios & Klundert 1997). This is not intended to be an exhaustive list of categories.

Economic aspects may include the costs and benefits of implementation, the available municipal budgets for waste management, and the spin-off effects for other sectors in the economy in terms of investments. The environmental dimension may consist of local problems (i.e., increased risk of epidemics and groundwater pollution), regional problems (i.e., resource depletion and acid rain), and global problems (i.e., global warming and ozone depletion). Social aspects include employment effects for both the formal and the informal sector, impact on human health and ethical issues such as the use of child labour. Finally, the institutional dimension of ISWM aims to develop a system which effectively involves the main stakeholders (Begum: online).

The programme (UNEP, 2009) suggested that if most of the waste could be diverted for material and resource recovery, then a substantial reduction in final volumes of waste could be achieved and the recovered material and resources could be utilized to generate revenue to fund waste management. Figure 2.3 provides a framework for analyzing the concept of ISWM.

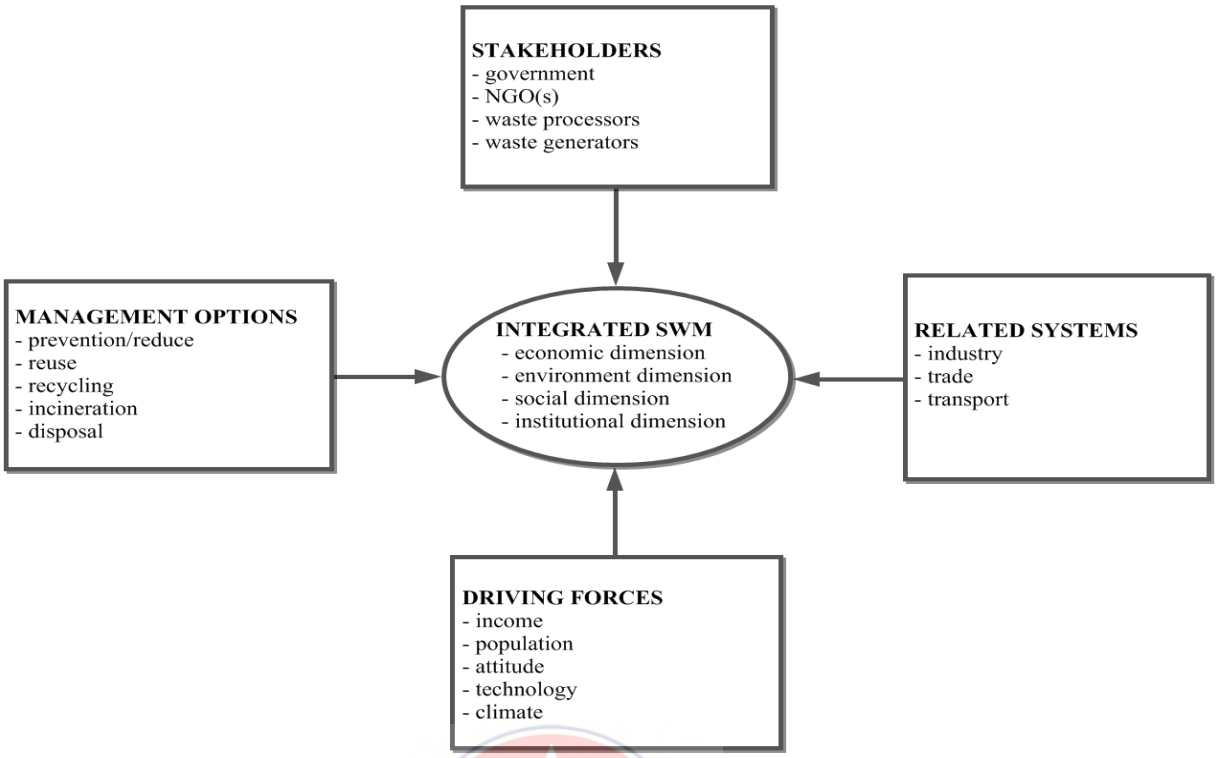

Figure 2.3: Framework for analyzing the concept of ISWM (Beukering et al., 1999:4)

1. The use of a range of different collection and treatment options. These include prevention, recycling, energy recovery and sound land filling of solid waste.
2. The involvement and participation of all the stakeholders. These may include waste processors such as formal and informal recyclers, waste generators such as households, industry and agriculture, and government institutions such as waste managers and urban planners.
3. The interactions between the waste system and other relevant systems such as industry. For example, product design at the industry level can have a significant impact on the 'recyclability' of the product after consumption. It is difficult to include all these aspects at the same time, since the factors affecting solid waste management are constantly changing For example, income and population growth contribute significantly to the amount of waste

which has to be managed. Similarly, differences in educational background and environmental awareness results in varying attitudes of waste generators.

Finally, technological progress in the field of waste management is rapid, so certain technologies may outdate more rapidly. These problems are more severe in developing countries where limited municipal budgets for waste management exacerbate the difficulties of integration.

2.5. Causes of Poor Waste Disposal Practices in Developing Countries

The management of solid waste has proven to be a daunting task for many towns and cities in developing countries. This is evidenced by the large number of uncontrolled dumps, gutters choked with garbage to various degrees and the irregular collection of waste among many others. According to a United Nations Conference on Human Settlement report, one third to one-half of solid waste generated within most cities in low-and middle-income countries, of which Ghana is of no exception, are not collected. They usually end up as illegal dumps on streets, open spaces, and waste lands (UNCHS, 1996).

In Ghana, Boadi and Kuitunen, (2005) pointed out some of the problems affecting solid waste management. These include: weak institutional capacity and lack of resources; both human and capital. They also indicated that, home collection of waste is limited to high and, some middle income areas while the poor are left to contend with the problem on their own. This leads to indiscriminate disposal of waste in surface drains, canals and streams, creating unsanitary and unsightly environments in many parts of the city. Furthermore, MLGRD (2004) summarises the challenges of solid waste management in Ghana as follows: poor planning for waste management programmes; inadequate equipment and operational funds to support waste

management activities; inadequate sites and facilities for waste management operations; inadequate skills and capacity of waste management staff; and negative attitudes of the general public towards the environment in general. Despite the importance of adequate solid waste management to the urban environment, the performance of many city authorities in this respect leaves much to be desired.

According to Malombe (1993), irregular services rendered to producers of refuse by municipal councils compel them to find ways of disposing of refuse. He observed that the main methods adopted by the producers are burning, composting, or indiscriminate dumping. Again according to Sule (1981), the main cause of the problem of Nigerian City's poor environmental condition can be ascribed to improper management of solid waste and lack of seriousness in the enforcement of solid waste disposal code. This is very pertinent in Ghana where waste management services are largely inefficient and ineffective. It is estimated that about 83% of the population dump their refuse in either authorized or unauthorized sites in their neighbourhoods, and due to weak capacity to handle solid waste, unsanitary conditions are created (Benneh, Songsore, Nabila, Amuzu, & Yaugyuorn, 1993).

Generally, the poor state of waste management is clearly not only an engineering problem. Rapid urbanization, poor financing capacity of local authorities, low technical capacity for planning and management of solid waste, weak enforcement of environmental regulations - which allow local authorities to flout environmental regulations without any sanctions - have all contributed to compound the problem. The Ghanaian experience shows that within the existing socio-economic context, manual systems are appropriate. The challenge is to develop and promote disposal systems that require a minimum level of mechanical equipment. It is clear that the main problem facing the proper management of MSW in many developing

countries are administrative, financial, technical (this has to with the equipments used) and institutional. This affect the amount of solid waste collected and managed and how well the management practices meet standard methods. There is no clear reliable framework by which the solid waste sector is administered from the collection, transformation to disposing or treatment phases. This situation is usually coupled with limited investment allocated for the MSW sector with complications of collecting or raising proper service fees. The management activities of MSW are considered public services which are directly controlled by governmental institutions. Such management arrangement is considered weak as it lacks the market mechanisms, and in this case economical incentives cannot be used to improve and develop the MSW management services (Khatib, 2011). A related common problem is the absent of effective and comprehensive legislative frameworks governing the solid waste sector and the inadequate enforcement mechanisms, which are no less important than the legislations themselves.

As urbanization continues to take place, the management of solid waste is becoming a major public health and environmental concern in the urban areas of many developing countries. The concern is serious, particularly in the capital cities, which are often gateways to the countries for foreign diplomats, businessmen, and tourist visits and foreign investment. Again according to Sule (1981), the main cause of the problem of Nigerian City's poor environmental condition can be ascribed to improper management of solid waste and lack of seriousness in the enforcement of solid waste disposal code. This is very pertinent in Ghana where the enforcement of solid waste disposal code is not effective at the local levels. Karley (1993), in an article entitled, "Solid Waste and Pollution," in the Daily Graphics (October 9, 1993) identified the main problem facing Ghana as the lack of suitable sites for disposal of

solid waste, of which we attributed to the failure of social and economic development to keep pace with the natural population increase and rural-urban migration.

In sum, the challenges facing access to improved sanitation including solid waste disposal include the following:

- poor development planning/poor infrastructure (population growing faster than waste management development)
- inadequate funding for logistics, infrastructure and landfills
- attitudes of the general public towards sanitation
- Ineffective coordination of sanitation delivery agencies at the regional and district levels.

They can be categorized into technical and financial constraints. Each of these constraints is discussed in relation to the sustainability of solid waste collaborative projects below.

2.5.1. Technical factors

Ogawa, (1996) posits that, in most developing countries, there is typically lack of human resources at both the national and local levels with technical expertise necessary for solid waste management planning and operation. Many officers in charge of solid waste management, particularly at the local level, have little or no technical background or training in engineering or management. Without adequately trained personnel, a project initiated by external consultants could not be continued. Therefore, the development of human resources in the recipient country of external support is essential for the sustainability of the collaborative project.

Another technical constraint in developing countries is the lack of overall plans for solid waste management at the local and national levels. As a result, a solid waste technology is often selected without due consideration to its appropriateness in the overall solid waste management system. In some cases, foreign assistance is given to a component of a solid waste management's system for which the use of resources may not be most cost-effective. For instance, an external support agency provided its support to improve a general disposal site. However, the coverage of solid waste collection service is so low that solid waste generated is dumped at many undesignated sites (e.g., open areas, water channels, streets, etc.). As a result, improving the disposal site, although it may not be a bad project, would have little impact on the overall solid waste management effectiveness. In such a case, the low collection coverage is a bottleneck in the overall solid waste management system in the city, and it would be most cost effective to provide resources to upgrade the collection service (Ogawa, 1996).

2.5.2. Financial factors

In general, solid waste management is given a very low priority in developing countries, except perhaps in capital and large cites. As a result, very limited funds are provided to the solid waste management sector by the government and the levels of supervisors required for protection of public health and the environment are not attained.

In the words of Bartone, (1995) the problem is acute at the local government level where the local taxation system is inadequately developed and, therefore, the financial basis for public services, including solid waste management, is weak. This weak financial basis of local government can be supplemented by the collection of

user service charges. However, users' ability to pay for the services which are irregular and ineffective is not high either.

In addition to the limited funds, many local government in developing countries lack good financial management and planning. The lack of financial management and planning, particularly cost accounting, depletes the limited resources available for the sector even more quickly, and causes the solid waste management services to halt for some periods, thus losing the trust of service users (Ogawa, 1996).

2.6. Effects of Poor Solid Waste Disposal on the Environment and Health

Inappropriate disposal of solid waste can have a major adverse impact or consequences on humans in the society both in terms of the natural environment and health.

2.6.1 Human Health Risks

There are some human health risks associated with solid waste handling and disposal in all countries to some degree, but certain problems are more acute and widespread in underdeveloped nations. Cointreau (1982) has classified these into four main categories: 1) presence of human fecal matter, 2) presence of potentially hazardous industrial waste, 3) the decomposition of solids into constituent chemicals which contaminate air and water systems, and 4) the air pollution caused by consistently burning dumps and methane release.

There could also be outbreak of diseases like cholera, typhoid fever, and other diseases, in severe forms causing death, especially in children ages 0-15 years, whose immunity is not as strong as the adult population (Olokor, 2001). Bassis (2004) claimed that serious and devastating outbreak of diseases and epidemics had been recorded owing to indiscriminate dumping of waste. Such diseases include, cholera,

typhoid and paratyphoid fever, diarrhoea and vomiting leading to serious health implications, unnecessary and unavoidable spending and in some cases, death of the victims. There appears to be an epidemic of typhoid and cholera in many communities in Ghana now. This is evident in the recent outbreak of cholera in some major cities in Ghana which has so far claimed about 200 lives out of about 10,000 reported cases (Daily Graphic, 2014). Most refuse dumping sites are also close to streams and rivers that are being employed for domestic use like cooking, washing and drinking. If this unhealthy trend is not checked, the risk-factors of indiscriminate disposal of waste may continue to increase (Ajayi, 2004). In a related issue, Moronkola (2003) claimed that indiscriminate dumping of refuse will give rise to offensive odour which is a source of nuisance to human existence as excessive intake of this polluted air can lead to choking of the lungs and breathing difficulty.

2.6.2. Environmental Issues

According to Karley, (1993) the health status of a community is affected by its state of environment. Poor sanitary conditions militate against the protection and preservation of the environment. The decomposition of waste into constituent chemicals is a common source of local environmental pollution. A major environmental concern is gas release by decomposing garbage. There is a risk-factor of air pollution in the event of accidental or spontaneous combustion of refuse. Air pollution signifies the presence in the atmosphere of substances generated by the activities of man that interfere with human health, safety or comfort. It is injurious to vegetation and animals and other environmental media, resulting in chemicals entering the food chain or being present in drinking water, causing health problems to man. Discharge of carbon monoxide by open burning of waste contributes to air pollution (Ayodele, 2007).

Current practices in the developing world range from absolutely no leachate management (unofficial dumps or those operating continuously for years without 'sanitary' specifications) to discharge into municipal sewer and sewage systems, direct discharge into surface water systems (rivers), multi-pond aeration and settlement systems, chemical treatment facilities, and recirculation systems (Johannessen, 1999). Achalu and Achalu, (2004) discovered that indiscriminate dumping of waste hinders free flow of erosion and floods when it rains causing blockage of drainages, diversion of flood to various places like living houses, farm lands leading to over-flooding, which results in destruction of lives and properties. Refuse dumped along streams and river courses cause flooding which can result in natural disasters. It can also result in outbreak of diseases and plagues. Many people were killed due to floods in parts of Accra Ghana on June 3, 2015. This was partly linked to waste being dumped in the Odornaa River.

Accumulated garbage and rubbish become eyesore in the community and pollute the air, acting as breeding grounds for mosquitoes and other harmful insects, especially where a foreigner has to be welcomed to the nation with huge accumulation of refuse (Akindutire & Alebiosu, 2014). Ajayi, (2004) also asserted that if an environment is polluted with filthy things like broken bottles, heaps of hazardous things, children and adults could receive injuries from the materials and if not quickly attended to, can lead to tetanus infection, which in turn, can kill the host. Heaps of refuse along motor parks or motor pathways can lead to road traffic accidents which could destroy lives and properties especially, when driving in the night and the driver is not aware of the heaps of refuse ahead.

2.7. Attitudes towards Waste Disposal

Attitude about waste management is the principle/perception that people have on how they deal with the waste that they produced. This attitude can predict the potential behaviour that residents want to perform. According to Kumar and Nandini (2013), attitude is a hypothetical construct that represents an individual's like or dislike for an item. Attitudes are positive, negative or neutral views of an 'Attitude Object'. People can also be 'Ambivalent Towards' a target, meaning that they simultaneously possess a positive and a negative bias towards the attitude in question. In his opinion, Kendie, (1999: 4) maintains that, the recent upsurge in waste disposal problems stems from the fact that, "...attitudes and perceptions towards wastes and the rating of waste disposal issues in peoples' minds and in the scheme of official development plans have not been adequately considered".

There has been a tendency to concentrate on the design of waste management technologies and how to apply them in context. According to him, the waste disposal practices of the authorities have also encouraged improper attitudes regarding waste management programmes and payments towards improved waste disposal services (Kendie, 1999).

Attitudes of residents can be critical in either ameliorating or exacerbating the waste situation. Schubeller *et al*., (1996) throw more light on this issue when they posit that "people's attitudes influence not only the characteristics of waste generation, but also the effective demand for waste collection services, in other words, their interest in and willingness to pay for collection services" (Schubeller *et al*., 1996:35).

Environmental knowledge and attitudes of households should be examined in order to understand their behaviour and how to encourage the waste separation and recycle at waste generating sources. Knowledge of people on environment in general and waste management in particular has long been recognized among the most crucial factors influencing household waste disposal (Burn & Osakamp, 1986; Nixon & Saphores, 2009). The erroneous perception about solid waste in Ghana has pushed us much deeper into the abyss we find ourselves currently. While other countries like Singapore, Philippines, Sweden and others are making money out of solid waste, Ghanaians regard all forms of solid waste to be fated for the landfill site. Consequently, most waste management companies, which are supposed to benefit from converting useful resources in our solid waste stream into valuable products, have just become waste collection companies. They only collect all the solid waste generated to the landfill site. However, solid waste management goes way beyond just collecting the solid waste generated to a landfill site (Monney, 2014).

Belief plays an important role in pro-environmental behaviour (Cary, 1993). In the words of Monney, (2014), dumping of rubbish indiscriminately is one of the extreme bad habits of Ghanaians toward cleanliness. It is very easy for people to create a dumping ground right beside their home or residence, due to lack of an official dumping ground, or to prevent them from walking a distance. Many gutters in the cities and towns are choked due to people making them dumping sites, some people deliberately, especially those who sell by the road side, sweep and dump their rubbish into nearby gutters. This always results in frequent flooding in many parts of Accra during the rainy season. Traders and street hawkers, who accumulate rubbish at the end of the day, dump their rubbish in nearby bushes, eventually making it a dumping site for all the traders, and even residents around. Littering of the

environment is an act almost every Ghanaian fall culprit to. The reckless littering attitude among the populace in the country is inimical to improving the current environmental sanitation situation across the country. Due to blatant disregard for the environment, people litter the environment indiscriminately. It is not uncommon for one to see passengers throwing waste onto the streets while in a vehicle or people discarding waste shamelessly at lorry stations and other public places (Monney, 2014).

The sachet water, which is meant to give Ghanaians a safe drinking water on the street, is gradually turning the whole city of Accra into a dumping ground. Moreover, the black polythene bag used for selling, popularly known as the "take away," also accounts for the immense nature of litter on the environment. It has become the habit of many people to litter the environment with these rubber sachets and black polythene bags when they are through with its purpose. Irrespective of where they are, they litter the environment even when they are in buses, instead of leaving them in the buses for the drivers to clear them after work. The nature of littering the street is evident when wind blows, as these polythene bags will be flying in the air, with one not knowing where they are coming from. The question, however, remains whether residents in Ghana and Winneba, have knowledge of the effects of indiscriminate dumping of waste and what prevents them from changing their attitudes.

