UNIVERSITY OF EDUCATION, WINNEBA

ATTITUDES OF HOUSEHOLDS TOWARDS SOLID WASTE MANAGEMENT IN KASOA TOWNSHIP

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DECLARATION

Student's Declaration

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

Signature: ……..……

Date: ……..……

Supervisor's Declaration

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

Supervisor"s Name**:** Dr. Isaac Eshun

Signature: ……..……

Date: ……..……

DEDICATION

I dedicate this work to my beloved parents, Mr. Emmanuel Anum Mensah and Mrs. Augustina Abena Mensah for all their unwavering support.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ASEMA	Awutu Senya East Municipal Assembly
CBO"s	Community Based Organisations
EPA	Environmental Protection Agency
GSS	Ghana Statistical Service
ISWM	Integrated Solid Waste Management
MMDA"s	Metropolitan, Municipal and District Assemblies
MSWM	Municipal Solid Waste Management
NGO"s	Non- Governmental Organisations
PPP	Polluter Pay Principle
SDG	Sustainable Development Goal
SWM	Solid Waste Management
TPB	Theory of Planned Behaviour
UNCHS	United Nations Conference on Human Settlement
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMD	Waste Management Department

ABSTRACT

The study sought to assess the attitudes of households towards solid waste management within Kasoa Township. To achieve the study objectives, a convergent parallel design based on the mixed- methods approach was adopted for the study. The single-stage cluster sampling technique was employed in selecting 246 household respondents aside 5 key informants who were purposively selected. Data collection instruments included a structured questionnaire, unstructured interview guide and observation guide. The quantitative data obtained were presented and analysed using descriptive statistics from the SPSS version 20 software and were complemented with qualitative data under emergent themes. It emerged from the study that majority of the households in Kasoa Township have poor attitudes towards source reduction and re-use of solid wastes materials although they were concerned about the generation rates. The high cost of procuring wastes bins and high fees charged by Zoomlion and other private waste collectors were the major affronts in managing solid wastes effectively by the households in Kasoa Township. It was recommended that advocacy for attitudinal change towards source reduction and re-use would help in changing households‟ attitude towards solid waste generation in the study area. Also, subsidization of the cost of procuring waste bins by the ASEMA for low-income households would be a laudable step to curb the attitude towards open dumping. By implication, the study findings and recommendations would furnish the ASEMA and Zoomlion with in-depth information in taking pragmatic steps to monitor and collect solid wastes effectively in households within Kasoa Township.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The world today is confronted by a myriad of environmental challenges notably on issues concerning Municipal Solid Waste Management (MSWM). A United Nations Populations Fund (UNFPA) report in 2008 revealed that more than half of the 3.3 billion human populations live in towns and cities with this number projected to increase to about 5 billion by 2030 (UNFPA, 2008). To this end, Baabereyir (2009) opined that urbanisation is a complex phenomenon that provides opportunities and benefits for countries but also associated with the process are problems of social, economic and environmental in nature. In countries around the world, one major environmental problem that confronts municipal authorities is solid waste management (Baabereyir, 2009). This implies that as the global urbanisation trend heightens, municipal solid waste management becomes a concern which poses a threat to environmental sustainability. For this reason, Shafiul and Mansoor (2004) also asserted that the disposal of waste became problematic with the rise of towns and cities where large numbers of people started to congregate in relatively small areas in pursuit of livelihoods. Thus, the issue of municipal solid waste management becoming a global environmental challenge stems from the rapid global urbanization rates leading to a high spate of solid waste generation and widespread spatial extent.

Over the years, huge economic outlays have been made by international bodies in an attempt to avert the global solid waste management problem. Cointreau (2001) projected that global solid waste management costs will increase from today‟s annual $205.4 billion to about $375.5 billion in 2025. In accord with this projection,

Monney, Makimula and Bagah (2013) intimated that since the year 2000, the World Bank has committed over $4.7 billion to more than 340 solid waste management programmes in countries across the globe by supporting countries to make critical solid waste management financing, policy and planning decisions. Although each country and city has its site-specific situations when it comes to municipal solid waste management, general observations can be made across low, middle and high-income countries. A World Bank (2011) report on the rate of solid waste generation around the world estimates that globally the amount of Municipal Solid Waste (MSW) generation will rise from the current 1.3 billion tonnes per year to 2.2 billion tonnes per year by 2025 with much of the increase coming from rapidly growing cities in developing countries. Pascione (2005) therefore added that income level and urbanization are highly correlated and as disposable incomes and living standards increase, consumption of goods and services correspondingly increases as does the amount of waste generated.

Fearon and Adraki (2014) pointed out that the rate of waste generation as well as quality of management, varies with the nature of settlements (high vs. low-income areas). Thus, although solid waste management is considered as a global issue, there are some disparities in terms of the nature and impact of the problem within various settlements and between developed and developing countries. Consequently, the nature of the solid waste management problem in developing countries are sometimes compounded by the influx of solid wastes in the form of second hand imports such as automobiles, electronic gadgets and clothing from advanced economies. Inadequate waste management systems and technology as well as public perception about solid waste as worthless materials are also cited as causes of the problem in developing countries (Neizer, 2014). From the foregoing, Lohse (2003) opined that municipal

authorities in most developing countries often tend to concentrate their waste collection efforts in official and wealthy areas while the poorer areas receive little or no service for waste collection even though waste collection operations are usually funded with public resources. Sarpong (2015) also argued that although the industrialised societies generate a chunk of the world‟s waste, they handle, store, collect, transport and finally dispose of their waste effectively with the help of modern technology. In the same vein, Mungure (2008) contended that the attention of developing countries is given to the attainment of proper collection, treatment and disposal of solid waste unlike the developed countries turning solid waste into resources.

Studies in Africa have shown that the problem of waste management has become intractable and threatens to undermine the efforts of most city authorities (Neizer, 2014). Subscribing to this assertion, Eshun, Bassaw and Bordoh (2014) opined that the rapid increase in the volume and types of solid waste as a result of continuous economic growth, urbanisation, and industrialization is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of solid waste. Cointreau (2001) remarked that Municipal Solid Waste (MSW) generation rates are influenced by economic development, degree of industrialization, urbanisation and public habits whereas Kendie (1999) contended that the recent upsurge in solid waste disposal problems stems from the fact that attitudes and perceptions towards waste disposal issues on people‟s minds and in the scheme of official development plans have not been adequately considered. Pascione (2005) also asserted that solid waste generation rates tend to be much lower in rural areas since, on average, residents are usually poorer, purchase fewer store-bought items (which results in less packaging) and have higher levels of reuse and

recycling. These postulations indicate that the persistence of solid waste management problem in Africa cannot be attributed to a single factor but several factors which are interlinked.

Within the parameters of Ghana, solid waste management has become a challenge to the government and municipal authorities just like in other cities on the African continent. This is because human activities produce large volumes of solid waste and so waste disposal constitutes a serious problem in such places today (Agyapong, 2012). A joint report by the World Health Organization and United Nations in 2015 ranked Ghana as the 7th dirtiest country in the world (Asante, 2015). Statistics from the Ghana Living Standards Survey in 2014 also shows that more than half (52.4%) of households dispose of their rubbish at a public dumpsite while less than one-fifth (18.2%) have their rubbish collected (GSS, 2014). Therefore, it is not a surprise that environmental agencies and municipal assemblies are grappling with the poor solid waste management problem in the country.

In an attempt to overcome the problems facing municipal authorities in Ghana regarding solid waste management, several methods including the creation of specialised agencies for the collection, solid wastes incineration, recycling and conversion of Municipal Solid Waste (MSW) to wealth have been touted as possible solutions to the menace (Neizer, 2014). However, the problem of municipal solid waste management persists in most municipalities across the country. Hence, as key contributors to solid waste generation in Ghana, municipal households cannot be left out in the country's quest to overcome the problem of municipal solid waste management. Therefore, it has become imperative to explore optimal measures that can be adopted to change the attitudes of municipal households towards solid waste management practices in our country in order to achieve the Sustainable Development

Goal (SDG) 6 which is focused on improving sanitation and access to drinking water by the end of the year 2030.

1.2 Statement of the Problem

According to Agyepong (2019), estimates from the Zoomlion Waste Management Company Limited indicate that about 5 million tonnes of solid waste materials are annually generated in Ghana. Supporting this assertion, Nasir (2017) noted that the general attitude of people towards solid waste disposal has contributed to solid waste management becoming a contemporary municipal environmental challenge in Ghana. Hence, Fearon and Adraki (2014) contended that the waste management problems in Ghana are national in character and are complicated by population pressures in the heavily populated cities. Therefore, it appears that the quest to ensure effective solid waste management has been elusive in various municipalities across the country with the Awutu Senya East Municipality being no exception despite the creation of the Ministry of Sanitation and Water Resources in 2017 to address the heightening spate of waste management problem in Ghana.

Monney, Makimula and Bagah (2013) opined that a significant proportion of the solid wastes generated are not collected and which end up in open spaces and drains. In view of this, Agyapong (2012) argued that the bane of municipal solid waste management in Ghana is primarily due to the wrong attitude of the general public to solid waste disposal. In the same vein, McAllister (2015) also noted that most community members are not involved in decision making so they develop the attitude of not being concerned which makes them not responsible for solid waste management.

As one of the rapidly growing residential and commercial hubs in Ghana, the Awutu Senya East Municipality is currently facing the challenge of effectively managing the volumes of households solid wastes generated in Kasoa, the Municipal capital. To Yoada, Chirawurah and Adongo (2014), the perception of many households that solid waste is an unwanted material with no value has dominated household attitudes towards indiscriminate solid waste disposal. Figures from Ghana Statistical Service (2014) indicate that the commonest form of solid waste disposal among households in the Municipality is by burning (43.4%) followed by collection by waste management companies (29.9%). Public dump using container (8.3%) and public dump in open space (7.4%) are also common in the municipality (GSS, 2014). These statistics suggests that the challenge of solid waste management in the Municipality goes beyond the efforts by the Awutu Senya East Municipal Assembly (ASEMA). Hence, much need to be done to encourage source reduction especially from households since they contribute significantly to solid waste generation within the Municipality.

