University of Ghana http://ugspace.ug.edu.gh

UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

SOLID WASTE MANAGEMENT PRACTICES AND CHALLENGES IN THE AWUTU SENYA EAST MUNICIPALITY

RUTH MIGBODZI

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

JANUARY 2023

University of Ghana http://ugspace.ug.edu.gh

UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

SOLID WASTE MANAGEMENT PRACTICES AND CHALLENGES IN THE AWUTU SENYA EAST MUNICIPALITY

BY

RUTH MIGBODZI

(10939116)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MA IN DEVELOPMENT STUDIES DEGREE

JANUARY 2023

University of Ghana http://ugspace.ug.edu.gh

DECLARATION

I, Ruth Migbodzi hereby declare that the works in this project were carried out by me under the supervision of Dr. Martha Awo, at the Institute of Statistical, Social and Economic Research, University of Ghana and that it does not contain any information which has not been duly recognized. References made to books, research works and publications are duly cited within the text.

…….. **……26/01/2023…….**

Ruth Migbodzi Date

(Student)

…… **……27/01/2023**……

Dr. Martha Awo Date

(Supervisor)

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

DEDICATION

I want to dedicate this project to the almighty God and my family for their tremendous support, love, and prayers and who were a source of motivation to me in starting this program.

University of Ghana http://ugspace.ug.edu.gh

ACKNOWLEDGEMENT

I want to foremost, thank the almighty God for life, wisdom, and strength given me to undertake this project work. Secondly, my thanks go to my project supervisor Dr. Martha Awo for the needed help and support given me and for the constructive criticisms, I could not have come this far, without her effort. God richly bless you. I am also grateful to all the lecturers at the Institute of Statistical, Social and Economic Research who have contributed to the success of this work through their advice and directions. I owe gratitude also to my husband Prince Baah for his tremendous love, motivation, and support. Finally, I would like to appreciate all my colleagues, friends, and course mates, for their individual contributions towards the success of this project. The Almighty God reward you abundantly.

University of Ghana http://ugspace.ug.edu.gh

ABSTRACT

The focus of the research was to assess the challenges associated with solid waste management in the Awutu Senya East Municipal Assembly. It aimed to understand people's waste management and disposal practices in the Awutu Senya East Municipality, the challenges faced by the Awutu Senya East Municipal Assembly in the realm of management of solid waste and make recommendations that will shape the approach to waste management in the ASEMA. Questionnaires and interview guides were used to collect primary data from the study area while relevant reports that were available at the municipal assembly was used as secondary data. Households, Municipal Assembly members, and municipal waste management company employees all provided data for the study. It was discovered that; plastic waste formed the majority of household waste. Most households do not separate or reuse waste which means there is more waste available for disposal than if waste was segregated and reused more. The lack of waste segregation was attributed to a lack of time, distinct waste bins, and understanding on how to segregate waste. Most responders spent more than 25 minutes dumping trash in the community. ASEMA's solid waste management is hampered by insufficient financial resources, a negative family attitude toward trash management, a lack of sanitation staff, and outdated and limited equipment. Local governments could utilize the money generated from waste collection to invest in new sanitation infrastructure and better waste management supplies since majority of the respondents said they would be prepared to pay for the collection of their rubbish. A portion of the internally generated fund could also be invested in the procurement of modern tools and equipment for waste collection and management. To achieve efficient and effective management of solid waste, a clearly articulated waste management strategy and its effective implementation are urgently needed.

University of Ghana http://ugspace.ug.edu.gh

LIST OF ABBREVIATIONS

AMA	-	Accra Metropolitan Assembly
ASEM	-	Awutu Senya East Municipality
CBD	-	Central Business District
CCWL	-	City and Country Waste Limited
CED	-	Centre for Environment and Development
EPA	-	Environmental Protection Agency
IGF	-	Internally Generated Funds
ISWM	-	Integrated Solid Waste Management
KMA	-	Kumasi Metropolitan Assembly
LI	-	Legislative Instrument
MLGRD	-	Ministry of Local Government and Rural Development
MMDA	-	Metropolitan, Municipal, and District Assembly
MWM	-	Municipal Waste Management
NDPC	-	The National Development Planning Commission
NGOs	-	Non-Governmental Organizations
PHMDS	-	Public Health Management Directorates
PPPs	-	Public-Private Partnerships
STMA	-	Sekondi-Takoradi Metropolitan Assembly

University of Ghana http://ugspace.ug.edu.gh

SW	-	Solid Waste
SWM	-	Solid Waste Management
UN	-	United Nations
UNEP	-	United Nations Environmental Programme
USEPA	-	United States Environmental Protection Agency
WMD	-	Waste Management Department

University of Ghana http://ugspace.ug.edu.gh

Table of Contents

DECLARATION iii

DEDICATION iv

ACKNOWLEDGEMENT v

LIST OF ABBREVIATIONS vii

LIST OF TABLES xiii

LIST OF FIGURES xiv

LIST OF PLATES xv

CHAPTER ONE 1

1.1 Introduction 1

1.2 Problem Statement 4

1.3 Research Questions 5

1.4 Objective of the Study 5

1.5 Significance of the Study 6

1.6 Scope of the Study 7

1.7 Limitations of the study 7

1.8 Definition of terms 8

1.9 Organization of the Study 8

CHAPTER TWO 10

LITERATURE REVIEW 10

2.1 Introduction 10

University of Ghana http://ugspace.ug.edu.gh

2.2 Conceptual Review 10

2.2.1 Defining Waste 10

2.2.2 Waste Management 11

2.2.3 Elements of Solid Waste Management System 12

2.2.4 Public-Private Partnership in Solid Waste Management in Ghana 17

2.2.5 Institutional, legal and Policy Framework for Solid Waste Management in Ghana 19

2.3 Theoretical Framing 20

2.3.1 The Urban Environmental Transition Model 21

2.4 Empirical Review 21

2.5 Conceptual Framework 24

CHAPTER THREE 26

Research Methods 26

3.1 Introduction 26

3.2 Study area 26

3.2.1 Size and location of Awutu Senya East 28

3.2.2 Zonal councils/Electoral areas 28

3.2.3 Major settlements 28

3.3 Research Approach and Design 28

3.4 Population and Sampling 29

3.5 Data sources 30

3.6 Data collection tools and procedures 30

University of Ghana http://ugspace.ug.edu.gh

3.7 Data Analysis 30

CHAPTER FOUR 31

RESULTS AND DISCUSSION 31

4.1 Introduction 31

4.2 Demographic Analysis 31

4.3 Waste management and disposal practices in the Awutu Senya East Municipality of Ghana. 33

4.3.1 Types of solid waste generated. 33

4.3.2 Waste segregation 34

4.3.3 Re-use of waste 35

4.3.4 Site for waste disposal 36

4.3.5 Responsible waste company for the community 37

4.3.6 Cost of waste disposal 38

4.3.7 Time spent to dispose of waste. 40

4.3.8 Involvement in waste management 41

4.3.9 Waste management arrangement in the community 41

4.3.10 Mode of waste collection 42

4.4 Challenges facing solid waste management. 43

4.5 Discussion 49

CHAPTER FIVE 52

SUMMARY, CONCLUSION AND RECOMMENDATION 52

5.1 Introduction 52

University of Ghana http://ugspace.ug.edu.gh

5.2 Summary of findings 52

5.3 Implication of key findings. 53

5.4 Recommendations 54

References 56

APPENDIX A-QUESTIONNAIRES 63

APPENDIX B -INTERVIEW GUIDES 83

University of Ghana http://ugspace.ug.edu.gh

LIST OF TABLES

Table 4.1:Personal and Household Characteristics of Study Respondents.....32

Table 4.2:A summary of the respondents' solid waste disposal sites 36

Table 4.3:How long it takes to dispose off waste 40

University of Ghana http://ugspace.ug.edu.gh

LIST OF FIGURES

Figure 2.1: Model of Solid Waste Management System…….....17

Figure 2.2: Conceptual framework of the study…….....24

Figure 3.1. Map of Awutu Senya East Municipal…….27

Figure 4.1:Summary of solid waste generated in Awutu-Senya Municipality.....33

Figure 4.2:Waste segregation attitude of respondents 35

Figure 4.3:Attitude of respondents towards reuse of waste. 36

Figure 4.4:Summary of respondents' views on if waste company was responsible for waste collection.....37

Figure 4.5:Number of times waste company visited community for collection of waste 38

Figure 4.6:Summary of respondent's view on if they paid to dispose waste 39

Figure 4.7:Willingness to pay for disposal of waste generated 39

Figure 4.8:Respondents involvement in waste management.....41

Figure 4.9:Respondent's view on waste management arrangement.....42

Figure 4.10:Mode of waste collection 42

University of Ghana http://ugspace.ug.edu.gh

LIST OF PLATES

Plate 1: Photograph showing the grim state of Skips in Kasoa ……..44

Plate 2: Photograph showing strewn garbage in drainage systems (gutter)……..…….46

Plate 3: Photograph showing heaps of rubbish unattended to in Kasoa market. …….47

Plate 4: Photograph showing unattended waste bins leading to sanitation issues……..……..48

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Waste of all kinds, solids, liquids and gases are generated on daily basis posing huge challenges for municipal waste management (MWM) in terms of their environmental and health impacts (Odonkor & Sallar, 2021, p. 1). Ferronato and Torretta (2019) posit that indiscriminate disposal of waste in waterways and poorly regulated dump sites exacerbate the problem of poor sanitation levels. The report underscored that the severe lack of efficient waste management infrastructure in most parts of the world especially in sub-Saharan Africa, coupled with the changing lifestyle and consumption patterns of the urban middle class particularly contributes to the menace and enhance the complexity and composition of waste (Ferronato & Torretta, 2019) Waste management challenges facing countries are expected to take on increased momentum as several countries undergo heavy urbanization in the coming decades (Godfrey *et al.*, 2020; Owusu, 2010).

According to the World Bank in 2020, 2.24 billion tonnes of solid waste were produced alone in per capita equivalence, this is close to 0.79 kg of waste per person per day, and this is projected to upsurge going into the future owing to urbanization and rapid population growth (World Bank, 2022). It is projected that globally, 70% more waste would be generated by 2050 and in spite of the expected fall in population growth projections for the same period, economic growth will be severely hampered if MWM authorities fail to bring increased urgency to waste management (Balasubramanian, 2018; Wahba *et al.*, 2019).

Sub-Saharan Africa presents an even more precarious challenge. With the region facing more devastating waste management challenges this period than ever before. Available data suggests that the region accounted for 122 million tonnes of waste in 2012 and this figure is projected

University of Ghana http://ugspace.ug.edu.gh

to double by 2025 (UN, 2019). It further hinted that there would be such a monumental increase in waste generation in the region that any reduction in waste from other regions across the world would completely be cancelled out by Africa. Currently, MWM in the region is estimated to be around 55% with close to 90% of all waste generated in the region being openly disposed-off at poorly controlled dumpsites and landfills which are openly burnt raising serious environmental and public health issues (Odonkor & Sallar, 2021; United Nations Environment Programme, 2019).

Studies (Abalo *et al.*, 2018; Godfrey *et al.*, 2020; The African Circular Economy Alliance, 2021) have shown that despite the serious health and environmental effects, if properly managed, waste could present unique opportunities for Africa by boosting her energy supplies through the addition of renewable energy, the provision of jobs and finally harnessing its potential as a resource for production, what is commonly referred to as the triple gains by Peprah et al (2018, p. 2). Currently, about 13% of waste produced in the region is made up of plastics with the largest composition by organic waste which accounts for about 57% the bulk and this is just dumped away with little attempt to leverage it for production purposes (United Nations Environment Programme, 2019). Although some amount of recycling is undertaken with respect to plastics albeit on small scale, those are driven more by the socio-economic exigencies of unemployment than by a strongly sustained public-private partnerships that deploy resources and infrastructure needed to make any significant impact in the sub-region and propel it into a circular economy (Hopewell, Dvorak, & Kosior, 2019).

The decentralized waste management system in Ghana operates on the principle that municipal waste management authorities, working together with the private sector and community involvement is the key to efficient and sustainable waste management in the country (Kyere *et al.*, 2019). However since the introduction of the decentralised solid waste management system in Ghana, there have been only occasional successes connected to its performance with respect

University of Ghana http://ugspace.ug.edu.gh

to waste management as the system has been largely bedevilled with several challenges making it difficult to adapt to both the changing volumes and content of waste (Oteng-Ababio, 2020). Kyere et al (2019) conducted a study on the state of solid waste management, focusing on the robustness of solid waste systems in Brekum and Dormaa municipalities in the Brong Ahafo region of Ghana. The study found that community members were not involved in waste collection and enforcement of regulations. It was also observed that there were poor systems in place for full cost recovery, making it difficult for the assemblies to adequately fund and carry out their waste management responsibilities.

Additionally, a study carried out in Accra to explore the factors that influence household waste management, the investigators found that, more than a quarter of all waste generated in the capital city was plastic. Although the respondents largely (73%) admitted that poor waste management could spur health problems and were willing to take part in waste management measures, close to half of them dumped waste through illegal means (Odonkor & Sallar, 2021). A number of empirical studies (Belen *et al.*, 2019; Mekonnen *et al.*, 2020; Sawyerr *et al.*, 2017) have established a strong connection between solid wastes and open dumpsites on one hand and soil and water contamination on the other as identified in leachate samples collected from areas close to dumpsites.

As aptly pointed out by Oteng-Ababio (2014), connection between cities and waste poses huge challenge that threatens the future of most countries, particularly looked at from "our buy, use and throw away mentality." The author stated that countries with efficient solid waste management stand to benefit immensely especially because the clear cut policies they have instituted on waste collection, transportation, sorting, treatment, storing and disposal guarantees that the benefit from waste economically flows back into the economy (Oteng-Ababio, 2014). This is how communities derive benefits from proper waste management and

University of Ghana http://ugspace.ug.edu.gh

exploit it as a tool to promote both public health, environmental safety, and sustainability. Ghana's challenge is how to evolve systems that better enables it to achieve these goals.

1.2 Problem Statement

Indiscriminate dumping of wastes products is a common problem in Ghana and city authorities are regularly having to respond to such challenges in diverse ways (Douti *et al.*, 2017). Hence, waste management is a serious agenda on local government especially in the era of decentralised waste management in the country (Douti *et al.*, 2017; Owusu, 2010).

The Awutu Senya East Municipality in Ghana is one of the many municipalities in the country that is reeling heavily from waste management related challenges. The amount of waste generated by the municipality is at an elevated level with an estimated 23 tonnes believed to have been produced daily in 2014, an upsurge over the 15 tonnes per day generated in 2009 (Addaney & Oppong, 2015). This means that in just five years, there was a 53% increase in waste generated in the municipality.

Bawakyillenou and Agbelie (2014, p. 3) report that between the 2500 to 2700 tonnes of waste generated monthly in the municipality in 2010, just about 1900 tonnes (representing 73%) were collected in that year. The garbage accumulated in the community is mainly made up of organic waste such as food and vegetable waste, plastics, textiles, scrap metal, glass, leather and to a smaller extent electronic waste (Addaney & Oppong, 2015; Bawakyillenuo & Agbelie, 2014).

The National Development Planning Commission [NDPC] (2014), indicates that only 8.3% and 3.7% of residents in urban and rural communities within the municipality disposed of their solid waste in public dumpsites specifically provided for that purpose whereas a large majority (45% in urban areas and 21% of rural dwellers) burnt their solid waste openly.

Subsequently, the problem of poor sanitation persists and worsens by the day even though the municipal assembly invests a greater proportion of its internally generated funds (IGF) into

University of Ghana http://ugspace.ug.edu.gh

managing and controlling solid waste in the municipality. The problem of poor waste management has been attributed to the presence of the market and the central business district in the municipal's capital and the rampant increase in population in the municipality. Its proximity to Accra has made it attractive for a lot of people to want to settle there. Available data suggests that in just one decade the population of the municipality more than doubled from 108,422 in 2010 to 236.527 people by 2021 when the last population and housing census was carried out (Ghana Districts, 2022; Ghana Statistical Service, 2014). With these increases in population, it is expected that waste generation will increase and how the municipality, other stakeholder institutions and residents are able to manage proper waste disposal is of interest to this paper.

It is in this regard the research focuses on the subsequent objectives.

1.3 Research Questions

To accomplish the objectives set out above, the study would be guided by this research question: *What are the common waste management practices and challenges to waste management in the Awutu Senya East Municipality*

The specific questions are stated below.

1. What management practices are employed by the Awutu Senya East Municipality to dispose of waste?
2. What challenges does the Awutu Senya East Municipality face when it comes to management of waste?

1.4 Objective of the Study

The main objective of the study is to examine the waste management practices and challenges facing the Awutu Senya East Municipality of Ghana and come out with recommendations that

University of Ghana http://ugspace.ug.edu.gh

would contribute to policy formulation and the academic discourse on waste management in developing countries context.

In pursuit of this objective, the following are the individual goals the study seeks to accomplish.