2.8. Theoretical Framework

This research was based on Rohrschneider, (1988) Self Interest Model which holds that citizens favour strict environmental regulations if their local environment is polluted and how this idea reflects in Ajzen, (1991) Theory of Planned Behaviour.

Icek Ajzen's Theory of Planned Behaviour (TPB) provides a framework for systematically investigating the factors which influence behavioural choices, and has been applied successfully on many diverse areas including recycling behaviour (Tong let et al., 2004). It is one of the most recent motivation theories developed in the 1980s, from the earlier Theory of Reasoned Action which was formulated by Fishbone and Ajzen (1975). The theory, which was developed from the earlier Theory of Reasoned Action TRA (Ajzen & Fishbein, 1980), assumes that people behave rationally, in that they consider the implications of their actions. Ajzen and Fishbein (1980) also assert that the model could be represented very simply as following structural model of attitude:

Attitude → Intention → Behaviour

Both theories apply to situations involving a choice of behaviour, where reasons can be given for the choice made (East, 1993). Proper waste disposal practices require considerable effort on the part of the individual as household waste must be sorted, prepared and stored (Boldero, 1995), consequently the decision is likely to be complex, and a number of factors may be taken into consideration. The TPB provides a theoretical framework for systematically identifying the factors which influence the waste disposal decision, and several studies have confirmed its utility for investigating the determinants of attitudes towards waste disposal.

Previous TPB studies (Ajzen & Driver, 1992; East, 1993) suggest that attitudes are composed of two components, instrumental (based on knowledge) and experiential (relating to feelings). Consistent with this approach Davies et al. (2002) argue for the importance of separating attitudes towards waste disposal into two components, affective (experiential) and cognitive (instrumental). Within the TPB, the attitude measure refers to the individual's favourable or unfavourable evaluation of performing the behaviour, and is usually operationalised by asking the individual their feelings about performing the behaviour, for example, whether the behaviour in question is good, rewarding, useful, responsible, etc. Whilst this measure captures the experiential/affective component of attitudes, it does not pay sufficient attention to the instrumental/cognitive element, which is based on the individual's knowledge of the outcomes or consequences of performing the behaviour. The TPB, however, allows for the incorporation of additional variables, provided that these variables make a significant contribution to the explanation of behaviour provided by the model (Ajzen, 1991).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter describes the research procedures and techniques for the study. The issues looked at include a description of Winneba municipality in order to glean more information about solid waste management, the research approach, design, population and sample and sampling technique, instruments for data collection, data collection procedures and how the data was analyzed. Also, the validity and reliability of the work was considered.

3.1. Description of Study Area

The study took place at Winneba, the capital of the Effutu Municipality which is a coastal town located in the Central Region of Ghana. Figure 3.1 shows the study area (Winneba) on the map of Ghana. Before 1988, the district was part of the Gomoa-Awutu-Effutu Senya District Council. The Effutu Municipal Assembly was established by the Local Government Act (Act 462) and by L.I.1860 in 2007. The Effutu Municipal Assembly was carved from the then Awutu-Effutu-Senya-District Assembly The Effutu Municipal with its Administrative Capital at Winneba is located in the south coast of the country, about sixty-five kilometers west of the capital, Accra. According to the 2010 Population and Housing Census (PHC), the Municipality had a population of 68,597 which is made up of 32,795 males; representing 48% and 35,802 females; representing 52% and representing 3.1% of the total population of 2,201,863 in the Central Region (Ghana Statistical Service, 2012).

In 2000, the population was 46,574 made up of 21,346 (45.83%) males and 25,508 (54.77%) females. In 1970 and 1984 the population of the Municipality was 32,315 and 32,523 respectively. The growth rate for the Municipality for 2000 and 1984 represents 2.2%. Winneba with a population of 40,017 is the only urban settlement. Other big settlements in the Municipality are Sankor, Gyangyanadze, Gyahadze, Nsuekyir, Ateitu, Osubonpanyin and Warabeba as shown in figure 3.2. There are four Zonal Councils in the Municipality namely; 1. Nsuekyir/Gyahadze Zonal Council, 2.Kojo-Beedu North/Low Cost Zonal Council, 3. South-East Winneba Zonal Council and 4. South-West Winneba Zonal Council. Ten suburbs in Winneba, (including Wonsom, Yepimso, Sakagyaano, Penkye, Aboadze and Ponko-ekyir, all located near the fishing beach) Zongo (low income area), Low Cost, Abasraba and Kojo Bedu (middle and high income earners) were involved in the survey.

The Effutus of Winneba are mainly fishermen and fish mongers with a few of them being farmers. Usually when they go to sea they do not get enough time to buy food, sit down and eat so the foods they buy are packaged in polythene bags and when they eat it, they leave the polythene bags on the beaches. Dustbins are also not provided at most of the beaches, therefore, encouraging indiscriminate disposal. Winneba is like a dormitory town where most people spend the night and leave for work at Swedru, Kasoa and even Accra. The traffic situation in our country today makes people already tired when they get home and, therefore, go in for prepackaged foods. This situation is also contributing to the worsening waste situation in Winneba.

Figure 3.1: A Map Showing the Study Area

Source: Effutu Municipal Assembly (2014)

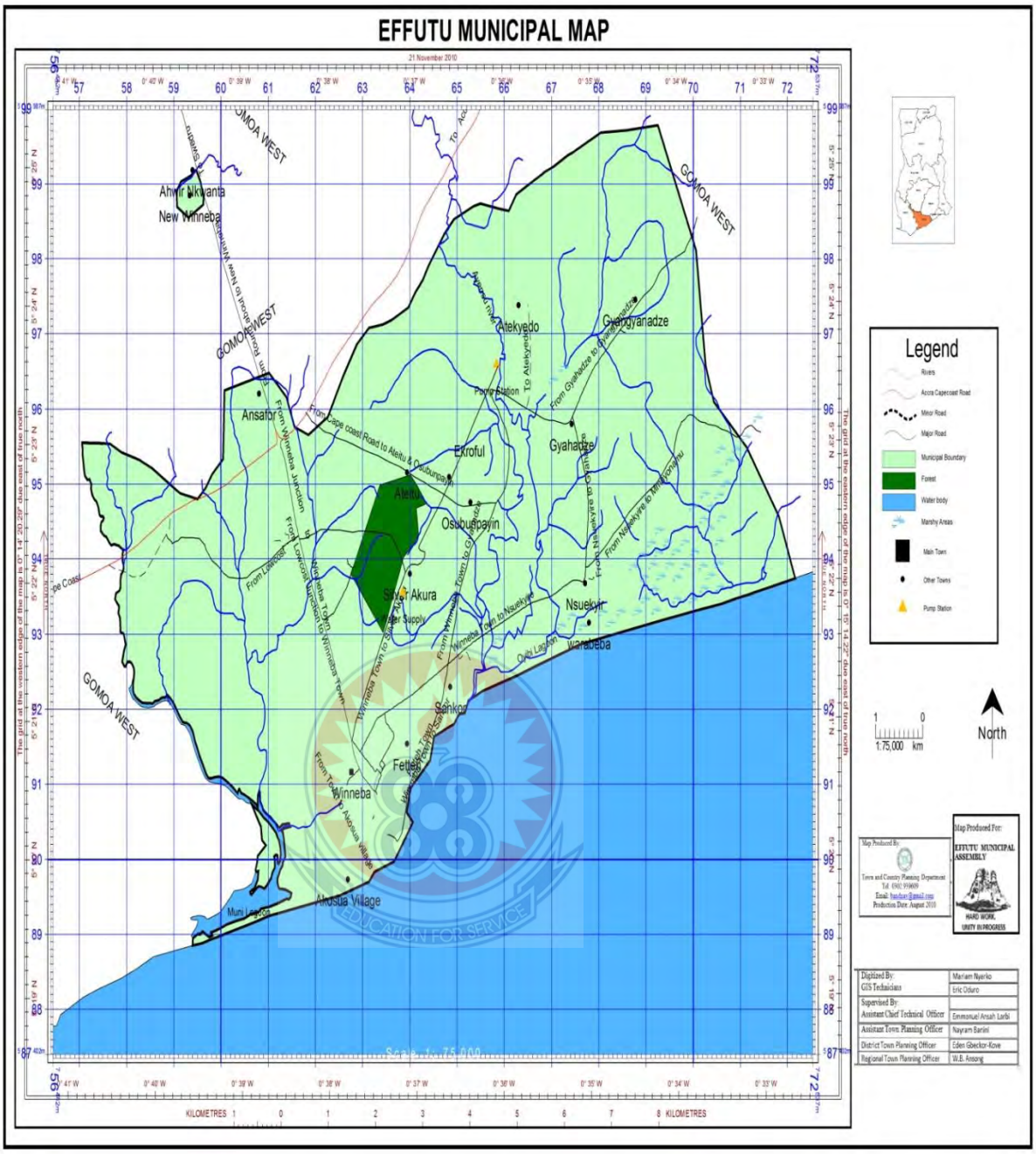

Figure 3.2: Effutu Municipal Map showing Settlements

Source: Effutu Municipal Assembly (2014)

3.2. Research Approach

The researcher employed quantitative method as the main research approach and occasionally fell on the qualitative methods as well. Research adopting the quantitative approach is said to be mostly numerical and is designed to ensure objectivity, generalizability and reliability. What constitutes qualitative research involves purposeful use of graph and charts for describing, explaining, and interpreting the collected data.

According to Cohen (1980), quantitative research is defined as social research that employs empirical methods and empirical statements. He states that an empirical statement is defined as a descriptive statement about what "is" the case in the "real world" rather than what "ought" to be the case. In the same context Creswell, (2003) states that quantitative research

> employ strategies of inquiry such as experimental and surveys, and collect data on predetermined instruments that yield statistical data. The findings from quantitative research can be predictive, explanatory, and confirming. It involves the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute alternate knowledge claims (Creswell, 2003: 18).

Leedy and Ormrod (2001), alleged that, qualitative research is less structured in description because it formulates and builds new theories. It is an effective model that occurs in a natural setting that enables the researcher to develop a level of detail from being highly involved in the actual experiences (Creswell, 1994).

The benefits associated with a quantitative approach include numerical data obtained through this approach facilitates comparisons between organizations or groups, as well as allowing determination of the extent of agreement or disagreement between respondents (Yacht & Strudel, 2003). The advantage of legitimate quantitative data, that is data which is collected rigorously, using the appropriate methods and analysed critically, is in its reliability (CAPS, 2012).

Although it has these benefits, it also had some shortcomings which included employing a larger sample size. As Dudwick, Kuehnast, Jones and Woolcock, (2006) rightly opine, effective quantitative research usually requires a large sample size sometimes several thousand households. However, lack of resources sometimes makes large scale research of this kind impossible. In many settings particularly developing countries, interested parties (e.g., governments, nongovernmental organizations and public service providers) may lack the skills and, especially the resources needed to conduct a thorough quantitative evaluation.

3.3. Research Design

The design for this research was a descriptive survey. The reason is that this research is non-experimental and it is intended to study relationships in their natural setting and the description of an existing phenomenon. Alhassan (2007), defines a survey as a method which describes and interprets what exist in its present form or condition; practice and process; trend and effect and attitude or belief. Survey is a study aimed at collecting data on and describing in a systematic manner, the characteristics and facts about a population and are also well suited to gathering demographic data that describe the composition of the sample (Nworgu 1991; McIntyre, 1999). Similarly Quartey and Awoyemi (2002) described descriptive research as a research aimed at producing an accurate description of a particular on-

going situation or real life setting. Isaac and Michael, (1997) gave an insight as to what a survey seeks to achieve when they stated that a survey research is used:

> to answer questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyze trends across time, and generally, to describe what exists, in what amount, and in what context (Isaac & Michael, 1997 55).

This type of research method uses questionnaires and interviews to collect information about people's attitudes, beliefs, feelings, behaviours, and lifestyles (O'Leary, 2010). This was considered as the best design since my research sought to investigate residents of Winneba attitudes towards waste disposal. Surveys are capable of obtaining information from large samples of the population. Surveys require minimal investment to develop and administer, and are relatively easy for making generalizations (Bell, 1996). The only way to find out the attitudes of people is by asking them, a survey was, therefore, employed to elicit information about attitudes of Winneba residents towards waste disposal that otherwise would have been difficult to measure using observational techniques (McIntyre, 1999). It is important to note, however, that surveys only provide estimates for the true population, not exact measurements (Salant & Dillman, 1994).

Bell (1996), observed that biases may occur, either in the lack of response from intended participants or in the nature and accuracy of the responses that are received. Other sources of error include intentional misreporting of behaviours by respondents to confound the survey results or to hide inappropriate behaviour. Finally, respondents may have difficulty assessing their own behaviour or have poor recall of

the circumstances surrounding their behaviour. This goes to confirm the experience I had during the field investigations some residents were uncomfortable sharing their views on the waste situation with me because they felt it was disgraceful.

3.4. Study Population

Since all residents of Winneba generate waste or require waste disposal services or are affected by waste disposal, the entire populations of Winneba were regarded as the study population for this research. During the 2010 Population and Housing Census, the Effutu municipal area recorded total populations of 68,597 (GSS, 2012). The target populations for the study were residents' of Winneba Township the capital of the Effutu municipality. The area is a fast growing urban community.

3.5. Sample Size and Distribution

A sample size of one hundred and sixty-one (161) residents participated as the study population. This involved ordinary residents whose activities related directly or indirectly to waste generation and management, some officials of the Effutu municipal assembly, ZoomLion and a health worker. A hundred and fifty-six (156) residents and officials were given questionnaires. Interviews, questionnaire and observation were the main methods of data collection. The data was collected through fieldwork. In-depth interviews and prolonged observations were used because the study sought to collect data at both factual and meaning levels. Two officials each of the Municipal Assembly and ZoomLion whose work related to overseeing waste management were interviewed. Another heath worker was also interviewed to get data on the health impact of indiscriminate waste disposal practices. The researcher

conducted a non-participant observation of everyday waste disposal practices at different times of the day and at different times of the week.

3.6. Sampling Techniques and Procedure

One hundred and fifty-six (156) residents and officials were selected using strata sampling to answer questionnaires. A stratified sample is a probability sampling technique in which the researcher divides the entire target population into different subgroups, or strata, and then randomly selects the final subjects proportionally from the different strata. This type of sampling is used when the researcher wants to highlight specific subgroups within the population (Babbie, 2001). The specific sub-groups that was highlighted were the poor communities vis-à-vis the residential areas. The main aim for using strata sampling is to reduce the potential of human bias in the selection of cases to be included in the sample. As a result, the stratified random sample provides me with a sample that is highly representative of the population being studied.

Purposive sampling technique was then used to select two officials each of the Effutu municipal assembly and ZoomLion to be interviewed. The health worker was also purposively sampled. Purposive sampling is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample are taken by the researcher, based upon a variety of criteria which may include specialist knowledge of the research issue, or capacity and willingness to participate in the research. This enabled the researcher intentionally select participant and sites to learn or understand the central phenomenon because of the information they possess and give fair chance to other respondent to be represented (Creswell, 2009).

3.7. Nature of Data for the Study

The data was collected from different sources but were mainly from a secondary and primary source. Secondary data were obtained from books, articles, newspapers and internet sources to review literature. Primary data were collected through preliminary field investigation, questionnaires and face-to-face interviews. These are further discussed in the sub-sections below.

3.8. Research Instruments

The instruments for the data collection were questionnaire, semi-structured interviews and observations. The questionnaire was used as a major instrument and interviews and the observations as supplementary instruments.

3.9. Data Collection Procedure

Data collection was facilitated through the administration of questionnaire, interview as well as field investigation.

3.9.1. Questionnaire Administration

The questionnaire consisted of twenty seven (27) open ended and close ended questions. This was administered to the 156 individuals and officials selected for the study. The questionnaire consisted of four sections. The first section focused on their background information such as age and sex. The second section was to describe the solid waste disposal situation in the Winneba Township. The third section focused on causes and effects of indiscriminate waste disposal. The fourth section was based on the perception and attitudes of residents towards waste disposal. The questionnaire was used to determine the extent of agreement or disagreement on some issues raised by the researcher. A five point likert scale was used to solicit their views on some of the issues pertaining to the study. The purpose of the study was explained to

respondents. They were also assured of their anonymity and were encouraged to participate.

3.9.2. Interviews

In a serene and conducive environment five (5) officials of Winneba were interviewed individually using interview guide made up of 10structured and semi-structured items respectively. This was to avoid interruption. This enabled the researcher asked additional questions and allowed for elaboration when something relevant came up during the interview. Measures were put in place to ensure anonymity of the respondents. Respondents were assured of their anonymity and absolute confidentiality.

3.10. Data Analysis

Both qualitative and quantitative methods were employed for this survey; the analysis was aimed at how the attitudes of residents affect their waste disposal patterns. Taped data and field notes from observation and interviews (qualitative data) was reviewed repeatedly to discern patterns (Bauer, 1996)

- they were sorted
- codes were assigned to the emergent themes
- categorized and analysed using descriptive analysis.

Each questionnaire was scored based on likert scale type. Each item was scored according to the weight of the ratings. Administered questionnaires were examined to check completeness, accuracy and consistency of responses in order to detect and eliminate errors. The Statistical Package for Social Sciences (SPSS) was used to calculate frequencies, percentages, and charts which was used to describe and summarized data.

3.11. Validity and Reliability

The validity and reliability of numerical/statistical data is important to conclude efficient results. In this context Leedy and Ormrod, (2001) argue that validity and reliability are important components that affect correlation coefficients. In order to have any effect upon educational theory or practice, educational research studies must be rigorous and present results that are acceptable to other educators and researchers (Merriam, 1998). To accomplish this task, studies must be of high quality and results must be trustworthy and dependable.

Internal validity refers to establishing results that are credible or believable from a participant's perspective (Trochim, 2000). The researcher used three instruments to collect data. Joppe, (2000) provides the explanation of what validity is in quantitative research, as validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are.

This helped to offset the limitations associated with using one method to collect data (Creswell, 2003; Punch, 2005) and to determine the veracity of information gathered.

Solid waste data should be considered with a degree of caution due to global inconsistencies in definitions, data collection methodologies, and completeness. The reliability of the data is influenced by:

- Undefined words or phrases
- Inconsistent or omitted units
- Dates, methodologies, or sources of data not indicated
- Estimates made without basis
- Incomplete or inconsistent data (Hoornweg & Bhada-Tata, 2012)

Reliability, refers to the ability of research results to be replicated or repeated (Merriam, 1998). According to Bryman and Bell, (2007) reliability means whether or not the results of a study are repeatable. Similarly, Joppe, (2000) defines reliability in quantitative research as the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. To make sure these inconsistencies do not affect the data, clear questions were asked to reduce bias and subjectivity during data collection. To ensure consistency and reliability of findings the researcher employed the procedures of triangulation. The instruments were first discussed with some colleagues and lecturers of Department of Social Studies. Some items were removed, others reframed before being handed over to my supervisor for scrutiny. Questions that were similar were deleted from both the questionnaire and the interview guide after consideration.