Recent studies conducted by Quarcoo (2014) as well as Peprah, Oduro- Ofori and Asante- Wusu (2015) in the Awutu Senya East Municipality generally explored the challenges of solid waste management and analysis of accessibility to water supply and sanitation services respectively. However, a current study on how the attitudes of households in Kasoa Township contribute to the persistence of the solid waste management problem in the Municipality is yet to be conducted which necessitated the need to fill this gap in the study area. Therefore, it is from this milieu that the study sought to find out the attitudes of households towards solid waste management practices in Kasoa Township and explored measures that can be taken to

drive attitudinal change towards effective household solid waste management in the study area.

1.3 Purpose of the Study

The purpose of the study was to examine the attitudes of households towards solid waste management practices in Kasoa Township in the Awutu Senya East Municipality in order to create awareness on the need to adopt apt solid waste management practices in the households.

1.4 Objectives of the Study

The objectives that guided the study were to:

i. Ascertain the types of solid wastes generated by households in Kasoa Township
ii. Assess the attitudes of households in Kasoa Township towards available solid waste management options
iii. Analyse the challenges faced by Kasoa households in solid waste management
iv. Examine the effects of solid waste management problem on households in Kasoa Township

1.5 Research Questions

In line with the stated research objectives, the following research questions were posed to guide the study:

1. What are the types of solid wastes generated in Kasoa Township by households?
2. What are the attitudes of households towards available solid waste management options in the Kasoa Township?

3. What are the challenges faced by Kasoa households in solid waste management?
4. How does the problem of solid waste management affect households in Kasoa Township?

1.6 Significance of the Study

Kasoa can be largely classified as a rapidly emerging residential and commercial city in Ghana and West Africa. Looking at the population density of Kasoa, it is not a surprise that the volume of solid waste generation keeps increasing incessantly over the years so the significance of the study cannot be underscored. It is therefore envisaged that the findings and recommendations of the study would be beneficial to all stakeholders in municipal solid waste management such as the Ministry of Sanitation and Water Resources, Awutu Senya East Municipal Waste Management Department, Zoomlion Waste Management Company Limited, Environmental Protection Agency (EPA) and households in the study area.

Succinctly put, the significance of the study can be subsumed under policy, practice and research. Concerning policy, it was envisaged that the findings of the study would be beneficial to the Ministry of Sanitation and Water Resources to plan policies aimed at advocacy on environmental public education to drive attitudinal change towards source reduction and proper disposal within the country. Also, the study findings would help the Environmental Protection Agency (EPA) on apt awareness creation mechanisms on the health and environmental impacts of improper management of solid waste on the Ghanaian populace.

In practice, the study findings would furnish the Awutu Senya East Municipal Waste Management Department and Zoomlion Waste Management Company Limited

with in-depth information in taking pragmatic steps to monitor, control and collect solid wastes effectively within the Municipality particularly in households in Kasoa Township. Again, the study findings would augment the efforts of the Awutu Senya East Municipal Waste Management Department and Zoomlion Waste Management Company Limited and households in Kasoa Township on the need to adopt on practical approaches of making solid waste management decisions to expedite source reduction and reuse of solid waste materials by households in the study area and the municipality at large. In furtherance, the findings of the study would retool the Awutu Senya East Municipal Waste Management Department on appropriate methods to disseminate sustainable measures and practices aimed towards safeguarding public health and promoting environmental sustainability of Kasoa Township.

Finally, in research, the findings of the study would broaden the repertoire of knowledge on studies conducted on attitudinal influence towards solid waste management practices. This would stimulate further studies to ameliorate the solid waste management crisis in cities within and outside Ghana.

1.7 Delimitation

The study was primarily delimited to the content and the study area. In this regard, the study content was limited to only the objectives that guided the study which included the types of solid waste generated by households in Kasoa, attitudes of households towards solid waste management options in Kasoa, challenges faced by Kasoa households in solid waste management and the effects of solid waste management problem on households in Kasoa. This served as a guide to the researcher to focus primarily on the problem under investigation.

Spatially, the study was carried out in Kasoa, the capital of the Awutu Senya East Municipality. According to the 2010 Population and Housing Census, the population of Kasoa is about 69,384 people with 16,445 households (GSS, 2014). This statistic represents the most densely populated settlement within the Awutu Senya East Municipality. Specifically, the study was delineated to only households in catchment areas such as Kasoa New- Town, Iron City and Zongo. The study was delineated to these areas because they are situated within the Zongo zonal council (main Kasoa Township), implying that, households in these areas are likely to be worse affected in the event of any natural disaster triggered as a result of poor solid waste management in Kasoa. Also, these places were selected for the study because they have similar characteristics to other households within the Municipality regarding their solid waste management practices.

Coupled with the above, household respondents who were less than 20 years of age and those above that age range were targeted as the primary cohort of respondents for the study since they were mostly involved in household solid waste generation and household solid waste management practices. In addition to that, a secondary cohort of key informants including the Municipal Waste Management Coordinator, an officer from Zoomlion Ghana Limited and 3 Assembly Members in the study area were also involved in the study since they are responsible for solid waste management decisions within the Awutu Senya East Municipality.

1.8 Organisation of the Study

The study was organised into five chapters. Chapter One discusses the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study and delimitation of the study. Chapter Two reviews related existing literature on concepts in waste management,

classification of municipal solid wastes, solid waste management, integrated solid waste management, household solid waste generation, contemporary methods of solid waste management in Ghana, concept of attitude, households‟ attitudes towards solid waste management, approaches to measuring household attitudes towards solid waste management, challenges associated with municipal solid waste management and the repercussions of improper municipal solid waste management on households.

Chapter Three also discusses the philosophical paradigm, research approach, research design, description of the study area, population of the study, sample and sampling techniques as well as data collection instruments. The chapter further delves into the validity and reliability of quantitative data collection instrument, trustworthiness of qualitative data collection instruments, data analysis and ethical considerations. In addition, Chapter Four focuses on findings and discussion. Finally, Chapter Five presents the summary of the study, major findings, conclusions and recommendations, limitations of the study and suggestions for further studies.

1.9 Operational Definition of Terms

Attitude: The tendency to react either positively or negatively towards a stimulus.

Household: A person or group of persons, who live together in the same house or compound, share the same housekeeping arrangements and constitutes a single consumption unit.

Municipality: An urban district having corporate status and decentralized powers of self- government.

Solid Waste: An unwanted material that is neither liquid nor gas hence disposed off.

Solid Waste Management: This is defined as the control, generation, storage, collection, transportation, processing and disposal of solid waste consistent with best practices of public health, economic, administrative, legal and environmental considerations.

Waste: Waste refers to any substance (either in liquid, solid or gaseous state), that is unwanted, rejected, abandoned, discarded or disposed off by the holder of the substance, whether or not such substance can be re-used, recycled or recovered.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter explores and reviews available literature related to the study. Literature information were obtained from online journals, articles, published thesis, dissertations, books, conference papers and documented reports. From these sources, the literature information reviewed under themes comprised the concepts in waste management; waste, solid waste and municipal solid waste. The chapter also reviewed existing literature on the classification of municipal solid wastes, solid waste management, integrated solid waste management, household solid waste generation, contemporary methods of solid waste management in Ghana, concept of attitude, approaches to measuring household attitudes towards solid waste management, households‟ attitudes towards solid waste management options, challenges associated with municipal solid waste management and the repercussions of improper municipal solid waste management on households. The study was underpinned by Ajzen‟s Theory of Planned Behaviour.

2.1 Concepts in Waste Management

2.1.1 Concept of waste

The term waste has been a victim of definitional plurality. As defined by the Macmillan English Dictionary for Advanced Learners (2007), waste substances are what is left of something after the valuable parts of it have been used. In line with this definition, Lutui (2001) sees waste as any material classified to be waste by national legislation or any materials that is no longer useful that needs to be disposed off. This

definition of waste takes into consideration the legal framework for which a material or substance can be deemed as worthless by a user. In a more comprehensive definition, Tahulela (2017) also noted that waste refers to any substance (either in liquid, solid or gaseous state) that is unwanted, rejected, abandoned, discarded or disposed off by the holder of the substance, whether or not such substance can be re-used, recycled or recovered. By inference, waste are simply classified as materials which have lost their economic value or usefulness as a resource hence dumped. Put differently, waste can be basically explained as any material considered to be useless which means it is no longer needed for its intended purpose.

Waste can be defined in several ways on the basis of the context in which it is being used or the function it performs (Nasir, 2017). Thus, any substance deemed as waste can be viewed from two perspectives; which are primary and secondary perspective. With regards to the primary perspective, something became waste when it cannot perform its actual purpose. From the secondary perspective, when a material is no longer useful to a primary user, it may be useful to another person thus someone‟s waste is someone‟s raw material for reuse (Nasir, 2017). In affirmation, Davies (2008) opine that what some people consider to be waste materials or substances are considered a source of value by others. This can be seen in the case of scrap dealers scavenging dump sites for scrap materials for recycling and reuse. Gilpin (1996) provides another insightful definition of the term waste. According to him, the concept of waste embraces all unwanted and economically unusable by-products or residuals at any given place and time, and any other matter that may be discarded accidentally or otherwise into the environment (Gilpin, 1996). Gilpin (1996) further intimated that what constitutes waste must occur in such a volume, concentration or manner which can cause a significant alteration in the environment.