1. To explore or understand the waste management and disposal practices in the Awutu Senya East Municipality of Ghana.

2. To examine the challenges with waste management facing the ASEMA.

1.5 Significance of the Study

The study would advance knowledge by contributing to literature on how urban waste management challenges can be identified and addressed. In this vein, the current study will be used as a guide for the municipal assembly and waste management organizations with regards to managing solid waste. This will provide individuals with a thorough awareness of the difficulties associated with solid waste management as well as solutions to those concerns. It will also be an important reference document for the municipality. By contributing to policy evaluation, development, implementation, resource allocation, stakeholder engagement, monitoring, and knowledge sharing, the study on solid waste management and practices in ASEMA aims to influence policy decisions that promote sustainable and effective waste management practices in the area. The research offers significant contributions to the knowledge base for policymakers, waste management experts, and the general public regarding the enhancement of waste management strategies in the Awutu Senya East Municipality of Ghana.

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

1.6 Scope of the Study

This study looks at solid waste management and the challenges the Awutu Senya East Municipality of Ghana. This suggests that other types of waste such as gaseous and liquid waste are beyond the scope of this study. Also, communities outside the study area are not considered.

Finally, the available body of scientific literature hints that research may take the form of qualitative, quantitative, or mixed method or paradigms. This study will adopt a mixed method approach to the analysis and presentation of data. The researcher therefore employ's both qualitative and quantitative data for analysis.

1.7 Limitations of the study

Because the research focused solely on Awutu Senya East Municipality, the findings were limited in their relevance to other municipalities in the country. The investigation was limited to what took place at Awutu Senya East Municipality and therefore cannot be generalized. As a result, the outcomes of the study may not be indicative of the overall picture. Second, because Awutu Senya East Municipality is not close to the researcher, there were some persistent difficulties. The issue of not gathering data from the relevant actors in the municipality to interview was a study limitation in this situation. Most of the performers are incredibly busy people with extremely tight schedules, so attempting to get them to complete the questionnaire was exceedingly tough. Again, the use of social media platform to gather data automatically cuts off the views of those without android phones. To deal with such issue, a mixed-methods approach by combining data from various sources was used. By cross-referencing and comparing data obtained through social media with other sources, the research was able to mitigate the bias caused by the limitation of Android phone usage.

University of Ghana http://ugspace.ug.edu.gh

1.8 Definition of terms

Waste: This refers to an unwanted or undesired material that poses challenging problems that often threaten public health if not efficiently managed although in many cases could become a lucrative business for many people if well managed (Oteng-Ababio, 2014)

Solid Waste : Bailie *et al.* (1997) refers to solid wastes to include all refuse materials that are not hazardous, liquid wastes or atmospheric emissions**.** Generally, such refuse is regarded as useless material that is unwanted and therefore discarded. Solid wastes may be intermixed with liquid wastes as it may include liquid wastes like paints, old medicines, spent oils, etc. but, in whichever manner the waste occurs, solid wastes are mostly considered nonflowing.

Municipal Solid Waste: Igoni et al (2008) defines municipal solid waste (MSW) as all waste collected by private and public authorities from domestic, commercial and some industrial (non-hazardous) sources.

Solid Waste Management: Demirbas (2011) describes waste management process as the collection, transport, processing, recycling or disposal, and monitoring of waste materials. He further explains that a typical waste management system comprises collection, transportation, pre-treatment, processing, and final abatement of residues.

1.9 Organization of the Study

The study was planned according to five main chapters: Chapter 1 discusses the introduction, background, problem statement, research objectives and the research questions. Chapter 2 presents the main theoretical postulations on which the research is anchored, particularly, the urban environmental transition model. Chapter 3 details the methodological and philosophical approach for the study. It explains in-depth the techniques for data collection and analysis and addresses concerns about the reliability and validity of the research approach used.

University of Ghana http://ugspace.ug.edu.gh

Chapter 4 present findings from the data analysis and interpretations of the research findings on waste management practices and challenges from the study area. Chapter 5 wraps up the study based on a synthesis of the research findings and discussions in the light of the literature and theories that were examined in prior chapters in line with the study objectives and research questions. Further, the chapter discusses the implication for waste management practice and makes recommendation for policy makers and future research.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter discusses key concepts and their usage in this study. The chapter considers relevant terminologies that includes solid waste management. The subsequent part of the chapter is a review of the pertinent theories, followed by a discussion of several studies that explored solid waste management in various nations, as well as an explanation of how the current study helps to fill in the gaps in the findings of earlier research.

2.2 Conceptual Review

2.2.1 Defining Waste

According to Oteng-Ababio (2014) depending on the type of material under consideration or region, the concept of waste connotes rubbish. Adding to the discourse on the types of waste, Odonkor and Sallar (2021) explained that classification of waste according their sources is often determined by whether they are industrial/commercial, household/domestic, agricultural, mining or construction waste.

Any substance no longer needed by a person, organization, or industry might be called waste. According to as Yoada, Chirawurah and Adongo (2014), waste has many negative effects on the environment, including unpleasant odors; obstructing the flow of traffic; as well as clogging drains and waterways, which can cause flooding, damage to the environment, and air pollution. They also, consider waste to be useless material that is unwanted and therefore discarded. Their opinion of waste does not consider the fact that what may be regarded as waste by one individual maybe a resource to another individual. The definition ignores the fact that not all by products or end products strictly turn out as waste.

University of Ghana http://ugspace.ug.edu.gh

Waste can be graded as solid, and liquid based on their physical properties. Solid waste consists of all solid waste materials generated and discharged from their premises for collection by institutions, households, businesses, and industries. Liquid waste comprises of human excreta (Nightsoil and sewage), animal manure, industrial waste, domestic/commercial wastewaters and industrial sewage (Quartey et al., 2015).

2.2.2 Waste Management

Waste management is conceived as the process of collecting, transporting, valorising, and disposing off waste of all types in ways that does not jeopardize the environment or poses danger to human health or impair future generations. This can better be achieved through public private partnerships where community involvement is given a major boost. Even so, several demographics, social, economic, individual behavioural and institutional factors and practices have been found to significantly impact waste management. Some of these elements are discussed below.

Individual behaviour, practices and attitudes are very important when it comes to efficient waste management. The argument has been made severally for the need for people to alter their behaviour to mitigate their adverse environmental impact. There are so many environmental challenges inter-alia water and air pollution, odours and floods which are directly connected to improper waste disposal by people. In most cases, where people can easily escape punishment for inappropriate waste disposal practices or where they feel they may not directly suffer from the public health and environmental sanitation challenges consequential to their actions, they are less likely to engage in pro environmental behaviour such as carrying out safe waste disposal (Janmaimool, 2017).

Thus, to assume that one's environmental consciousness would always translate into pro-environmental behaviour that positively affect the larger society is completely wrong (Zhong

University of Ghana http://ugspace.ug.edu.gh

& Shi, 2020). Sawitri, Hadiyanto and Hadi (2015) explained pro-social behaviour as a unique set of conduct which is focused, and undertaken with the intention of enhancing the welfare of a group, individual or society. Waste management problems could easily be eliminated were people to take appropriate steps to reduce the amount of waste produced and making a firm resolve to help reduce their adverse environmental impacts.

Also, municipal authorities who are mandated to carry out waste management are often handicapped by inadequate infrastructure and personnel. Kumar et al (Ferronato & Torretta, 2019; Kumar *et al.*, 2017). Findings from comparative analysis have brought to light the worrisome fact that whereas developing countries share of organic waste in total waste generated is more than 50% as opposed to less than 30% of their counterparts in developed countries, only a small portion (less than 10%) of this waste is properly managed in developing countries in contrast to developed countries that are effectively able to manage more than 50% (Odonkor & Sallar, 2021; United Nations Environment Programme, 2019). Odonkor and Sallar (2021), assessed that the challenge with organic waste is that when left unattended to for a while, they undergo decay, moisturize and eventually emit very foul odour.

2.2.3 Elements of Solid Waste Management System

Abdel-Shafy and Mansour (2018), identified four main aspects of waste management systems as: Waste generation, waste composition, waste collection and transport, and waste treatment and disposal. These include on-site collection, processing, and storage; off-site collection, transfer, and transportation; resource recovery and processing; and final solid waste disposal. Here, the study focuses on the following elements:

Waste Generation

The term "waste generation" refers to the process by which items that are no longer useful are discarded or amassed for disposal. For now, waste production is not an easy thing to regulate

University of Ghana http://ugspace.ug.edu.gh

(Vergas & Techobanoglous, 2012). However, in the future, waste production is expected to be subject to more regulation. Though not under the direct supervision of solid waste managers, source reduction is now factored into performance evaluations as a means of decreasing overall waste production (Vergara & Techobanoglous, 2012). Growth in industry, population, consumption patterns, and climate all play a role in the frequency with which municipal solid waste is produced. The amount of waste generated is usually proportional to the level of economic and urbanization progress. There is a strong connection between income and the degree to which a population is urbanized. There is a correlation between prosperity and waste production, but there can also be large variances in waste production even within a same city. Although specific figures are unavailable, it is estimated that households in ASEMA produced the most waste, followed by markets, industries, and finally institutions (Fianko & Okyere, 2014).

Waste Handling, Sorting, Storage and Processing at the source

Handling, sorting, storing, and processing waste at the source is the second of the solid waste management system's six functional elements. The process of managing trash up until it's collected involves a few steps, including collection, sorting, and storage (Yoada, Chirawurah & Adongo, 2014). Getting the full container to the pick-up location is also part of the handling process. Separating recyclables from other types of waste is a crucial first step in proper solid waste management. For instance, sorting waste for recycling and reuse is most effective close to where it's produced. More and more people are learning at home how vital it is to separate their waste into paper and cardboard, glass and other recyclables, food scraps, and metals (Steblin & Stanfor, 2018). According to Labspace (2013), "onsite" refers to the location where the waste is generated, while "residential" refers to the individual's residence. But the first step in waste management is the onsite handling. In this level, proper waste management requires the knowledge of individuals, households, and communities.

University of Ghana http://ugspace.ug.edu.gh

Handling refers to the process of classifying waste into its constituent parts for more efficient disposal. Reducing the amount of waste that needs to be thrown away and reclaiming useable materials are both outcomes of proper onsite management (Labspace, 2013). Temporary waste collection at the residential level, often known as "on-site storage." Waste should be contained in suitable containers. Containers of this type could be baskets, plastic buckets, or metal crates, and ideally would be crafted from locally sourced materials. Particularly for food waste, larger containers or dustbins should be durable, leakproof, and fitted with secure lids. Ideally, the container would be large enough to accommodate the average amount of waste generated per day by a single family. Organizations should think about installing larger capacity storage facilities on location (Labspace, 2013). Whether it's a private residence or a business, those responsible for the upkeep of the premises are typically expected to pay for on-site storage facilities for solid wastes. Home composting is an example of "source processing" (McDougall *et al.,* 2011).

Collection

The functional element of collection includes not only the gathering of solid wastes and recyclable materials, but also the transport of these materials, after collection, to the location where the collection vehicle is emptied (Ahsan et al, 2018). In other words, collection includes both the gathering and the emptying of the collection vehicle. According to research conducted by Labspace (2013), in urban centers, collecting is a function that is responsible for its own process and services. The waste is brought to central transfer stations, where it is stored until being sent to its ultimate disposal location.

Sorting, Processing and Transformation of Solid Waste

This feature encompasses activities such as material recovery, waste processing, and solid waste transformation that typically take place in remote areas. Recycling plants, transfer

University of Ghana http://ugspace.ug.edu.gh

stations, incinerators, and landfills are common places to find sorting equipment for commingled (mixed) wastes. Some common methods of sorting are separating large things by hand, utilizing screens to separate trash into smaller pieces, manually sorting waste, and separating ferrous from non-ferrous metals (Steblin & Stanford, 2018). Recovering valuable conversion products and energy is the goal of waste processing. The goal of waste transformation is to lessen the amount of waste produced by reducing its mass, size, or toxicity without resulting in a net loss of resources. Methods of transformation range from mechanical (such as shredding) to thermal (such as burning without energy recovery) to chemical (such as encapsulation) (Yoada, Chirawurah & Adongo, 2014). As elaborated by Labspace (2013), "Resource recovery" involves finding a way to use the waste so it becomes a useful resource rather than just a disposal concern. This step is crucial in the recycling process. Composting and energy recovery are just two examples of the many methods that are included in resource recovery.

Transfer and Transport

Two steps make up the functional part of transfer and transport: (i) moving the waste from small collection vehicles to large haulage equipment, and (ii) driving the waste to its destination, which is often located at a considerable distance. Typically, a transfer station is used (Vergara & Techobanoglous, 2012).

Disposal

Disposal is the system's final functioning element. Currently, all types of solid wastes end up in landfills or in unregulated dump sites, including waste from homes that has been collected and trucked to a landfill, materials left over from Materials Recovery Facilities (MRFs), ash from incinerated garbage, composting rejects, and other substances from a wide range of solid

University of Ghana http://ugspace.ug.edu.gh

waste-processing facilities (McDougall *et al.*, 2001). Vergara & Tchobanoglous (2012) opined that municipal solid waste landfill facility is a technical facility for the disposal of solid waste on land or in the earth's mantle in a way that does not endanger public health and safety such as, attracting vermin and contaminating groundwater.

Energy Generation

There is potential in making use of MSW to generate energy. Several technologies, including gasification, plasma arc gasification, combustion, landfill gas collection, and pyrolysis have been developed to make the treatment of municipal solid waste to produce energy more environmentally friendly and cost-effective than ever before (Vergara & Techobanoglous, 2012). New regulations and technological advancements have greatly mitigated the pollution problem previously associated with trash incineration facilities. The regulations enacted by the Environmental Protection Agency (EPA) of the United States in 1995 and 2000 under the Clean Air Act, have resulted in a reduction of dioxin emissions from waste-to-energy facilities that is greater than 99 percent lower than their levels in 1990 and mercury emissions have been reduced by more than 90 percent. Waste-to-energy is a power source "with less environmental impact than almost any other source of electricity," (Rush, 2010).

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

Model of Solid Waste Management System

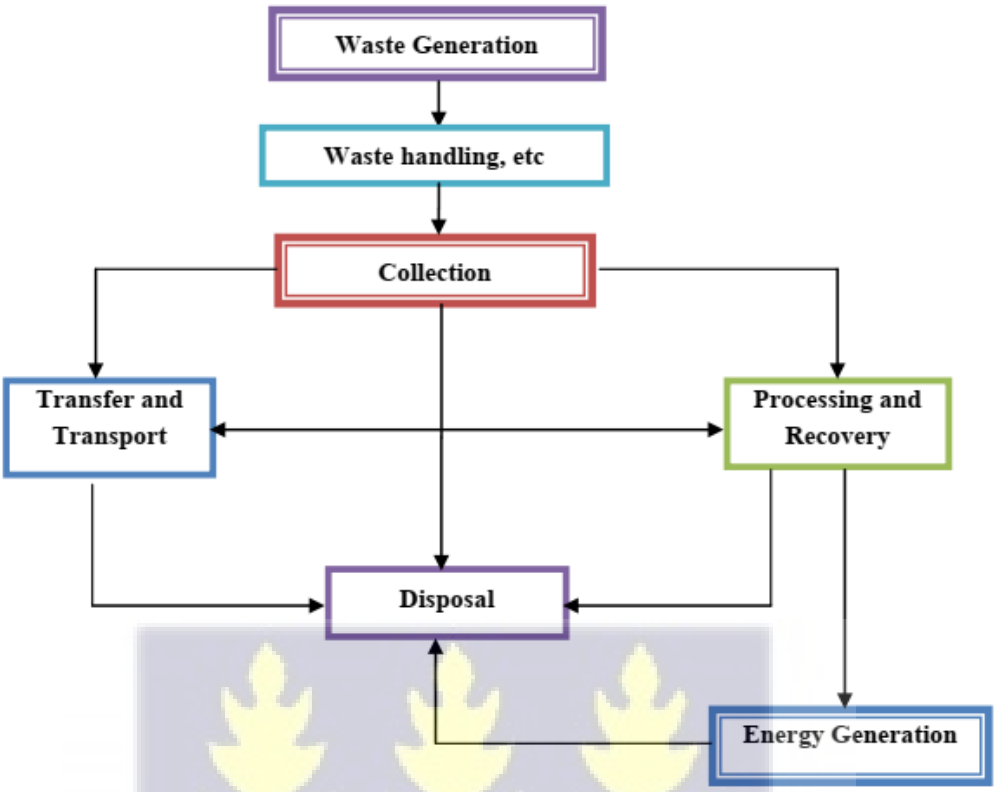

Figure 2.1: Model of Solid Waste Management System

Source: (Tadesse, 2014)

2.2.4 Public-Private Partnership in Solid Waste Management in Ghana

The public-private partnership model for waste management is not a completely new concept in Ghana. Research by Asare & Frimpong (2013) indicates that there had been previous partnership agreements for solid waste management prior to the government signing of a commercial deal with Zoom lion Ghana Limited in 2006. For instance, in the Accra Metropolitan Assembly, privatized waste collection become part of the official policy although 1977 was the year that Accra saw its first foray into the world of privatized collection of domestic waste. According to Yeboah (2017), participation of local government authorities in waste collection agreement in Kumasi and Accra takes different forms including, contracting out, franchising, leasing of equipment etc.