Objectivity concerns itself with the ability of research findings not to be 'contaminated' by any individual involved. The researcher ensured that the results weren't influenced by personal feelings, interpretations of the results, or personal prejudices but purely based on facts, and is unbiased.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.0 Introduction

This chapter presents data collected from the respondents; officials of the WMD of EMA, ZoomLion Ghana Ltd., TSH-Winneba and the general public in Winneba on residents' attitudes towards waste disposal. The questionnaire was divided into four categories with a total of twenty-seven questions. Section one presented the background information of the respondents. Section two was to establish the solid waste disposal situation in Winneba Township. The third section covered the causes and effects of indiscriminate waste disposal. The fourth section was based on the attitudes of residents towards waste disposal. The data collected were looked at and linked to the appropriate research questions and presented accordingly. The interview guide for the data collection was also categorized into three.

4.1. Demographic Characteristics of Participants

The demographic characteristics of the participants centred on sex (male and female), age, level of education and occupation. The participants selected to respond to the questionnaire were one hundred and fifty-six (156). The officials who were interviewed were also five (5).The officials and workers of ZoomLion, WMD and TSH totalled five (all males). All five officials who were interviewed have had tertiary education. The outcome of the data as presented in Table 4.1 indicated that a higher percentage of people who engage in waste disposal practices in the locality were females.

Table 4.1: Demographic Characteristics (Gender, age, Occupation and Level of Education) of Respondents

		Frequency	Percent
Sex	Male	75	48.1
	Female	81	51.9
	Total	**156**	**100.0**
Age	Under 20 years	12	7.7
	21-30 years	32	20.5
	31-40 years	48	30.8
	over 41 years	64	41.0
	Total	**156**	**100.0**
Occupation	Farming	6	3.8
	Trading	24	15.4
	Public servant	61	39.1
	Other	62	39.7
	Total	**153**	**98.1**
Level of education	Never	2	1.3
	Primary	8	5.1
	Middle school/JHS	19	12.2
	SHS/Technical	50	32.1
	Tertiary	77	49.4
	Total	**156**	**100.0**

Source: Fieldwork (June, 2014)

From Table 4.1, out of a total number of 156 respondents sampled to respond to the questionnaire, 48.1% were males and 51.9% females. The age characteristics of respondents were; over 41 years (41.0%), 31-40 years (30.8%), 21-30 (20.5%) and respondents under 20 years of age were 7.7%. Occupation characteristics of respondents were public servants (39.1%), traders 15.4%, farmers (3.8%) and others 39.7%. The majority of respondents sampled (49.4%) went to school up to tertiary level, SHS/ Technical (32.1%), and (12.2%) were Middle School/JHS leavers.

4.2. Solid Waste Disposal Practices in the Winneba Township

This section sought to give a clear description of the waste disposal practices among residents, how the respondents manage their waste and how refuse is collected regularly in Winneba.

4.2.1. Description of the waste situation in Winneba

Since the nature of the waste problem indicates how concerned people will be in dealing with waste, respondents were asked to indicate the nature of the solid waste situation in their various localities.

Table 4.2. How will you Describe the General Waste Situation in your Neighbourhood?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very satisfactory	6	3.8	3.8	3.8
	Satisfactory	53	34.0	34.0	37.8
	Poor	69	44.2	44.2	82.1
	Very poor	28	17.9	17.9	100.0
	Total	**156**	**100.0**	**100.0**	

Source: Fieldwork (June, 2014)

As indicated in Table 4.2, 69 respondents representing 44.2% of the residents held the view that the nature of the waste situation in their various neighbourhoods was poor, 53 people representing 34% were of the view that the general waste situation in Winneba is satisfactory, 28 individuals representing 17.9% held the view that the situation was very poor and only six individuals representing 3.8% thought that the situation was very satisfactory.

4.2.2 Waste Disposal is a Problem in my Community

Residents' acknowledging that waste disposal is a problem in their various communities is a good step in helping find possible solutions to it. Majority of the locals 70 and 64 agreed and strongly agreed respectively that waste disposal is a problem in the community, only 11 respondents disagreed that waste is a problem in the community (Figure 4.1).

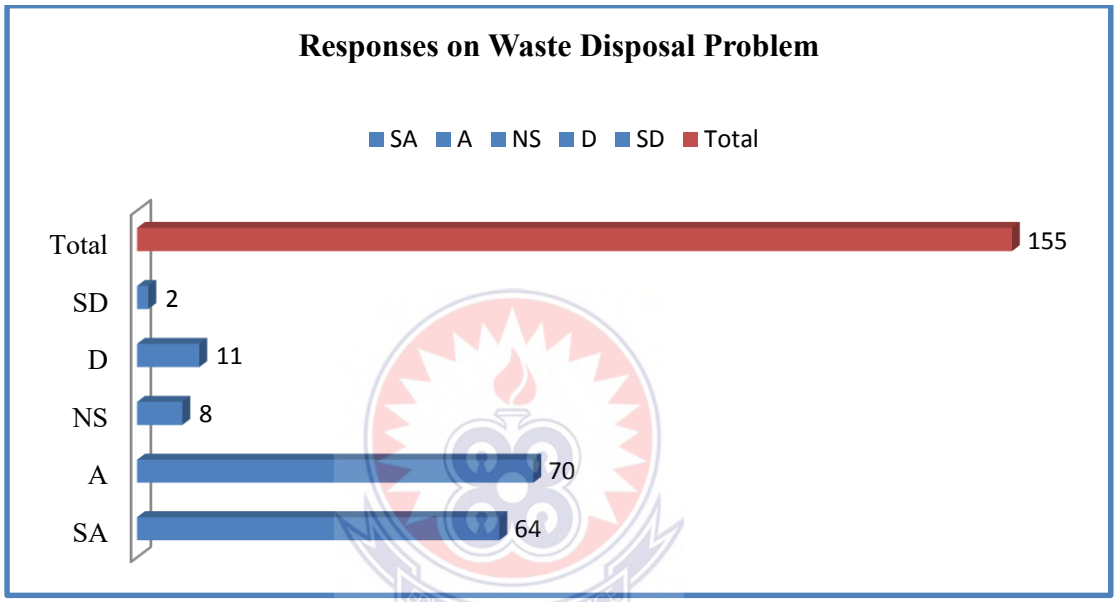

Figure 4.1: Waste disposal is a problem in the community

Source: Fieldwork (June, 2014)

Table 4.3 shows a relative comparison of one's' educational level and perception of waste disposal situation in the community.

Table 4.3: Relative comparison of one's' educational level and perception of waste disposal situation in the community

		Waste disposal is a problem in my community					Total
		SA	A	NS	D	SD	
Highest educational level	Never	0.0	100.0	0.0	0.0	0.0	100.0
	Primary	50.0	50.0	0.0	0.0	0.0	100.0
	Middle school/JHS	42.1	57.9	0.0	0.0	0.0	100.0
	SHS/Technical	42.0	48.0	2.0	4.0	4.0	100.0
	Tertiary	40.8	38.2	9.2	11.8	0.0	100.0
	Total	**41.3**	**45.2**	**5.2**	**7.1**	**1.3**	**100.0**

Source: Fieldwork (June, 2014)

From Table 4.3, regardless of one's educational level they all perceived waste disposal situation in the community as a problem. That is, 41.3% of the indigenes irrespective of educational level, strongly agreed that waste disposal is a problem in the town and 45.2% agreed that waste disposal in Winneba Township is a problem. Meanwhile, 7.1% of respondents of all levels of education disagreed that waste disposal is problem in the community.

Table 4.4 presents data on the influence of age and sex on how residents perceive waste disposal as a problem in Winneba.

Table 4.4: Age and sex and how residents perceive waste disposal as a problem in Winneba

		Waste disposal is a problem in my community (%)					Total
		SA	A	NS	D	SD	
Age	Under 20 years	44.4	51.9	3.7	0.0	0.0	**100.0**
	21-30 years	39.4	45.1	2.8	12.7	0.0	**100.0**
	31-40 years	40.0	48.6	8.6	2.9	0.0	**100.0**
	over 41 years	42.1	36.8	10.5	0.0	10.5	**100.0**
	Total	**40.8**	**46.1**	**5.3**	**6.6**	**1.3**	**100.0**
Gender	Male	42.7	42.7	5.3	8.0	1.3	**100.0**
	Female	40.0	47.5	5.0	6.2	1.2	**100.0**
	Total	**41.3**	**45.2**	**5.2**	**7.1**	**1.3**	**100.0**

Source: Fieldwork (June, 2014)

Almost all the different age groups 40.8% and 46.1% strongly agreed and agreed respectively that waste disposal is a problem in the Winneba Township. Majority of women and men in the locality sampled greed (45.2%) and strongly agreed (41.3%) that waste disposal is a problem in the town and 7.1% disagreed with this assertion.

4.2.3. Institutions Responsible for Managing Waste in Winneba

The waste management institutions responsible for collecting waste for disposal in Winneba were WMD of EMA and ZoomLion Ltd.

Table 4.5: Which Waste Management Institution collects waste in your area for disposal?

	Frequency	Percent	Valid Percent	Cumulative Percent
Waste Management Department (of the municipal assembly)	23	14.7	14.7	14.7
ZoomLion	80	51.3	51.3	66.0
None	34	21.8	21.8	87.8
Don't know	19	12.2	12.2	100.0
Total	**156**	**100.0**	**100.0**	

Source: Fieldwork (June, 2014)

Table 4.5 shows that the use of WMD of EMA facilities and services constituted only14.7% representing 23 respondents and as 80 individuals representing 51.3% relied on ZoomLion Ghana Ltd to collect their waste. This proves that the dependency rate of the residents' on the facilities and service provided by ZoomLion Ghana Ltd for disposal of refuse was very high which creates a lot of pressure on ZoomLion Ghana Ltd facilities in Winneba.

4.2.4. Waste Management Personnel

The views of residents on the importance of the work of waste management personnel were also sought and the results are presented in Table 4.6.

Table 4.6: The work of the waste management personnel is very important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	81	51.9	52.3	52.3
	A	57	36.5	36.8	89.0
	NS	6	3.8	3.9	92.9
	D	9	5.8	5.8	98.7
	SD	2	1.3	1.3	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.6, the presentation indicated that, 81 residents constituting 51.9 percent strongly agreed to the statement, the work of the waste management personnel is very important and 57 others representing 36.5 percent also agreed to the statement. Whilst 9 and 2 residents representing 5.8 and 1.3 percents respectively disagreed and strongly disagreed to the statement, the work of the waste management personnel is very important. This means that majority of the residents cherish the job of these waste collectors.

4.2.5. Waste Disposal Sites

This section presents data on the various waste disposal sites in Winneba as perceived by the participants.

Table 4.7: Where do you dump your waste?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Roadside	4	2.6	2.6	2.6
	Skip	8	5.1	5.1	7.7
	Dump site	79	50.6	50.6	58.3
	Open spaces	16	10.3	10.3	68.6
	Nearby gutter	10	6.4	6.4	75.0
	Backyard	26	16.7	16.7	91.7
	other, specify	13	8.3	8.3	100.0
	Total	**156**	**100.0**	**100.0**	

Source: Fieldwork (June, 2014)

As shown in Table 4.7, 79 respondents representing 50.6% dispose their refuse at approved dump sites, 26 individuals representing 16.7% also dump their waste at their backyards. Another option available to residents was to dump waste in open spaces, 16 individuals representing 10.3% resorted to this practice, 10 other individuals representing 6.4% chose to use nearby gutters as the most convenient place to dispose their waste. Some eight respondents representing 5.1% used skips provided by either ZoomLion or WMD of EMA to dispose waste.

This is evident from Figures 4.2 and 4.3 respectively, where residents dumped waste on the street (open space) and others chose to use a gutter at Wonsom market as a convenient place to dispose waste.

Fig. 4. 2: Disposed waste on the street at Winneba

Fig. 4.3: A Gutter at Wonsom market used as a Refuse Dump Site

Table 4.8 presents data on the influence of educational level on where waste is disposed of.

Table 4.8: Relative comparison of level of education and where waste is disposed of

		Where do you dump your waste? (%)							Total
		Roadside	Skip	Dump site	Open spaces	Nearby gutter	Back yard	Other	
Level of education	Never	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
	Primary	0.0	0.0	12.5	12.5	0.0	50.0	25.0	100.0
	Middle school/JHS	0.0	10.5	52.6	26.3	0.0	10.5	0.0	100.0
	SHS/Technical	4.0	4.0	60.0	2.0	4.0	18.0	8.0	100.0
	Tertiary	2.6	5.2	46.8	11.7	10.4	14.3	9.1	100.0
	Total	**2.6**	**5.1**	**50.6**	**10.3**	**6.4**	**16.7**	**8.3**	**100.0**

Source: Fieldwork (June, 2014)

From Table 4.8, 50.6% of respondents of all levels of education said they dumped their waste at a designated dump site and 16.7% said they dumped their waste at their backyard. It was, therefore, shown that there was no association between ones level of education and where they disposed of their waste in Winneba Township.

4.2.6 Regularity of Waste Collection

This section presents data on respondents' perspectives about the regularity of waste collection in Winneba. The data is mainly from the questionnaires.

Table 4.9: How many times is the waste collected in a week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	48	30.8	31.2	31.2
	Once	44	28.2	28.6	59.7
	Twice	37	23.7	24.0	83.8
	Thrice	6	3.8	3.9	87.7
	Four times	4	2.6	2.6	90.3
	Five times	4	2.6	2.6	92.9
	Throughout	11	7.1	7.1	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.9, 30.8 percent of respondents representing 48 individuals indicated that the waste they generated was not collected at all by the district assembly nor was any other collecting agency. In some instances, waste was collected once in a week as indicated by 28.2 percent of the respondents representing 44 residents. Five times a week which should have been the required number of times waste was collected was rather the least particularly in the low class residential areas. This brought about heaping of waste at dumpsites and overflowing particularly in low class residential areas. Since these skips are not replaced immediately when they are taken people resort to dumping waste in open spaces. This is evident in figure 4.4.

Fig. 4.4: An overflowing skip near the office of ZoomLion

4.2.7. Mode of Waste Collection

Solid waste management includes the hauling and final disposal at landfills. Table 4.10 displays the mode of collection of solid waste in the Municipality.

Table 4.10: What is the mode of collection of waste in your area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Door-to-door	38	24.4	25.3	25.3
	Curb	11	7.1	7.3	32.7
	Communal	68	43.6	45.3	78.0
	Other, (specify)	33	21.2	22.0	100.0
	Total	150	96.2	100.0	
Missing	System	6	3.8		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From the Table 4.10, 43.6 percent of the respondents representing as much as 68 individuals indicated that, waste was collected directly from their communal dumpsites while 24.4 and 7.1 percent of the respondents representing 38 and 11 residents indicated waste was collected from their door-to-door and curb respectively.

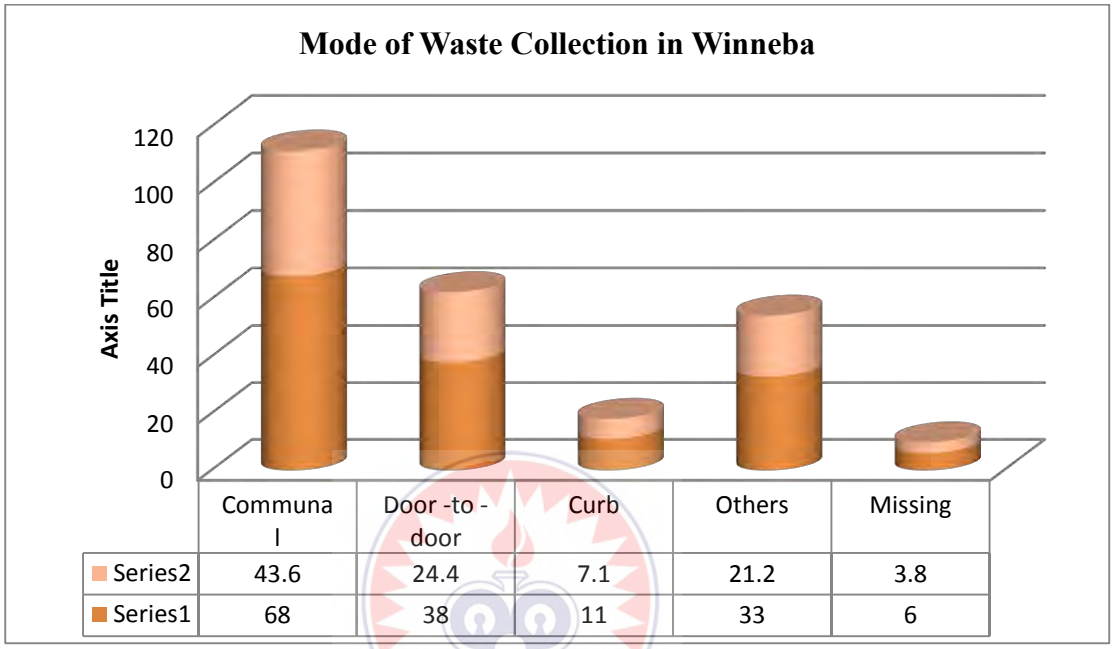

Figure 4.5: Mode of Solid waste Collection

Source: Fieldwork (June, 2014)

As shown in figure 4.5, there are three main modes of waste collection in EMA. These are: communal dumpsites (primary waste collection), door-to-door and curb (secondary waste collection). The waste collected was finally disposed of in a landfill located at Osubunpeyin, a suburb of Effutu Municipality. From the survey, 43.6 percent of the respondents indicated that, waste was collected directly from their communal dumpsites while 31.5 percent indicated waste was collected from their door-to-door and curb. The door-to-door and curb modes of waste collection were carried out mainly in the high class residential areas such as Low Cost, Kojo Beedu and other places. Figure 4.5 shows that, the main mode of waste collection in EMA was communal. This was carried out mainly in the low class residential areas. Figure

4.6 shows a communal skip used for waste collection. This shows that, waste from various households were dumped in the skips for onward collection by ZoomLion Ghana Ltd.

Figure 4.6: Communal Mode of Waste Collection at Winneba

4.2.8. Quality of Waste Disposal Service

Residents were asked to assess the quality of waste disposal services they receive from the two main institutions. Table 4.11 presented data gathered from the respondents.

Table 4.11: How Will you Describe the Quality of Waste Disposal Service you Receive?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very satisfactory	6	3.8	3.9	3.9
	Satisfactory	62	39.7	40.0	43.9
	Poor	68	43.6	43.9	87.7
	Very poor	19	12.2	12.3	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

As indicated in Table 4.11, 68 respondents representing 43.6 percent of the residents held the view that the quality of waste disposal service they receive in Winneba was poor, 62 people representing 39.7 percent were of the view that, the quality of waste disposal service they receive in Winneba was satisfactory, 19 individuals representing 12.2 percent held the view that the quality of waste disposal service they receive was very poor and only 6 individuals representing 3.8percent thought that the quality of waste disposal service they receive in Winneba was very satisfactory.