Thus, apart from waste being an unwanted substance that is discarded, the amount of it and the impact it makes on the environment also become important considerations when defining waste.

Deducing from the paragraphs, it is clear that the concept of waste has been widely defined. Waste is simply regarded by many as materials which are useless. Nonetheless, what one may regard as waste may be seen as an economic resource by another person. This justifies why waste is regarded by many as a multidimensional concept.

2.1.2 Solid waste

According to Chengula, Bahati and Mzula (2015), solid waste is made up of organic and inorganic waste materials that comes about as a result of human and animal activities and are no longer needed which needs to be discarded due to its value loss to the user. To Mantell (as cited in Sarpong, 2015), solid wastes are those materials that result from man‟s activities and are not in the form of liquid or gas but are compacted and substantial which are thrown away for the fact that they are no longer in use. These materials are both in organic and inorganic form and also differ in shapes, sizes, forms and compositions. By implication, these definitions classify solid wastes based on the state or form of the unwanted materials which are discarded. Thus, solid waste is any undesirable material neither in the form of liquid nor gas hence disposed off. In accord, Tchobanoglous, Theisen, and Vigil (1993) observed that solid waste includes materials that arise from both human and animal activities and they are normally discarded because they are no longer needed. Contrary to the prior definitions which have defined waste materials on the basis of their state, other authors have also defined solid waste based on the sources in which the solid waste materials emanate. In view of this, the Ghana Innovation Market Place (2009) posited

that solid waste does not include atmospheric emissions and waste water discharges which may arise from commercial, industrial, institutional and domestic activities. Consistent with this definition, Zerbock (2003) also pointed out that solid waste comprises commercial, non-hazardous industrial, and domestic waste. Thus, solid wastes are tangible waste materials emanating from homes, industrial and business activities.

Drawing from the prior definitions, it can be observed that solid wastes are generally unwanted substances from varied sources in the environment which are neither in the form of liquid nor gas. This may include organic and inorganic solid waste materials from households, commercial centers, farms, construction sites, mechanical shops and warehouses.

2.1.3 Municipal solid waste

As established under the prior theme, solid wastes chiefly emanate from various sources within a settlement. To this end, Cointreau (2001) contends that municipal solid waste is non-air and sewage emissions created within and disposed off by a municipality including household garbage, commercial refuse, construction and demolition debris, dead animals and abandoned vehicles. In similar fashion, Tchobanoglous and Kreith (2002) define municipal solid waste as the waste that is produced from residential and industrial (non-process wastes), commercial and institutional sources with the exception of hazardous and universal wastes, construction and demolition wastes and liquid wastes (water, waste water, industrial processes).

Urban areas in Ghana produce a variety of waste with the predominant wastes being domestic solid waste, industrial waste and construction waste (Neizer, 2014). These wastes are sent to a few dumpsites, but majority end up in drains, streams and

open places. Waste is disposed off by open dumping, open burning, controlled burning and tipping at dumpsites. This has created a pressing sanitation problem as many towns and cities are overwhelmed with management of municipal solid and liquid wastes. Hence, Douti, Abanyie and Ampofo (2017) argued that several studies indicate that much of the municipal solid waste from developing countries is generated from households (55% - 80%), market areas (10% - 30%), and institutions among others. Consequently, solid wastes from these sources are highly heterogeneous in nature and have variable physical characteristics depending on their sources. Thus, municipal solid wastes are basically generated from all sources within a municipality.

Hence, looking at the concept of municipal solid waste, it can be explained as all forms of wastes produced in a municipal district which are neither in the form of liquid nor gas. This comes in various forms such as food waste, plastics, polythene, electronic wastes among others. Nevertheless, the physical features and chemical components of municipal solid wastes may vary depending on their point of generation.

2.2 Classification of Municipal Solid Wastes

Urban solid wastes can be broadly classified into hazardous wastes and non-hazardous wastes (Pascione, 2005). Hazardous waste are solid wastes which are health and life threatening, for example, medical wastes and poisons while non-hazardous wastes are solid wastes which are unsightly and occupy much land space due to improper disposal (Pascione, 2005). For example, heaps of commercial wastes in market centres such as Kasoa Old and New markets, Kaneshie market, Agbogbloshie market and Makola market cast an unpleasant view of the market environment which poses a threat to consumers‟ health. The European Union (EU)

classifies its waste not only based on the type of waste but also its origin, how it was collected and which authority is in charge of it (Sarpong, 2015). Classifying waste depends on what kind of waste it is and its impact on humans or the environment. The EU as cited in (Sarpong, 2015) categorizes hazardous waste which contains varying quantities of toxic or hazardous elements that may have an impact on human health and the environment. It may be organic (solvents, hydrocarbons, etc.), mineral (acids, metal hydroxide sludge, etc.) or gaseous. To the EU, hazardous waste can further be classified into three subcategories to include special industrial waste, special household waste and medical waste. Hazardous wastes are typically classified by product type. As such, they typically require special disposal techniques to eliminate or reduce the hazards they pose (Meakin as cited in Neizer, 2014). Additionally, there is the non-hazardous waste. Some of this waste is recyclable and can include wood, household packaging, ferrous metals, plastics, glass, and paper while others are compostable or biodegradable such as bio waste, green waste among others (Sarpong, 2015).

According to Baabereyir (2009), a number of criteria are usually employed to classify urban solid wastes. This include classifications based on their sources, physical state, material composition and the level of risks associated with the waste substance. Classification based on source of waste generation include residential, commercial, industrial, municipals services, building, construction and agriculture. Classification based on physical state includes liquid, solid and gas. Classification based on material composition of waste includes organic, food wastes, paper and cards, plastics, metal, glass, textiles and polythene. Classification based on level of risks are hazardous wastes and non- hazardous wastes. These classifications of urban solid wastes provide the basis for the development of appropriate urban solid waste

management practices to Baabereyire (2009). The classification of solid waste is summarized in Table 1.

Table 1: Classifications of Solid Waste

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

Source: Baabereyir, 2009

The source classification of wastes is based on the fact that the waste is generated from different sectors in our cities such as residential, commercial and industrial sources. According to a World Bank report on a study conducted in Asia (as cited in Baabereyir, 2009), the sources of municipal solid waste in Asia were mentioned as residential, commercial, industrial, processing, institutional municipal services, construction and demolition and agricultural sources. The residential source includes types of solid wastes like food waste, home-keeping waste, paper, plastics, textiles, glass, metals, ashes, special waste and household hazardous wastes. Commercial source include paper, polythene, plastics, wood, food waste, glass, metals and hazardous wastes. Industrial source includes food wastes, rubbish, ashes, demolition and construction wastes, special wastes, slay, tailings and hazardous wastes like scraps. Municipal services source includes street sweepings, tree trimmings and general waste from parks, beaches and other recreational centres. Agricultural source such as spoiled food wastes, rubbish, hazardous wastes. Lastly,

construction and demolition source including wood, steel, concrete and dirt (World Bank, 1999). This is also illustrated in Table 2.

Table 2: Sources and Types of Municipal Solid Waste

Sources	Typical Waste Generators	Types of Solid Waste
Residential	Single and multi-family dwellings	Food wastes, paper, cardboard, plastics, textiles, glass, metals, ashes, special wastes(bulky items, consumer electronics, batteries, oil, tires) and household hazardous wastes
Commercial special	Stores, hotels, restaurants, market etc	Paper, cardboard, plastics, wood, food wastes, glass, metals, hazardous wastes
Institutional special	Schools, government center, hospitals, prisons	Paper, cardboard, plastics, wood, food wastes, glass, metals, wastes, hazardous wastes
Municipal services	Street cleaning, landscaping, parks, beaches, recreational areas	Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational areas
Construction and demolition	New construction sites, road repairs, renovation sites, demolition of buildings	Wood, steel, concrete, dirt
Process (Manufacturing)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing	Industrial process wastes, scrap materials, off-specification slay, tailings
Agriculture	Crops, orchards, vineyards, wastes, dairies, feedlots, farms	Spoilt food wastes, agricultural hazardous wastes (e.g pesticides).

Source: World Bank/IBRD, 1999

The classification of municipal solid wastes into types is very important for waste management planning. Aside this, it provides useful information that enables municipal authorities to organize waste management operations including the frequency, means of collection and appropriate disposal methods.

Coupled with the prior classifications of solid waste materials, Tchobanoglous, Theisen and Vigil (1993) also outlined various forms of solid waste and grouped them into food waste, rubbish, ashes and residues and special waste. Tchobanoglous *et al*. (1993) posited that food wastes include all animal, plant and vegetable residues which may result from preparation, cooking and eating of foods. One important feature of food wastes is that they are exceedingly putrescible and in warm weather, they decompose very quickly. Regularly, offensive stench may be emanate due to the decomposition (Quarcoo, 2014). The rapid decomposition nature of food waste usually influence the design and operation of the solid waste collection. The composition of rubbish is combustible and non- combustible solid wastes which are generated from institutions, commercial activities and households. It excludes food wastes or other extremely perishing materials. Typical combustible rubbish includes of items such as plastics, paper, rubber, textiles, cardboard, wood, garden trimmings leather and furniture. In addition, the non-combustible rubbish comprises of dirt, ferrous and non-ferrous metal, glass, tin cans, and aluminum cans.