University of Ghana http://ugspace.ug.edu.gh

In July 1999, the national government contracted a Canadian-Ghanaian joint venture partnership called City and Country Waste Limited (CCWL), to provide AMA with sanitation services (Asare & Frimpong, 2013). The broad consensus is that the private sector is beneficial to economic expansion, and that its participation in the delivery of waste management services will increase operational effectiveness. However, before Zoom lion Ghana Limited, PPPs had failed woefully. According to observation by Awortwi (2004), the failure of PPPs in dealing with Ghana's sanitation problem before Zoom lion can be attributed to lack of participation. Because of the top-down nature of the waste management contracts, locals and their representatives (assembly members) were excluded from the decision-making process. For instance, the Waste Management Department (WMD) and even the AMA were not consulted before deciding to outsource waste collection to CCWL. More so, lack of monitoring and regulation of partnership contracts due to weak state capacity was a contributing factor to the failure of earlier PPPs. The 1999 Environmental Sanitation Policy requires the MMDAs' Waste Management Departments (WMD) and Public Health Management Directorates (PHMDs) to oversee and enforce sanitation and service quality standards (Yeboah, 2017). However, the official controls were extremely lax due to restrictions such as lack of administrative capability, lack of personnel and professional oversight, poor compensation, and corruption. Despite the significance of regulation and monitoring in PPPs, WMD and PHMDs were given few resources, transfer of materials, and training. Vast sums of money were expended by AMA and KMA in signing contracts with private vendors; however, not up to one percent was budgeted for monitoring (Asare & Frimpong, 2013).

Poor local government remuneration provided the room for private agents to manipulate monitoring officers with bribes easily. It was therefore typical for private waste management firms to engage in questionable practices and provide inadequate service while getting away

University of Ghana http://ugspace.ug.edu.gh

with it. Private service providers often disregarded contract requirements and violated health and safety regulations, yet no action was taken against them (Asare & Frimpong, 2013).

In addition, before Zoomlion Ghana Limited, PPPs for sanitation services delivery struggled due to a lack of financial viability. House-to-house solid waste collection appeared more challenging in low-income and densely populated areas, where the cost of services provided was higher. However, local companies providing house-to-house services have griped that the prices they've set are lower than what was originally agreed upon in the franchise contract (Asare & Frimpong, 2013). Also, undue delays were faced by PPPs in government release of donor funding. More worrying is the fact that, local governments were unable to raise sufficient revenues internally to guarantee payment in case of loss or damage of contracted waste management agents. This can be attributed to narrow tax network, lack of technical know-how at the local level and poor financial administration and corruption (Asare & Frimpong, 2013). Despite the inability to mobilize funds internally in an effective and efficient manner, unreasonably high prices were paid by AMA and KMA for collection of waste due to the inefficiency of the contracted solid waste management services. In Accra and Kumasi, the high contract cost was aggravated by alleged corrupt politicians, local bureaucrats and private associates (Lapuente & Suzuki, 2020).

2.2.5 Institutional, legal and Policy Framework for Solid Waste Management in Ghana

Institutional Framework: General solid waste management in Ghana falls under the purview of the Ministry of Local Government and Rural Development, which oversees the country's decentralized Metropolitan, Municipal, and District Assemblies (MMDAs). The MMDAs through the WMDs and Environmental Health and Sanitation Department coordinate waste collection and disposal (Puopiel & Owusu-Ansah, 2014).

University of Ghana http://ugspace.ug.edu.gh

Regulatory/Legal Framework: The Public Private Partnerships are regulated by the Environmental Protection Agency (EPA). The legal structure regulating the management of dangerous, solid, and radioactive waste includes Local Government Act (1994), Law 462, Act 490, Pesticide Control and Management Act (1996), Act 528, Environmental Assessment Regulations (1999), Law LI 1652, Ghana Environmental Sanitation Policy (1999), Establishment and Guidance. All of which are products of the National Environmental Action Plan (Puopiel & Owusu-Ansah, 2014).

Policy Framework: The National Environmental Sanitation Policy (1999), which was amended in September 2010, is the policy that governs Solid Waste Management in Ghana. The policy aims to build a coherent, nationally agreed vision of environmental health as a core driver of health and quality of life transformation in Ghana. Under the scheme, the private sector, including NGOs and Community-based organizations under the oversight of the public sector, in particular MMDAs, provides the bulk of environmental sanitation services. Furthermore, the legislation notes that the primary control of solid waste lies with the Assembly. Generally, the National Environmental Sanitation Policy Coordination Council (NESPCC) is responsible for coordinating the policy and ensuring effective communication and cooperation between the many different agencies involved in environmental management in their respective Districts (Puopiel & Owusu-Ansah, 2014).

2.3 Theoretical Framing

Theories are important in research because they provide the lenses for data analysis and helps propose explanations for the various causes of an observed behaviour. This study would be supported by the urban environmental transition model.

University of Ghana http://ugspace.ug.edu.gh

2.3.1 The Urban Environmental Transition Model

According to McGranahan *et al.* (2013) and Owusu (2010), the urban environmental transition model argues that towns' unique environmental challenges, and consequent waste management issues, changes in respond to economic growth. The theory contends that in poor countries, sanitation and health related challenges associated with poor waste management for example are found within proximate locations of homes, offices, and neighbourhoods. Among some of the challenges the authors highlighted include left over of contaminated food items, uncollected waste or garbage and insanitary drainage systems (Owusu, 2010). Interestingly however, progression unto middle-income status occasioned by economic growth and development, sanitation related challenges characteristic of low-income households reduces drastically and are replaced by community-wide environmental concerns such as air and water pollution. Finally, the model argues that, when countries reach the advanced stage of economic development, cities become more empowered because they tend to have more resources at their disposal to address both the household or neighbourhood waste and sanitation related challenges as well as that of the entire city. The theory thus underlies the reason why although wealthy nations produce enormous amount of waste, they are also able to effectively manage and mitigate their adverse health and environmental problems.

2.4 Empirical Review

The following sections presents a brief literature of some empirical research that have been carried out in the Awutu Senya East Municipality to update policy makers and academia on the waste management crisis facing the municipality.

Peprah, Oduro-Ofori and Asante-Wusu (2015), investigated the level of the municipality's access to services for sanitation and water supply using a mixed method approach for data gathering and analysis involving a sample of 394 respondents drawn from four communities. With respect to solid waste management, the researchers indicated for 31% of the participants,

University of Ghana http://ugspace.ug.edu.gh

burning was the commonly used means of waste disposal which they explained was caused by the poor nature of waste collection services, and the need to prevent the accumulation of waste conducive to the breeding of flies. Of the remaining, 45% used house-to-house waste collections services whilst only 8% of admitted they normally dispose their waste at refuse dumpsites (Peprah *et al.*, 2015).

Although the study by Peprah et al (2015) is very relevant in providing a glimpse into the nature of the sanitation challenge at the Awutu Senya East Municipality, one of the major limitation of that study which necessitates a follow-up study lies in the fact that although the researchers did indicate that they collected data from a cross section of residents and state institutions that have a stake in water and sanitation management and delivery, nowhere in their data analysis were reference(s) made to findings connected to any of those actors meaning they were practically left out. This study seeks to fill that gap by broadening the sample frame to include not only residents by government agencies and institutions within the municipality whose activities could impact or maybe impacted my waste management challenges.

Also, a study carried out by Addaney and Oppong (2015) in the proposed study area which followed the mixed method approach to data collection and analysis with the goal to enhancing the reliability of findings established that whereas all stakeholders in waste management sanitation nexus have the desire to carry out practices and behaviours that could assist in effectively reducing the sanitation and waste management challenges of the municipality, the lack of financial and technical capacity or resources, coupled with coordination failures make it a very daunting task to accomplish. The researchers indicate that about 35% of the municipal budget is spent on waste management.

Other important findings the study made had to do with solid waste collection, storage and disposal. The researchers observed that despite the effort by the municipal assembly to

University of Ghana http://ugspace.ug.edu.gh

complement its waste collection service with private waste collection contracts that make waste collection services available to households and business, only 25% of the 105 tonnes of waste generated weakly were collected. The common means of waste disposal method used by residents, the study found, was the house-to-house which the authors explained could be due to the highly urbanized nature of the municipality and the absence of easily accessible dumpsites or landfills (Addaney & Oppong, 2015). The study concluded that there was an urgent need for institutional capacity building both for the assembly and private sector actors by way of both financial and logistical support to enable the Environmental Health and Sanitation Unit of the Assembly to effectively discharge its duties. It also called for a review of the existing laws on sanitation and waste management to include recycling as integral waste management approach in the municipality.

Addaney and Oppong's (2015) study however suffers two major setbacks. First, the study is mute on grounds of absence of theoretical support. The researchers did not indicate any relevant theory that could have been used to offer greater analytical insights and bring clarity to the sanitation and waste management challenges facing the municipality. For example, which theory could have been used to explain why households chose to openly burn solid waste or throw solid waste into residential compounds knowing fully well the adverse environmental and health effects of such conducts?

Secondly, given the population of the municipality of about 108,000 people as per the 2010 census data, a sample of 100 residential respondents with 17% margin of error and 30 institutional participants with 10% margin of error is woefully inadequate to constitute a representative sample. When the study was conducted, the population would have increased significantly, the more reason why they should have strived to use a larger sample than 130. The researchers, having opted for a blend of quantitative and qualitative research method have implicitly admitted to ensuring that the selected sample size is representative enough. A

University of Ghana http://ugspace.ug.edu.gh

population of 108,000, according to the guideline offered by Saunders et al (2013, p. 212) should have at least 383 respondents with a margin of error of 5%. The author's decision to use 17% and 10% margin of error in their selection of the residential and institutional respondents clearly signals that the study findings should be treated with a pinch of salt since those figures are unduly too high. The proposed study hopes to avoid the shortcomings of the study by ensuring that not only representative samples are drawn, but that the analysis and discussion of findings are done in line with appropriate theories that enhances the appreciation of the waste management challenges in the municipality.

2.5 Conceptual Framework

The preceding literature review serves as the conceptual underpinning for the study. The framework focuses on three main issues: primary waste disposal, solid waste management methods, and the accessibility of both human and material resources, in ASEMA for solid waste management. The conceptual framework is described in Figure 2.2 below.

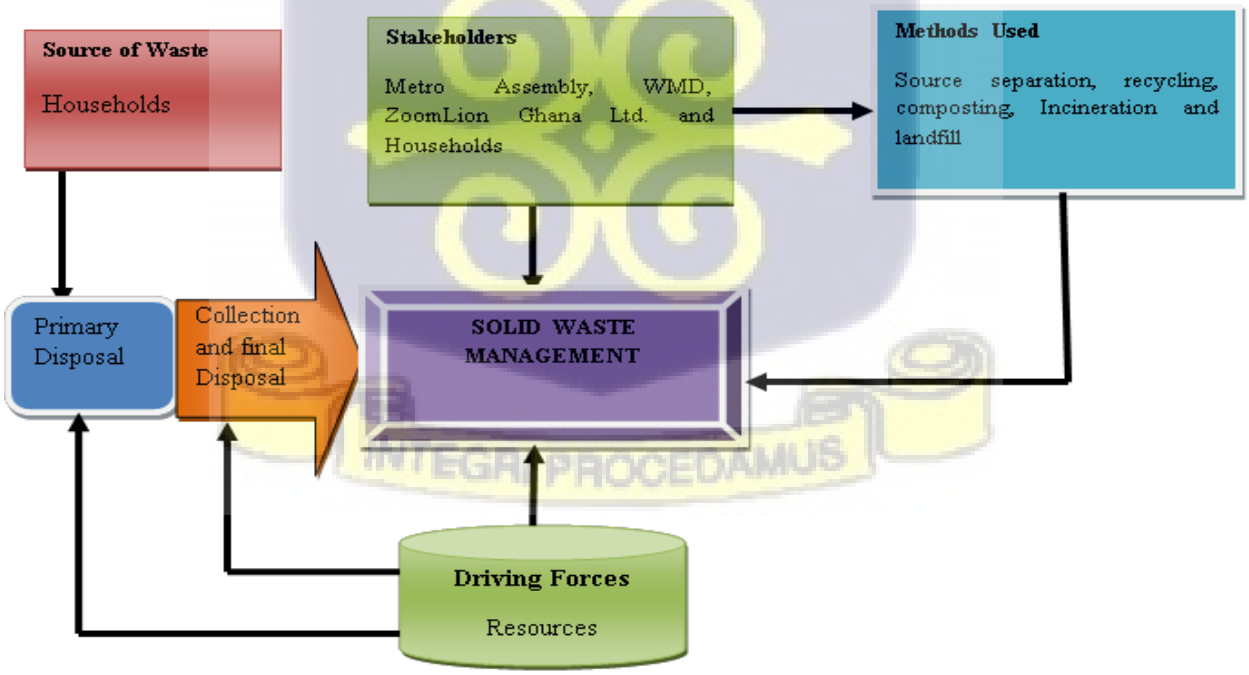

Figure 2.2: Conceptual framework of the study

University of Ghana http://ugspace.ug.edu.gh

Source: Adopted from Puopiel, 2010

Examining the practices of individual houses, government agencies, and waste collection companies in the context of household-generated solid waste is central to this study's overarching goal. The concept reveals that households produce most of the waste. As shown in Figure 2.1, there are three key obstacles that need to be considered in the solid waste management stream. These include the stakeholders in solid waste management (municipal solid waste management agencies, institutions for waste management, as well as waste producers like individuals and households), as well as the forces driving solid waste management (resources), and the techniques employed in this field (reuse, source separation composting, recycling, and landfill). Most of the solid waste is created in private homes, however it is effectively disposed of depending on the accessibility of skips and rubbish bins, as well as the mentality of the public.

As indicated in Figure 2.2 the main disposal site is where people often dump their household waste (which may be disposed of in skips or other waste containers). Disposal at its core is reliant on available materials. It costs money for cities, individuals, and waste management organizations to provide even the most fundamental of disposal services to residents. Waste bins and skips, which can be made available to the public at convenient locations, are typically purchased with hard currency. From the initial dumps, the waste must be hauled to its ultimate disposal place. The collection and transport of materials is extremely resource intensive. Among the necessary assets are heavy-duty compactor vehicles and waste delivery vehicles. An acceptable research methodology for collecting data to fill in the gaps in the framework's descriptions of the three main issues has been established based on the literature studied in the previous sections.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER THREE

Research Methods

3.1 Introduction

The chapter provides a brief discussion of the background of the study area. These covers size and location of Awutu Senya East, the zonal councils/electoral areas and major settlements. The other sections cover the research approach and design, population and sampling, data sources, data collection tools and procedures and data analysis.

3.2 Study area

There are 261 Metropolitan, Municipal, and District Assemblies (MMDAs) in Ghana, and the Awutu Senya East Municipal is one of 22 MMDAs in the Central Region. Among the new Districts and Municipalities inaugurated in 2012 on the 28th of June 2012, is Kasoa, with Awutu Senya as its administrative capital.

By Executive Order 2025 of February 6, 2012, the Awutu Senya East Municipal and Awutu Senya West District Assemblies replaced the Awutu Senya District Assembly. The entire district was referred to as Awutu Senya District prior to the division of the eastern portion of the district on June 28, 2012, which resulted in the formation of Awutu Senya East District. On March 15, 2018, the eastern portion of the district was elevated to the status of a Municipal Assembly, transforming it into Awutu Senya East Municipal District by LI 2025.On February 20, 2012, the remaining part of the district was renamed Awutu Senya West District. Roughly 18% of the Central Region's total land area is occupied by the Awutu Senya East Municipal, which is situated in the region's eastern half between latitudes 5°45 south and 6°00 north and longitudes 0°20 west and 0°35 east. Its entire land area is approximately 63 square kilometers. Ga South Municipal (part of the Greater Accra region) lies to the east and is laterally bounded by the Awutu Senya West district to the north and the Gomoa East district to the west and

University of Ghana http://ugspace.ug.edu.gh

south. There are a total of 236,527 residents in the Municipality as of the 2021 census of population and dwellings, including 115,530 males and 120,997 females. Alliance Waste Company Limited and Zoomlion Company Limited are the two largest waste collection companies. There was a lack of information in the Municipal Assembly about the number of 'kaya bola' who perform door-to-door solid waste collection and disposal. A map of the study area is presented in Fig. 3.1.