4.3. Causes of Indiscriminate Waste Disposal

Identifying the causes of a problem is a first step in finding a solution to it. As a result, respondents were asked series of questions on what they think constitute the major causes of the solid waste disposal problem. Officials of ZoomLion Ghana Ltd. and the WMD were also consulted to help the researcher ascertain the major causes of the problem.

4.3.1. Availability of Collection Point to Dispose Waste

From the questionnaire residents were asked if they had collection points to dispose of their waste. The data was presented in Table 4.12

Table 4.12: There is a collection point to dispose waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	36	23.1	23.2	23.2
	A	59	37.8	38.1	61.3
	NS	35	22.4	22.6	83.9
	D	19	12.2	12.3	96.1
	SD	6	3.8	3.9	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.12, 59 residents representing 37.8 percent Agreed to the statement, there is a collection point to dispose waste and 36 residents representing 23.1 percent strongly agreed to the statement. Whereas, 19 individuals representing 12.2 percent disagreed to the statement there is a collection point to dispose waste and six others representing 3.8percent strongly disagreed to the above statement.

4.3.2. Unimportance of Waste Disposal

If residents regard waste disposal as equally important as the food they eat then, they will handle waste properly.

Table 4.13:Waste disposal is not as important as the food we eat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	12	7.7	7.8	7.8
	A	11	7.1	7.2	15.0
	NS	11	7.1	7.2	22.2
	D	54	34.6	35.3	57.5
	SD	65	41.7	42.5	100.0
	Total	153	98.1	100.0	
Missing	System	3	1.9		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.13, the presentation showed that as much as 65 residents representing 41.7 percent strongly disagreed to the statement, waste disposal is not as important as the food we eat and 54 individuals representing 34.6 percent disagreed to the above statement. On the other side, 12 residents representing 7.7 percent strongly agreed to the statement, waste disposal is not as important as the food we eat and 11 others representing 7.1 percent also agreed to the statement.

4.3.3. Rules and Regulations Regarding the Disposal of Waste

Existence of proper and functioning rules and regulation regarding waste disposal practices within Winneba Township will encourage people to adopt environmentally safe waste disposal practices.

Table 4.14:There are rules and regulations regarding the disposal of waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	32	20.5	20.6	20.6
	A	41	26.3	26.5	47.1
	NS	45	28.8	29.0	76.1
	D	23	14.7	14.8	91.0
	SD	14	9.0	9.0	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

The presentation from Table 4.14 indicated that 45 residents representing 29.0 percent were not sure about the statement; there are rules and regulations regarding the disposal of waste. 41 and 32 residents representing 26.3 and 20.5 percents respectively agreed and strongly agreed to the statement, there are rules and regulations regarding the disposal of waste. Subsequently, 23 residents constituting 14.7 percent disagreed to the statement; there are rules and regulations regarding the disposal of waste and 14 others representing 9.0 percent strongly disagreed to the same statement.

Table 4.15 presented a relative comparison of gender and age responses on the existence of rules and regulation governing waste disposal in Winneba Township.

Table 4.15: Relative comparison of gender and age responses on the existence of rules and regulation governing waste disposal in Winneba Township

		There are rules and regulations regarding the disposal of waste (%)					Total
		SA	A	NS	D	SD	
Gender	Male	24.0	32.0	22.7	10.7	10.7	100.0
	Female	17.5	21.2	35.0	18.8	7.5	100.0
	Total	**20.6**	**26.5**	**29.0**	**14.8**	**9.0**	**100.0**
Age	Under 20 years	22.2	22.2	29.6	14.8	11.1	100.0
	21-30 years	19.7	26.8	29.6	18.3	5.6	100.0
	31-40 years	22.9	31.4	28.6	5.7	11.4	100.0
	over 41 years	15.8	15.8	31.6	21.1	15.8	100.0
	Total	**20.4**	**25.7**	**29.6**	**15.1**	**9.2**	**100.0**

Source: Fieldwork (June, 2014)

Respondents were divided in opinion among men and women and the different age groups as to the existence of rules and regulations regarding waste disposal in Winneba Township. From Table 4.15, 26.5%, of both men and women agreed that there are rules and regulation regarding the disposal of waste and 20.6% of both males and females were in strong agreement that there were rules and regulations regarding waste disposal. However, 29.0% were unsure of any rules and regulation regarding waste disposal and 14.8% said they disagreed that there were any such regulation. The different age groups were also varied in opinion on the existence of rules and regulations governing waste disposal in the town; strongly agreed 20.4%, agreed 25.7%, not sure 29.6%, 15.1% disagreed and 9.2% strongly disagreed.

4.3.4. Adequacy of Information regarding Waste Management practices

This section presents data on the adequacy of information regarding waste management practices in the municipality.

Table 4.16: Information regarding waste management practices at Winneba is adequate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	14	9.0	9.2	9.2
	A	20	12.8	13.2	22.4
	NS	32	20.5	21.1	43.4
	D	50	32.1	32.9	76.3
	SD	36	23.1	23.7	100.0
	Total	152	97.4	100.0	
Missing	System	4	2.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From the data presented in Table 4.16, 50 residents constituting 32.1 percent disagreed to the statement, information regarding waste management practices at Winneba was adequate and 36 others representing 23.1 percent also strongly disagreed to the statement. On the other hand, 20 and 14 residents constituting 12.8 and 9.0 percent respectively agreed and strongly agreed to the statement, information regarding waste management practices at Winneba is adequate.

4.3.5. Knowledge about Rules and Regulations on Waste Disposal

The awareness of people on the existence of rules and regulations on waste disposal is a very important step to ensure a clean environment.

Table 4.17:I am well informed about the rules and regulations on waste disposal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	20	12.8	12.9	12.9
	A	43	27.6	27.7	40.6
	NS	32	20.5	20.6	61.3
	D	36	23.1	23.2	84.5
	SD	24	15.4	15.5	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

As shown in Table 4.17, 43 residents constituting 27.6 percent agreed to the statement, I am well informed about the rules and regulations on waste disposal and 20 others representing 12.8 percent also strongly agreed to the statement, whereas 36 other residents constituting 23.1 disagreed to the statement; I am well informed about the rules and regulations on waste disposal and some 24 individuals representing 15.4 percent also strongly disagreed to the above statement.

4.3.6. Equipment Base of Waste Management Institutions in Winneba

An interview with the WMD and ZoomLion Ghana Ltd. revealed the equipment base of the two waste management institutions in the Municipality. Table 4.18 displays the equipment used for storing and collecting waste by the two institutions.

Table 4.18: Equipment Base of Waste Management Institutions (WMD and ZoomLion)

Equipment	WMD (number available)	Number required	ZoomLion (number available)	Number required	Total available	Total required
Skip Trucks	-	2	2	1	2	3
Shovels	8	5	10	10	18	15
Oboafo tricycle	-	30	25	25	25	55
Skips	14	8	14	7	28	15
Dustbins	250	400	625	700	875	1100
Wheelbarrow	11	5	8	7	19	12
Graders	1	1	-	1	1	2
Compaction Truck	-	1	1	1	1	2
Rake	15	5	15	10	30	15
Picking Rod	30	-	40	10	70	10

Source: WMD and ZoomLion, EMA, May, 2014

From table 4.18, the equipment base of the two institutions responsible for managing waste in Winneba is grouped into their respective uses namely storage, collection and transportation. In terms of waste disposal, fifteen (15) extra skips were required by both ZoomLion Ghana Ltd. and WMD to be supplied in both the middle and low class residential areas. Although twenty- eight (28) skips were available for storing waste in the municipality, in effect, if these extra skips were not supplied it could result in people dumping waste at unapproved sites. Also, about 1100 dustbins were needed for storing waste in the high class and middle class residential areas for effective service in the municipality. This is because dustbins were the main equipment for storing waste at the household level at the residential areas for onward collection by either ZoomLion or WMD.

In terms of waste collection and transportation in the municipality Oboafo tricycle and skip trucks were mainly used. The Oboafo tricycle was used for primary transferring of waste collected into a compaction truck for final disposal at the landfill. However, these were not enough to ensure regular collection and transportation of waste to the landfill. For instance about 55 Oboafo tricycles were needed by the waste management institutions for the door-to-door collection. Also, the compaction truck which was used for the door-to-door collection was only one (1) for the entire municipality. There was, therefore, the need for two additional compaction trucks and two graders.

4.3.7. Technical Staff of Waste Management Institutions

The interview revealed the staffing situation of the two institutions in the municipality. Table 4.19 below shows the staff of WMD and ZoomLion Ghana Ltd.

Table 4.19: Technical Staff of Waste Management Institutions in EMA

Institution	Personnel	Number	Qualification
ZoomLion Ghana Ltd	Municipal Operations Supervisor	1	B.Sc Business Administration
	Sanitation Guards	20	Certificate
	Core Staff	5	Certificate
WMD	Municipal Environmental Health and Sanitation Director	1	BSc. Civil Engineering
	Technical Supervisors	3	Dip. Environmental Health
	Supervisors	2	Certificate

Source: WMD and ZoomLion Ghana Ltd., May 2014

From table 4.19, it was evident that both the municipal Operations Supervisor of ZoomLion and the Municipal Environmental Health and Sanitation Director of EMA do not have any background in waste management.

4.4. Effects of Indiscriminate Waste Disposal

Under this section, respondents were asked to respond to some series of statements. These statements described their knowledge on waste disposal practices in their various localities and the effects of indiscriminate waste disposal practices.

4.4.1. Poor Waste Disposal Practice leading to the spread of Diseases

Poor waste disposal can lead to the spread of several diseases some of which have been presented below.

Table 4.20: Poor waste disposal practices can lead to the spread of diseases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	99	63.5	63.9	63.9
	A	43	27.6	27.7	91.6
	NS	8	5.1	5.2	96.8
	D	5	3.2	3.2	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From the presentation in Table 4.20, the data revealed that as many as 99 residents representing 63.5 percent strongly agreed to the statement, poor waste disposal practices can lead to the spread of diseases and 43 other respondents constituting 27.6 percent agreed to the statement. However, 5 respondents

representing 3.2 percent disagreed to the statement, poor waste disposal practices can lead to the spread of diseases.

Table 4.21: Relative Comparison of age and gender and waste disposal practices that can lead to diseases

		Poor waste disposal practices can lead to the spread of diseases (%)				Total
		SA	A	NS	D	
Age	Under 20 years	70.4	22.2	3.7	3.7	100.0
	21-30 years	63.4	29.6	5.6	1.4	100.0
	31-40 years	62.9	31.4	0.0	5.7	100.0
	over 41 years	57.9	21.1	15.8	5.3	100.0
	Total	**63.8**	**27.6**	**5.3**	**3.3**	**100.0**
Gender	Male	78.7	13.3	5.3	2.7	100.0
	Female	50.0	41.2	5.0	3.8	100.0
	Total	**63.9**	**27.7**	**5.2**	**3.2**	**100.0**

Source: Fieldwork (June, 2014)

From Table 4.21, majority of respondents of all the different age groups 63.8% and 27.6% respectively strongly agreed and agreed respectively that poor waste disposal could lead to the spread of diseases. The results showed no association between age and poor waste disposal practices leading to diseases.

The views of men and women of the Township generally supported the claim that poor waste disposal could lead to the spread of diseases in the community 63.9% and (27.7%) strongly agreed and agreed respectively (Table 4.21). An overwhelming majority (99) and 43 strongly agreed and agreed respectively that poor waste disposal

practices could lead to the spread of diseases in the community. This is presented in Figure 4.7.

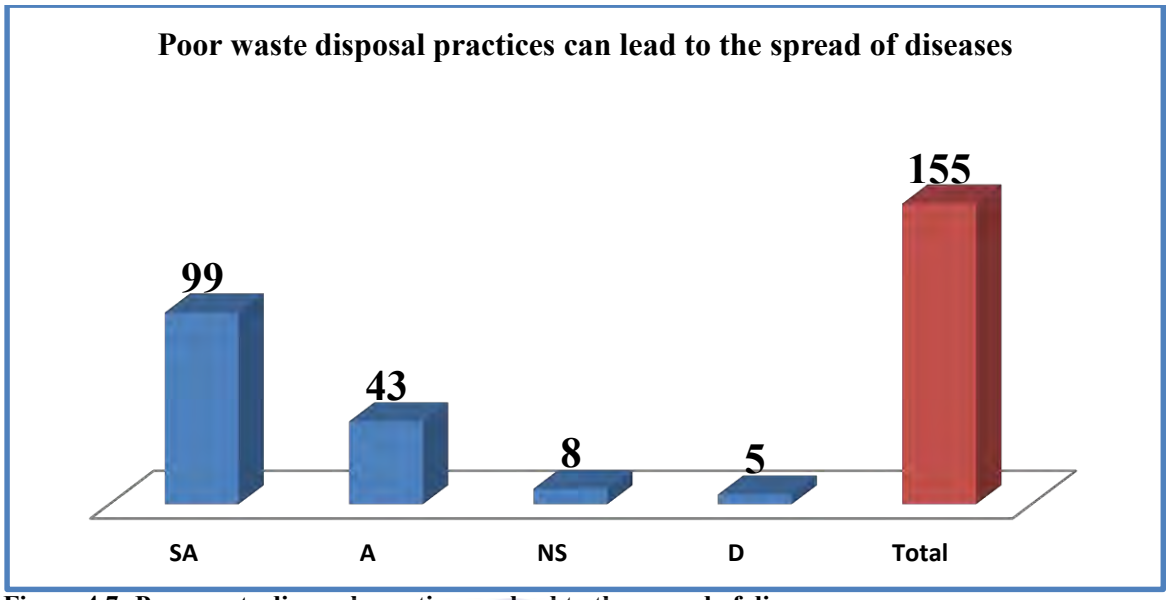

Figure 4.7: Poor waste disposal practice can lead to the spread of diseases

Source: Fieldwork (June, 2014)

Table 4.22: Comparison of respondents' educational level and the effects of poor waste disposal practices

		Poor waste disposal practices can lead to the spread of diseases (%)				Total
		SA	A	NS	D	
Education level	Never	0.0	0.0	50.0	50.0	100.0
	Primary	25.0	75.0	0.0	0.0	100.0
	Middle school/JHS	42.1	42.1	10.5	5.3	100.0
	SHS/Technical	64.0	30.0	4.0	2.0	100.0
	Tertiary	75.0	18.4	3.9	2.6	100.0
	Total	**63.9**	**27.7**	**5.2**	**3.0**	**100.0**

Source: Fieldwork (June, 2014)

In a similar situation, majority of respondents irrespective of their educational background (63.9%) strongly agreed that poor waste disposal practices can lead to the spread of diseases and 27.7% agreed with the assertion that poor waste disposal could lead to the spread of diseases. Only 3.0% of respondents disagreed with this view (Table 4.22).

4.4.2. Environmental Problems Associated with Indiscriminate Waste Disposal

The perspective of residents was sought on the environmental problems associated with their methods of waste disposal. The data from the questionnaire is presented in Table 4.23.

Table 4.23: Do you know of any environmental problems associated with your method of waste disposal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	61	39.1	39.4	39.4
	No	94	60.3	60.6	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

Respondents were asked if they knew any environmental problems associated with their methods of waste disposal. The outcome of the question is presented in Table 4.23. From the presentation, 94 respondents representing 60.3 percent said “no” to the question, do you know of any environmental problems associated with your method of waste disposal and 61 others constituting 39.1 percent responded “yes” to the question. Littering causes an eyesore, which devalues the land around it. These ugly scenarios have impacted negatively on tourism, businesses and residents alike.

Winneba a town that used to pride herself of long clean sandy beaches can no longer boast of that since firth have taken over most beaches in the town. Figure 4.8 shows how waste has polluted the sea and also made the beaches become unattractive.

Figure 4.8: Effect of Indiscriminate Waste Disposal on the Environment at Wonsom

Waste materials like toxic if consumed by animals can be very dangerous to life and worse still if these wastes are dumped in water bodies. Solid wastes, when improperly disposed of can be an environmental hazard. In that the surrounding environment as well as the fishes in the sea is affected since some waste materials are dangerous to aquatic life. Residents were also asked to write down some environmental problems associated with improper waste disposal practices.

Table 4.24: Environmental Problems Associated with Improper Waste Disposals

Problem	Number of Respondents	Percentage
Air pollution	19	12.1
Littering	25	16
Air pollution &littering	14	9
Flooding	12	8
Water pollution	21	13
Water pollution &flooding	26	16.6
Water pollution &air pollution	27	17.3
Water pollution & littering	12	8
Total	**156**	**100.0**

Source: Fieldwork (June, 2014)

From Table 4.24 the most common once were water pollution, air pollution, flooding, and littering.

4.4.3. Common Diseases in the Town

An interview with the Technical Officer (Health Information) of TSH also showed some common diseases that are caused by insanitary conditions.

Table 4.25: Most Common Diseases associated with insanitary conditions

	Number of Times Recorded	
Disease	**January - December 2013**	**January - October 2014**
Malaria Cases	4292 cases	3753 cases
Typhoid Cases	1354 cases	743 cases
Cholera Cases	-	51 cases

Source: Trauma and Specialist Hospital, Winneba – November, 2014

These diseases were malaria, typhoid and cholera. The data was collected on the frequency of the diseases from January 2013 to December 2013 and from January 2014 to October 2014. This improper dumping has led to the spread of diseases to

man such as malaria, typhoid and cholera. As evident in Table 4.25 these diseases have been reoccurring in the township.

4.5. Attitudes of Residents towards Waste Disposal

Attitudes of individuals have both positive and negative effects on waste management practices. A good waste management practice is achieved when individuals have positive attitudes towards it. For instance, individuals disposing of waste at the rightful places, keeping the community neat and tidy and cooperating with the authorities to promote good sanitation practices. However disposing of waste in gutters, on the floor instead of the containers, not cooperating with the authorities to curb problems of how to dispose of waste can affect waste management negatively.

4.5.1. Importance of Waste Disposal

How important people see waste disposal will inform their attitudes towards it.

Table 4.26: Waste disposal is important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	96	61.5	61.9	61.9
	A	39	25.0	25.2	87.1
	NS	3	1.9	1.9	89.0
	D	5	3.2	3.2	92.3
	SD	12	7.7	7.7	100.0
	Total	155	99.4	100.0	
Missing	System	1	.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

Information gathered from the questionnaire as presented in Table 4.26, indicated that 96 residents representing 61.5 percent strongly agreed to the statement, waste disposal is important and 39 residents representing 25.0 percent agreed to the above statement. On the other hand, 12 individuals representing 7.7 percent strongly disagreed to the statement, waste disposal is important and 5 others representing 3.2 percent disagreed to the same statement.