Tchobanoglous *et al.* (1993) indicated that ashes and residues are materials that are left from the burning of wood, coal, coke and other combustible wastes industrial, institutions and domestic settings. The purposes of burning these items include heating, cooking and disposing off the waste materials and the remains after the burning process are to generate ashes and residues. The items included in the list of special waste are roadside litter, litter from municipal containers, catch-basin debris, street sweepings, and abandoned vehicles and dead animal (Tchobanoglous *et al*., 1993)

Moreover, in a more expanded classification, the Centre for Environment and Development (2003) also categorized the types of solid waste based on origin (food

waste, rubbish, ashes and residues, demolition and construction, agriculture waste), based on characteristics (biodegradable and non-biodegradable), based on the risk potential (hazardous waste). The Centre also enumerated sources of solid waste as residential, waste from shops, commercials establishment, hotels/restaurants/eating stalls, slaughter houses and others. Hence, this shows that Tchobanoglous *et al.* (1993) and the Centre for Environment and Development (2003) are in agreement with the types and sources of solid wastes generated in municipalities.

Therefore, a cursory look at the preceding paragraphs shows that the source classification of municipal solid wastes can also be traced from domestic (households), commercial (business operators), institutional (schools and offices) and industrial (raw material processing) sources. Also, the types of municipal solid waste generated by municipal households consists of food waste, paper, plastics, textiles, ashes, consumer electronics and other hazardous wastes.

2.3 Solid Waste Management (SWM)

The business of keeping our environment free from the contaminating effects of waste materials is generally termed waste management (Baabereyir, 2009). Kumah (2007) explains solid waste management as the administration of activities that provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of waste. Similarly, Othman (as cited in Sarpong, 2015) also refers to solid waste management as the control of waste generation, storage, collection, transfer and transport, processing and disposal of solid waste consistent with the best practices of public health, economics, finance, engineering, administrative, legal and environmental considerations. Thus, sound waste management practices regarding economic development, environmental impact, resource conservation and even political consideration are essential for planning

municipal waste management (Agyapong, 2012). In view of this, it can be said that solid waste management practices include generation, reduction, reuse, recycling, handling, collection, transfer and transport and final disposal consistent with environmental and public health standards. In a more expanded explanation, Tchobanoglous *et al.* (1993) suggested that solid waste management is associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations and that is also responsive to public attitudes. Consequently, Puopiel (2010) noted that the important mechanisms and relationships involved in solid waste management must be identified and understood clearly if solid waste management is to be accomplished in an efficient and methodical manner.

Drawing from these explanations, it can be stated that management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life. Hence, it can be observed that the authors cited under this theme concur that solid waste management is necessary and must be performed in a particular way that adheres to best practices to safeguard both the environment and public health.

2.3.1 Solid waste management processes

Rouse (2008) indicated that the basic processes of SWM involves the collection, storage, transportation, processing, treatment, recycling, and final disposal of waste. He also noted that the management system should be simple, affordable, sustainable, economical efficient, environmentally sound and socially acceptable and providing the service for both the poor and wealthy households. The current state of waste management in Ghana leaves much to be desired. Less than 40% of urban

residents are served with solid waste collection services and less than 30% by an acceptable household toilet facility in Ghana (Quarcoo, 2014). According to the United Nations Commission on Sustainable Development (as cited in Puopiel, 2010), the traditionally applied methods of dealing with wastes have been unsuccessful and the resulting contamination of water and land has led to growing concern over the absence of an integrated approach to waste management in the country. This observation is a clear case in most developing countries around the world including Ghana. From this backdrop, Puopiel (2010) opined that solid waste management must practically integrate source reduction, storage, collection, transportation and disposal of solid waste in an environmentally sustainable manner as illustrated in Figure 1.

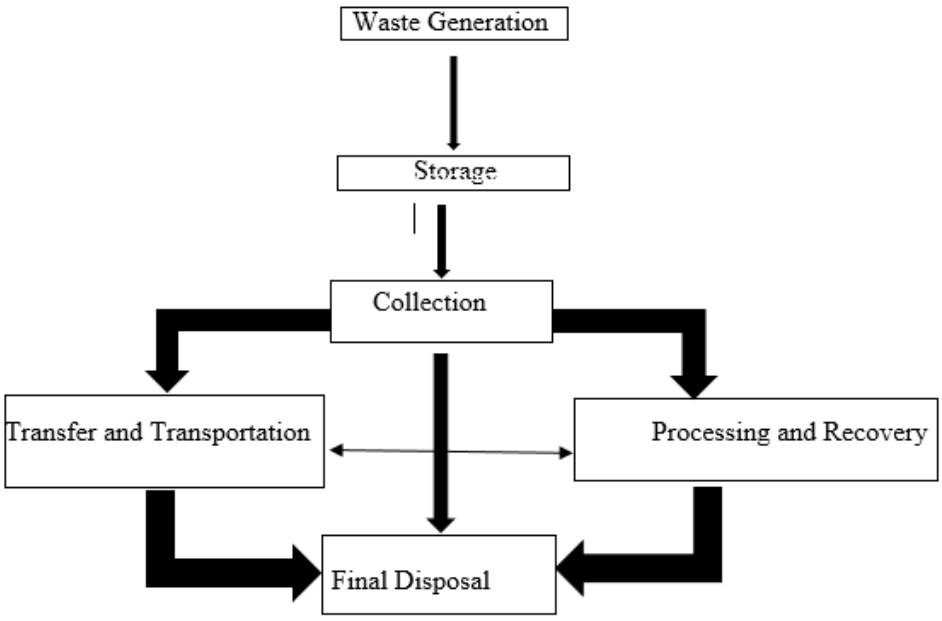

Figure 1: Key Elements of Solid Waste Management

Source: Adopted from Puopiel, 2010

As shown in Figure 1, the essentials in solid waste management include tracking the source of solid waste generation, storage, collection, transfer and transport, processing and recovery and final disposal. This implies that when waste is generated it is first stored in sacks, dustbins or skips. It is then collected and finally

disposed off in landfill. Also, when waste is collected it can be transferred from small collection equipment like the tricycle to a bigger truck for final disposal. In contrast, waste collected can be processed and recovered for materials to be reused. These elements are further expanded below;

2.3.1.1 Waste generation

Waste generation encompasses those activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal (Asante, 2015). According to UNEP (2009), in 2006 the total amount of municipal solid waste (MSW) generated globally reached 2.02 billion tones, representing a 7 per cent annual increase since 2003. It is further estimated that between 2007 and 2011, global generation of municipal waste will rise by 37.3 per cent, equivalent to roughly 8 per cent increase per year (UNEP, 2009).

2.3.1.2 Storage

Tchobanoglous *et al*. (as cited in Quarcoo, 2014) explain storage to mean where solid waste is stored before it is collected. It could be stored in a skip or dustbins and not thrown away indiscriminately. According to them, storage is of primary importance because of the aesthetic consideration.

2.3.1.3 Collection

The element of collection includes not only the gathering of solid waste, but also the hauling of waste after collection to the location where the collection vehicle is emptied (Kreith, 1994). According to Kreith (1994), the most common type of residential collection services in the United States include “curb”, “setout-setback” and “backyard carry”. According to the Quarcoo (2014), in the city of Thimphu in Bhutan, the collection of solid waste from households, commercial set-ups was done

in concrete receptacles placed at strategic points and conveyed by trucks/tractors. Accordingly, there were concrete bins and containers provided at various locations from where the waste was lifted for disposal (Quarcoo, 2014). Individual bins/containers were also placed alongside the shops in certain areas, which were emptied directly into the trucks/tippers. This prevents people from dumping waste indiscriminately. Quarcoo (2014) further states that, on the contrary, the building of these concrete bins and containers may be expensive to do in Ghana and for that matter the Awutu Senya East Municipal Assembly (ASEMA).

2.3.1.4 Transfer and transport

Kreith (1994) opine that the transfer and transport involves two steps namely; the transfer of wastes from the smaller collection vehicle to the larger transport equipment and the subsequent transport of the wastes, usually over long distances to the final disposal site.

2.3.1.5 Processing and recovery

The element of processing and recovery includes all the technology, equipment, and facilities used both to improve the efficiency of other functional elements and to recover usable materials, conversion products or energy from solid wastes (Tchobanoglous *et al*. as cited in Quarcoo, 2014). In the recovery, separation operations have been devised to recover valuable resources from the mixed solid wastes delivered to transfer stations or solid waste processing plants.

2.3.1.6 Disposal

The final destination of all residential solid wastes collected is disposal. According to Asante (2016), in Ghana, household‟s disposal of solid waste is mostly done at public dumps and public containers and it has contributed to 37.7% and

23.8% respectively. Significant proportions of 14.4% households have their solid waste collected and 10.7% have their waste burned. Regionally, Ghana Statistical Service (2012) estimates that most households dispose their solid waste at public dumps and it is done either in containers or in open space. In Accra, about 48.5% of households have their solid waste collected from their homes. Aside this, a significant proportion of 25.7% households in Greater Accra dump their solid waste in containers. The proportion of households who dump their solid waste haphazardly is highest in the Upper region with 36.0% followed by the Northern region 26.4% (GSS, 2012).

From preceding paragraphs, it can be inferred that solid waste management is an inescapable environmental challenge that confronts municipal or local authorities. Therefore, it has become imperative to observe the problem from the source of generation to disposal and effective management in order to determine the areas of critical concern. Managing solid waste is essentially about pragmatic initiatives meant to ensure that solid waste generated as carefully and scientifically handled regularly in line with best practices that safeguards public health and the environment as a whole.

2.4 Integrated Solid Waste Management (ISWM)

Globally, local governments are now looking at waste as a business opportunity to extract valuable resources contained within it that can still be used and to safely process and dispose wastes with a minimum impact on the environment. According to UNEP (2009), Integrated Solid Waste Management (ISWM) refers to the strategic approach to sustainable management of solid wastes covering all sources and all aspects; generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner with an emphasis on maximizing resource use efficiency. In the opinion of Klundert and Anschutz (2001), the ISWM is a way of

using a combination of waste management techniques to treat the different types of waste in a way that is environmentally, financially and socially sustainable. The ISWM system coverage expands across geographical and administrative boundaries, jurisdiction (municipal and industrial) limits, institutions involved and administrative mandate, sectors and sub- sectors (residential, commercial, industrial, urban agriculture, healthcare, construction debris and sludge), waste streams (hazardous and non- hazardous) and finally recyclable and non- recyclable waste (Klundert & Anschutz, 2001).