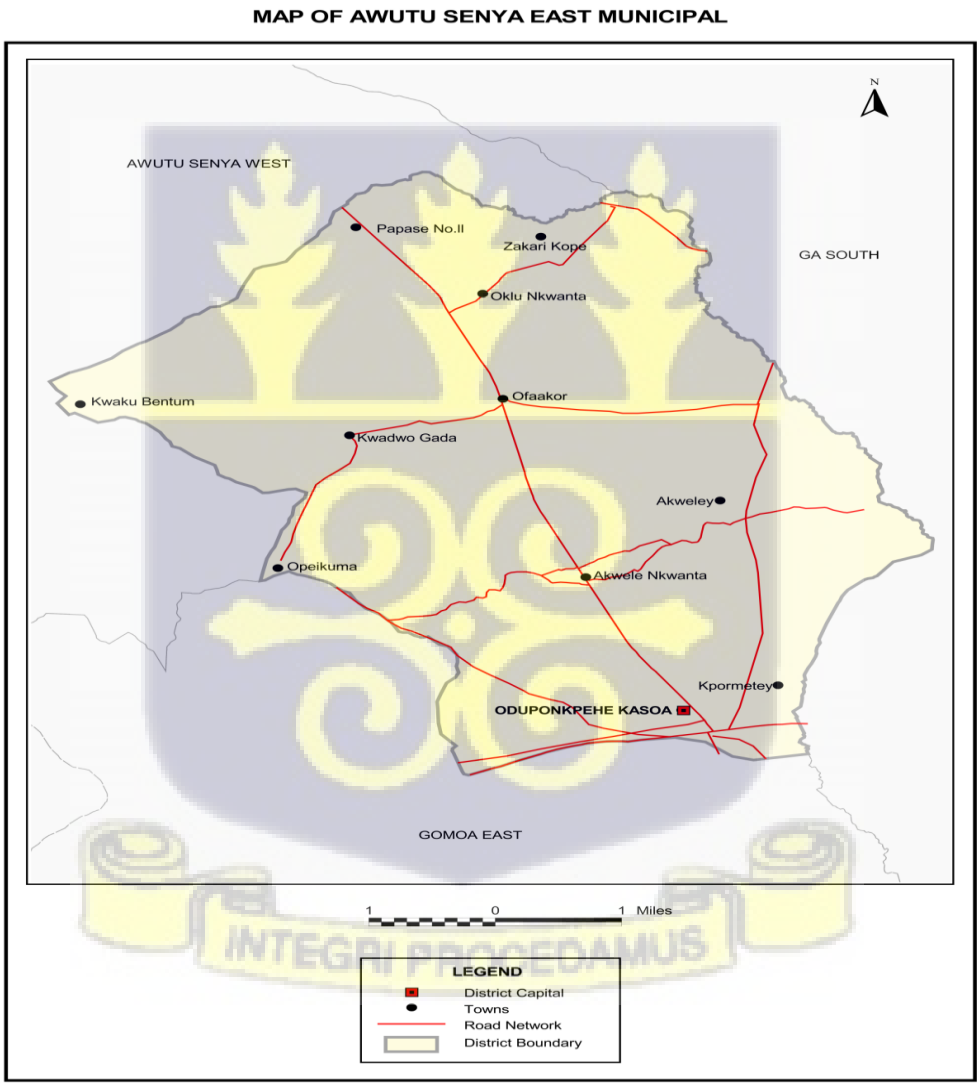

Figure 3.1. Map of Awutu Senya East Municipal

University of Ghana http://ugspace.ug.edu.gh

Source: (GSS, 2021)

3.2.1 Size and location of Awutu Senya East

The Awutu Senya East Municipality can be found in the eastern section of the Central Region, between the coordinates 5°45' South and 6°00' North and 0°20' West and 0°35' East on the map. (https://www.ghanadistricts.com/Home/District/65). It is bordered on the east by Ga South Municipal Assembly (in the Greater Accra Region), on the north by Awutu Senya District, and on the west and south by Gomoa East District. The Municipality has a total land area of approximately 180 square kilometers, accounting for approximately 18% of the total area of the Central Region (Composite Budget, 2014).

3.2.2 Zonal councils/Electoral areas

Six (6) councils, one for each electoral district, make up the Awutu Senya Municipal Assembly. Each of these councils has a chairperson or assemblymember who is responsible for running the day-to-day operations within that body's purview. The Municipal Chief Executive reports directly to these chairpersons.

3.2.3 Major settlements

Kasoa, the capital of the Municipality, is about 31 kilometers south-east of Accra. Akan is the most spoken language. Hausa, Ga, Ewe, and English are among the other languages spoken. One of the most rapidly expanding localities in West Africa is Kasoa (GSS, 2021). Important The important settlements of the municipality are: Opaykuma, Adam Nana, Kuporumeti, Ofankor, Akwertey, Walantu and Zongo.

3.3 Research Approach and Design

A combination of qualitative and quantitative techniques was used in this investigation. Creswell (2014) defines a mixed methodologies research approach as one that uses both quantitative and qualitative research approaches. In the case of the quantitative approach, the

University of Ghana http://ugspace.ug.edu.gh

hard copy questionnaire was translated into google forms and distributed to the respondents through WhatsApp to facilitate data collection. For the qualitative approach, the researcher visited the assembly during which interviews were carried out with a few of the municipal authorities to bring to light the grim state of the solid waste management situation on the ground.

3.4 Population and Sampling

The study proposes to examine waste management challenges in the Awutu Senya East Municipality of Ghana. To achieve the goals of the study, the Environment and sanitation officer and residents within the municipality were contacted based on the 2021 population and housing census figure of 236, 527 and mindful of the guidelines for selecting a representative sample from populations of different sizes at the 5% margin of error suggested by Saunders et al (2013, pp. 212–214). For populations greater than 100, 000 but smaller than 1,000,000 the authors recommend using the following formula to compute the sample sizes where a probability sampling technique is adopted $n^a = \frac{n \times 100}{re\%}$; where n^a is the actual sample size required, n is the minimum or adjusted sample size while *re%* is the estimated response rate expressed in percentage. Thus, a sample of 100 participants were involved in the study. The sampling approach used was a blend of purposive and simple random sampling. The selection of respondents for both the qualitative and quantitative data was done through the application of purposive sampling to enable the researcher recruit respondents that have attributes needed to adequately answer the research questions. The sample was made up of waste collectors, residents, municipal planning officer and the municipal waste and sanitation officers and other workers in the Awutu Senya East Municipal Assembly who have had to grapple with the teething waste and sanitation challenges on daily basis.

University of Ghana http://ugspace.ug.edu.gh

3.5 Data sources

For conducting this study, both primary and secondary sources of information were utilized. The use of questionnaires and interview guides was the primary method of collecting primary data, while relevant reports that are available at the municipal assembly was used for collecting secondary data.

3.6 Data collection tools and procedures

The study collected quantitative information from participants via pre-designed questions. The objectives guided the development of the questionnaires across four primary sections. To collect qualitative data, in-depth one-on-one interview was conducted using a semi-structured interview guide with open-ended questions. To get as much information as possible in the short amount of time available for the study, the questionnaire was translated to an online version using google forms and distributed on social media platform, specifically, WhatsApp, to solicit the necessary response. In otherwise the questionnaire which was in the form of google form was shared on WhatsApp where candidates filled in their responses.

3.7 Data Analysis

Quantitative data was analyzed using Ms Excel and SPSS 26.0. Frequencies and percentages were used for descriptive statistics of categorical variables. The in-depth interviews with research participants that produced the qualitative data on the other hand was transcribed manually for coding and thematic content analysis of the qualitative data, findings from which was used to throw more light on the results from the quantitative data analysis. The reason for the use of content analysis is that it directly analyses communication using language while data is collected. The researcher can gain useful historical and cultural insights across time using content analysis, which is another advantage of this research method.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the empirical findings, analysis, and extensive discussion of the study are presented. The remaining chapter comprises demographic profile, results, and discussions; theoretical implications and Managerial/Practical (or Policy) implications.

4.2 Demographic Analysis

Table 4.1 shows the personal and household features of the research participants. Out of the 96 respondents, 46 of them, making 47.92%, were males and 50 of them, making 52.08%, were females. The background information about sex indicates that, more females responded to the questionnaire than males. The age distributions indicated that, 45 (46.9%) of the respondents, making the majority, were between the ages of 31-40 years, 40 of them, making 41.4%, were between the ages of 20-30 years, 7 of them, making 7.3%, were between the ages of 41-50, 3 of them, making 3.1%, were between the ages of 51-60 years and only one person (1.0%) was above 61 years.

It became clear that majority (46.9%) of the responders had tertiary education, followed by 16.7% who had secondary/Technical education and another 16.7% were attending training colleges. Results indicated that, there was no relationship between the educational level of the respondent and their knowledge about waste management practices (likelihood ratio = 1.483, p = 0.679, df =3, $\alpha = 0.05$).

Also, 8.33% had training in vocational, 2.1% had primary education whilst 3.13% had no form of education. In all, 44 of the respondents, making 45.8% were married whilst 52 (54.2%) were single. Regarding religion, the majority (61.5%) of the respondents said they were Christians whilst the remaining 36.5% and 2.1% were Muslims and traditionalist respectively.

University of Ghana http://ugspace.ug.edu.gh

Further analysis of the demographic data revealed that 36 (37.5%) of the respondents were engaged as public servants as their primary occupation, 25 (26.0%) responders engaged in their own businesses, 33 (34.4%) of them were engaged in white-collar jobs, 2 (2.1%) respondents were engaged in farming and the remaining 2 (2.1%) respondents being students. This demographic analysis is presented in the table below.

Characteristics	Frequency N=96	Percentage
Sex		
Female	50	52.08
Male	46	47.92
Age		
20-30	40	41.37
31-40	45	46.88
41-50	7	7.29
51-60	3	3.13
61 and above	1	1.04
Education		
Primary	2	2.08
Middle/J. S.S/J. H.S	6	6.25
Secondary/Technical	16	16.67
Training college	16	16.67
Vocational	8	8.33
Tertiary	45	46.88
None	3	3.13
Occupation		
Public servant	36	37.51
Business	25	26.04
Student	2	2.08
White-collar job	33	34.38
Farming	2	2.08
Marital Status		
Single	52	45.83
Married	44	54.17
Religion		
Christianity	59	61.46
Islamic	35	36.46
Traditionalist	2	2.08

Table 4.1:Personal and Household Characteristics of Study Respondents

University of Ghana http://ugspace.ug.edu.gh

4.3 Waste management and disposal practices in the Awutu Senya East Municipality of Ghana.

4.3.1 Types of solid waste generated.

The households were asked to identify the kinds of solid waste that were produced in their homes the most frequently. The responses indicate that the components of domestically generated solid waste consist of, among other things, plastic waste, food waste, paper, ashes, wood, and grasses. Figure 4.1 displays a summary of the respondents' responses.

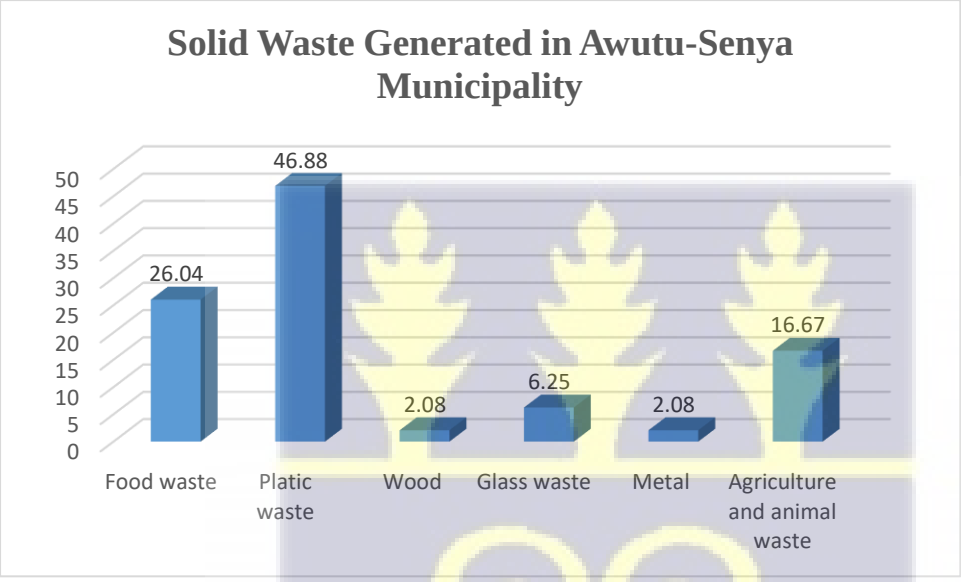

Figure 4.1: Summary of solid waste generated in Awutu-Senya Municipality

Source: (Field work, 2022)

As shown in figure 4.1. above, the most domestically generated type of waste is plastic waste, being 46.88%, followed by food waste (26.0%) and agriculture and animal waste (16.7%). A smaller proportion of wood (2.1%), glass waste (6.3%) and metal (2.1%) were generated by respondents as domestic waste in the municipality. Similarly, 57% of respondents in Eshun (2013)'s research of the KEEA Municipality agreed that plastic waste accounts for far over 50% of the Municipality's total solid waste output.

University of Ghana http://ugspace.ug.edu.gh

4.3.2 Waste segregation

To understand the waste management practices in the Awutu Senya Municipality, the respondents were asked, if they do separate the waste they generate into various forms. The study found that, majority (86.5%) did not separate the waste being generated whilst 13.5% did. This is indicated in Figure 4.2. Most respondents did not segregate their waste because, some indicated they had only one dustbin for collecting their waste, whilst others indicated that, they do not have the time to segregate their waste. Also, some respondents, indicated that, even if they segregate their waste, it will end up being put together by the waste collectors who pick them. Moreso, other respondents indicated that, they do not have the knowledge for waste segregation.

The 3.5% that segregated their waste stated that they do so to sell it (plastic waste) to gain revenue. Some also stated that they separated their waste for convenient disposal, while others stated that they did so to be able to burn the plastic and paper waste. Yoada *et al.* (2014) confirm similar findings from a survey administered in the Ga East municipality (including Danfa, Madina, Dome and Taifa) in Accra, where they found that 83 percent of residents do not sort their waste. Fei-Baffoe *et al.* (2014) observed that the Sekondi-Takoradi Metropolis does not process or treat its solid waste because waste from different homes and other points of generation is just thrown in the same pile.

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

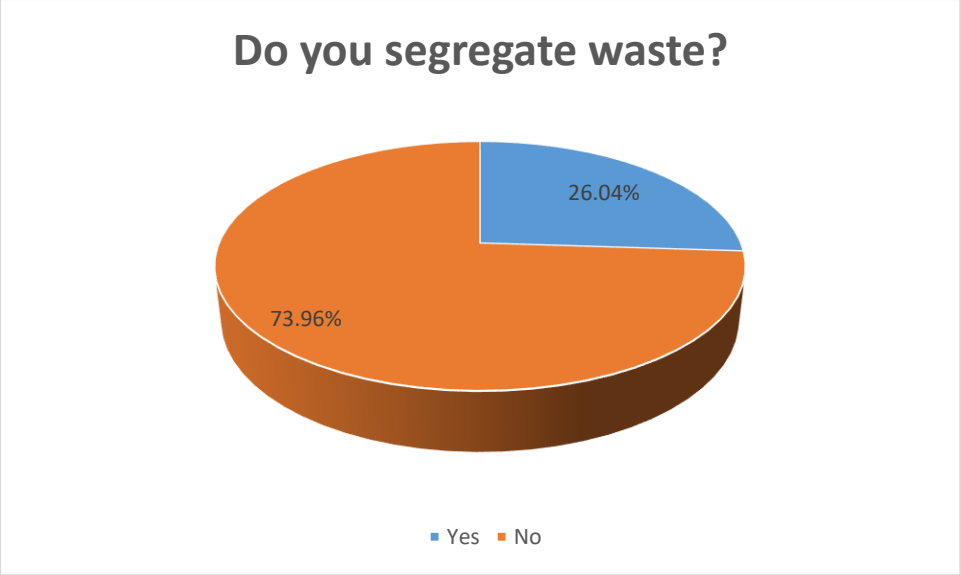

Figure 4.2:Waste segregation attitude of respondents

Source: (Field work, 2022)

4.3.3 Re-use of waste

In terms of waste re-use, figure 4.3 of the findings demonstrates that the majority (73.9%) of the responders do not re-use their waste, whereas 26.0% did. The percentage of people who reused waste did so in a variety of ways, including composting it and reusing bottles as storage containers and packaging materials. Some claim that discarded foods were fed to animals. This finding agrees with the work of Read (2003), who argued that an integrated system should form the basis of practical solid waste management. Some locals grow vegetables in home gardens, and rather than purchasing chemical fertilizers, they could use the organic parts of their solid waste to make compost. Those who did not reuse waste stated that the waste they made was of no use to them and thus they did not reuse it, whilst others stated that the waste, they disposed was not reusable.