Table 4.27: Relative comparison of age and importance of waste disposal in the communities

	Waste disposal is important (%)					**Total**
	SA	A	NS	D	SD	
Under 20 years	66.7	16.7	0.0	0.0	16.7	100.0
21-30 years	62.5	28.1	0.0	0.0	9.4	100.0
31-40 years	62.5	29.2	2.1	2.1	4.2	100.0
over 41 years	60.3	22.2	3.2	6.3	7.9	100.0
Total	**61.9**	**25.2**	**1.9**	**3.2**	**7.7**	**100.0**

Source: Fieldwork (June, 2014)

Waste disposal in the Township was generally agreed by locals to be important. From Table 4.27, it was obvious that regardless of one's age group proper disposal of waste was either strongly agreed (61.5%) or agreed (25.0%) upon by them.

4.5.2. Concern about the Waste Situation

Since the concern about the problem indicates how willing people will be in dealing with it, respondents were asked to indicate their concern about the waste situation in their Winneba.

Table 4.28: I am not much Concerned about the Waste Situation here

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	6	3.8	3.9	3.9
	A	23	14.7	14.9	18.8
	NS	4	2.6	2.6	21.4
	D	55	35.3	35.7	57.1
	SD	66	42.3	42.9	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

The concern of residents about the waste menace will definitely reflect in their attitudes. That is if they are much concerned about the waste situation in Winneba then they will also have a positive attitude. From Table 4.28, 18.5 percent representing 29 residents both agreed and strongly agreed to the statement, I am not much concerned about the Waste Situation here, 121 other residents who represented 77.6 percent both disagreed and strongly disagreed to the statement, I am not much concerned about the Waste Situation here.

4.5.3. Indiscriminate Disposal of Waste

When people have a positive environmental attitude, they tend to dispose of their waste properly.

Table 4.29: Waste is Disposed of Indiscriminately in my Locality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	35	22.4	22.7	22.7
	A	55	35.3	35.7	58.4
	NS	15	9.6	9.7	68.2
	D	34	21.8	22.1	90.3
	SD	15	9.6	9.7	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.29, 35 residents representing 22.4 percent strongly agreed to the statement, waste is disposed of indiscriminately in my locality, 55 individuals representing 35.3 percent agreed to the statement, whereas 34 residents representing 21.8 percent disagreed to the statement, waste is disposed of indiscriminately in my locality and 15 residents representing 9.6 percent strongly disagreed to the statement, waste is disposed of indiscriminately in my locality. Figure 4.9 confirms how residents dispose waste indiscriminately in Winneba.

Fig. 4.9: Indiscriminate Disposal of Waste in Winneba

4.5.4. Assistance of Residents towards Waste Management

Individuals' responsibility to ensure a clean environment is crucial to ensure environmental stability and sanctity. Data on residents' responses to the statement of offering any possible assistance for waste management is presented in Table 4.30.

Table 4.30: It is not my responsibility to offer any possible assistance for waste management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	4	2.6	2.6	2.6
	A	11	7.1	7.1	9.7
	NS	14	9.0	9.1	18.8
	D	62	39.7	40.3	59.1
	SD	63	40.4	40.9	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.30, 4 residents representing 2.6 percent strongly agreed to the statement, it is not my responsibility to offer any possible assistance for waste management and 11 residents representing 7.1 percent also agreed to the statement. While 62 residents representing 39.7 percent disagreed to the statement, it is not my responsibility to offer any possible assistance for waste management and 40.4 percent made up of 63 residents strongly disagreed to the statement; it is not my responsibility to offer any possible assistance for waste management. Residents were unanimous in accepting their responsibility to assist in waste management in the town. Overwhelming majority either strongly disagreed (63) or disagreed (62) that, it is not their responsibility to offer any possible assistance for waste management (Figure 4.10).

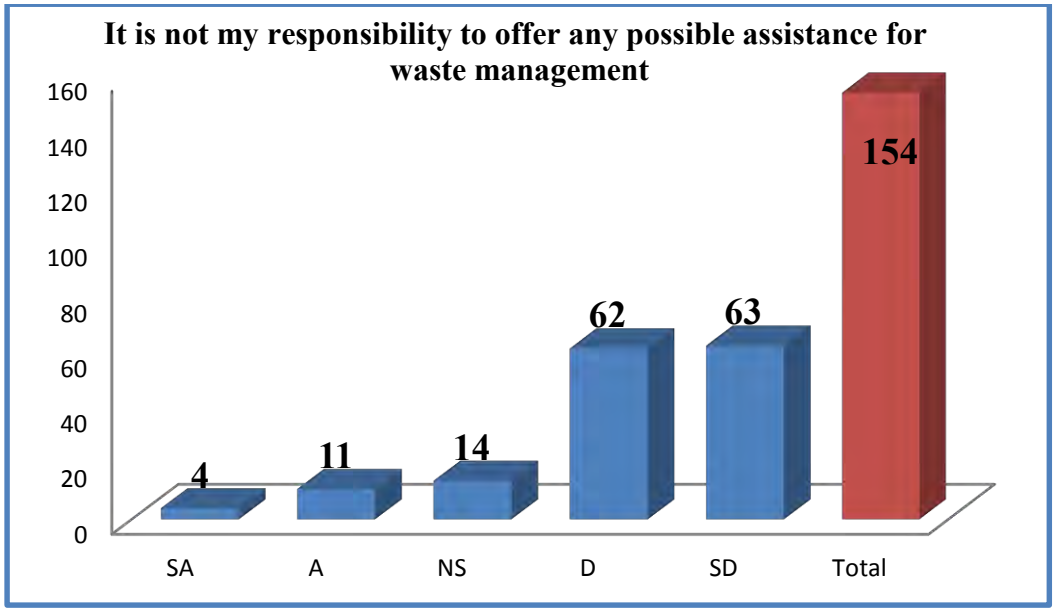

Figure 4.10: Responses on Residents' Responsibility to offer Assistance for Waste Management

Source: Fieldwork (June, 2014)

4.5.5. Organisation of Clean Up Exercise

Frequent cleaning of our various communities ensure a sustained environmental cleanliness, therefore, the respondents were asked if clean up exercises were organized in the community to clear the environment of waste.

Table 4.31: Clean up exercises are organized in my community to clear the environment of waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	8	5.1	5.2	5.2
	A	42	26.9	27.3	32.5
	NS	24	15.4	15.6	48.1
	D	41	26.3	26.6	74.7
	SD	39	25.0	25.3	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.31, 42 residents representing 26.9 percent agreed to the statement, clean up exercises are organized in my community to clear the environment of waste and 8 individuals representing 5.1 percent strongly agreed to the statement, whilst 41 residents making 26.3 percent disagreed to the statement, clean up exercises are organized in my community to clear the environment of waste and 39 residents forming 25.0 percent also strongly disagreed to the statement. From Figure 4.11 respondents were asked if clean up exercises were organized in their communities to clear the environment of waste, responses were split, even though 42 respondents supported the proposal 41 respondents agreed and 39 strongly disagreed with the suggestion.

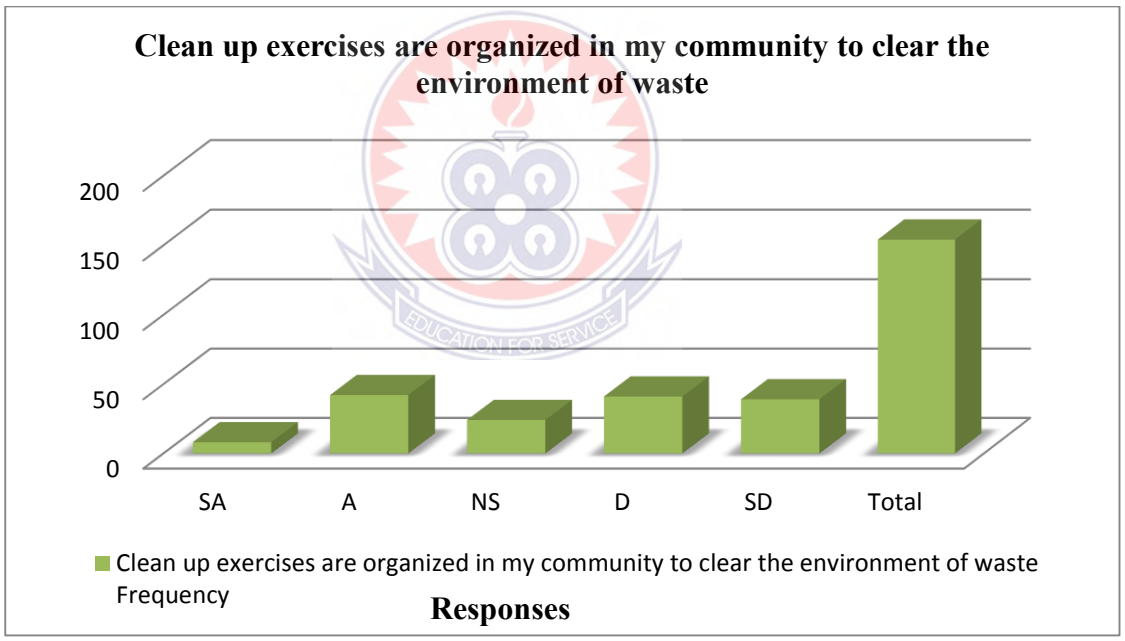

Figure 4.11: Clean up exercises are organized in my community to clear the environment of waste

Source: Fieldwork (June, 2014)

4.5.6. Attendance to Communal Labour

Respondents were asked whether they attend communal labour to clean their communities. The responses given are presented below

Table 4.32: I attend communal labour to clean up my community

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	10	6.4	6.6	6.6
	A	38	24.4	25.0	31.6
	NS	20	12.8	13.2	44.7
	D	40	25.6	26.3	71.1
	SD	44	28.2	28.9	100.0
	Total	152	97.4	100.0	
Missing	System	4	2.6		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.32, 44 residents making 28.2 percent strongly disagreed to the statement; I attend communal labour to clean up my community and 40 residents representing 25.6 percent disagreed to the statement. But 38 residents representing 24.4 percent agreed to the statement, I attend communal labour to clean up my community and the 10 residents representing 6.4 percent also strongly agreed to the statement.

4.5.7. Appropriateness for Individuals to Clean their Surroundings

Residents were asked the appropriateness for individuals to clean their surroundings. The responses are presented in Table 4.33.

Table 4.33: It is appropriate for individuals to clean their surroundings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	95	60.9	61.7	61.7
	A	39	25.0	25.3	87.0
	NS	10	6.4	6.5	93.5
	D	3	1.9	1.9	95.5
	SD	7	4.5	4.5	100.0
	Total	154	98.7	100.0	
Missing	System	2	1.3		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

An analysis of the data as presented in Table 4.33 showed that, 95 residents representing 60.9 percent strongly agreed to the statement, it is appropriate for individuals to clean their surroundings and 39 residents representing 25.0 percent agreed to the same statement. On the other hand, seven residents representing 4.5 percent strongly disagreed to the statement, it is appropriate for individuals to clean their surroundings and 3 others representing 1.9 percent also disagreed to the statement. Individuals' responsibility to ensure a clean environment is crucial to ensure environmental stability and sanctity. Majority of the locals sampled (95) strongly agreed that individuals should clean their environment, 39 respondents agreed and 7 strongly disagreed this is evident in Figure 4.12.

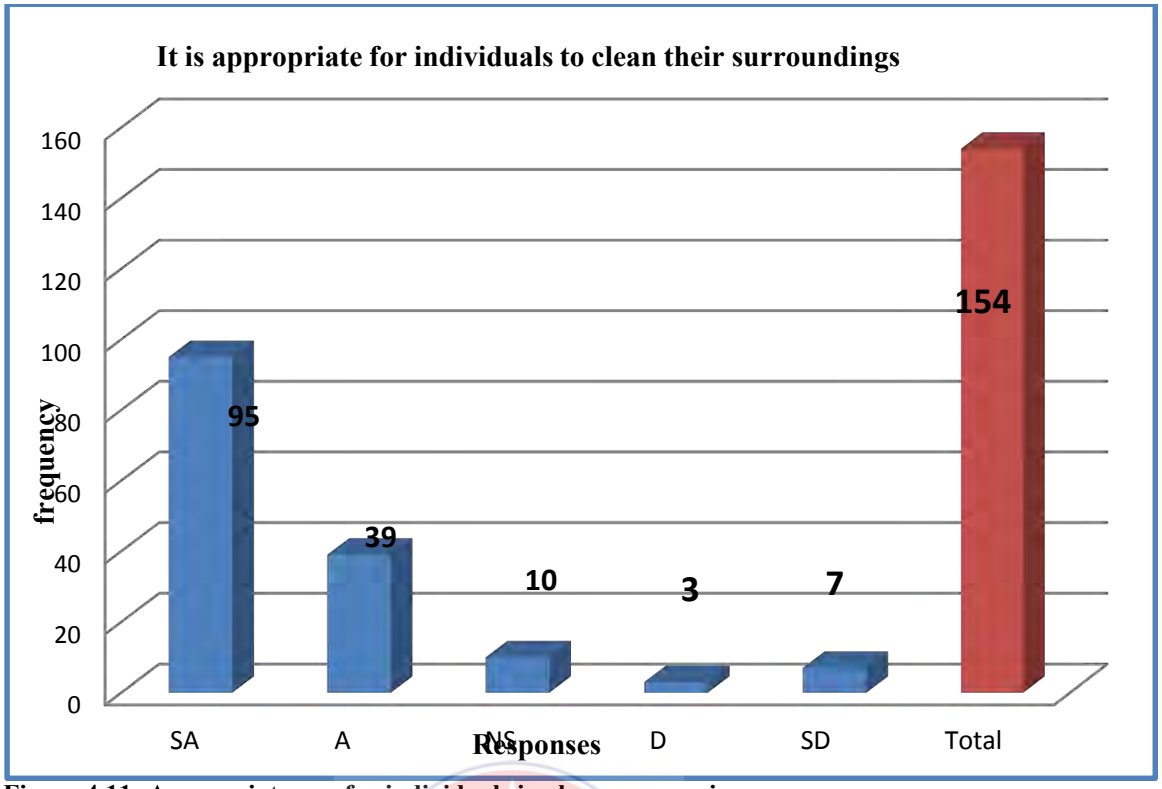

Figure 4.11: Appropriateness for individuals in clean up exercise

Source: Fieldwork (June, 2014)

4.5.8 Willingness to pay for Waste Disposal Services

This section presents data on the willingness of Winneba residents to pay for waste disposal service. The data is presented in Table 4.34.

Table 4.34: Do you Pay for your Waste Disposal Service?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	49	31.4	32.0	32.0
	No but I am willing to pay	61	39.1	39.9	71.9
	I don't pay but I'm not willing to pay	43	27.6	28.1	100.0
	Total	153	98.1	100.0	
Missing	System	3	1.9		
Total		**156**	**100.0**		

Source: Fieldwork (June, 2014)

From Table 4.34, 70.5 per cent of respondents are willing to pay a fee to be accorded better services regarding household waste collection. Out of the 70.5 per cent, 31.4 per cent representing 49 respondents are already paying and 39.1 per cent out of the 70.5 representing 61 respondents are not paying as at the time of the survey but they are willing to pay a reasonable amount towards waste management which confirms their readiness towards managing waste in the municipality. It can also be deduced that 27.8 percent of the respondents were also not paying any fee and are not ready to pay any fee since they are not receiving any better service.

CHAPTER FIVE

ANALYSIS AND DISCUSSION

5.0. Introduction

Chapter four presented the research findings, highlighted the major themes to 'make sense' of the data. This chapter analysed the data critically with reference to relevant literature in an attempt to explore the deeper meanings of the responses and to understand the phenomenon. As noted earlier, the purpose of this study was to investigate Winneba residents' attitudes towards waste disposal. This section analyzes the data collected from the study areas in the municipality through preliminary field investigation, questionnaire and face-to-face interviews. In all, 156 respondents were surveyed and interviews were carried out for five (5) key respondents including institutional heads. Data were collected on the following issues:

- Solid waste disposal practices in the Winneba Township.
- Causes of poor solid waste disposal in Winneba Township.
- Effects of poor waste disposal practices.
- Attitude of residents towards waste disposal

5.1. Solid Waste Disposal Situation in Winneba

As part of the objectives for the study in describing the waste disposal situation in the study area, this section looks at how the respondents manage their waste, problems they face as to where they dispose of waste and how refuse is collected regularly in the study area. Objective one of the work was to describe the solid waste disposal situation of Winneba Township.

As indicated in Table 4.2 (p. 66), 69 respondents representing 44.2% of the residents held the view that the nature of the waste situation in their various neighbourhoods was poor, 53 people representing 34% were of the view that the general waste situation in Winneba was satisfactory, 28 individuals representing 17.9% held the view that the situation was very poor. This means that majority of the residents described the waste situation as poor, reaffirming a statement made by Schübeler *et al.*, (1996), that although MSWM is essential to public health and environmental protection, solid waste management in most cities of developing countries is highly unsatisfactory. Residents' acknowledging that waste disposal is a problem in their various communities is also a good step in helping find possible solutions to it. Majority of the locals 70 and 64 agreed and strongly agreed respectively that waste disposal is a problem in the community this is evident in Figure 4.1 (p. 67). From Table 4.3 (p. 68), regardless of one's educational level they all perceived waste disposal situation in the community as a problem. 41.3% of the indigenes of all education level sampled, strongly agreed that waste disposal is a problem in the town and 45.2% agreed that waste disposal in the town is a problem. Meanwhile, 7.1% of respondents of all levels of education disagreed that waste disposal is a problem in the community. Almost all the different age groups 40.8% and 46.1% strongly agreed and agreed respectively that waste disposal is a problem in Winneba. Majority of women and men in the locality sampled greed (45.2%), strongly agreed (41.3%) that waste disposal is a problem in the town and 7.1% disagreed with this assertion.

Municipal Solid Waste Management (MSWM) is major responsibility of local government. It is a complex task which requires appropriate organizational capacity and cooperation between the numerous stakeholders in the private and public sectors.

Information gathered indicated that there were two main institutions responsible for collecting waste in Winneba. Table 4.5 (p. 70) shows that the use of WMD of EMA facilities and services constituted only 14.7% representing 23 respondents and as 80 individuals representing 51.3% relied on ZoomLion Ghana Ltd to collect their waste. This proves that, residents depended heavily on the facilities and services provided by ZoomLion Ghana Ltd for disposal of waste. This created a lot of pressure on the facilities of ZoomLion Ghana Ltd (Winneba).