The UNEP (2009) opined that the ISWM is based on the waste hierarchy with much focus on the 3Rs (reduce, reuse and recycle) principle. Hence, the United States Environmental Protection Agency (EPA) developed the non-hazardous materials and waste management hierarchy in recognition that no single waste management approach is suitable for managing all materials and waste streams in all circumstances (United States EPA, 2017). The hierarchy ranks the various management strategies from most to least environmentally preferred. The hierarchy places emphasis on reducing, reusing, and recycling as key to sustainable materials management (United States EPA, 2017).

Figure 2: Waste Management Hierarchy

Source: United States EPA, 2017

According to the United States EPA (2017), source reduction (also known as waste prevention) means reducing waste at the source and is the most environmentally preferred strategy. It can take many different forms including reusing or donating items, buying in bulk, reducing packaging, redesigning products and reducing toxicity. Recycling is a series of activities that includes collecting used, reused or unused items that would otherwise be considered waste. It involves sorting and processing the recyclable products into raw materials and remanufacturing the recycled raw materials into new products. Energy recovery from waste is the conversion of non-recyclable waste materials into useable heat, electricity or fuel through a variety of processes including combustion, gasification, pyrolization, anaerobic digestion and landfill gas (LFG) recovery. This process is often called waste-to-energy (WTE). Prior to disposal, treatment can help reduce the volume and toxicity of waste. Treatments can be physical (e.g. shredding), chemical (e.g. incineration) and biological (e.g. anaerobic digestor). Landfills are the most common form of waste disposal and are important component of an integrated waste

management system. Landfills that accept municipal solid waste are primarily regulated by state, tribal, and local governments (United States EPA, 2017).

Baabereyir (2009) succinctly opined that the waste hierarchy is in pyramid form which shows how action must or needs to be taken. He further suggested that the first action must be taken is preventing the generation of waste (i.e source reduction), followed by reducing waste generation (e.g. through re-use), recycling, composting or anaerobic digestion, recovery and waste to-energy and if energy is not recovered from processes then it ends up in landfill. Thus, waste disposal on landfills is the last resort only when waste has not been prevented, diverted or recovered in the preceding steps (Baabereyir, 2009). Consequently, the ISWM system has been pilot tested by the UNEP in a few cities around the world including Wuxi New District, PR China; Pune City, India; Maseru City, Lesotho; Nairobi, Kenya; Novo Humbargo, Brazil and Matale, Sri Lanka (UNEP, 2009). Other counties including Thailand, Indonesia and Ethiopia have all been earmarked to undergo the pilot test (UNEP, 2009). Puopiel (2010) acknowledged that the ISWM system has been well received by local authorities where the pilot tests have been conducted. It has been shown that with appropriate segregation and recycling system, significant quantity of waste can be diverted from landfills and converted into resource (Puopiel, 2010).

From the above discussions, it can be said that the ISWM involves a combination of waste management methods to achieve the best solid waste management solution. The ISWM is built on the 3Rs (reduce, reuse and recycle) and on the waste management hierarchy. The ISWM system promotes waste management principles such as equity, effectiveness, efficiency and sustainability. Unfortunately, many towns and cities are unable to follow the waste hierarchy and the only option used is disposal. As in the case of most municipalities in Ghana, much of the waste is

never collected (it is either burnt or dumped) and even where it is collected, most of the waste is taken to a landfill that has no means of controlling pollution from the site.

2.5 Municipal Households Solid Waste Generation

Municipal households contribute greatly towards the volume of solid waste generation in both the developed and the developing world. As a key component of the urban settlements, the number of households coupled with the nature of work engaged by inhabitants in households influence the types and volume of municipal solid waste generation to a large extent (Sarpong, 2015). In a study conducted by Boadi and Kuitunen (2003), the residents of Accra, generate an estimated 1200 tonnes of solid waste per day with an annual increase of 6 percent. Municipal solid waste in Accra on wet basis shows a daily per capita generation rate and density of 0.40 kg and 0.47 t/m3, respectively (Boadi & Kuitunen, 2005). As in most developing cities, solid waste generation in Accra has a high putrescible organic content. Asomani-Boateng and Haight (1999) also opined that the organic fraction of municipal solid waste are made up of kitchen waste including food leftovers, rotten fruits, vegetables, leaves, crop residues, animal excreta and bones but plastics, glass, metals, and paper account for less than 15 percent of the total waste. High organic and moisture contents coupled with prevailing high temperatures necessitate frequent removals, which place additional burden on an over strained collection system. When the waste is not collected in time it emanates a foul smell especially in low income areas where the waste is often mixed with human waste due to inadequate sanitation facilities.

Boadi and Kuitunen (2003) further pointed out that the amount and components of solid waste generated in Accra varies with income levels. Low income areas generate less waste per capita than middle and high income areas. The waste generated has a high organic content. Packaged products and empty cans form a

significant part of the waste in high income areas. The specific waste generation rate in low income areas, is low at 0.40 kg per capita per day. Middle income areas show a specific waste generation rate of 0.68 kg per capita per day and high income residential areas range with 0.62 kg per capita per day. Omoleke (as cited in Wahab, 2012) alludes to the fact that information about physical and chemical properties of solid waste is important in evaluating equipment needs, systems and management programs and plans, especially with respect to the implementation of disposal and resource and energy recovery options.

The literature review shows that municipal solid waste generation rates are generally high among urban households in spite of disparity of income levels between such households in urban settlements. In the same vein, the number of households together with the kind of occupation engaged in by the householders also influence the quantity and types of municipal households" solid waste generation rates to a very large extent.

2.6 Contemporary Methods of Solid Waste Management in Ghana

In Ghana, the contemporary methods of managing solid waste include source reduction, sanitary landfills, composting, recycling, and incineration (Denison & Ruston, 1990). Asante (2016) succinctly corroborated that solid waste management options in Ghana include reuse, recycling and composting. Below are elaborations on some contemporary solid waste management options as highlighted by Denison and Ruston (1990) and Asante (2016);

Source reduction is any action taken to reduce the volume or toxicity of solid waste prior to its processing and disposal in incinerators or landfills. Source reduction can help reduce waste disposal and handling costs because it avoids the cost of recycling, composting, land filling and incineration (Denison & Ruston, 1990).

Reuse involves the recovery of items by using them again (Asante, 2016). It helps save energy and water, reduces pollution and lessens society‟s consumption of natural resources when compared with single-use products and materials. Households reuse plastic bags, containers, newspapers and glass bottles among others. Reuse does not only save money but also it is a source of revenue for those who implement it (Asante, 2016).

Sanitary landfill includes confining the solid waste, compacting it and covering with soil. It does not only prevent the spread of diseases but also helps in reclamation of sub- marginal lands for valuable use. In some peri-urban areas, residents dispose of their waste in open pits. When these pits are filled they are either covered with sand or burnt, but burning is the normal practice to save digging new pits (Boadi & Kuitunen, 2003). The dumping of solid waste into landfills is the oldest and the most prevalent form of solid waste management in Ghana (Denison & Ruston, 1990).

Incineration is a controlled combustion process for burning combustible waste to gases and reducing it to a residue of non-combustible ingredients (Denison & Ruston, 1990). Solid waste burning is common in low income communities with limited access to waste facilities. Denison and Ruston (1990) contend that the major advantages of incineration are complete destruction of combustible solid waste and the reduction of non- combustible wastes into smaller sizes. However, this household waste management option has a disadvantage of not being environmentally friendly due to emission of poisonous gases into the atmosphere.

Compositing is a process of biological decomposition of materials under temperature, humidity and pH and is used in landscaping and horticultural agriculture projects (Al-Salem & Baeyens, 2009). Thus, composting process uses

microorganisms to degrade the organic content of the solid waste. The UNEP (2009) stated that composting as a biological decomposition of biodegradable solid waste under controlled aerobic conditions to a state that is sufficiently stable for nuisance-free storage, handling and satisfactorily matured state for safe use in agriculture. Composting is a low-technology approach to waste management which produces organic fertilizer to support agriculture in developing countries.

Recycling is a conversion process by which solid waste materials are collected and used as raw materials for producing new products (Asante, 2016). This include the collection of recyclable components of municipal solid waste, separating by type and processing them into reusable forms. The materials that can be recycled include plastics, wood, metals, glass, textiles, paper, cardboard, rubber, ceramics and leather. Organic solid waste can also be recycled into fertilizer for agricultural purposes. Recycling has been viewed as a veritable tool in minimizing the amount of urban solid wastes that enter dump sites (Denison & Ruston, 1990). It also provides the needed raw materials for industries thereby helping to conserve energy and natural resources. Recycling reduces the amount of household solid waste to be collected, transported and disposed off promoting cleaner environment and economic competitiveness (Al-Salem & Baeyens, 2009).

In the same vein, the 2010 United Nations Report on Sanitation in Ghana (as cited in Asante, 2016) also indicated that wastes can also be managed through ways such as monitoring of waste generation, collection, transport, processing, recycling and disposal. Methods of waste reduction, waste reuse and recycling are the preferred options when managing waste. There are many environmental benefits that can be derived from the use of these methods. They reduce or prevent greenhouse gas emissions, reduce the release of pollutants, conserve resources, save energy and

reduce the demand for waste treatment technology and landfill space. Therefore, it is advisable that these methods be adopted and incorporated as part of the waste management plan.