University of Ghana http://ugspace.ug.edu.gh

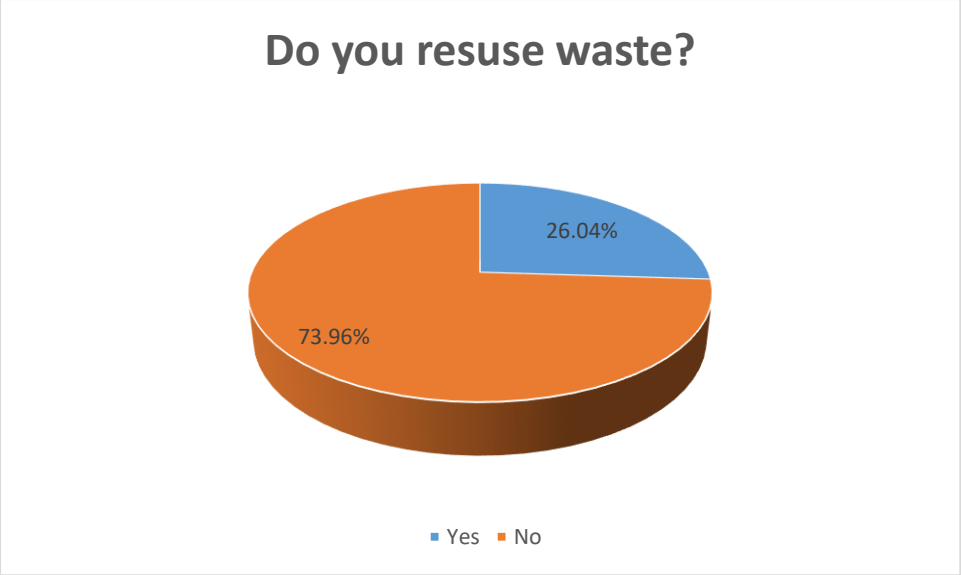

Figure 4.3:Attitude of respondents towards reuse of waste.

Source: (Field work, 2022)

4.3.4 Site for waste disposal

It is possible to get a good idea of the solid waste management system being used by the community at large if residents are aware of where they are supposed to take their domestic waste. Table 4.2 gives a brief overview of where the respondents disposed of their solid waste.

Means of Disposal	**Frequency N=96**	**Percentage (%)**
Collected by waste company or kaya bola	50	51.94
Waste bins	28	29.17
Dump sites	11	11.46
Backyard	3	3.13
Burn	6	6.25
Open spaces	1	1.04
Skips	1	1.04

Table 4.2: A summary of the respondents' solid waste disposal sites

Source: (Field work, 2022)

University of Ghana http://ugspace.ug.edu.gh

As shown in the preceding Table 4.2, most respondents (51.9%) indicated that, their waste was collected by waste company or Kaya bola. Respondents also disposed of their wastes personally into waste bins (29.2%), dump sites (11.5%), backyard (3.1%), or burn (6.3%) their wastes. Two respondents admitted they dispose of their wastes at open spaces (1.0%), or in skip containers near them (1.0%).

4.3.5 Responsible waste company for the community

As shown as shown in Figure 4.4, the majority of respondents (61.8%) stated that waste collection in the community was the responsibility of a waste company whilst 35.95% indicated that, there was no waste company responsible for waste collection. A few (2.3%) had no knowledge on the subject matter.

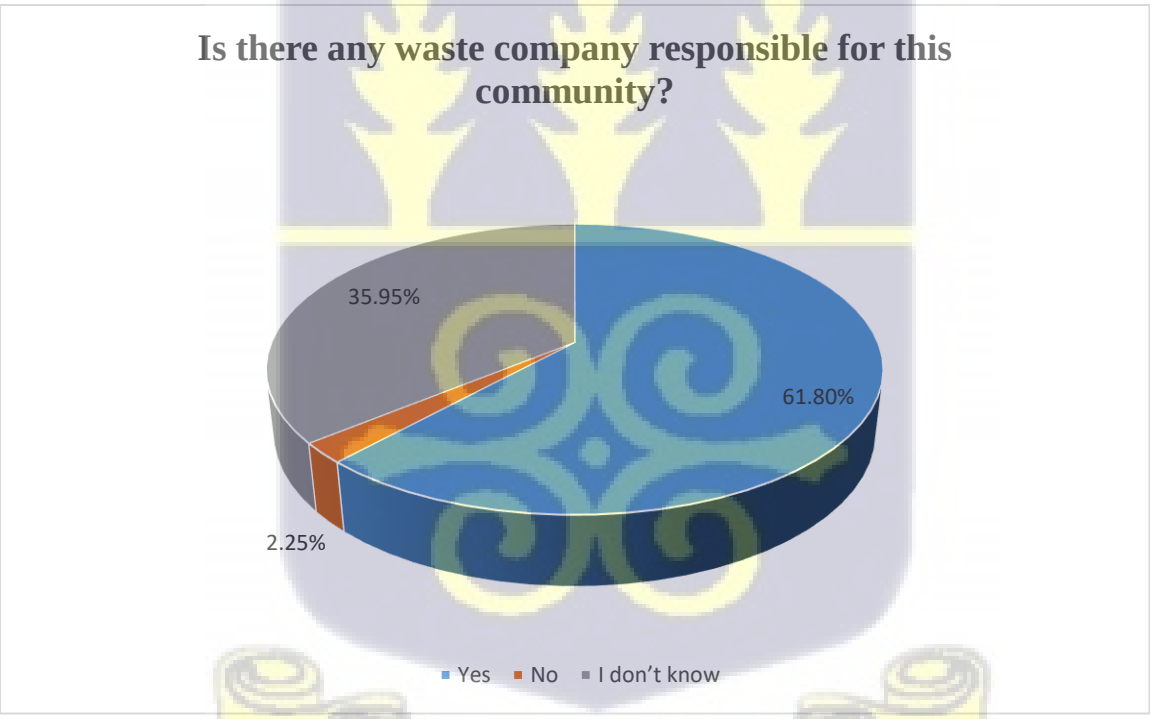

Figure 4.4:Summary of respondents' views on if waste company was responsible for waste collection.

Source: (Field work, 2022)

University of Ghana http://ugspace.ug.edu.gh

Most respondents (52.9 percent) noted that the waste company in charge of collection of waste usually visited the community once a week. On the other hand, 24.3% indicated that, the waste company visited the community twice a week for waste collection, whilst 12.9% and 7.1% indicated that, the visit was thrice a week and everyday respectively. Only a few (2.9%) indicated they visited four times in the week. This has been summarised in Figure 4.5 below.

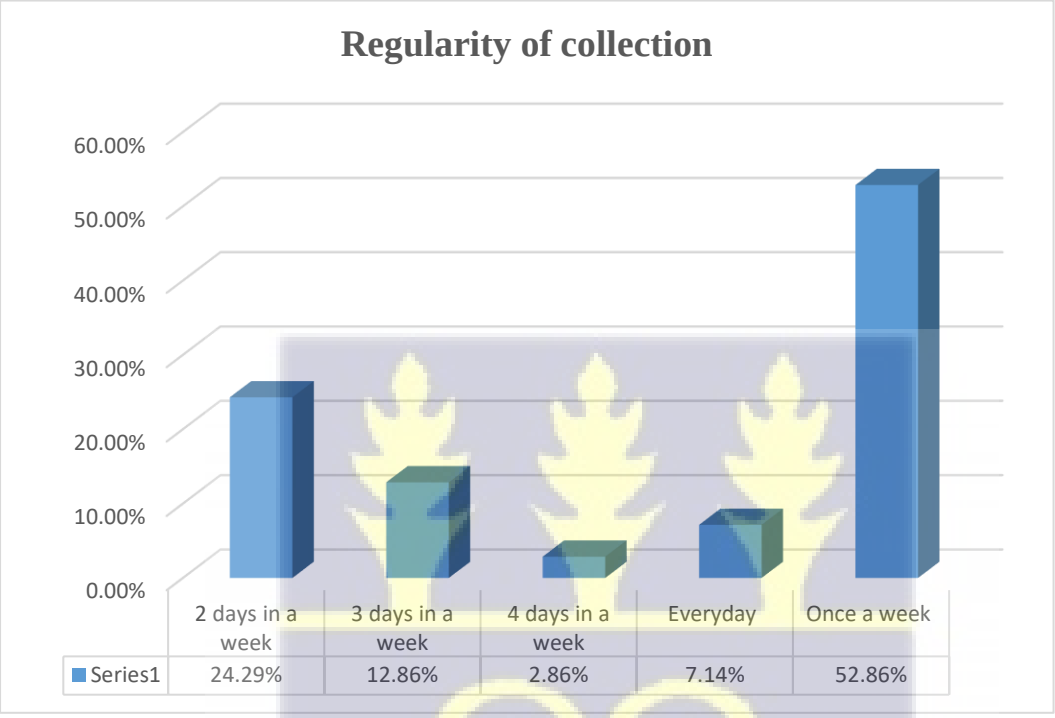

Figure 4.5: Number of times waste company visited community for collection of waste.

Source: (Field work, 2022)

4.3.6 Cost of waste disposal

Finance is another factor which affects the waste management practices adopted by individuals. In this study, majority (87.7%) indicated that, they paid to dispose of their waste whilst 12.4% indicated otherwise. This has been summarised in Figure 4.6 below.

University of Ghana http://ugspace.ug.edu.gh

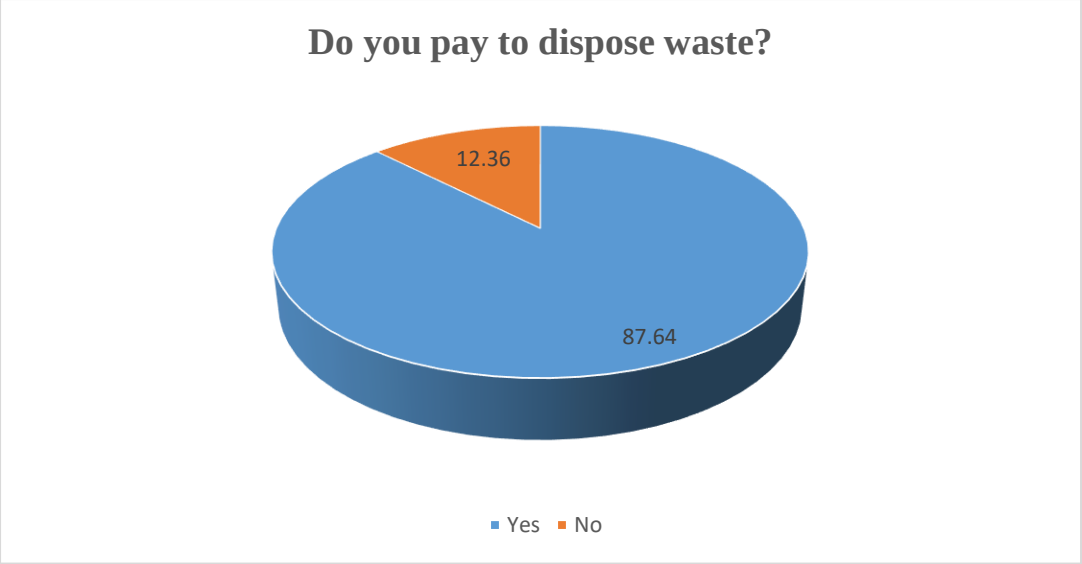

Figure 4.6: Summary of respondent's view on if they paid to dispose waste.

Source: (Field work, 2022)

However, majority (62.5%) of those who didn't pay to dispose waste indicated that, they will be ready to pay for the garbage they generate to be collected, whilst the remaining 37.5% were not willing to pay to dispose of waste generated (Figure 4.7).

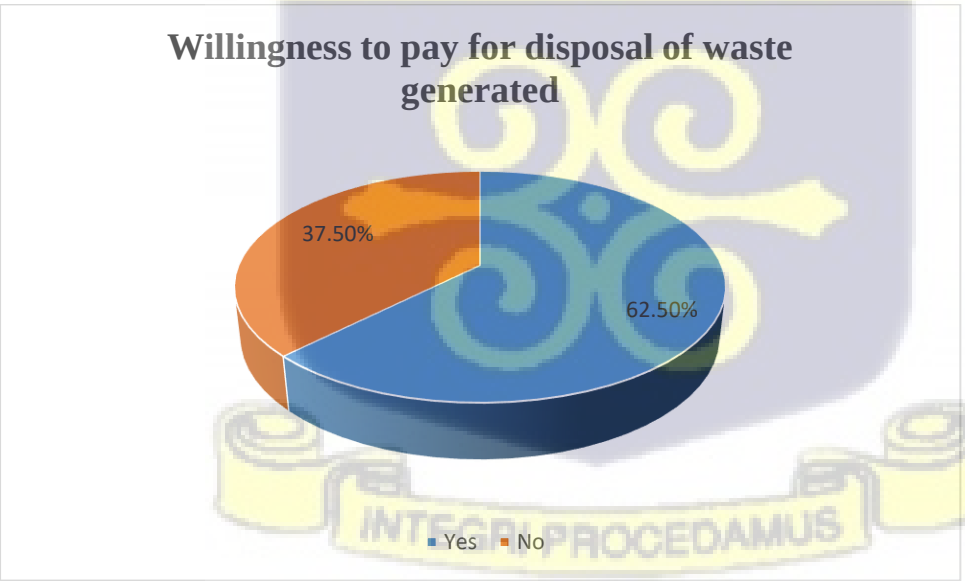

Figure 4.7: Willingness to pay for disposal of waste generated

Source: (Field work, 2022)

University of Ghana http://ugspace.ug.edu.gh

4.3.7 Time spent to dispose of waste.

The time spent disposing of waste is also likely to have a substantial impact on people's behaviour. For example, if communal skip placements are further distant from households, it causes significant trouble. As a result, people are more prone to dump in sites that are handy for them. Table 4.3 summarizes the participants' replies in terms of the time it takes to dump waste in the available skip bins.

Time (mins)	Frequency (N=96)	Percentage (%)
5-10	31	32.29
11-15	6	6.25
16-20	16	16.67
21-25	4	4.17
More than 25	39	40.63

Table 4.3:How long it takes to dispose of waste.

Source: (Field work, 2022)

The Table 4.3 indicates that, 40.6% of respondents who disposed their waste in the communal dumpsite spend more than 25 minutes while 32.3% spend between 5-10minutes. This demonstrates that the dumpsites are not conveniently located within a short walking distance. People will have less time to go about their daily lives, and as a result, they may resort to dumping solid waste wherever they like. Again, 16.7% spend between 16-20 minutes whilst 6.25% and 4.17% spend between 11-15 minutes and 21-25 minutes respectively. So, it's clear that most skip bins aren't within easy walking distance. As posited by Odonkor, Frimpong and Kurantin (2020), an average time of 11-15 minutes to a refuse site is considered ideal. However,

University of Ghana http://ugspace.ug.edu.gh

in this study most participants alleged they walked for more than 25 minutes to reach refuse sites.

4.3.8 Involvement in waste management

Respondents were questioned about their level of involvement in waste management activities, majority (72.9%) indicated that, they were not active or involved in any of such kind of meetings or activities. The few that were active, participated in several ways such as joining in communal labour (15.7%) and obeying rules and regulations with regards to waste management (11.5%). This is summarised in Figure 4.8 below.

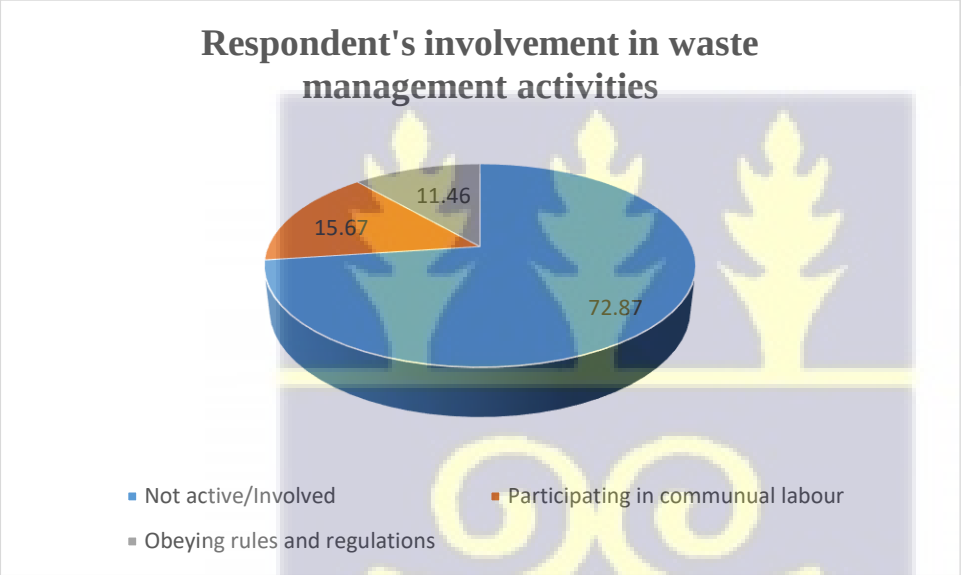

Figure 4.8: Respondents involvement in waste management

Source: (Field work, 2022)

4.3.9 Waste management arrangement in the community

As shown in Figure 4.9, majority (48.1%) indicated that, the waste management arrangement in the community was not effective and reliable as compared to the "Kaya bola" who are always available for waste collection. On the contrary, 38.7% indicated that, the arrangement was effective and an improvement of what existed previously, whilst the remaining 13.2% indicated

University of Ghana http://ugspace.ug.edu.gh

that they had no knowledge of any arrangement of the sort. They simply said there was no arrangement.