In developing countries the prevalent methods of solid waste disposal is through uncontrolled dumping or burning on open ground or city streets (UNEP, 1994; Cointreau-Levine, 1997). As shown in Table 4.7 (p. 72), the commonest place for waste disposal was an open dump site (50.6 per cent). This method was used in suburbs such as Ponko-ekyir, Wonsom, Yepimso, Sakagyaano, Penkye, Aboadze and other areas. This is followed by storing waste at the backyard (16.7 percent) mostly in the high class residential areas and some middle class residential areas in the municipality. These areas were: Abasraba, Low Cost and Kojo Beedu. The rest of respondents who were located in different suburbs in Winneba, including Zongo, and others constituted (32.7 percent) resorted to dumping waste on either the roadside, in skips, open spaces, nearby gutter and other specified places. From the literature, Momoh and Oladebeye (2010) pointed out that, the methods of solid waste disposal include dumping of waste in gutters, drains, by roadside, unauthorized dumping sites and stream channels during raining season and burning of wastes on unapproved dumping sites during the dry season. This was evident in Figures 4.2 and 4.3 (p. 73) where residents dumped waste on the streets and in gutters respectively. This resulted in littering and heaping of waste thereby making the environment filthy. Therefore, the possibility of outbreak of cholera and other environmentally related diseases.

Indiscriminate disposal of solid waste in dumpsites located within urban areas has proved to be a problem to nearby residents in most developing cities of the world and Winneba is no exception. The final disposal site of solid waste in the Municipality was a dumpsite at Osubunpeyin, about four kilometres away from the city centre. A visit to the site showed that, it was in a bad shape. This goes to confirm the argument put forward by Zerbock (2003), which suggests that, "landfills" are nothing more than open, sometimes controlled dumps. According to him the difference between landfills and dumps is the level of engineering, planning, and administration involved. Ideally, a sanitary landfill should have the following functional elements:

- Weighbridge
- Internal access
- Treatment plant
- Leachate collection system
- Gas recovery and
- Location should be far away from human settlement and existing water body.

This was not the case with the landfill in Winneba the site was close to a community called Gengen-adzi. This community was about one kilometre (1km) away from the site. The landfill was an old quarry and all the cells at the site were filled to capacity. Waste dumped in the cells was not levelled and compacted as required of a sanitary landfill. This had left a mountain of waste at the site. This has gone to confirm that the practices of solid waste disposal in the 1950s still exist in Winneba today.

From Table 4.8 (p. 74), 50.6% of respondents of all levels of education said they dumped their waste at a designated dump site and 16.7% said they dumped their waste at their backyard. Data from Table 4.9 (p. 75), showed that, 30.8 percent of respondents representing 48 individuals indicated that the waste they generated was not collected at all by the district assembly nor any other collecting agency, in some instances waste was collected once in a week as indicated by 28.2 percent of the respondents representing 44 residents. Five times a week which should have been the required number of times waste was collected was rather the least particularly in the low class residential areas. This brought about heaping of waste at dumpsites and overflowing skips particularly in the low class residential areas. Since these skips were not replaced immediately when they are taken people resorted to dumping waste in open spaces. As shown in Table 4.10 (p. 76), 43.6 percent of the respondents representing as much as 68 individuals indicated that, waste was collected directly from their communal dumpsites while 24.4 and 7.1 percent of the respondents representing 38 and 11 residents indicated waste was collected door-to-door and curb respectively.

As evident in figure 4.5 (p. 77), there are three main modes of waste collection in Winneba. These are: communal dumpsites (primary waste collection), door-to-door and curb (secondary waste collection). The waste collected was finally disposed of in a landfill located at Osubunpeyin, a suburb of Effutu Municipality. From the survey, 43.6 percent of the respondents indicated that, waste was collected directly from their communal dumpsites while 31.5 percent indicated waste was collected from their door-to-door and curb. The door-to-door and curb modes of waste collection were carried out mainly in the high class residential areas such as Low Cost, Kojo Beedu and other places. Figure 4.6 (p. 78) shows that, the main mode of waste collection in

EMA was communal. This was carried out mainly in the low class residential areas. This shows that, waste from various households were dumped in the skips for onward collection by ZoomLion Ghana Ltd. As indicated in Table 4.11 (p. 79), 68 respondents representing 43.6 percent of the residents held the view that the quality of waste disposal service they receive in Winneba was poor, 62 people representing 39.7 percent were of the view that the quality of waste disposal service they receive in Winneba was satisfactory, 19 individuals representing 12.2 percent held the view that the quality of waste disposal service they receive was very poor and only 6 individuals representing 3.8 percent thought that the quality of waste disposal service they receive in Winneba was very satisfactory.

5.2. Causes of Indiscriminate Waste Disposal Practices in Winneba

A typical solid waste management system in a developing country displays an array of problems, including low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin.

It is clear that the main problems facing the proper management of MSW in many developing countries are administrative, financial, technical (this has to do with the equipment used) and institutional. This affect the amount of solid waste collected and managed and how well the management practices meet standard methods. The presentation from Table 4.14 (p.82), indicated that 45 residents representing 29.0 percent were Not Sure about the statement; there are rules and regulations regarding the disposal of waste. There was no clear reliable framework by which the solid waste sector is administered from the collection, transformation to disposing or treatment phases. As evident from Table 4.15 (p. 83), 26.5% of both men and women agreed that there were rules and regulations regarding the disposal of waste and 20.6% of

both males and females were in strong agreement that there were rules and regulations regarding waste disposal. However, 29.0% were unsure of any rules and regulations regarding waste disposal and 14.8% said they disagreed that there were any such regulation. The different age groups were also varied in opinion on the existence of rules and regulations governing waste disposal in the town; strongly agreed 20.4%, agreed 25.7%, not sure 29.6%, 15.1% disagreed and 9.2% strongly disagreed. A study conducted in Nigeria by Sule indicated that, the main cause of the poor environmental condition can be ascribed to lack of seriousness in the enforcement of solid waste disposal code (Sule 1981).

The data presented in Table 4.16 (p. 84), showed that, 50 residents constituting 32.1 percent disagreed to the statement, information regarding waste management practices at Winneba was adequate and 36 others representing 23.1 percent also strongly disagreed to the statement. As shown in Table 4.17 (p. 85), 43 residents constituting 27.6 percent agreed to the statement, I am well informed about the rules and regulations on waste disposal and 20 others representing 12.8 percent also strongly agreed to the statement, whereas 36 other residents constituting 23.1 disagreed to the statement, I am well informed about the rules and regulations on waste disposal 24 other individuals representing 15.4 percent also strongly disagreed to the above statement. The management activities of MSW are considered public services which are directly controlled by governmental institutions. Such management arrangement is considered weak as it lacks the market mechanisms, and in this case economical incentives cannot be used to improve and develop the MSW management services (Khatib, 2011). A related common problem was the absence of effective and comprehensive legislative frameworks governing the solid waste sector in Winneba and the inadequate enforcement mechanisms.

From Table 4.18 (p. 86), the equipment base of the two institutions responsible for managing waste in Winneba is grouped into their respective uses namely storage, collection and transportation. In terms of waste disposal, fifteen (15) extra skips were required by both ZoomLion Ghana Ltd. and WMD to be supplied in both the middle and low class residential areas. Although twenty- eight (28) skips were available for storing waste in the municipality. In effect, if these extra skips were not supplied it could result in people dumping waste at unapproved sites. Also, about 1100 dustbins were needed for storing waste in the high class and middle class residential areas for effective service in the municipality. This is because dustbins were the main equipment for storing waste at the household level at the residential areas for onward collection by either ZoomLion or WMD of EMA.

In terms of waste collection and transportation in the municipality Oboafo tricycle and skip trucks were mainly used. The Oboafo tricycle was used for primary transferring of waste collected into a compaction truck for final disposal at the landfill. However, these were not enough to ensure regular collection and transportation of waste to the landfill. For instance about 55Oboafo tricycles were needed by the waste management institutions for the door-to-door collection. Also, the compaction truck which was used for the door-to-door collection was only one (1) for the entire municipality. There was, therefore, the need for two additional compaction trucks and two graders.

The interview revealed the staffing situation of the two institutions in the municipality. Table 4.19 (p. 87), shows the staff of WMD and ZoomLion Ghana Ltd. The data revealed that the staffing strength of the two institutions is woefully inadequate coupled with the fact that most of the workers do not have expert knowledge on proper waste management. This is evident in the works of Boadi and

Kuitunen (2004); they pointed out some of the problems affecting solid waste management. These include: weak institutional capacity and lack of resources; both human and capital. They also indicated that, home collection of waste is limited to high and, some middle income areas while the poor are left to contend with the problem on their own. This leads to indiscriminate disposal of waste in surface drains, canals and streams, creating unsanitary and unsightly environments in many parts of the city. Furthermore, MLGRD (2004) summarises the challenges of solid waste management in Ghana as follows: poor planning for waste management programmes; inadequate equipment and operational funds to support waste management activities; inadequate sites and facilities for waste management operations; inadequate skills and capacity of waste management staff; and negative attitudes of the general public towards the environment in general. All these challenges come to bear in the case of Winneba. Another technical constraint in Winneba was the lack of overall plans for solid waste management. This resulted in a situation where solid waste technology was often selected without due consideration to its appropriateness in the overall solid waste management system.

5.3. Effects of Indiscriminate Waste Disposal

In Ghana and most importantly Winneba, environmental issues, especially problems associated with waste disposal are a big problem that the local government have had to deal with. Visible evidence exists to show how 'ordinary' citizens are daily contributing to filth and chocked gutters resulting from indiscriminate waste disposal practices.

From the presentation in Table 4.20 (p. 88), the data revealed that as many as 99 residents representing 63.5 percent Strongly Agreed to the statement, Poor waste disposal practices can lead to the spread of diseases and 43 other respondents

constituting 27.6 percent agreed to the statement. All the different age groups as shown in Table 4.21 (p. 89), majority of respondents of 63.8% and 27.6% respectively strongly agreed and agreed that poor waste disposal can lead to spread of diseases. There was no association between the different age groups and poor waste disposal practices leading to diseases.

The views of men and women of the township generally supported the claim that poor waste disposal can lead to the spread of diseases in the community 63.9% and (27.7%) strongly agreed and agreed respectively. An overwhelming majority (99) and 43 strongly agreed and agreed respectively that poor waste disposal practices could lead to the spread of diseases in the community.

In a similar situation, majority of respondents of all education level (63.9%) strongly agreed that poor waste disposal practices can lead to the spread of diseases and 27.7% agreed with the assertion that poor waste disposal could lead to the spread of diseases. Only 3.0% of respondents of all level of education disagreed with this view (Table 4. 22, p. 90).

Respondents were asked if they knew any environmental problems associated with their methods of waste disposal. The outcome of the question is presented in Table 4.23 (p. 91). These ugly scenarios have impacted negatively on tourism, businesses and residents alike. Winneba a town that used to pride herself of long clean sandy beaches can no longer boast of that since firth has taken over most beaches in the town. Figure 4.8 shows how waste has polluted the sea and also made the beaches become unattractive.

Waste materials like toxic if consumed by animals can be very dangerous to life and worse still if these wastes are dumped in water bodies. Solid wastes, when improperly disposed of can be an environmental hazard in that the surrounding environment as well as the fishes in the sea is affected since some waste materials are dangerous to aquatic life. Residents were also asked to write down some environmental problems associated with improper waste disposal practices.

From Table 4.24 (p. 93), the most common ones were water pollution, air pollution, flooding, and littering. Some of the municipality's final garbage disposal site is also located near the sea and it is polluting it. These practices have created an unhealthy environment. As one report by the Environmental Protection Agency states,

> municipal solid waste has been disposed of anywhere anyhow without regard to the nuisance and harm caused to the environment. All kinds of wastes, regardless of their nature, are being dumped indiscriminately into depressions, sand pits, old quarries, beaches, drains and even, in certain areas, along streets (EPA, 2002: 1).

Data collected in Winneba on the frequency of the diseases in the town showed that, the most common diseases in the town from January 2013 to December 2013 and from January 2014 to October 2014 were malaria, typhoid and cholera. This improper dumping has led to the spread of diseases to man such as malaria, typhoid and cholera. As evident in Table 4.24 these diseases have been reoccurring in the township. This goes to reaffirm the views of Olokor, (2001) when he stated that indiscriminate waste disposal could lead to the outbreak of diseases like cholera, typhoid fever, and other diseases, in severe forms causing death, especially in children ages 0-15 years, whose immunity is not as strong as the adult population. Bassis (2004) re-echoed this when he claimed that serious and devastating outbreak of

diseases and epidemics had been recorded owing to indiscriminate dumping of waste. Such diseases include cholera, typhoid and diarrhoea. In 2014, a report in the Ghanaian Daily Graphic showed that indiscriminate disposal of waste of any kind has continued to be a major public health problem in the country. There appears to be an epidemic of typhoid and cholera in many communities in Ghana now. This is evident in the recent outbreak of cholera in some major cities in Ghana which has so far claimed about 200 lives out of about 10,000 reported cases (Daily Graphic, 2014). Winneba also had her fair share of this cholera epidemic when 51 cases were recorded from January – October, 2014.

5.4. Attitudes of Residents towards Waste Disposal

According to Kendie, (1999) whilst there is some substance to claims of rapid and unplanned urbanization, inadequate funding and economic decline as justification for the most promising economies in sub-Saharan Africa the same argument cannot be put forward in recent times. This is because the recent increase in waste disposal problems stems from the fact that, attitudes and perceptions towards waste disposal have not been adequately considered. Most waste management programmes have not been successful since they failed to address the remote cause of the problem. These programmes fail to look at the attitudes of people and how it affects their waste disposal patterns.

Public awareness and attitudes to waste can affect the population's willingness to cooperate and participate in adequate waste management practices. General environmental awareness and information on health risks due to deficient solid waste management are important factors which need to be continuously communicated to all sectors of the population. Information gathered from the questionnaire as presented in Table 4.26 (p. 94), indicated that 96 residents representing 61.5 percent strongly

agreed to the statement, waste disposal is important and 39 residents representing 25.0 percent agreed to the above statement. On the other hand, 12 individuals representing 7.7 percent strongly disagreed to the statement, waste disposal is important and 5 others representing 3.2 percent disagreed to the same statement. From Table 4.27 (p. 95), it was obvious that regardless of one's age group proper disposal of waste was either strongly agreed (61.5%) or agreed (25.0%) upon by them.

The concern of residents about the waste menace will definitely reflect in their attitudes. That is if they are much concerned about the waste situation in Winneba then they will also have a positive attitude. From Table 4.28 (p. 96), 18.5 percent representing 29 residents either agreed or strongly agreed to the statement I am not much concerned about the waste situation here, 121 other residents who represented 77.6 percent either disagreed or strongly disagreed to the statement, I am not much concerned about the waste situation here.

When people have a positive environmental attitude, they tend to dispose of waste properly. But from the survey there seem to be a contrast because majority of residents claim to be concerned about the waste menace and yet continue to dispose of waste indiscriminately. From Table 4.29 (p. 97), 35 residents representing 22.4 percent strongly agreed to the statement Waste is disposed of indiscriminately in my locality, 55 individuals representing 35.3 percent agreed to the statement, whereas 34 residents representing 21.8 percent disagreed to the statement, Waste is disposed of indiscriminately in my locality and 15 residents representing 9.6 percent strongly disagreed to the statement, Waste is disposed of indiscriminately in my locality. Figure 4.9 (p. 98), confirms how residents dispose waste indiscriminately in Winneba.

Individuals' responsibility to ensure a clean environment is crucial to ensure environmental stability and sanctity. This is in line with the self-interest model which holds that citizens favour strict environmental regulations if their local environment is polluted (Rohrschneider, 1988). From Table 4.30 (p. 99), 4 residents representing 2.6 percent strongly agreed to the statement, it is not my responsibility to offer any possible assistance for waste management and 11 residents representing 7.1 percent also agreed to the statement, while 62 residents representing 39.7 percent disagreed to the statement, it is not my responsibility to offer any possible assistance for waste management and 40.4 percent made up of 63 residents strongly disagreed to the statement, it is not my responsibility to offer any possible assistance for waste management. Residents were unanimous in accepting their responsibility to assist in waste management in the town.

From Table 4.31 (p. 100), 42 residents representing 26.9 percent agreed to the statement, clean up exercises are organized in my community to clear the environment of waste and 8 individuals representing 5.1 percent strongly agreed to the statement, whilst 41 residents making 26.3 percent disagreed to the statement and 39 residents forming 25.0 percent also strongly disagreed to the statement. Community participation has a direct bearing on efficient Solid Waste Management. Yet, the municipal authorities have failed to mobilize the community and educate citizens on the rudiments of handling waste and proper practices of storing it in their own bins at the household, shop and establishment level (Asnani, 2006). In the absence of a basic facility of collection of waste from source, citizens are prone to dumping waste on the streets, open spaces, drains, and water bodies in the vicinity creating insanitary conditions. Citizens assume that waste thrown on the streets would be picked up by the municipality through street sweeping. For the general public,

which is quite indifferent towards garbage disposal protocol, the responsibility of keeping the city clean is entirely on the Local Authorities.

From Table 4.32 (p. 102), 44 residents making 28.2 percent strongly disagreed to the statement; I attend communal labour to clean up my community and 40 residents representing 25.6 percent disagreed to the statement. But 38 residents representing 24.4 percent agreed to the statement, I attend communal labour to clean up my community and 10 residents representing 6.4 percent also Strongly Agreed to the statement. Literature suggests that the root cause of many nations' environmental problems can be traced to the way and manner in which "the imbibed behavioural patterns and acquired values are superimposed on the environment" (Agbola, 1993: 23). Imbibed behavioural patterns are cultural in origin. Therefore, the relationship between humans and environment is thus a function of culture, the level of society's technological development, the perceived magnitude of existing environmental problems and the level of education (Agbola 1993: 24). The attitudes, beliefs and perceptions are learned and can therefore be changed through education. The attitudes of residents therefore play an important role in curbing environmental problem as Schubeller *et al.,* (1996) rightly opine

> ...waste generation is conditioned to an important degree by people's attitudes towards waste: their patterns of material use and waste handling, their interest in waste reduction and minimisation, the degree to which they separate wastes and the extent to which they refrain from indiscriminate dumping and littering (Schubeller *et al.,* 1996:35).

An analysis of the data as presented in Table 4.33 (p. 103), showed that, 95 residents representing 60.9 percent strongly agreed to the statement, it is appropriate for individuals to clean their surroundings and 39 residents representing 25.0 percent

Agreed to the same statement. On the other hand, seven residents representing 4.5 percent strongly disagreed to the statement, it is appropriate for individuals to clean their surroundings and 3 others representing 1.9 percent also Disagreed to the statement. Individuals' responsibility to ensure a clean environment is crucial to ensure environmental stability and sanctity. From Table 4.34 (p. 104), 70.5 per cent of respondents are willing to pay a fee to be accorded better services regarding household waste collection. Out of the 70.5 per cent, 31.4 per cent representing 49 respondents are already paying and 39.1 per cent out of the 70.5 representing 61 respondents are not paying as at the time of the survey but they are willing to pay a reasonable amount towards waste management which confirms their readiness towards managing waste in the municipality. It can also be deduced that 27.8 per cent the respondents were also not paying any fee and are not ready to pay any fee since they are not receiving any better service. Willingness to pay for waste management services or facilities is very important to the success of the Private Sectors' Participation (PSP) in Solid Waste Management program. The willingness to or not to pay could have direct impact positively or negatively on the reliability and success of any solid waste management strategy (Epp & Mauger, 1989; Rahman *et al.,* 2005). Attitudes of residents can be critical in either ameliorating or exacerbating the situation. Schubeller *et al*., (1996) throw more light on this issue when they posit that "people's attitudes influence not only the characteristics of waste generation, but also the effective demand for waste collection services, in other words, their interest in and willingness to pay for collection services" (Schubeller *et al*., 1996:35).