It can be deduced that source reduction, reuse, sanitary landfills, composting , incineration and recycling are some of the contemporary solid waste management options available for households and municipal authorities in managing solid waste in order to reduce the implications of poor solid waste management on human life and the environment in general.

2.7 Approaches to Household Solid Waste Management

There are substitute systems as to how the municipal solid wastes which are generated at household level can be disposed without destroying the quality of the environment and ensuring the safety of human health (Sarpong, 2015). One of such approaches is the conventional approach to solid waste management. Under this approach, solid wastes generated in the home are separated at source based on their nature and stored until a small amount is accumulated. In this approach, the generators‟ of solid wastes in the households are expected to convey the stored wastes to the nearest waste skip or dustbin provided by the municipal waste department in the municipality (World Bank 2000). In the next stage, the municipal waste department is responsible for transferring the collected wastes from the waste skips or dustbins into trucks to the final disposal sites. Thus, the direct involvement of private waste collectors, as far as this approach is concerned, is rare (World Bank, 2000; Rahman, Bahar, Uddin, Islam & Harun, 2005).

World Bank (2000) again stated that, problems in this system are often observed due to the failure of involved stakeholders. Most of the time, the city

administration fail to provide adequate number of containers or even the provided dustbin may not position in a convenient locations. Due to these reasons, the households may be motivated to dispose of their wastes on the road, in sewerages or other illegal places (Sarpong, 2015). In addition, Sarpong (2015) pointed out that poor motivation for appropriate disposal, lack of awareness or social factors are the other forces which make the environment unacceptable for certain members of households, who are interested to transport their wastes to the containers. On top of these, because of institutional and financial constraints, the municipal waste department may delay the collection and transfer of wastes to final disposal sites. Rahman, Bahar, Uddin, Islam and Harun (2005) also noted that in conventional system of collection and disposal of wastes, the municipal waste department trucks visit the waste storage station point at a regular intervals to collect and haul the stored wastes to the final disposal site. This approach is prevalent in low-income areas in municipalities across Ghana.

Another approach to household solid waste management is the community or participation- based approach. Unlike the conventional approach to solid waste management, the community or participation- based approach elucidates the way stakeholders are involved in discharging their responsibility regarding solid waste management (Sarpong, 2015). In the community or participation-based approach, it involves the primary collectors; it may be paid door- to- door collectors, Community Based Organization (CBO‟s) or Non- Governmental Organizations (NGO‟s). Due to this reason, at least the financial difficulties which may arise from the waste collectors‟ point of view can be minimized. The households are responsible to store their waste in plastic bags or other available materials by sorting in terms of their nature and hand over to the door- to- door or primary collectors. The primary

collectors are responsible for appropriately collecting solid wastes from the households and later covey them to the town transfer station or secondary collection. Given that the town municipality built the transfer station point nearest to the primary collection area. Finally, the city municipality is responsible to collect and transfer wastes from secondary collection place to final disposal sites (World Bank, 2000; Rahman *et al*., 2005). By implication, this approach to household solid waste management involves phases; point source collection from the households, conveyance to community transfer station and then final transportation to the disposal site. Hence, if the stakeholders in municipal solid waste management perform their roles as expected, it is possible to envisage that solid wastes management in municipal households will be fairly effective. For instance, if the households are sorting their wastes before handing over to the assigned primary waste collectors, the waste collected will be transported to the appropriate site for recycling before finally dumping the unrecyclable components.

It can be deduced that the solid waste management approaches as discussed in the paragraphs highlight the conventional approach and community or participation-based approach to solid waste management. Though both approaches are common in municipalities across Ghana, little positive results have been achieved so far in tackling the solid waste problem in our municipalities. Regardless of the flaws associated with these approaches, it can be argued that unwavering commitment to responsibility on the part of all stakeholders will go a long way to effectively manage solid wastes in municipal households.

2.8 Concept of Attitude

Attitude is a complex term which has been subjected to a plethora of definitions among scholars and psychologists. Nevertheless, many refer to attitude as the "predispositions to respond" (Zimbardo & Leippe, 1991). According to Chakraborty and Mondal (2014), the simplest definition of attitude is that it is a feeling for or against something. Attitude influences an individual's choice of action, response to challenges, incentives and rewards (Sidiquea, Lupib & Joshi, 2010). This implies that the positive or negative predisposition of an individual towards an object or a phenomenon can affect how the individual perceives solid waste generation, solid waste disposal and solid management in general (Eshun *et al*., 2014).

Attitudes may be formed in either a positive or negative direction. A positive attitude would be reflected by a choice toward the person, object, or event to which it is attached to. A negative attitude would be reflected in the "avoidance" of the person, object or event to which it is attached. Attitudes also reflect complex relationships among past experiences and the present environmental situation. For example, it might be very "useful" to an individual to have a negative attitude toward certain choice of behaviours, such as littering. Thus, by avoiding littering, the person is less likely to suffer the consequences of the attitude towards littering. Therefore, in the long term, the avoidance of littering will be a positive consequence.

From the foregoing definitions, the term attitude can be succinctly explained as a mental and neutral state or readiness, exerting influence on an individuals' response to objects and situations within which resultant behaviour is related. From this perspective, inferences can be made from how households in Kasoa behave towards municipal solid waste management due to their perceived attitudes toward solid waste management.

2.8.1 Approaches to measuring households attitudes towards solid waste management

Longe and Williams (2006) performed a survey to seek information on existing household solid waste management practices and public perceptions on the effectiveness of the current system by which waste is collected in Ojo local government area in Nigeria. A sample size of 60 respondents was chosen using random sample of multi-persons households in single family dwelling. The data were collected from eleven selected residential areas which were divided into three socio-economic strata namely high, middle and low-income groups based on the state‟s socio-economic status index. Direct questionnaire administration, personal interviews as well as focus group discussion were used to obtained data. Likert scale was used to measure attitude and all data collected were analysed using statistical tools for simple percentages, frequency analysis and severity index calculations. Results established that waste management behaviour among the respondents on solid waste management systems, patronage of services and cost recovery methods was relative among the study population.

Another study undertaken by Litui (as cited in Sarpong, 2015) to investigate the waste management practices, perceptions and attitudes in Tonga located in the South Pacific in the region of western Polynesia used the quantitative approach. He therefore used anonymous questionnaire survey and the Likert scale method of attitude measurement as well as check list ranking types of questions employed to enable respondents rank their preferences. A random sample of 220 households was selected from 3 villages in this study with just about 172 questionnaires being responded to. The clustersampling method was used based on gender and age in a bid to be representative of males and females as well as the different age groups. The

survey responses were then coded and entered by using Microsoft Access which was then imported into Stat View for analysis. Here, results showed that waste management practices, perceptions and attitudes seemed not to be influenced by any of gender, age, household size, educational level, occupation, income and place of residence.

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

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

knowledge concerning solid waste management but it was not consistent with their attitudes towards solid waste management.

It can be deduced from the paragraphs that various studies on the approaches to measuring people‟s attitudes towards solid waste management mainly centered on the use of Likert scale questionnaires. An advantage of this approach is the ease of scoring and the ease of summarizing the information obtained. However, it is noteworthy to posit that when survey questionnaires are constructed using the Likert scale, it is crucial to consider the validity and reliability of the data collection instrument.

2.8.2 Household attitudes towards solid waste management options

Various solid waste management alternatives including source reduction, re-use, composting, sanitary landfills, recycling and incineration have been touted as possible options for municipal households to effectively manage their solid wastes. Nevertheless, there are varying reactions concerning the usage of any of these solid waste management practices (Sarpong, 2015). Concerning landfills, Sarpong (2015) observed that negative reactions are evident even without detailed knowledge because of the idea that things are going to be buried in the ground with stuffs popping up the earth surface especially plastic bags. Evidence abounds from the work of Pokhrel and Virarghavan (2005) that local people in Nepal prevented trucks carrying solid waste from entering landfill sites to dispose of the waste due to the fact that it affected public life and tourism in the area. The landfill site was however closed for almost 2 years but was reopened and operated for a period of 3 years. The government then developed a sanitary landfill site about 26 kilometres away from the previous which is expected to operate for the next 50 years (Mishra & Kayastha, 1998). Normally,

people prevent landfills from being sighted close to them because of the stench and the environmental problems associated with it.

The situation in Nepal can be further elaborated with the study performed by Oteng-Ababio in Kwabenya where he explained that residents prevented the construction of a landfill in the area (Sarpong, 2015). This supports what was stated by Zeiss (1991) that residents tend to show more negative attitudes to unfamiliar facilities of which they have no experience compared with similar facilities that already exist. Generally, peoples‟ attitude and perception towards landfilling is bad.

On recycling of solid wastes, Kumar and Nandini (2013) also performed a study in Bangalore in India to find out the community‟s attitude and willingness to solid waste management. They observed that a number of the households about were willing to use recyclable products. However, when asked about the recycling of the waste only 5.5% of the households were motivated and involved in recycling whereas remaining 94.5% of the households were not recycling their waste because they were not aware and did not have time. Also, 85.5% of households had no information on waste management and so disposed their waste as it is into the nearby open spaces. In the same vein, Huhtala (1997) studied optimal recycling rates for municipal solid waste using a model that included recycling costs and consumer preferences. Here, results suggested that a recycling rate of 50% was achievable, economically justified and environmentally preferable.

Furthermore, incineration is not viewed as a complete method of disposal but its main advantage is that, it produces a residue that is substantially reduced in volume and may be relatively inert (Suess, 1985). Incineration is, however, expensive and supplementary fuel may be required if the moisture content of the waste is high and its combustible content low (Sarpong, 2015). Lima (2006) in a study on predictions of

attitudes towards the construction of a waste incinerator in Portugal found out varying responses. The results indicated that residents in Lisbon rejected the incinerator more strongly than in Oporto. According to Lima (2006), this was because residents in Lisbon had lower levels of acceptability which was sustained by enhanced risk perception and a sense of unfairness process of the distribution of the project whereas in Oporto, residents had high levels of acceptability sustained by a sense of fairness of the process, trust in politicians and technicians and positive expectancy towards the project. Thus, people in different groups may hold different attitudes and actually this may come about due to a process of accentuation of intergroup differences.