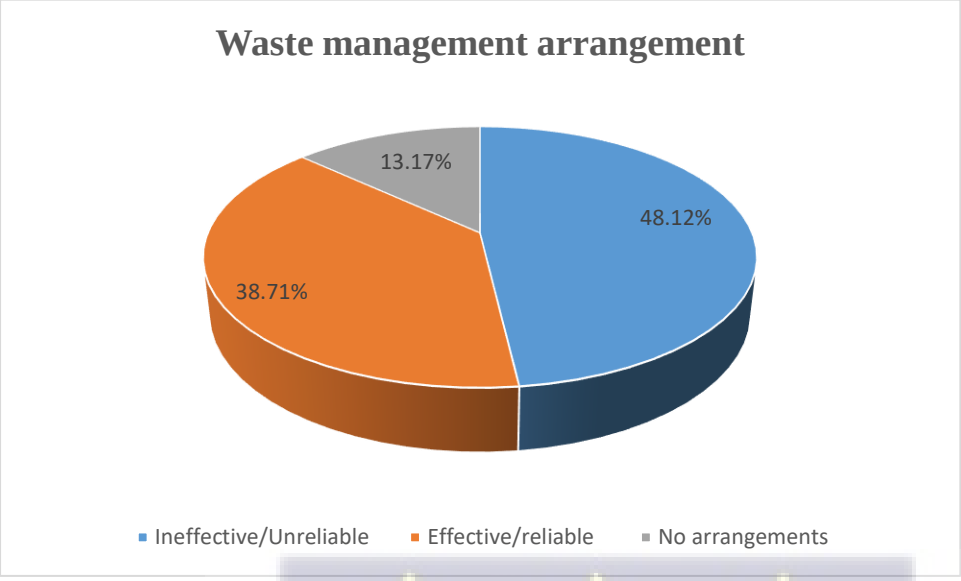

Figure 4.9: Respondent's view on waste management arrangement

Source: (Field work, 2022)

4.3.10 Mode of waste collection

With regards to mode of waste collection, majority (82.5%) of the respondents indicated that, waste collection was done door-to-door which usually involved the "Kaya- Bola". In this mode of waste collection, the "Kaya-Bola" in exchange for a payment, collect waste from homes utilizing motorized tricycles or manually pulled carts. Most of them make do with homemade, non-mechanized trolleys, which require considerable muscle to push. On the other hand, 12.4% of the respondents indicated that, they had their own personal arrangement. This usually involves individuals personally going to dump their waste at the dump site. Again, 5.1% relied on communal clean up exercises as mode of waste collection, where the members of the community gather on a specific date to clean up the community. This has been summarised in Figure 4.10 below.

University of Ghana http://ugspace.ug.edu.gh

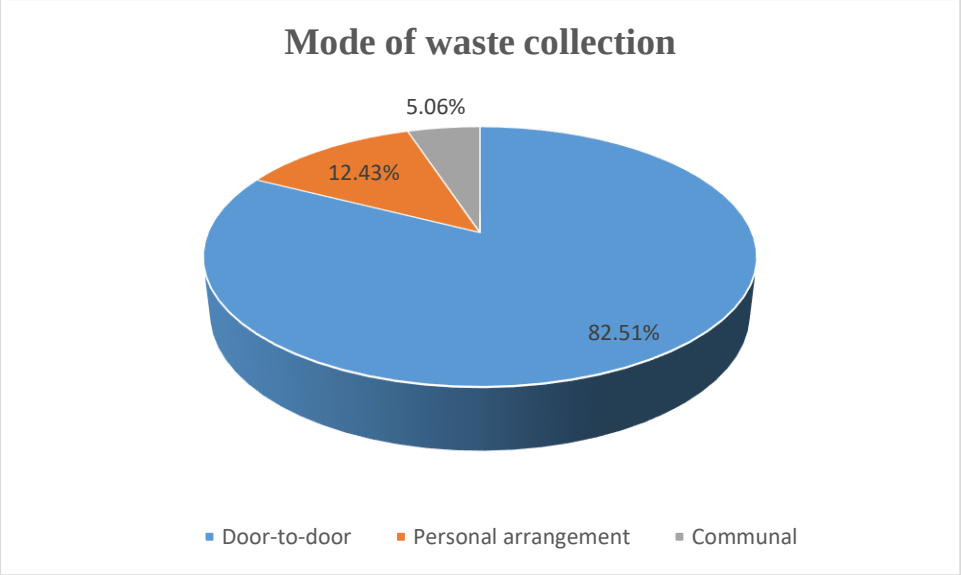

Figure 4.10: Mode of waste collection

Source: (Field work, 2022)

4.4 Challenges facing solid waste management.

The objectives of the research included looking into the challenges of municipal solid waste management. Preliminary field visits by the researcher during which interviews carried out with a few of the municipal authorities brought to light the grim state of the solid waste management situation on the ground. The community is battling with serious sanitation problems due to the inability to properly manage solid wastes, thereby resulting in the current state of poor sanitation in the municipality. The image on Plate 1 below shows a dire state of solid waste management facility in Kasoa, where some residents go personally to dispose of their solid wastes.

University of Ghana http://ugspace.ug.edu.gh

Plate 1: Photograph showing the grim state of Skips in Kasoa.

Source: (Quarcoo, 2014)

The Environment and Sanitation officer of the municipality identified the frequent breakdown of waste collection trucks; inadequate refuse collection bins; inaccessibility of haulage trucks; poor sanitation at the central business district (CBD) and new market; inadequate tools and equipment; inefficient door to door refuse collection; dumpsites managed by private individuals and the current ban on dumping of refuse at the current dumpsite as a few of the various difficulties that the municipality's waste management faces. The Environment and Sanitation officer of the municipality had this to say about the challenges:

"We collect part of the waste generated in the municipality and we use refuse trucks to be able to effectively and efficiently do that, but as we speak our two refuse trucks has been down for the past eight months, so you can imagine the challenge."

University of Ghana http://ugspace.ug.edu.gh

"Another challenge we face in the CBD is the fact that, some people dump waste at the CBD during odd hours, that is at night when the officers are asleep and so you wake up to meet waste hipped up."

Also discovered was the fact that the municipality had no dumpsite or landfill site for waste treatment and disposal at present, with the only landfill site available closed because of the huge danger it posed to public health, environment, and soil quality. The participants narrated that those land sites contributed to environmental pollution by emitting toxic fumes into the atmosphere and adding heavy metals that were far above permissible levels to the soil and water bodies there. The absence of a well-managed landfill site or dumpsite had compounded the challenge of waste management in the community by increasing the indiscriminate dumping of refuse and promoting the dumping of waste at unauthorised sites. This has led to the upsurge of garbage and the poor state of sanitation in the community. The image on Plate2 shows the grim state of some water bodies in the Awutu Senya East municipality, resulting from the unavailability of dumpsites and the indiscriminate dumping of refuse in the community.

University of Ghana http://ugspace.ug.edu.gh

Plate 2: Photograph showing strewn garbage in drainage systems (gutter)

Source: (newsghana.com.gh/residents-of-kasoa-demands-more-sensitisation-for-sanitation-and-hygiene/)

There is therefore the need to call for urgent academic enquiry into how the municipality manages or hopes to manage this challenge going into the future.

Another challenge identified by the Development Planning Unit; and Finance Department was with private waste contractors not going by the agreement with the Assembly, and the inability of private waste contractors to control the large volume of waste generated within the municipality. Waste bins in the streets are left unattended to for days as shown in Plate 3.

University of Ghana http://ugspace.ug.edu.gh

Plate 3: Photograph showing heaps of rubbish unattended to in Kasoa market.

Source: (mordenghana.com/amp/news/847689/heaps-of-rubbish-taking-over-kasoa.html)

Documentary analysis showed that, the PPP arrangement in the Municipality was extremely centralized. The Ministry of Local Government signed the agreement that existed between the local authorities and Zoomlion Ghana Limited and the MMDAs were thus expected to ensure compliance with the terms of the contract. Also, the Assembly members as law makers and community leaders were to ensure the efficiency of the PPP arrangement by helping the Environmental Health Analyst in monitoring and supervision roles. Sadly, assemble members lacked information about the contract details and hence are unable to put this private waste contractors to check.

Municipal waste management workers indicated that because there aren't any roads to landfills that can be driven on, waste trucks sometimes get stuck in the mud, especially when it rains. Towing can take up to two months in some cases. As a result, during the rainy season, truck

University of Ghana http://ugspace.ug.edu.gh

drivers avoid driving on waterlogged roads, causing delays in picking up waste bins. This situation is shown on the image on Plate 4.

Plate 4: Photograph showing unattended waste bins leading to sanitation issues.

Source: (Field work, 2022)

University of Ghana http://ugspace.ug.edu.gh

Another major challenge had to do with the level of cooperation of community members. The study found that, community members do not keep the waste bins clean, or they allow the refuse to be scattered by livestock which end up littering the community and making the waste collection by sanitation workers more cumbersome and challenging.

The municipality has few resources to devote to solid waste management. As a result, it has become challenging to hire more sanitation personnel and buy cutting-edge materials and tools for waste management. This is in line with the research of Ogawa (2005), who found that governments in poor countries do not adequately fund the solid waste management sector, making it unable to offer adequate protection for public health and the environment.

4.5 Discussion

The study's primary objective was to investigate waste management techniques and difficulties in the Awutu Senya East Municipality. As a result of a constraint highlighted in the literature, indiscriminate dumping of waste products which is a widespread problem in Ghana, made this purpose pertinent. Females made up a higher percentage of responders (52.08%), as seen in Table 4.2. This is because, in the Ghanaian cultural context, females are more likely than males to deal with sanitation and related difficulties. A related investigation was conducted in the WA municipality where it was found that, in poor and middle-class neighbourhoods, waste collection and disposal were traditionally viewed as the responsibility of women (Bowan *et al.*, 2014). The value of education in terms of socioeconomic growth cannot be overstated. Education is beneficial and able to shape the lives of people. Table 4.2 depicts the educational level of the survey respondents. Most household respondents (46.88%) had a tertiary education. Thus, with proper education of residents on waste disposal regulations combined with an effective solid waste management system, municipal authorities may be able to change residents' attitudes toward improper waste disposal, because educated people understand the threat posed by waste that has not been properly managed to human health and the environment.

University of Ghana http://ugspace.ug.edu.gh

It was established that; Most of the household waste, comprising 46.88 percent, was made up of plastics. Oteng-Ababio (2011a) cites a study on waste composition from 1989–1999, which he says is in line with the present literature since it finds that organic materials (including food and yard trimming) make up about 67% of rubbish in the three areas studied in Accra and Tema. About twenty percent of the whole was plastic (including plastic bottles and sachet bags). When looking at waste compositions from 1989–1999 and 2000–2009, we see that organic trash decreased from 73% to 60%, whereas plastic waste increased from 3% to 8%. There appears to be no strategies in place to monitor the collection and disposal of waste in the city, which, along with the growing population, may explain the seeming contradiction.

A person strolling through the municipal capital of Kasoa would see skips and other open spaces, especially in the market area, filled to the brim with piles of solid waste, primarily plastic as shown in Figure 4.13 above. The data shows that plastic bags are the most popular option for carrying food, drink, and personal items around town.

Again, majority of the households did not segregate their waste or reuse any component of it. It indicates that the volume of garbage accessible for disposal is greater than it would have been if the generated waste had been separated and reused to a greater extent. The lack of waste segregation was found to be attributed to the lack of time, lack of different waste bins to facilitate segregation and the lack of knowledge on how waste segregation should be done. Yoada et al (2014) report that 83% of respondents in a similar survey done in Accra's Ga East municipality (which includes Madina, Danfa, Taifa, and Dome) not sort their waste before discarding it. As posited by Fei-Baffoe et al (2014), most solid waste disposed of in the Sekondi-Takoradi Metropolis is neither processed or treated because waste generated at multiple residences or points of generation is jumbled together without any waste separation. In terms of waste re-use, the findings (Figure 4.3) demonstrates that the majority (73.96%) of responders do not re-use their waste, whereas 26.04% did. This result goes against what Read

University of Ghana http://ugspace.ug.edu.gh

(2003) says about how an integrated system is needed for practical solid waste management. It means that a lot of that kind of organic waste can get dumped in open areas like gutters, leading to overflow. The findings also contradict the remark made by Tsiboe and Marbel (2004), who claimed that sorting residential solid waste into glass, paper, and plastic for simple collection and reuse was key to effective waste management. This cuts down on the primary contributor to waste pileups greatly. In a comparable study, Oteng-Ababio (2011b) found that the manner of home solid waste collection in the Greater Accra Metropolitan Area (GAMA) does not facilitate source separation.

It was discovered that, majority (40.63%) of the respondents spent more than 25 minutes to dispose of waste in the community. This creates an incentive for improper disposal of waste such as in gutters etc. since most individuals may not be willing to go through the pain of walking long distances just to get their waste disposed. With regards to mode of waste collection, majority (82.51%) of the respondents indicated that, waste collection was done door-to-door which usually involved the "Kaya- Bola".

In addition, it was noticed that solid waste management within ASEMA is hampered by insufficient financial resources, a negative attitude of families toward waste management, a lack of sanitation employees, and a small number of obsolete and limited solid waste management and equipment. Because most respondents (62.5%), who were surveyed, are willing to pay more for better sanitation services, this could be a good source of money for local governments to improve their solid waste management equipment and materials. However, this should be carried out with caution because a program that was implemented in James Town, Usher Town, and Zongo that charged fees based on the size of one's bucket did not function properly, encouraging people to dump their solid waste into gutters and drains, and ultimately leading to the system's abolition (Tsiboe & Marbell, 2004).

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the entire study, which attempted to investigate waste management procedures in the Awutu Senya East Municipality. The study also investigated the municipality's waste management difficulties and suggestions for improving the system. This chapter summarizes the study and derives the relevant conclusions after evaluating and discussing the findings in the previous chapter. In the final section of the chapter, several recommendations for practice and research are also made.

5.2 Summary of findings

The first objective of the research was to investigate or gain a better understanding of the procedures for the management and disposal of waste that are currently in place in the Awutu Senya East Municipality of Ghana. It was discovered that most of the waste produced by households was composed of plastic. Most homes do not sort their trash or reuse any of it, which results in a greater quantity of waste that must be disposed of compared to what would be the case if more trash was separated and recycled. It was determined that the lack of waste segregation was due to a lack of time, separate waste bins, and an understanding of how to properly segregate waste. The majority of those who responded spent more than quarter of an hour dumping trash in the neighborhood.

The second objective of the study was to investigate the difficulties that the ASEMA is currently experiencing in terms of waste management. It was discovered that ASEMA's solid waste management is hampered by insufficient financial resources, a negative family attitude towards trash management, a lack of sanitation staff, and outdated and limited equipment. All these factors contributed to the problem.

University of Ghana http://ugspace.ug.edu.gh

5.3 Implication of key findings.

The study's results reveal significant challenges in waste management and disposal in the Awutu Senya East Municipality of Ghana. These challenges have far-reaching implications for the economy, environment, and municipality. Inadequate waste management can have a negative impact on the environment, which in turn can have indirect effects on the economy. Tourism potential can be negatively impacted by pollution and improper waste disposal practices, as visitors may be discouraged by the unsanitary conditions. Improper waste management can lead to significant costs associated with cleaning up and mitigating its effects. This can put a strain on the municipal budget and divert resources away from other important developmental projects. In addition, improper waste management practices can present substantial health hazards. The accumulation of waste can attract pests and vermin, which in turn can increase the risk of disease transmission. Improper disposal of waste, such as through open dumps or burning, can result in the emission of harmful pollutants into the air. This can lead to respiratory problems and other illnesses among the local population.

According to the study, plastic waste makes up a considerable portion of household waste due to the lack of waste segregation. Improper waste segregation practices can put a strain on the current waste management infrastructure of municipalities. Mixing different types of waste makes it difficult to recover valuable materials through recycling or composting. Generating more waste can lead to increased expenses for waste management systems and may cause inefficiencies in resource allocation. The study's results indicate a requirement for a comprehensive waste management strategy that prioritises enhancing waste segregation, imparting knowledge to the general public regarding the significance of waste management and allocating resources towards advanced and effective waste management technologies.

University of Ghana http://ugspace.ug.edu.gh

5.4 Recommendations

Based on the findings, the following recommendations have been made:

- **Awareness and Education Campaign**: Launch an extensive public awareness campaign to educate households about the importance of waste segregation and recycling. This campaign should focus on explaining the environmental impact of plastic waste, the benefits of recycling, and how to properly segregate different types of waste. Utilize various communication channels, such as television, radio, social media, and community engagement programs, to reach a wide audience.
- **Provision of Separate Waste Bins**: Ensure that every household has access to separate waste bins for different types of waste, including separate bins for plastic waste. Provide clear instructions on the bins regarding which types of waste should be disposed of in each bin. Collaborate with local municipalities or waste management companies to distribute these bins and regularly collect the segregated waste.
- **Incentives and Rewards**: Introduce incentive programs to encourage households to participate in waste segregation and recycling. Offer rewards or discounts to those who consistently segregate their waste and properly dispose of recyclables. Collaborate with local businesses to provide these incentives, which could include discounts on products or services, coupons, or loyalty points.
- **Community Engagement and Voluntary Programs**: Organize community events, workshops, or training sessions to engage residents and provide hands-on guidance on waste segregation and recycling practices. Encourage the formation of volunteer groups or committees focused on promoting sustainable waste management practices within the neighborhood. These initiatives will foster a sense of community ownership and create a supportive environment for waste reduction efforts.