This goes to reaffirm the self-interest model which holds that citizens favour strict environmental regulations if their local environment is polluted (Rohrschneider, 1988). From the survey residents were willing to pay fees for waste collection

provided they will be provided with better and quality services. In effect it was also a confirmation to The Theory of Planned Behaviour (TPB). Within TPB, the attitude measure refers to the individual's favourable or unfavourable evaluation of performing the behaviour, and is usually operationalised by asking the individual their feelings about performing the behaviour, for example, whether the behaviour in question is good, rewarding, useful, and responsible. The theory also suggests that a person's Imbibed behavioural patterns are cultural in origin. Therefore, the relationship between humans and environment is thus a function of culture, the level of society's technological development, the perceived magnitude of existing environmental problems and the level of education (Agbola 1993: 24).

CHAPTER SIX

SUMMARY OF KEY FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.0. Introduction

This final chapter of the study presented the summary of the research findings, conclusions and provides recommendations on how to improve the waste disposal services in Winneba. The aim of the research was to investigate Winneba residents' attitudes towards waste disposal. Thus understanding peoples' attitudes and perception provides an opportunity for effectively planning and implementing efficient solid waste management technologies. Out of the one hundred and sixty-one (161) individuals who constituted the sample size, one hundred and fifty-six (156) were given questionnaires to respond to and the other five (5) individuals who were officials of WMD, ZoomLion and TSH were also interviewed.

6.1. Summary of the Research Findings

Through the analyses, the following are the key findings of the study. These are discussed below.

6.1.1 Solid Waste Disposal Situation in the Winneba Township

The study revealed that there was irregular or lack of routine collection of waste by WMD of EMA and ZoomLion Ghana Ltd. especially in the low class residential areas in the Municipality. Waste collection was mostly carried out once a week and in some low class residential areas. Residents therefore resorted to dumping waste in nearby gutters, by roadside, opened spaces and other unapproved sites.

The landfill on the other hand did not meet the requirement of a sanitary landfill as in the case of Winneba and therefore could be described as an open dump. The landfill was sited near a community. Additionally, waste was not usually separated into their various components before final disposal. This led to burying of some valuable resources in the landfill which could have been otherwise re-used.

6.1.2 Causes of Indiscriminate Solid Waste Disposal Practices in Winneba

From the study, it showed clearly that there was no clear reliable framework by which the solid waste sector was administered from the collection, transformation to disposing. Rules and regulations regarding waste disposal were not effective. Most people did not know about the existence of such rules and regulations.

The waste management institutions were also unable to deliver efficient services as they were under resourced. The study also showed that inadequate skips was a major factor affecting the disposal of waste in Winneba especially among the low class residential areas. The survey established that most skips when carried away are not replaced immediately. This usually compelled residents to dispose waste indiscriminately. The interview revealed that the two waste management institutions were under staffed and also those in charge of operations in these institutions had no background in waste management.

6.1.3 Effects of Indiscriminate Solid Waste Disposal Practices in Winneba

Respondents were asked if they knew any environmental problems associated with their methods of waste disposal. The residents mentioned some of the environmental problems which included flooding, water pollution, air pollution, littering among others. It was also noted that some diseases were reoccurring in the

Winneba Township as a result of improper disposal practices among these diseases were malaria, typhoid and cholera.

6.1.4 Attitude of Residents towards Waste Disposal

Individual participation has a direct bearing on proper waste disposal practices. Yet, Winneba municipal authorities have failed to mobilize the community and educate citizens on the rudiments of proper practices of waste disposal which include segregating waste in their own bins at the household level. Some dumping sites were more than 200 meters away from the houses of residents and in the absence of a basic facility of collection of waste, residents were prone to dumping waste on the streets, open spaces, drains, and water bodies in the vicinity creating insanitary conditions. More often, it was due to households lacking knowledge and incentives to keep to the rules of the collection system, and operators lacking sanctions and authority. Indeed there was irregular or lack of routine education or information regarding waste management by EMA, WMD, ZoomLion Ghana Ltd. especially in the fishing beach areas in the Municipality.

6.2. Conclusion

A clean environment is the responsibility of every Ghanaian, as everyone is a direct beneficiary of its consequences. The development of the country is slowed down when people do not make it a point to observe good sanitation habits. A dirty environment brings the possibility of an outbreak of an epidemic, which in the long run the government has to spend huge amount of money to get rid of.

It was, therefore, concluded that attitudes, beliefs and perceptions are learned and can therefore be changed through education. The data suggested that general environmental knowledge significantly predicted behaviour. Past behaviour had a

sizeable effect on predicting subsequent behaviour, suggesting that TPB plus knowledge will go a long way to help predict proper waste disposal practices in Winneba Township. The availability of an effective waste management infrastructure that enables the public to properly dispose their waste is also a crucial part of any waste management initiative so too are the many other factors which motivate individuals to make use of that infrastructure. Understanding these other motivational factors (Facilities, regular collection, incentives) is essential if proper waste disposal practice is ever to attain its full potential and become a part of everyday individual routine in the town. It is hoped that these recommendations, when considered for action by the local authorities and the people themselves would help address the solid waste management problem and its related issues in Winneba.

6.3. Recommendations

Based on the findings of the study, the following measures were recommended for efficient and effective disposal of waste in Winneba. These are discussed below.

6.3.1. Provision of adequate Skips and Dustbins

Adequate dustbins and skips should be provided by ZoomLion Ghana Ltd. (Winneba) in collaboration with the WMD and Municipal Assembly for residents in the Municipality for waste storage. Approximately fifteen (15) skips should be supplied. This should be provided particularly for the low class residential and middle class residential areas to avoid dumping of waste in open spaces, gutters and roadside. These should be placed at least within 30 metres radius and at most 50 metres radius in the low class residential areas. With this, residents in the low class residential areas will spend less time to dispose of their domestic waste at the skip

site. Also 1100 dustbins should be supplied by ZoomLion Ghana Ltd. particularly for the high class residential areas and some middle class area.

6.3.2 Regular Collection of Waste

There should be regularity in waste collection by ZoomLion Ghana Ltd. Particularly in highly populated areas like Zongo, Wonsom, Yepimso, Sakagyaano, Penkye, Aboadze and Ponko-ekyirto avoid heaping of waste and over flowing of skips with solid waste. At least, waste should be collected three times a week in these areas and twice in the Middle and high class residential areas. There should be regular monitoring of waste collection by the Municipal Assembly. This will keep the place constantly clean and prevent any possible outbreak of communicable diseases such as cholera and typhoid.

6.3.3 Proper Management of Landfill

The landfill site should be properly managed to avoid heaping of waste and burning. The following should be revived for the landfill to work effectively. These include the weighbridge, gas recovery system and leachate collection system. With the weighbridge the quantity of waste that goes into the landfill can be easily determined. With proper leachate system put in place the possibility of waste polluting groundwater in the area will be prevented. Also, waste dumped in the landfill should be spread, compacted and covered with soil. This will prevent heaping of waste in the landfill. Furthermore, the landfill management should ensure that waste that is carried to the landfill does not contain fire. Any container that contains fire should be isolated and fire quenched before dumping is done. This will go a long way to prevent the burning of waste in the landfill. The landfill site should also be relocated because of its negative environmental impact on the lives of people in the

nearby community. The relocation will prevent the community from being constantly engulfed by smoke from the landfill. This will also prevent possibility of the waste in landfill especially hazardous waste from polluting water sources of the community through percolation.

6.3.4 Adequate Education and Monitoring

One sure way of bringing proper waste disposal practices is through education and awareness creation, which have still not been effective. Since education is a major way of changing the attitudes of individuals, there should be regular and constant education of Winneba residents. This will make them aware of the regulations on waste management in the municipality. Changing attitudes and cultures towards waste and sanitation requires new learning; it also requires unlearning our old unsustainable ways and replacing them with modern approaches that are culturally and contest-relevant. The older population who seem not to have acquired any information on proper waste disposal practices should also be educated on the need to practice an environmentally safe waste disposal practice. Public awareness and attitudes towards waste can affect the population's willingness to cooperate and participate in adequate waste management practices. General environmental awareness and information on health risks due to deficient solid waste management are important factors which need to be continuously communicated to all sectors of the population.

Creating a sustainable society requires a critical mass to take up sustainable lifestyles before the rest will follow. However, efforts are also needed to involve the public in the policy-formation, development of plans, and implementation of waste management programs. Public support is essential for the success of such decisions. Schübeler *et al.*, (1996) re-echoed this view when they stated that, whilst attitudes towards solid waste may be positively influenced by public information and

educational measures, improved waste handling patterns can hardly be maintained in the absence of practical waste disposal options. Awareness-building measures should therefore be coordinated with improvements in waste collection services, whether public or community-managed. Participation of the population can be by carrying waste to a shared container, by segregating waste to assist recycling activities, or even by paying for waste management services.

The Environmental Protection Agency (EPA) and the Waste Management Department of EMA which are the regulatory authorities on sanitation should ensure routine monitoring of households and management of the landfill site. People do not give respect to the laws on environmental cleanliness, due to lack of its enforcement. This has given people the chance to dump solid waste at their convenience, anywhere they please. The lack of enforcement of the law has made the power of the law dormant, making the existence of the law irrelevant. If the people are refusing to realise the benefit of a clean environment, then it is the duty of the law makers to implement the law to save the environment and the people in it.

6.3.5. Adequate Resourcing of Waste Management Institutions

The waste management institutions should be adequately resourced by the Municipal Assembly to ensure efficient and effective waste management in the area. The Municipal Assembly should liaise with other corporate bodies in the municipality like banks to pull financial resources to support institutions in charge of managing waste especially WMD and ZoomLion Ghana Ltd. With the support, adequate dustbins, skips and core waste management equipment such as compaction trucks, roll on/roll off trucks, skip loaders would be purchased to ensure effective waste collection and disposal. People particularly in the low class residential areas should be made to pay for disposing their waste. This is because they are the very people who

generate the waste. That is the 'pay as you throw principle' should be introduced. All these should be done through education by letting residents know the importance of environmental cleanliness and how they can contribute to it. This will go to support the financial base of the waste management institutions.

REFERENCES

ACAPS (2012). Qualitative and quantitative research techniques for Humanitarian needs assessment: An introductory brief. *IOSR Journal of Humanities and Social Science, 19*(4).

Achalu, O. E & Achalu, E. (2004). *Environmental health and pollution control*. Lagos: Simarch.

Agbola, T. (1993). 'Environmental education in Nigerian schools'. In W. Filho (Ed). *Environmental education in the commonwealth*. The Commonwealth of Learning, Vancouver.

Ajayi, F. T. (2004). *A guide to primary health care practice in developing countries*. Ekiti-State: Government Printer.

Ajzen I, & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour.* Englewood Cliffs, NJ: Prentice Hall.

Ajzen, I. & Driver B. L. (1992). Application of the theory of planned behaviour to leisure choice. *Journal of Leis Res; 24*(3):207–24.

Akindutire, I. O. & Alebiosu, E. O. (2014). Environmental risk-factors of indiscriminate refuse disposal in Ekiti State, Nigeria. *IOSR Journal of Research & Method in Education (*IOSR-JRME) e-ISSN: 2320–7388, p-ISSN: 2320–737X Volume 4, Issue 5 Ver. II (Sep-Oct. 2014), PP 54-59

Alhassan, S. (2007). *Modern approaches to research in educational administration*. American Psychological Association (APA) Key Points in Research Publication: *Journal of Educational Technology & Society*. Last update: June 10, 2008.

Anderson, G. K. (1999). "*Waste minimization*." Unpublished Report. Seminar in Advanced Wastewater Treatment, Faculty of Civil Engineering. UTM-Skudai. 27-29 January.

Appiah, S. (2014 November 3). First national sanitation day observed. *Daily Graphic* (Accra). Issue no.19606. pp 14, 16 and 20.

Appiah, S. (2014 March 24). Refuse piles up in Accra central business district. *Daily Graphic* (Accra). Issue no. 19416. p.23.

Asnani, P. U. (2006). *Solid waste management*. In India infrastructure report 2006, New Delhi: 3i Network, Oxford, pp 160–189.

Awoyemi, M. O., & Quartey, S. M. (2002). *Research methods in education*. Accra: KNA B Limited.

Ayodele-Oni, S. (2007). Environmental health education in schools and in the community. *Nigerian School Health Journal 19*(2) 116-122

Baabereyir, A. (2009). *Urban environmental problems in Ghana: A case study of social and environmental injustice in solid waste management in Accra and Sekondi-Takoradi.* School of Geography, University of Nottingham.

Babbie, E. (2001). *The practice of social research*: (9th ed.). Belmont, CA: Wadswort Thomson.

Bartone, C. (2000). *Strategies for improving municipal solid waste management: Lessons from World Bank lending and CWG activities*. Workshop on Planning for Sustainable and Integrated Solid Waste Management, Manila, 18-22 September 2000. Washington, DC: Urban Management Division, World Bank.

Bartone, C. R. (1995). *The role of the private sector in developing countries: Keys to success*. Paper presented at ISWA Conference on Waste Management - Role of the Private Sector, Singapore, 24-25 September.

Bassis, L. (2004). *Waste disposal* www.unich.edui/gs/265/society/wastedisposal/htm

Bauer, M. (1996). *The narrative interview.* London School of Economics and Political Science. London: Methodology Institute.

Beede, D. N. & Bloom, D. E. (1995). *The economics of municipal solid waste*. The World Bank Research Observer, 10 (2), August, 113-50.

Begum, Z. (nd). *Solid waste management*. Centre of Excellence in Environmental Economics. Sponsored by Ministry of Environment and forests, Government of India.

Bell, S. (1996). *Learning with information systems: Learning cycles in information systems development*. New York: Routledge.

Benneh, G., Songore, J., Nabila, S. J., Amuzu, A. T., Tutu, K. A., & Yaugyuorn, K. A. (1993). *Environmental problem and urban household in Greater Accra Metropolitan Area (GAMA), Ghana*. M. A. C. Stockholm.

Beukerung, P. V., Sehker, M., Gerlagh, R. & Kumar, V. (1999*). Analysing urban waste in developing countries: A perspective on Bangalore, India*. Working Paper No.24

Blight, G. E. & Mbande, C. M. (1996). Some problems of waste management in developing countries. *Journal of Solid Waste Technology and Management* 23, no. 1, February 1996. pp 19-27.

Boadi, K. O., & Kuitunen, M. (2005). Environmental and health impacts of household solid waste handling and disposal practices in third world cities: The case of the Accra Metropolitan Area, Ghana. *Journal of Environmental Health, 68*(4), 32.

Boldero, J. (1995). The prediction of household recycling of newspapers: the role of attitudes, intentions and situational factors. *Journal of Applied Social Psychology*, *25*(5):440–62.

Botkin B. D. & Keller A. E., (2003). *Environmental science: Earth as a living planet.* (4th ed.). U.S.A: John Wiley and Sons, Inc.

Bryman, A. & Bell, E. (2007). *The nature of qualitative research: In Business research methods.* New York: Oxford University Press. P. 402-437.

Burn, S. M. & Scamp, S. (1986). Increasing community recycling with persuasive communication and public commitment. *Journal of Applied Social Psychology*, *16*, 29-41.

Cary, J. (1993). The nature of symbolic beliefs and environmental behaviour in a rural setting. *Environment & Behaviour*, *25*, 555-576.

Centre for Environment and Development (2003). *Study of the attitude and perception of community towards solid waste management: A case study of Thiruvananthapuram city-Phase II.* Submitted to Kerala Research Programme on Local Level Development.

Cohen, L., & Manion, L. (1994). *Research methods in education* (4th ed.). London: Routledge.

Cointreau, S. (1982). *Environmental management of urban solid waste in developing countries: A project guide*. Urban Development Technical Paper Number 5, World Bank, Washington DC.

Cointreau, S. J. & de Kadt, K. (1991). *Living with garbage: Cities learn to recycle.* Development Forum. January – February: p.12-13.

Cointreau-Levine, S. (1997). Occupational and environmental health issues of solid waste management. In S. Cointreau-Levine (Ed.): *International occupational and environmental medicine*. Mes by, St. Louis (USA).

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: SAGE Publications.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). London: Sage Publications.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson Education.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). London: Sage Publications.

Cunningham, W. P., & Siago, B. W. (1997). *Environmental science: A global concern.* Times Mirror Higher Education Group, Inc.

Davies J, Foxall, G. R, & Pallister, J. (2002). Beyond the intention–behaviour mythology: an integrated model of recycling. *Market Theory 2*(1), 29–113.

DeLamater, J. D. & Myers, D. J. (2011). *Social psychology.* Belmont, CA: Wadsworth Carnegie Learning.

Dudwick, N., Kuehnast, K., Jones, V. N., & Woolcock, M. (2006). *Analyzing social capital in context: A guide to using qualitative methods and data.* Washington: World Bank Institute.

Dunlap R. E. (1994). International attitudes towards environment and Development. In H. O. Bergesen & G. Parmann, (Eds.), *Green globe yearbook of international co -operation on environment and development*. Oxford: Oxford University Press.

East, R. (1993). Investment decisions and the theory of planned behaviour. *Journal of Economic Psychology, 14*:337–75.

Environmental Protection Agency (2002). *Ghana's state of the environment report* EPA, MES, MLGRD, (2002) Ghana Landfill Guidelines: Best Practice Environmental Guidelines. Accra, Ghana.

EPA's 2007 Report on the Environment: Science Report http://epa.gov/ncea

Epp, D. J., & Mauger, P.C. (1989). Attitudes and household characteristics influencing solid waste generation: A household garbage analysis. *Northeastern J. Agric. and Res. Econ, 18*(1), 46-51.

Eshun, J. K. (2002). *Co-ordinating informal settlement waste into the municipal waste system: The case of Accra city.* Unpublished MSc. Thesis, Enschede: ITC.

European Commission (2010). *Being wise with waste: The EU's approach to waste management*. Luxembourg: Publications Office of the European Union.

Fishbein, M., & Ajzen, I. (1975*). Belief, attitude, intentions and behaviour: An introduction to theory and research*. Boston: Addison – Wesley

Freduah, G. (2008). *Problems of solid waste management in Nima, Accra*. University of Ghana, Legon.