Drawing from the paragraphs, it can be observed that people attitudes towards solid waste management options differ to large extent. This is because people‟s attitude towards solid waste management options such as source reduction, reuse, recycling, incineration and siting of landfills around communities tend to change over time.

2. 9 Challenges Associated with Municipal Solid Waste Management

Oftentimes, when systems are breaking down and problems are arising, authorities critically examine the factors which are causing the breakdown of the system so as to fix the situation. The challenges associated with municipal solid waste management in developing countries and for that matter Ghana are varied stemming from economic, logistical, legislative, attitudinal, political and institutional perspectives.

2.9.1 Financial constraints

Many writers have cited the scarcity of funds as a major constraint to effective municipal solid waste management in all developing countries (Pacione, 2005). Lohse

(2003) explains that one reason for the municipal finance gap is that most municipalities lack the autonomy to establish their tax basis, rate structures and enforcement procedures, and so cannot raise revenues commensurate with their expenditure requirements. In the face of this predicament facing municipal authorities, Cointreau (2001) has observed that in spite of the deplorable waste situation in poor country cities, it is common for municipalities to spend 20-50 percent of their available recurrent budget on solid waste management alone. Eshun, Bassaw and Bordoh (2014) also observed that the problem is even more acute in economically developing countries where financial, human and other critical resources are scarce. By implication, although solid waste menace is a global issue, the budgetary allocation for solid waste management in the developing world is comparably higher than the developed world due to the worsening nature of solid waste management problem in such countries.

Tracing the root cause of the financial problems facing municipal authorities to combat solid waste management problems in the Berekum Municipality, Agyapong (2012) contended that inadequate government financial support and delayed payment of government subsidies makes it difficult for private waste management companies to go to financiers and secure long term funding to meet the capital and operational requirements for effective solid waste management in Ghana. Moreover, households in poor communities within municipalities are unable to afford the cost of paying for exorbitant charges on solid waste collection services. This implies that there is positive relationship between income and people‟s willingness to pay for solid waste disposal services (Boateng, Amoako, Poku, Appiah & Garsonu, 2016). Therefore, it can be deduced from the literature review that a combination of poverty, economic

hardships and population explosion place considerable strain on solid waste management in Ghana.

2.9.2 Logistical and technological constraints

The technologies employed in municipal solid waste management in most developing countries are said to be inappropriate and inadequate (Nasir, 2017). Zurbrugg (2002) has observed that adoption of the conventional waste collection vehicles used in rich countries constrain solid waste management operations in developing countries. Apart from the high acquisition and maintenance costs involved, developing countries actually lack the engineering capacity to support the operation and maintenance of such sophisticated equipment like compactors and skip lifts (Nasir, 2017). Yet, these equipment are usually employed by municipal authorities and private sector waste contractors in many poor countries (Achankeng, 2003). Besides, the high cost of new equipment compels many poor country municipal authorities to import used equipment from western countries. Such vehicles arrive already near the end of their useful life and so frequently require repairs due to breakdowns. In the absence of spare parts and the required engineering skills to maintain the trucks, only a small part of the fleet usually remains in operation after a short period of their use (Achankeng, 2003). Tadesse, Ruijs and Hagos (2008) in analyzing the factors that influence household waste disposal decision-making also claimed that inadequate supply of waste bins and long distances to communal containers create a problem for waste management. Hence, this has resulted in solid wastes being dumped into gutters, streets, rivers and lagoons in the cities (Tsiboe & Marbell as cited in Kwetey, Cobbina, Asare & Duwiejuah, 2014).

It can be inferred that the nature of the technological and logistical problems bedeviling solid waste management systems in developing countries especially Ghana is that, developing countries are lagging behind in terms of integrating technology into solid waste management systems compared to the developed countries. The situation is further worsened by poor maintenance culture of the scarce waste management equipment such as waste skips, trucks, tricycles and bins which are procured by the local authorities.

2.9.3 Enforcement of solid waste management legislations

The lack of enforcement of legislations on solid waste management has also been cited as being partially responsible for the undefined roles of agencies in the waste sector as well as the lack of coordination among them (Anaman & Nyadzi, 2015). In spite of the many legislations, bye- laws and regulations on waste management, Onibokun (as cited in Wahab, 2012) has observed the inability or unwillingness of municipal officials to enforce existing laws on environmental sanitation including the scanty legislation on waste disposal. This situation is particularly grave in the major cities where there is a general lack of public compliance with waste disposal laws if they exist at all. Ogawa (2002) has also observed that legislation related to solid waste management in developing countries is usually fragmented and several acts (such as public health, local government and environmental protection acts) include clauses relating to solid waste management. However, the non-enforcement of waste disposal laws engenders lack of fear of the law among the public and encourages negative waste handling practices such as littering and dumping of waste in drains and at roadsides (Neizer, 2014). Such practices worsen the waste disposal situation and increase the burdensome tasks of

waste collection, transportation and disposal for the resource-constrained municipal authorities.

From the paragraph, it appears that despite the plethora of laws and regulations on solid waste management in developing countries, usually these laws do not bite, paving the way for culprits to litter around without fear of being sanctioned by municipal authorities.

2.9.4 Attitudes and perceptions towards waste management

Nasir (2017) assert that most municipal dwellers have the attitude of not being concerned about waste management which reduces their responsibility to the environment. This is with the reason that most community members are not involved in decision- making and therefore develop the attitude of not being concern which makes them not responsible for waste management (McAllister, 2015). Subscribing to this assertion, Kendie (as cited in Baabereyir, 2009) argues that, the recent upsurge in waste disposal problems stems from the fact that, attitudes and perceptions towards wastes and the rating of waste disposal issues in people‟s minds and in the scheme of official development plans have not been adequately considered. In accord, Oteng-Ababio (2010) also maintains that householders often complain of unsatisfactory or unreliable waste management services. As a result, they often resist paying the charges levied and instead prefer to dispose by informal dumping. Chengula, Bahati and Mzula (2015) therefore intimated that lack of awareness and active involvement of the households as the key stakeholders in service provision, delay of households to pay collection fees to the organizations concern with collection of wastes and bad relationship between the households and the collectors of solid wastes are other factors hindering the process of proper municipal solid wastes management.

Al-Khatib, Arafat, Daoud and Shwahneh (2009) claim that a negative attitude often associated with the mismanagement of solid waste in developing countries is the occurrence of littering. They further explained that there are a multitude of causes that can contribute to an increase in public littering rates such as lack of social pressure to prevent littering, absence of realistic penalties or consistent enforcement, and lack of knowledge of the environmental effects of littering. In line with this assertion, Babaei, Alavi, Guordazi, Teymouri, Ahmadi and Rafiee (2015) in a study about household‟s knowledge, attitudes and practices towards solid waste management in Abadan also observed that only 1.7% of household participants did practice source reduction and reuse of solid wastes materials. Drawing from Baabereyir (2009), the inability of municipal authorities to enforce existing by-laws on waste disposal results in a general lack of respect for the law and a „throw-it-where-you-like‟ attitude towards waste disposal among the population. It is therefore common to see motorists, pedestrians and passengers littering the streets without any fear of the law. For the same reason of non- enforcement, many householders, traders and other business operators resort to indiscriminately dumping waste in open spaces and into drains, streams and drainage channels. This attitude among the public creates unsanitary conditions in the cities and blocks existing drainage channels, a situation which promotes flooding during heavy rains.

Moreover, Awasthi, Zeng and Li (2016) contended that researches in less developed countries solely focus on distinct circumstances that influence municipal solid waste management. Such studies include the identification of waste management problems and their root causes, analysis of waste compositions and the extent of service delivery. Consistent with the position of Awasthi *et al.* (2016), Tahulela (2017) indicated that behavioural studies of waste management in developing

countries have dealt primarily with recycling and focused on ways that would encourage people to recycle. Tahulela (2017) stated that few studies have been conducted on social norms and attitudes to manage waste. He further asserted that there are limited studies conducted to understand the effects of people"s social norms and attitudes towards household waste management in developing countries.

Succinctly put, the paragraph mirror the general negative attitude of people towards solid waste generation and disposal. Although public education has been touted a viable measure to address the situation, apparently the undesirable attitude towards solid waste management can be traced to psychological, sociological and environmental factors. However, the literature gap shows that few studies have been undertaken to ascertain the influence of social norms on people"s attitudes towards municipal solid waste management in Ghana.

2.9.5 Political commitment to municipal waste management

While the various challenges pointed out above are important contributors to the poor solid waste situation in poor country cities, some researchers find political neglect to be the root cause of the waste problem in poor country cities. To this end, Neizer (2014) opined that both national and municipal governments in poor countries seem to lack the political will to manage the rapidly growing cities and to provide infrastructure and services for environmental maintenance. Also, Agyapong (2012) contend that governments and political office seekers use the promise of providing better waste management services for their campaigns but show commitment after assuming office. The citizens bear the brunt of the repercussions associated with poor solid waste management in the municipalities. Hence, Tamakloe (as cited in Monney *et al*., 2013) posited that successive governments since independence have failed to pay any` serious attention to issues of urban settlement planning and environmental

management and this situation is responsible for the chaotic cities and their poor environmental conditions.

It can be deduced from the preceding paragraphs that general political commitment towards ensuring effective solid waste management in the country is not the best due to the proactive ways adopted by the government to find a lasting solution to the menace.