University of Ghana http://ugspace.ug.edu.gh

- **Upgrade Equipment and Technology**: Outdated and limited equipment hinder efficient waste management. ASEMA should invest in modern waste management technologies such as waste sorting and recycling machinery, waste compactors, and transportation vehicles. Upgrading equipment will enhance productivity, reduce manual labor, and improve overall waste management processes.

University of Ghana http://ugspace.ug.edu.gh

References

Abalo, E. M., Peprah, P., Nyonyo, J., Ampomah-Sarpong, R., & Agyemang-Duah, W. (2018). A Review of the Triple Gains of Waste and the Way Forward for Ghana. *Journal of Renewable Energy*, *2018*, 1–12.

Abdel-Shafy, H. I., & Mansour, M. S. M. (2018). Solid waste issue: Sources, composition, disposal, recycling, and valorization. *Egyptian Journal of Petroleum*, *27*(4), 1275–1290.

Addaney, M., & Oppong, R., A. (2015). Critical Issues of Municipal Solid Waste Management in Ghana. *JENRM*, *2*(1), 30–36.

Ahsan, A., Alamgir, M., El-Sergany, M. M., Shams, S., Rowshon, M. K., & Daud, N. N. (2014). Assessment of municipal solid waste management system in a developing country. *Chinese Journal of Engineering*, *2014*(12a), 1-11.

Asare E. B., & Frimpong, M. K. (2013). Public-private partnerships and urban sanitation: Do expectations meet realities in Madina-Ghana? *Journal of African Studies and Development*. Department of Political Science, University of Ghana, Legon, Ghana.

Awortwi, N. (2004). Getting the fundamentals wrong: woes of publicprivate partne rships in solid waste collection in three Ghanaian cities. *Public Administration and Development*, *24*, 213–224.

Bailie, R.C., Everett, J.W., Liptak, B.G., Liu, D.H.F., Rugg, F.M. & Switzenbaum, M.S. (1997). Solid waste. In: Liu DHF, Liptak BG, Bouis PA, editors. Environmental Engineers' Handbook. New York: Lewis Publishers

Balasubramanian, M. (2018). Municipal solid waste management in India: Status, problems and challenges. *International Journal Environment and Waste Management*, *21*(4), 253–268.

Bawakyillenuo, S., & Agbelie, I., K. (2014). *Waste as a Resource for Energy Generation in the Ga East and Ewutu Senya East Municipalities: The Policy Discourse*. DFID, EPSRC & DECC. http://samsetproject.net/wp-content/uploads/2016/02/Policy-case-study-Waste-to-energy-in-Awutu-Senya-and-Ga-East-Municipalities.pdf

University of Ghana http://ugspace.ug.edu.gh

Belen, M. A., Jacinto, J. L., Go, N., Santos, L. T., Zagala, A. J. C., Santos, R. A., & Apodaca, D., C. (2019). *Assessment of the impact of open waste dumpsites on groundwater quality: A case study of the Payatas dumpsite in Quezon city, Philipines*. *344*, 1–11.

Composite Budget (2014). Awutu Senya East Municipal Assembly, Kasoa-Central region, Ghana.https://mofep.gov.gh/sites/default/files/compositebudget/2014/CR/Awutu_Senya_East.pdf

Creswell, J. (2014). *Research Design -qualitative, quantitative, and mixed methods approaches* (V. Knight, J. Young, K. Koscielak, B. Bauhaus, M. Markanich, & A. Hutchinson (eds.); 4th ed.). SAGE.

Demirbas, A. (2011). Waste management, waste resource facilities and waste conversion processes. *Energy Conversion and Management*, *52*(2), 1280-1287.

Douti, N. B., Abanyie, S. K., Ampofo, S., & Nyarko, S. K. (2017). Solid Waste Management Challenges in Urban Areas of Ghana: A Case Study of Bawku Municipality. *International Journal of Geosciences*, *8*(4), 494–513.

Environmental Sanitation Policy, (Revised 2009). Ministry of Local Government and Rural Development, Government of Ghana. https://www.ircwash.org/sites/default/files/MLGRD-2010-Environmental.pdf

Fei-Baffoe, B. & Nyankson, E. & Gorkeh-Miah, J. (2014). Municipal Solid Waste Management in Sekondi-Takoradi Metropolis, Ghana. Journal of Waste Management.

Ferronato, N., & Torretta, V. (2019). Waste Mismanagement in Developing Countries: A Review of Global Issues. *International Journal of Environmental Research and Public Health*, *16*(6), 1060.

Ghana Districts. (2022, May 4). *Awutu-Senya-East Municipal Assembly*. Ghanadistricts.Com. http://www.ghanadistricts.com/Home/Reader/57b1d81-d015-4ca6-b6

Ghana Statistical Service. (2014). *2010 Population and Housing Census District Analytical Report: Awutu Senya East Municipality*. Ghana Statistical Service. https://www2.statsghana.gov.gh/docfiles/2010_District_Report/Central/Awutu%20Senya%20East%20Mun.pdf

University of Ghana http://ugspace.ug.edu.gh

Ghana Statistical Service. (2021). *2021 Population and Housing Census District Analytical Report: Awutu Senya East Municipality*. Ghana Statistical Service.

Godfrey, L., Tawfic, M., Gebremedhin, K., G., Ketima, J. H. Y., Oelofse, S., Osibanjo, O., Richter, U., H., & Yonli, A., H. (2020). Solid Waste Management in Africa: Governance Failure or Development Opportunity? In N. Edomah (Ed.), *Regionla Development in Africa*. IntechOpen. https://doi.org/10.5772/intechopen.78853

https://www.ghanadistricts.com/Home/District/65

Hopewell, J., Dvorak, R., & Kosior, E. (2019). Plastics recycling: challenges and opportunities. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, *364*(1526), 2115–2126.

Janmaimool, P. (2017). Application of Protection Motivation Theory to Investigate Sustainable Waste Management Behaviors. *Sustainability*, *9*(1079), 1–16.

Kjellén, M. (2018). Wastewater Governance and the Local, Regional and Global Environments. *Water Alternatives*, *11*(2).

Kumar, S., Smith, S. R., Fowler, G., Velis, C., Kumar, S. J., Arya, S., Rena, Kumar, R., & Cheeseman, C. (2017). Challenges and opportunities associated with waste management in India. *Royal Society Open Science*, *4*(3), 160764.

Kyere, R., Addaney, M., & Akudugu, J. A. (2019). Decentralization and Solid Waste Management in Urbanizing Ghana: Moving beyond the Status Quo. In M. E. M. Saleh (Ed.), *Municipal Solid Waste Management*. IntechOpen.

Labspace website, (2013). "labspace, Hygiene and Environmental Health HEAT Module", available on line at: http://labspace.open.ac.uk/mod/oucontent/view.php?id=453833&section=1.4.4, accessed on 6st January 2013.

Lapuente, V., & Suzuki, K. (2020). Politicization, Bureaucratic Legalism, and Innovative Attitudes in the Public Sector. *Public Administration Review*, *80*, 454–467.

University of Ghana http://ugspace.ug.edu.gh

McDougall, F. & White, P. & Franke, M. & Hindle, P. (2001). Integrated Solid Waste Management: A Life Cycle Inventory. The International Journal of Life Cycle Assessment. 6. 10.1007/BF02978794.

McGranahan, G., Songsor, J., Surjadi, C., Kjellen, M., & Jacobi, P. (2001). *The citizens at risk: From urban sanitation to sustainable cities*. Routledge.

Mekonnen, B., Haddis, A., & Zeine. (2020). Assessment of Solid Waste Dump Site on Surrounding Soil and River Water Quality in Tepi Town, Southwest Ethiopia. *Journal of Environmental and Public Health*, 1–9.

MLGRD (2004).” Sanitation Country Profile Ghana”. (www.un.org/esta/agenda21.../ ghana/sanitationGHANA04.pd f). Accessed on 12th October 2012

mordenghana.com/amp/news/847689/heaps-of-rubbish-taking-over-kasoa.html

NDPC. (2014). *Awutu Senya East Municipal Assembly Four-Year Medium Term Development Plan*. National Development Planning Commission. https://new-ndpc-static1.s3.amazonaws.com/CACHES/PUBLICATIONS/2016/04/04/CR_Awutu+Senya+East_2014-2017+MMTDP.pdf

newsghana.com.gh/residents-of-kasoa-demands-more-sensitisation-for-sanitation-and-hygiene/

Obirih-Opareh & Post (2002). Quality assessment of public and private modes of solid waste collection in Accra, Ghana. Habitat International 26 (2002) 95–112. Cited in (Yeboah, 2017).

Odonkor, S., T., & Sallar, A., M. (2021). Correlates of household waste management in Ghana: Implications for public health. *Heliyon*, *7*(e08227), 1–7.

Odonkor S. T., Frimpong K., Kurantin N. (2020). An assessment of household solid waste management in a large Ghanaian district. Heliyon, 6(1): 30-40

Ogawa, H. (2005) Sustainable Solid Waste Management in Developing Countries.

http://www.gdrc.org/

University of Ghana http://ugspace.ug.edu.gh

Oteng-Ababio, M. (2011b). Missing links in solid waste management in the Greater Accra Metropolitan Area in Ghana. *GeoJournal*, *76*(5), 551-560.

Oteng-Ababio M. (2011). Governance Crisis or Attitudinal Change? Generation, Collection, Storage and Transportation of Solid waste in Ghana, Integrated Waste Management – Volume I, Mr. Sunil Kumar (Ed.) ISBN: 978-953-307-469-6, In Tech, Available from: http://www.intechopen.com/books/integrated-waste-managemnet-volumei/governance-crisis-or-attitudinal-challenges-generation-collection-storage-andtransportation-of-sol

Oteng-Ababio, M. (2014). Rethinking waste as a resource: Insights from a low-income community in Accra, Ghana. *City, Territory and Architecture*, *1*(10), 1–14.

Oteng-Ababio, M. (2020). The Quest for Efficient Waste Management Architecture in Ghana. *The Journal of Field Actions*, *22*, 24–29.

Oteng-Ababio, M., Owusu-Sekyere, E., & Amoah, S., T. (2017). Thinking Globally, Acting Locally: Formalizing Informal Solid Waste Management Practices in Ghana. *Journal of Developing Societies*, *33*(1), 75–98. https://doi.org/10.1177/0169796X17694517

Owusu, G. (2010). Social effects of poor sanitation and waste management on poor urban communities: A neighborhood-specific study of Sabon Zongo, Accra. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, *3*(2), 145–160.

Peprah, C., Oduro-Ofori, E., & Asante-Wusu, I. (2015). Analysis of Accessibility to Water Supply and Sanitation Services in the Ewutu-Senya East Municipality, Ghana. *Journal of Sustainable Development*, *8*(8), 310–325.

Puopiel, F. (2010). Solid Waste Management in Ghana: The case of Tamale Metropolitan Area. MSC Thesis, KNUST, Ghana URL: ir.Knust.edu.gh /handle/123456789/146 (Accessed on 30th December, 2014)

Puopiel, F. & Owusu-Ansah, J. (2014). Solid Waste Management in Ghana: The Case of Tamale Metropolitan Area. *Journal of Environment and Earth Science*, 4(17)17

Quartey, E. T., Tosefa, H., Danquah, K. A. B., & Obrsalova, I. (2015). Theoretical framework for plastic waste management in ghana through extended producer responsibility: Case of

University of Ghana http://ugspace.ug.edu.gh

sachet water waste. *International Journal of Environmental Research and Public Health*, *12*(8), 9907–9919. https://doi.org/10.3390/ijerph120809907

Rush, C. (2010). Waste-Based Energy, Present and Future. SVP Organic Growth Group, Waste Management. https://www.renewableenergyworld.com/baseload/waste-based-energy-present-and-future/#gref

Saunders, M., Lewis, P., & Thornhill, A. (2013). *Research methods for business students* (4th ed.). Prentice Hall Financial Times.

Sawitri, D. R., Hadiyanto, H., & Hadi, S. P. (2015). Pro-environmental behavior from a social cognitive theory perspective. *Procedia Environmental Sciences*, *23*, 27-33.

Sawyerr, H., O., Adeolu, A., T., Afolabi, A., S., Salami, O., O., & Badmos, B., K. (2017). Impact of Dumpsites on the Quality of Soil and Groundwater in Satellite Towns of the Federal Capital Territory, Abuja, Nigeria. *Journal of Health and Pollution*, *7*(14), 15–22.

Steblin, P.W., and Stanford, J., (2008). "Solid waste management in Ontario, Canada: problems and opportunities", Presented at 2008 American Public Works Association International Public Works Congress and Exposition, August 17–20.

Tabachnick, B., & Fidell, L., S. (2007). *Using Multivariate Statistics*. Pearson Education Inc.

Tsiboe, I. A. & Marbell, E. (2004), "A Look at Urban Waste Disposal Problems in Accra, Ghana", MSc Thesis, Roskilde University, Roskilde, Denmark. Cited in Quarcoo, 2014.

The African Circular Economy Alliance. (2021). *Five Big Bets for the Circular Economy in Africa* (pp. 1–46) [Insight Report]. The World Economic Forum.

Tracy, S., J. (2013). *Qualitative research method: Collecting evidence, crafting analysis, communicating impact*. Wiley-Blackwell.

Tsiboe, A. I., and Marbel, E. (2004). "A look at Urban Waste Disposal Problem in Accra, Ghana", Masters Thesis, Roskilde University

University of Ghana http://ugspace.ug.edu.gh

United Nations Environment Programme. (2019). *Africa Waste Management Outlook: Summary for Decision-Makers*. United Nations. https://wedocs.unep.org/bitstream/handle/20.500.11822/25515/Africa_WMO_Summary.pdf?sequence=1&isAllowed=y

Vergara, S. & Tchobanoglous, G. (2012). Municipal Solid Waste and the Environment: A Global Perspective. Annual Review of Environment and Resources. 37. 277-309. 10.1146/annurev-environ-050511-122532.

Wahba, S., Kaza, S., & Ionkova, K., M. (2019). *A new phenomenon – realizing economic growth while cutting waste. HOW?* [Blog]. https://blogs.worldbank.org/sustainablecities/new-phenomenon-realizing-economic-growth-while-cutting-waste-how

World Bank. (2022). *Solid Waste Management*. World Bank. https://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management

Yeboah, R. (2017). *PUBLIC PRIVATE PARTNERSHIP IN SOLID WASTE MANAGEMENT IN SUNYANI MUNICIPALITY, GHANA*. University of Cape Coast.

Yoada, R. M., Chirawurah, D., & Adongo, P. B. (2014). Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. *BMC Public Health, 14*(1), 1–10. https://doi.org/10.1186/1471-2458-14-697

Zhong, Q., & Shi, G. (2020). *Environmental Management in China: Changes with social transformation*. Chandos Publishing Ltd.

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

APPENDIX A-QUESTIONNAIRES

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

UNIVERSITY OF GHANA

Topic: Examination of Waste Management Challenges in the Awutu-Senya East Municipality

Introduction:

I am exploring waste management challenges in the Awutu Senya East Municipality. I will be very grateful if you could spend some minutes to complete this questionnaire. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Questionnaire for Households

Location of House: .....

House Number (if available): .....

Date of Interview: .....

SECTION A

Demographic Information

1. Age: Below 20 years [ ] 20 - 30 years [ ] 31-40 years [ ]

41-50 years [ ] 51-60 years [ ] 61 and above [ ]

2. Gender : Male [ ] Female [ ]

University of Ghana http://ugspace.ug.edu.gh

3. What is your highest level of education? [ ] None [ ] Primary [ ] Middle/J.S.S/J.H.S [ ]

Secondary/Technical [ ] Vocational [ ] Training College [ ] Tertiary

4. What is your major Occupation? [ ] Farming [ ] Petty Trading [ ] Any other business [ ] Public servant [ ] other, specify.....

5. Marital Status: Married [ ] Single [ ]

6. Religion: Christian [ ] Muslim [ ] Traditionalist [ ] other (specify) …….

SECTION B

Please tick ONLY THE BOX of the response given or state responses briefly for questions/statements for which answers are not provided.

Place of Disposal of Household Waste

7. Which of the following persons in your household is normally tasked to dispose off waste? Myself [ ] My Spouse [ ] Children [ ] other (please state)……..

8. Which of the following types of waste do you generate in your home? (tick all that apply) Food waste [ ] Plastic waste [ ] Agricultural and animal waste [ ]

Glass waste [ ] Wood [ ] metal [ ] other, specify: .....

9. Do you separate the waste generated in your household into various forms?

[ ] Yes [ ] No

University of Ghana http://ugspace.ug.edu.gh

If you answered no to question 10 above, can you give some of the reasons why you do not separate your waste but dispose them together? ……

……
…….

If yes, why do you separate the waste

10. Do you recycle some of the waste items? Yes [ ] No [ ]

11. If yes, in which way do you recycle the waste generated?

12. Can you please discuss with me some of the reasons why you have not considered recycling some of the waste generated in your home?
13. If No: are you aware that waste can be reused/recycled?

Who is responsible for disposing off waste in the household?