Gerlagh, M., Goossen-van de Geijn, H. M, Fokkema, N.J. & Vereijken P. F. G. (1999). *Long-term bio sanitation by application of Coniothyriumminitans on sclerotial of Sclerotiniasclerotiorum-infected crops*. Phytopathology 89, 141–7.

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

Ghana Innovation Marketplace (2009). Waste Management Conference and Exhibition. 11th-12th November, 2009. Great Hall, KNUST.

Ghana Statistical Service (2012). *2010 population and housing census report*. Accra, GSS.

Gilbert, R., Stevenson, D., Giradet, H. & Stren, R. (1996). *Making cities work, the role of local authorities in the urban environment.* London: Earthscan Publications Ltd.

Glipin, A. (1996). *Dictionary of environmental and development.* Chester and New York: John Wiley and Sons.

Goulay, K. A. (1992). *World of waste, dilemmas of industrial development.* London: ZedBooks Limited

Isaac, S., & Michael, W. B. (1997). *Handbook in research and evaluation: A collection of principles, methods, and strategies useful in the planning, design, and evaluation of studies in education and the behavioural sciences*. (3rd ed.). San Diego: Educational and Industrial Testing Services.

Hoornweg, D., Thomas, L. & Otten, L. (1999). *Composting and its applicability in developing countries*. Urban Waste Management Working Paper Series 8. Washington, DC: World Bank.

Hoornweg, D. & Bhada-Tata, P. (2012). *What a waste: A global review of solid waste management.* Urban Development & Local Government Unit. Washington D.C: The World Bank.

http://www.modernghana.com/blogs/263216/31/ghanaians-contribution-to-ghanas-insanitary-enviro.html (Retrieved on 15th June, 2015)

Isaac, S., & Michael, W. B. (1997). *Handbook in research and evaluation: A collection of principles, methods, and strategies useful in the planning, design, and evaluation of studies in education and the behavioural sciences*. (3rd ed.). San Diego: Educational and Industrial Testing Services.

Johannessen, L. M. (1999*). Observations of solid waste landfills in developing countries: Africa, Asia and Latin America*. Urban and Local Government Working Paper Series No. 3. Washington, DC: The World Bank,

Johannessen, L. M., & 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.

Joppe, M. (2000). *The research process*. Retrieved February 25, 2015, from http://www.ryerson.ca/~mjoppe/rp.htm

Karley, N. A. (1993, October 9). Solid waste and pollution. *People's Daily Graphic* (Accra). *pp. 5.*

Kendie S. (1999). *Do attitudes matter? Waste disposal and wetland degradation in the Cape Coast municipality of Ghana*. Development and Project Planning Center, University of Bradford Discussion Paper no. 21. Bradford.

Khatib, I. A. (2011). *Municipal solid waste management in developing countries: Future challenges and possible opportunities*. INTECH Open Access Publisher.

Kreith, F. (1994). *Handbook of Solid Waste Management.* USA: McGraw Hill,

Kumah, A. M. (2007). *The situation of solid waste in Ghana.* Accra: Ghana.

Kumar. M. & Nandini. N. (2013). Community attitude, perception and willingness towards solid waste management in Bangalore city, Karnataka, India. *International Journal of Environmental Sciences*, *4*(1),

Kwawe, B. D. (1995). Culture of waste handling: Experience of a rural community. *Journal of Asian and African Studies*. Volume xxx, Number 1-2.

Lardinios, I. & Klundert, van de, A. (1997). *Integrated sustainable waste management*. Paper for the Programme Policy Meeting Urban Waste Expertise Programme. p.1-6

Leedy, P. & Ormrod, J. (2001). *Practical research: Planning and design (7th ed.).* Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.

Lyse, O. (2003). *Waste disposal haunts cities*. *The Times of Zambia* (Ndola). Retrieved from, Allafrica.com/stories.

Malombe, J. M. (1993). *Sanitation and solid waste disposal in Malindi, Kenya. Water, Sanitation, Environment and Development.* Ghana: Conference Preprints.

Mariwah, S., Kendie, S. B., & Dei, A. l. (2010). Resident's perception of the solid waste problem in the Sekondi-Takoradi metropolitan area. *Oguaa Journal of Social Science, 5* (1).

McIntyre, L. J. (1999). *The practical skeptic: Core concepts in Sociology*. Mountain View, CA: Mayfield Publishing.

Mensah, A. & Larbi, E. (2005). *Solid waste disposal in Ghana*. www.trend.wastsan.net Accessed on 24th June, 2013.

Merriam, S. B. (1988). *Case study research in education: A qualitative approach.* San Francisco: Jossey-Bass.

Merriam, S. B., Caffarella, *R. S.*, & Baumgartner, L. M. (2002). *Qualitative Research in Practice: Examples for discussion and analysis.* San Francisco: Jossey-Bass.

Merriam-Webster online Dictionary. Retrieved on July 30, 2013 from http://www.merriam-wester.com/dictionary/

Michael, D. (1997). Qualitative research in information systems. *Management Information Systems Quarterly 21*: 241-242.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE Publications.

Milter, R. V. (2008). *Environmental health*. London: Biddles Ltd, Guildford and King's Lynn.

Momoh, J. J. & Oladebeye, D. H. (2010*).* Assessment of awareness of attitude and willingness of people to participate in household solid waste recycling programme in Ado-Eketi, Nigeria. *Journal of Applied Sciences in Environmental Sanitation*. Jakarta: Indonesia.

Monney, I. (2014*). Ghana's solid waste management problems: The contributing factors and the way forward*. Retrieved from http://www.ghanaweb.com/GhanaHomePage/NewsArchive/Urban-waste-management-problems-and-challenges-the-way-forward-321845

Moronkola, O. A. & Okonlawon, F. A (2003). *Fundamentals of public and community health education*. Ibadan: Royal People (Nigeria) Ltd.

Muniafu, M. & Otiato, E. (2010*).* Solid waste management in Nairobi, Kenya: A case for emerging economies. *The Journal of Language, Technology & Entrepreneurship in Africa*, *2*(1), 342-350.

Nixon, H., & Saphores, J. M. (2009). Information and the decision to recycle: results from a survey of US households. *Journal of Environmental Planning Management 48*(4), 593-618.

Nworgu. B. G. (1991). *Educational research: Basic issues and methodology*. Owerri: Kisdom Publishers Ltd.

Ogawa, H. (1996). *Sustainable solid waste management in developing countries*. In: 7th International Solid Waste Association International Congress and Exhibition. Yokohama, October 27 - November 1, 1996, Vol. Parallel Session 7, "International Perspective". International Solid Waste Association, Denmark.

O'Leary, Z. (2010). *The essential guide to doing your research project*. (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Olokor, C.O. (2001). Hazardous wastes: Its production, effects, disposal and control in Nigeria Industries. Oyo: *JONAPHER-SD 2*(2) 258-267

Oluwade, P. A. (2009). *A guide to tropical environmental health and Engineering, Lagos*. A Publication of Nigerian Institute of Social and Economic Research.

Onibokun, A. & Kumuyi, J. (1999). Governance and waste management in Africa. In, G. A. Onibokun, (Ed.). *Managing the monster*: *Urban waste management and governance in Africa*. International Development Research Centre, Canada.

Peavy, H. S., Rowe, D. R., & Tchobanoglous, G. (1986). *Environmental engineering***.** McGraw-Hill. International Addition.

Punch, K. (2005). *Introduction to social research: Quantitative and qualitative approaches* (2nd ed.). London: Sage Publications.

Puopiel, F. (2010). *Solid waste management in Ghana, the case of Tamale Metropolitan Area.* MSc Thesis, Kwame Nkrumah University Science and Technology, Kumasi- Ghana.

Quashigah, A. Y. (2003). *An introduction to environmental challenges issues for social studies education*. Accra: Progressive Stars Printing Press.

Rahman M., Salequzzaman, M. D., Bahar, M., Uddin, N., Islam A. & Al Hrun, A. Y. (2005). *People's perception of the existing solid waste management of Khulna City Corporation (KCC) Area: A case study of participatory management*. Proc. National Workshop for REGA and CDM Awareness & Motivation under the ADB PREGA Project, Bangladesh Centre for Advanced Studies, Khulna. www.adb.org?m Documents/Evwnts/2005/Awareness-Motivation-Phase2/Khulna/mrahaman.pdf

Rabinovitch, J. (1998). *Environmental innovation and management in Curitiba, Brazil*. Urban Management Programme Working Paper. UNDP. United Nations Centre for Human Settlements and World Bank, New York.

Rohrschneider, R. (1988). Citizens attitudes towards environmental issues: Selfish or selfless? *Comparative Political Studies 21*: 347-367.

Salant, P., & Dillman, D. A. (1994). *How to conduct your own survey*. New York: John Wiley and Sons.

Schall, J. (1995). *Does the solid waste hierarchy make sense? A technical, economic and environmental justification for the priority of source reduction and recycling*. New Haven: Yale University.

Schmidt, C. (2004). The analysis of semi-structured interviews. In U. Flick, E. V. Kardorff, & I. Steinke, (Eds.). *A companion to qualitative research*. London: Sage Publications.

Schubeller, P., Wehrle, K &Christen, J. (1996). *Urban management and infrastructure: Conceptual framework for municipal solid waste management in low-income countries.* Working Paper No. 9.UNDP/UNCHS (Habitat/World Bank/SDC Collaborative Programme on Municipal Solid Waste Management in Low- Income Countries. St, Gallen, SKAT.

Simmens, D. L. (2001). *Protecting the environmental workers*. Bombay: Society for the study of Environmental Studies Publications.

Sule, O. R. A. (1981). Management of solid wastes in Nigeria towards a sanitary urban environment. *Quarterly Journal of Administration*, Vol.15.

Tchobanoglous, G., Theisen, H. & Eliason, R. (1977). *Solid wastes: Engineering Principles and management issues*. USA: McGraw-Hill Publishing Company.

Tchobanoglous, G., Theisen, H. & Vigil, S. (1993). *Integrated solid waste: Engineering principles and management issues.* McGraw-Hill Publishing Company, USA.

Thomas-Hope, E. (Ed.) (1998). *Solid waste management: Critical issues for developing countries*. Kingston: Canoe Press.

Tonglet, M., Phillips, S. P & Read, A. D. (2004). *Using the theory of planned behaviour to investigate the determinants of recycling behaviour: A case studyfrom Brixworth, UK*. Boughton: University College Northampton.

Trochim, W. (2000). The research methods knowledge base. (2nd ed.). Atomic Dog Publishing, Cincinnati: OH.

UNCHS, 1996. *Refuse Collection Vehicles for Developing Countries*. Nairobi, Kenya: United Nations Centre for Human Settlements USA Today, 1993. April 7, p. 10-A

UNEP. 1991. *Environmental Data Report 1991/92.* United Nations Environment Program. Oxford, U.K: Basil Blackwell,

UNEP. 1994. *Environmental Data Report 1993/94*. A Report for the Global Environment Monitoring System. United Nations Environment Programme. Oxford, U.K: Basil Blackwell.

United States Environmental Protection Agency (USEPA) (1999). *State and Local Solutions to Solid Waste Management Problems.* (http://www.epa.gov).

United Nations Environmental Programme (UNEP) (2009). *Developing Integrated Solid Waste Management Plan Training Manual.* Volume 2: Assessment of Current Waste Management Systems and Gaps Therein. Osaka/Shiga, Japan.

United Nations Environmental Programme (2009). www.un.In //environmental program/activity/publications/Africa. Retrieved on 12/08/2013.

USPS (2000). *Solid waste management plan for Thimphu City, Bhutan, Draft version, April 2000. Bhutan.* Urban Sector Programme Support Secretariat.

World Health Organization. (1992). *Our Planet, Our Health*. Report of the WHO Commission on Health and Environment, Geneva. www.gdrc.org on 12/11/2013

Yauch, C. A. and Steudel, H. J. (2003). Complementary use of qualitative and quantitative cultural assessment methods. *Organizational Research Methods, 6*(4), 465-481.

Zerbock, O. (2003). *Urban solid waste management: Waste reduction in developing nations*. (www.cee.mtu.edu). Accessed on 25th January, 2014.

Zurbrugg, C. (2009). *Solid waste management in Developing countries*. (www.sanicon.net). Accessed on 18th July, 2014.

APPENDICES

Appendix I

DEPARTMENT OF SOCIAL STUDIES EDUCATION

SCHOOL OF GRADUATE STUDIES

UNIVERSITY OF EDUCATION, WINNEBA

M.phil Social Studies

WASTE DISPOSAL PRACTICES AT WINNEBA: AN INVESTIGATION INTO RESIDENTS' ATTITUDES.

Household Questionnaire

The aim of this questionnaire is to investigate residents of Winneba attitudes towards waste disposal. Please share your honest views about how you think about disposal of waste. Your personal opinions are being sought. There are no "right" or "wrong" answers, and your responses will be completely anonymous. Thank you for your assistance.

SECTION A: BACKGROUND INFORMATION:

Please tick (√) the appropriate box.

1. Gender: ☐ Male ☐ Female

2. Age: ☐ under 20 years ☐ 21-30 years ☐ 31-40 years ☐ over 41 years

3. What is your highest educational level?

a. Never b. Primary

c. Middle school/JSS d. SHS/Technical

e. Tertiary

4. What is your major occupation?

a. Farming b. Trading

c. Public servant d. Other……

SECTION B: SOLID WASTE DISPOSAL SITUATION IN WINNEBA

5. How will you describe the general waste situation in your neighbourhood?

• Very satisfactory [ ]

• Satisfactory [ ]

• Poor [ ]

• Very poor [ ]

6. Waste disposal is a problem in my community

- Strongly Agree [ ]
- Agree [ ]
- Not Sure [ ]
- Disagree [ ]
- Strongly Disagree [ ]

7. Which waste management institution collects waste in your area for disposal?

☐ Waste Management department (of the municipal assembly)

☐ ZoomLion

☐ None

☐ Don't know

8. The work of the waste management personnel is very important

- Strongly Agree [ ]
- Agree [ ]
- Not Sure [ ]
- Disagree [ ]
- Strongly Disagree [ ]

9. Where do you dump your waste?

- ☐ Roadside
- ☐ Skip
- ☐ Dump sites
- ☐ Open spaces
- ☐ Nearby gutter
- ☐ Backyard
- ☐ other, specify: .....

10. How many times is the waste collected in a week**?**

- ☐ Not at all
- ☐ Once
- ☐ Twice
- ☐ Thrice
- ☐ Four times
- ☐ Five times
- ☐ Throughout

11. What is the mode of collection of waste in your area?

- ☐ Door-to-door
- ☐ Curb
- ☐ Communal
- ☐ Other,

(specify):.....

12. How will you describe the quality of waste disposal service you receive?

• Very satisfactory [ ]

• Satisfactory [ ]

• Poor [ ]

• Very poor [ ]

SECTION C: CAUSES AND EFFECTS OF INDISCRIMINATE WASTE DISPOSAL

The following statement may best describe your knowledge on the causes and effects of waste disposal practices and management in your locality. Please indicate your answer by ticking (√) one of the appropriate columns.

Strongly Agree: SA, Agree: A, Not Sure: NS, Disagree: D, Strongly Disagree: SD.

No.	STATEMENT	SA	A	NS	D	SD
13.	There is a collection point to dispose waste					
14.	Waste disposal is not as important as the food we eat					
15.	There are rules and regulations regarding the disposal of waste					
16.	Information regarding waste management practices at Winneba is not adequate					
17.	I am well informed about the rules and regulations on waste disposal					
18.	Poor waste disposal practices can lead to the spread of diseases					

19. Do you know of any environmental problems associated with your method of waste disposal?

SECTION D: ATTITUDES OF RESIDENTS TOWARDS WASTE MANAGEMENT

Strongly Agree: SA, Agree: A, Not Sure: NS, Disagree: D, Strongly Disagree: SD.

No.	STATEMENT	SA	A	NS	D	SD
20.	Waste disposal is important					
21.	I am not much Concern about the Waste Situation here					
22.	Waste is disposed off indiscriminately in my locality					
23.	It is not my responsibility to offer any possible assistance for waste management					
24.	Clean up exercises are organized in my community to clear the environment of waste					
25.	I attend communal labour to clean up my community					
26.	It is appropriate for individuals to clean their surroundings					

27. Do you pay for your waste disposal service?

- Yes [ ]
- No but I am willing to pay [ ]
- I don't pay and I am not willing to pay [ ]

Appendix II

DEPARTMENT OF SOCIAL STUDIES EDUCATION

SCHOOL OF GRADUATE STUDIES

UNIVERSITY OF EDUCATION, WINNEBA

M.phil Social Studies

WASTE DISPOSAL PRACTICES AT WINNEBA: AN INVESTIGATION INTO RESIDENTS' ATTITUDES.

Interview schedule for WMD and ZoomLion Ghana Ltd.

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

Thank you

Position of Respondent: .....

Date of Response: .....

SECTION A: WASTE COLLECTION AND DISPOSAL

Please record answers in the spaces provided

1. What is the mode of collection and the number of times waste is collected per week in the following listed sections in the municipality?

Name of section	**Mode of collection**	**Number of times per week**
Wonsom		
Zongo		
Yepimso		
Sakagyaano		
Penkye		
Aboadze		

Ponko-ekyir		
Low Cost		
KojoBedu		

2. What is the cost of collection per week? Indicate the amount in GH¢.....

3.Where do you dispose off the waste collected from the various sections? (Final disposal site).....

4. What is the distance covered to final disposal site in kilometres? .....

5. Is the distance a problem?

- Yes
- No

6. If yes, indicate the problems

.....

7. How do these problems affect the frequency of waste disposal at the site?

.....

8. Do you feel comfortable working in Winneba?

a. Yes

b. No

If no, why?

……

SECTION B: AVAILABILITY OF RESOURCES FOR MANAGING WASTE

9. Waste collection and disposal equipment (Indicate the number available and the number needed

Equipment	Number Available	Number Required

10. Availability of qualified personnel for managing waste (Technical Staff)

Description Of Labour	Available Number	Available Number

Appendix III

INTRODUCTORY LETTER

UNIVERSITY OF EDUCATION, WINNEBA | **DEPARTMENT OF SOCIAL STUDIES EDUCATION**

P. O. Box 25, Winneba, Ghana. ***Tel.*** (03321) 91840
Email: socialstudies@uew.edu.gh

12th March, 2014

Dear Sir/Madam,

LETTER OF INTRODUCTION: VIDA AMANKWAAH KUMAH

We write to introduce Vida Amankwaah Kumah to your outfit. She is an M. Phil Social Studies student with index number 8120140010 from the above named Department.

She enrolled on the programme in 2012 and is currently conducting a research on "***An investigation into the Winneba residents' attitudes towards waste disposal.***"

We shall, therefore, be grateful if she could be offered any assistance that she may need.

We count on your usual co-operation.

Thank you.

Yours faithfully,

Florence Okore –Hanson
***for*: Head of Department**