14. Where do you or the person(s) responsible for disposing off waste in your home

dispose them? [ ] Roadside [ ] Nearby gutter [ ] Skips [ ] Waste bins [ ] Backyard [ ] Open spaces [ ] Burn it [ ] Dump sites [ ] Collected by waste company or

"Kaya Boola" [ ] other, specify: .....

Is that place the designated location for waste disposal in the community?

Is there any waste company responsible for this community?

Can you please tell me about what you see them do in the community?

15. If waste is collected by waste management company or "kaya boola", do you pay as the waste is collected? [ ] Yes No [ ].

University of Ghana http://ugspace.ug.edu.gh

16. If yes (to question 15) how many days in a week does a waste management company comes for your waste?

Once a week [ ] 2 days in a week [ ] 3 days in a week [ ] 4 days in a week [ ]

17. How much do you pay for each day when your waste is collected by a waste management company or "Kaya boola"? .....

18. If no (to question 15), will you be willing to pay for disposing your waste you generate ?

Yes [ ] No [ ]

19. If yes (to question 18), how much will you be willing to pay to get your waste disposed? ……..

20. Have you ever dumped your refuse at unapproved sites (anywhere else) because you did not have money to pay? [ ] Yes [ ] No

21. If you have to take your waste to an approved dumpsite, how many minutes does it take you to get to the site? [ ] 5-10mins [ ] 11-15mins [ ] 16-20mins [ ] 21-25 mins [ ] More than 25mins. [ ]

22. Can you tell me some of the inconvenience you go through having to take your waste to a designated dumpsite?

23. What are the regulations on waste management in your community? …….

24. How are you involved in meetings or activities directed toward waste management in your community? …….

25. What can you say about the waste management arrangement in your community?

…….

University of Ghana http://ugspace.ug.edu.gh

26. What do they think the metropolitan assembly or government could have done to improve waste management issues in the community?

…….

SECTION C

Waste Collection by Waste management Company

27. What is the mode of collection of waste in your area? Door-to-door [ ] Communal [ ] Curb [ ] other, (specify): .....

28. What are some of the challenges you often come across in your effort to engage in waste management at home or in your community?

…… ……

29. In your own view, suggest methods or ways in which waste disposal can be effectively managed in your area (You can tick more than one answer)

Contributing to buy waste containers [ ] Paying for the disposal and collection of waste [ ] Stop dumping waste any how [ ]

Other (specify): .....

30. Are you able to do any of these suggestions in provided (in question 29)? Yes [ ] No [ ]

31. If yes, mention those that you are able to carry out.

Contributing to buy waste containers [ ] Paying for the disposal and collection of waste [ ] Stop dumping waste any how [ ] other specify: .....

32. If no, why are you not able to carry out any of these suggestions?

University of Ghana http://ugspace.ug.edu.gh

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

UNIVERSITY OF GHANA

Topic: Examination of Waste Management Challenges in the Awutu-Senya East Municipality

Introduction:

I am investigating waste management challenges in the Awutu Senya East Municipality. I will be very grateful if you could spend some minutes to complete this questionnaire. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Questionnaire for Metropolitan/ Assembly Members (planning officer)

Name of Electoral Area.....

Location: .....

Date of Interview: .....

SECTION A

Please record answers in the spaces provided

Solid waste collection and disposal

1. Does the assembly have any waste collection contract with any waste management company? If so, what is the nature of this contract? If not why so?

2. Which waste management institution(s) manages the waste in the area? (If there is more than one mention all)

.....

University of Ghana http://ugspace.ug.edu.gh

.....

3. Can you please discuss with me the nature of waste management arrangement you have in the community and waste management companies?

4. How many times does the collection take place in a week?

.....

……..

5. How does the municipal authorities ensure that the waste management company and the community keep to the terms of the contract on waste management if any?

6. Are there "boola kaya" in the municipality?

7. If yes, how are they regulated?

8. If no, are the waste management companies able to work alone in ensuring effective waste management in the municipality?

9. If there are 'boola kaya' in the municipality, how are they regulated?

10. What facilities have been made available for waste disposal in the community?

Bins/Skips	Number Available	Number Required
Dustbins		
Skips		
Others:		

11. If the facilities required are not enough, what are the measures put in place by the Assembly and community to ensure that more or these bins and skips are made available to the community?

University of Ghana http://ugspace.ug.edu.gh

12. If the skips provided are not adequate, what happens to waste generated from households?

.....

.....

13. 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 Area	Mode of collection	Number of Waste bins required
Kasoa		
Kpormetey		
Walantu		
Ofankor		
Akertey		
Opeikuma		

14. Do the people pay for the cost of collection? [ ] Yes No [ ]

15. If yes, by what means was that amount determined? (Were the community members involved?)

16. If yes, indicate the amount per house/household per month in GH¢.....

17. Are the people able to pay? Yes [ ] No [ ]

18. If No, what are the reasons?

University of Ghana http://ugspace.ug.edu.gh

1.....

2.....

3.....

19. What happens to the waste if the residents are not able to pay?

.....

.....

20. Do you segregate the waste that is collected? Yes [ ] No [ ]

21. Do you reuse some of the waste that is collected? Yes [ ] No [ ]

22. Do you recycle all or some of the waste that is collected Yes [ ] No [ ]

23. What do you do with the waste that is not reused or recycled

Incinerate [ ] Dump at landfill site [ ]

24. In your own view, what are some of the challenges to effective waste management in the area?

i .....

ii .....

iii .....

iv .....

25. In terms of policy, How do you think the challenges to effective waste management you have identified can be resolved?

i .....

ii .....

iii .....

iv .....

University of Ghana http://ugspace.ug.edu.gh

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

UNIVERSITY OF GHANA

Topic: Examination of Waste Management Challenges in the Awutu-Senya East Municipality

Introduction:

I am investigating waste management challenges in the Awutu Senya East Municipality. I will be very grateful if you could spend some minutes to complete this questionnaire. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Questionnaire for Revenue Officer/Accountant of the ASEMA

SECTION A

Position of Respondent: .....

Date of Response: .....

SECTION B

Please record answers in the spaces provided

Revenue and solid waste management

1. What arrangement exist between the assembly, waste management companies and the community regarding waste management?

2. What are the challenges to waste management in the district?

……..

University of Ghana http://ugspace.ug.edu.gh

…….

…….

…….

…….

3. How much revenue do you generate in a month? GH¢.....

4. What percentage is spent on waste collection? GH¢.....

5. What percentage of your annual revenue is spent on the acquisition of waste management equipment? GH¢.....

6. How much is spent on maintaining waste management equipment. GH¢.....

7. What percentage of the district assembly's common fund is spent on waste management? GH¢.....

8. What are some of the challenges of managing waste in the municipality?

.....

.....

.....

.....

9. What are some of the ways you can recommend for effectively dealing with the waste management challenges in the district?

…….....

.....……

……

University of Ghana http://ugspace.ug.edu.gh

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

UNIVERSITY OF GHANA

Topic: Examination of Waste Management Challenges in the Awutu-Senya East Municipality

Introduction:

I am investigating waste management challenges in the Awutu-Senya East Municipality. I will be very grateful if you could spend some minutes to complete this questionnaire. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Questionnaire for Waste Management Companies Responsible for the Metro/ District

Position of Respondent: .....

Date of Response: .....

SECTION A

Please record answers in the spaces provided

Waste collection and disposal

1. What is the most common type of waste regularly generated in the area?

[ ] Food waste [ ] Plastic waste [ ] Agricultural and animal waste [ ] Glass waste
[ ] Wood [ ] Metal [ ]

Other, specify .....

University of Ghana http://ugspace.ug.edu.gh

2. What are the major components of waste generated in the area? (Indicate by ranking using the scale 1st, 2nd 3rd, 4th 5th and 6th.

Major Component	**Rank**
Plastic	
Glass	
Wood	
Metals	
Food Waste	
Others……	

3. On the average, how many waste compactor truckloads of waste do you collect in your area of operation in a day. (In figures): .....

4. Do you segregate the waste before disposal? (Example plastics, woods, metals, glass, food waste among others) [ ]Yes [ ]No

5. Please can you explain why the waste is sorted or not before final disposal?

……

……

……

6. Is the waste treated before final disposal at your end?

University of Ghana http://ugspace.ug.edu.gh

7. What is the cost of collection per week? GH¢.....

8. Where do you dispose-off the waste collected from the various sections? Final disposal site) ……

9. What is the distance covered to final disposal site in kilometers? .....

10. How does the distance contribute to the challenges you encounter when it comes to waste management?

.....
.....

.....

……

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

.....

.....

.....

.....

12. What methods do you use in managing the solid waste generated in the area?

(If more than one indicate them) [ ] Composting [ ] Recycling [ ] Incineration [ ] ISWM (Reduce, Reuse and Recycle/landfill/incinerate) [ ] None [ ] Other, (specify): .....

13. Why do you choose to use any of the method(s) for managing solid waste above? (Indicate the reasons in the spaces provided below).

University of Ghana http://ugspace.ug.edu.gh

.....

.....

.....

.....

SECTION B

Availability of Resources for Managing waste

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

Equipment	Number Available	Number Required
1.Dustbins		
2.Skips		
3.Oboafo tricycle		
4.Motorist tricycle		
5.Graders		
6. Skip Loaders		
7.Compaction trucks		
8.Roll on/Roll off trucks		
9.Bulldozers		

University of Ghana http://ugspace.ug.edu.gh

10. Road sweepers		
11.Bulldozers		
12.Road sweepers		
14. Others:		

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

Technical Staff	Number	Qualification

16. In your view what are some of the problems facing the department in terms of managing waste? (List the top four)

.....

.....

.....

.....

17. In your opinion, how can these problems be solved? (State them briefly)

University of Ghana http://ugspace.ug.edu.gh

.....

.....

.....

.....

University of Ghana http://ugspace.ug.edu.gh

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

UNIVERSITY OF GHANA

Topic: Examination of Waste Management Challenges in the Awutu-Senya East Municipality

Introduction:

I am investigating waste management challenges in the Awutu Senya East Municipality. I will be very grateful if you could spend some minutes to complete this questionnaire. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Questionnaire for unregistered/ unlicensed waste collectors aka "Kaya boola"

Position of Respondent: .....

Date of Interview.....

SECTION A

Please record answers in the spaces provided

Waste collection and disposal

1. What is the most common type of waste regularly generated in the area?

[ ] Food waste [ ] Plastic waste [ ] Agricultural and animal waste [ ] Glass waste
[ ] Wood [ ] Metal [ ]

Other, specify .....

2. On the average, how many waste compactor truckloads of waste do you collect in your area of operation in a day. (In figures): .....

University of Ghana http://ugspace.ug.edu.gh

3. What equipments are used in collecting waste in your area?

Tricycles [ ] Trucks [ ] others (specify): ……..

4. Do you segregate the waste before disposal? (Example plastics, woods, metals, glass, food waste among others) [ ] Yes [ ]No

5. Can you please explain why?

……

……

……

……

6. What are the major components of waste generated in the area? (Indicate by ranking using the scale 1st, 2nd 3rd, 4th 5th and 6th.

Major Component	**Rank**
Plastic	
Glass	
Wood	
Metals	
Food Waste	
Others……	

University of Ghana http://ugspace.ug.edu.gh

7. Do you pay to for the final disposal of the waste you collect from households? [ ]Yes [ ]No If no skip to question 9

8. If yes what is the cost of collection per week? GH¢.....

9. Where do you dispose-off the waste collected from the various sections? .....

10. What is the distance covered to final disposal site in kilometers? …….

11. Is the distance a problem? [ ]Yes [ ]No

12. If yes, indicate the problems

.....

.....

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

.....

.....

14. What methods do you use in managing the solid waste generated in the area?

(If more than one indicate them) [ ] Composting [ ] Recycling [ ] Incineration [ ] ISWM (Reduce, Reuse and Recycle/landfill/incinerate) [ ] none [ ] other,

(Specify): .....

Do you have any suggestion as to what the assembly/Government can do to help with waste management in the community/ metro or to support your work?

University of Ghana http://ugspace.ug.edu.gh

APPENDIX B -INTERVIEW GUIDES

UNIVERSITY OF GHANA

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

Research Topic: AN ASSESSMENT OF CHALLENGES ASSOCIATED WITH SOLID WASTE MANAGEMENT IN THE AWUTU SENYA EAST MUNICIPALITY

Interview Guide for the Development Planning Unit; and Finance Department

Name of ASEMA department	
Name of contact person	
Phone number of contact person	

Introduction:

I am a student from the ISSER Master of Arts in Development studies investigating the institutional capacity of Municipal Environmental Health Unit (MEHU) to ensure good sanitation within the Central Business District (CBD) of the Awutu Senya Municipal Assembly (ASEMA). I will be very grateful if you could spend some minutes to discuss this research topic. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Interview Questions:

1. What roles does your department play in ensuring good sanitary conditions in ASEMA?
2. In what ways do you collaborate with the Municipal Environmental Health Unit (MEHU) when it comes to issues of sanitation in ASEMA?

University of Ghana http://ugspace.ug.edu.gh

3. What are the top three challenges you have identified with sanitation within the central business district of ASEMA?
4. What are some of the strengths of MEHU with respect to their mandate on waste management within the central business district of ASEMA? What are they doing well as a Unit?
5. What are some of the challenges MEHU has as a Unit when it comes to the delivery of their mandate? What accounts for these challenges?
6. What market and financial opportunities can MEHU take advantage of to ensure good sanitary conditions within the central business district of ASEMA? Any more innovative opportunities?
7. What are the most significant threats that MEHU faces with waste management within the CBD?
8. In your opinion, does the MEHU have the necessary resources and capacity to manage sanitation within the central business district of ASEMA? Let us talk about their …
    a. Legal mandate, and operational support capacity
    b. Tools and equipment
    c. Human resources or staff
    d. Technical knowledge or skills
    e. Funding
9. How have funding and funding release been disbursed to support the work of MEHU? How has it impacted delivery of their mandate?
10. What recommendations do you have to make the work of MEHU effective to ensure good sanitation within the central business district of ASEMA?

INTEGRI PROCEDAMUS

University of Ghana http://ugspace.ug.edu.gh

UNIVERSITY OF GHANA

INSTITUTE OF STATISTICAL, SOCIAL AND ECONOMIC RESEARCH

Research Topic: AN ASSESSMENT OF CHALLENGES ASSOCIATED WITH SOLID WASTE MANAGEMENT IN THE AWUTU SENYA EAST MUNICIPALITY

Interview Guide for the Municipal Environmental Health Unit (MEHU)

Name of contact person	
Phone number of contact person	

Introduction:

I am a student from the ISSER Master of Arts in Development studies investigating the institutional capacity of Municipal Environmental Health Unit (MEHU) to ensure good sanitation within the Central Business District (CBD) of the Awutu Senya Municipal Assembly (ASEMA). I will be very grateful if you could spend some minutes to discuss this research topic. The research is mainly for academic purpose only and therefore responses given by you will be kept confidential. Thank you.

Interview Questions:

1. What roles does MEHU play in ensuring good sanitary conditions in ASEMA?
2. What are the top three challenges you have identified with sanitation within the central business district of ASEMA?
3. What are some of the strengths of MEHU with respect to your mandate on waste management within the central business district of ASEMA? What are you doing well as a Unit?
    a. What important skills and knowledge does MEHU possess that gives the Unit advantages in the work you do?
    b. What are your financial resource strengths, such as funding, sources of income and investment opportunities?

University of Ghana http://ugspace.ug.edu.gh

   c. What are your physical resource strengths, such as our location, facilities and equipment?
   d. What are your human resource strengths, such as employees, consultants, partners and networks?
4. What market and financial opportunities can MEHU take advantage of to ensure good sanitary conditions within the central business district of ASEMA? Any more innovative opportunities?
   a. What policies and initiatives align with MEHU goals?
   b. Who can MEHU work with to leverage resources?
   c. What financial opportunities are open to MEHU within and outside ASEMA?
   d. What investment opportunities are open to MEHU?
5. What challenges do you have as a Unit with respect to waste management within the central business district of ASEMA? With the identified challenges, let us delve into:
   a. What knowledge or skills does MEHU lack that the Unit needs to achieve its mission?
   b. What are the financial resource weaknesses, such as funding, sources of income and investments?
   c. What are the physical resource weaknesses, such as tools, equipment, facilities, etc?
   d. What are our human resource weaknesses, such as employees, consultants, partners and networks?
6. What are the most significant threats that MEHU faces with waste management within the CBD?
   a. What existing public policies, if any, pose a threat to achieving the mandate of MEHU?
   b. What competitive threats does MEHU face from other organizations?
   c. What financial threats does MEHU face?
7. In your opinion, does the MEHU have the necessary resources and capacity to manage sanitation within the central business district of ASEMA? Let us talk about their …

Area	**What is available**	**What is actually needed**	**Deficit**
Legal mandate, and operational support capacity			
Tools and equipment			
Human resources or staff			
Technical knowledge or skills			

University of Ghana http://ugspace.ug.edu.gh

Funding			
Technological innovation			

8. How have funding and funding release been disbursed to support the work of MEHU? How has it impacted delivery of their mandate?
9. What recommendations do you have to make the work of MEHU effective to ensure good sanitation within the central business district of ASEMA?