2.9.6 Institutional challenges

Fobil, Kolawole and Hogarh (2010) argued that the lack of well thought management plan for solid waste collection and disposal in most developing countries is a major drawback for efficient management of solid waste in most developing countries. Elsewhere**,** Anomanyo (2004) observed that apart from lack of funds, insufficient information on quantities and characteristics of waste is the major contributing factor to Ghana's waste management problems. As he noted, the existing waste management systems in the country has not been appropriately integrated other essential components of waste management such as reuse, recycling, reprocessing and treatment. Corroborating with this assertion, Chengula, Bahati and Mzula (2015) revealed that the insufficient coverage of the collection system and methods, lack of institutional arrangement and information resources, inflexible work schedule, insufficient information on quantity and composition of waste have been reported as the major problems facing the solid wastes management systems in developing countries in Africa.

In view of this, Boadi and Kuitunen (2003) pointed out that weak institutional capacity and lack of human and capital resources are challenges facing Ghana. To them, the collection of waste is restricted to high and some middle income areas while the poor are left to cope with the problem on their own. This often leads to

indiscriminate dumping of waste in rivers, streams, gutters and absolutely anywhere which is not their home creating unsanitary and unsightly environments in many parts of the city. Lohse (2003) also observed that local governments in developing countries generally lack the required capacity and technical expertise to accomplish effective and sustainable waste management programmes. Chukwudi and Oluwafemi (2014) therefore argued that in towns and cities, high population amplifies household solid waste generation but often households are unable to effectively handle the waste generation rates hence the institutional arrangements for solid waste management methods are often organized. This also confirms the finding by Mensah and Larbi (2005) that the waste management problem is more serious in low-income residential areas. To this end, Zurbrugg (2002) noted that deficient management capacities of institutions involved in urban environmental management in poor country cities. Solving the waste problem in poor cities will therefore require improvements in the institutional arrangements and capacity building for waste management and other aspects of the urban environment.

Hence, it can be said that the weak institutional machinery to deal with the increasing volumes of solid waste generation in urban centers is a major challenge. This has worsened the problem of solid waste management in developing countries owing to the flaws in institutions charged with the responsibility to salvage the solid waste management situation.

2.9.7 Education and awareness on solid waste management

Lack of education and awareness of effective solid waste management practices is one of the major issue in developing countries. Addai and Danso-Abeam (2014) as well as Aggrey and Douglason (2010) all hypothesized that the higher people‟s level of education, the more they would appreciate the consequences of

mishandling solid waste, and the more they would be willing to pay in order to avoid the risk of being victims of an unclean environment. According to McAllister (2015), a study in Gaborone, Botswana, found that even though citizens were aware of recycling and other sustainable waste-management techniques, this does not necessarily translate into participation in pro-environmental activities such as recycling initiatives. When people lack interest in environmental issues, it means that they are not well informed which affect their actions and also makes them feel not included in waste management decision making. According to McAllister (2015) lack of interest in the environment brings about a culture of non-participation of communities in decision-making processes which enhances lack of responsibility for pollution and waste issues. When citizens are given education or awareness about solid waste management, they turn to be informed as well as know the essence of waste management which will make them responsible (Nasir, 2017).

Household size can influence environmental awareness and the willingness to pay for waste management. Addai and Danso-Abeam (2014) pointed out that the more the number of people in the household, the more the household will appreciate a clean environment. Keeping them informed or educated means improving their knowledge in waste management which will call for participation in decision making (Nasir, 2017). The community‟s participation in solid waste management activities from decision making, structural reforms among others, will increase their sense of belonging and ownership which can bring about improvement rather than blaming. According to Doya and Garcia (as cited in McAllister, 2015), it has been recognized by researchers that it is important to create sustainable waste systems as well as promoting environmental citizenship amongst community members through improved public awareness and community participation in waste management. It therefore

emerged from a study conducted in Malaysia by Aini, Razi, Lau and Hashim (as cited in Nasir, 2017) that to overcome the municipal solid waste crisis, conscience of the individual needs to be raised through environmental awareness and concern, inculcation of sustainable consumption practices and education on waste management. They went further to say that environmental awareness and knowledge about environmental conservation were found to affect recycling attitude positively, therefore waste managers need to take steps to enhance the public knowledge on waste management. (McAllister, 2015).

Tracing from the preceding paragraphs, in Ghana, due to lack of education or low awareness creation on proper solid waste management practices, it appears that individuals in various municipal households often turn to blame the central government and the local authorities for the poor solid waste management situation in their localities instead of taking up roles as concerned citizens to ensure a tidy environment.

2.10 Repercussions of Improper Municipal Solid Waste Management

The abysmal waste situations in a developing country‟s cities can have enormous implications for public health and the environment (Neizer, 2014). To this end, Zahari (2007) noted that improper municipal solid waste management tend to affect households and municipalities in general by posing problems which are environmental, social and economic in nature. Boadi and Kuitunen (2003) argue that home collection of waste is limited to high and some middle income areas while the poor are left to contend with the problem on their own. This leads to indiscriminate disposal of waste in surface drains, canals and streams, creating unsanitary, and unsightly environments in many parts of the city. The decomposing piles of wastes, especially in communities of the poor, have the potential to attract and harbour vermin and rodents which spread diseases (Hardoy as cited in Sarpong, 2015). The accumulated wastes also attract foraging animals like dogs and goats which scatter infected waste materials, spreading diseases and causing a nuisance (Songsore & McGranahan, 2003). Besides, accumulated waste in the cities become hot beds for the breading of pathogens that cause diseases like dengue fever, malaria, leprosy and even elephantiasis while the blockage of drainage systems by waste materials creates stagnant waters which also become ideal breading grounds for mosquitoes and other vectors that spread disease pathogens.

The United Nations Environment Program (1996) also identified the following health risks associated with improper solid waste management; skin and blood infections resulting from direct contact with waste and from infected wounds, eye and respiratory diseases resulting from exposure to dust especially during landfills and road construction operations. Infectious diseases linked to poor environment conditions kills one out of every five children in Africa with diarrhea and acute

respiratory infections being the two major killers (WHO, 2002). Other sanitation related diseases include guinea worm, cholera, bilharzia and malaria (Boadi & Kuitunen, 2003). Achankang (2003) argue that the poor solid waste situation in the cities constitutes a disaster for human health and environmental degradation. Thus, the poor solid waste situation in the cities constitutes a disaster for human health and environmental degradation (Achankang, 2003).

Waste pollution in the cities also causes the pollution of both surface and underground water and cause damage to natural ecosystems (Perera as cited in Sarpong, 2015). Solid waste materials that find their way into water courses like drains, streams and lagoons block the flow of flash waters during storms and cause extensive flooding in some of these cities. For instance, the June 3, 2015 fire-flood disaster that occurred in Accra. Urban floods occur when drainage systems and other storm control devices over flow their embankments due to water blockages. In line with this assertion, Achankang (2003) opine that urban flooding leads to loss of lives, destruction of properties, halting of economic activities, displacement of affected households in low lying areas and increment in municipal authorities expenditure to provide relief packages to support flood victims.

A study conducted by Agyapong (2012) on solid waste management situation in the Berekum Municipality also revealed that there are visible implications of poor household solid waste management as garbage accumulation in communities, waste-clogged in drains and water bodies, and stinking gutters. When it rains, heaps of polythene bags, empty water sachets and other waste materials can be found all over the streets and backyards of houses (Agyapong, 2012). This situation is as a result of the fact that people dump waste into gutters waiting for rain water to convey it. Uncollected waste matter is also found in the streets and around houses resulting in

pollution in the municipality. Consequently, poor urban solid waste management practices display an ugly sight of the environment thereby destroying the beauty of municipalities in Ghana. The unpleasant odour and unattractive appearance of piles of uncontrolled solid waste along streets, markets and other recreational areas can also discourage investors who may set up businesses to provide employment opportunities for some municipal households (Agyapong, 2012).

Furthermore, Tahulela (2017) in a study on the effect of social norms and attitudes towards domestic waste management in a selected formal settlement in the Western Cape, South Africa hypothesized that there no influence of household waste management practices on social interactions among urban dwellers in unclean environments. Nonetheless, he further added that the increase in cost of health care services due to frequent disease outbreaks associated with poor solid waste management incur financial burden on municipal households. In Ghana, infectious and vector borne diseases like malaria, diarrhea and typhoid are the most common making significant health impact (Boadi & Kuitunen, 2003). In accord, the UNFCC (as cited in Fearon and Adraki, 2014) posited that majority of the diseases in municipal households are related to poor sanitary conditions with dire economic and social costs.

Drawing from the preceding paragraphs, the repercussions of inappropriate urban solid waste management on municipal households can be succinctly outlined as environmental effects, health effects and socio- economic effects. In a broader view, this include unsightly view of urban settlements, environmental degradation, disease outbreaks and annual urban floods. Therefore, it behooves on the local authorities and the government to give much more attention to the challenge of solid waste

generation and disposal in order for Ghana to achieve the Sustainable Development Goal 6, thus, improving sanitation and access to water supply by 2030.

2.11 Theoretical Framework

The study was supported by Ajzen‟s Theory of Planned Behaviour (TPB). Shaw (2008) found that this theory provides a framework for systematically examining attitudes and intentions of people‟s behaviours on waste management practices. The TPB proposes three determinants of intention; the foremost is the attitude toward the behaviour and it refers to the extent to which a person has a favourable or unfavourable evaluation of the behaviour in question, the second determinant is the subjective norm which refers to perceived social pressure to exhibit or not to exhibit a particular behaviour and the third is the perceived behavioural control which connotes the person‟s belief as to how easy or difficult the exhibition of the behaviour is likely to be (Ajzen, 1985).

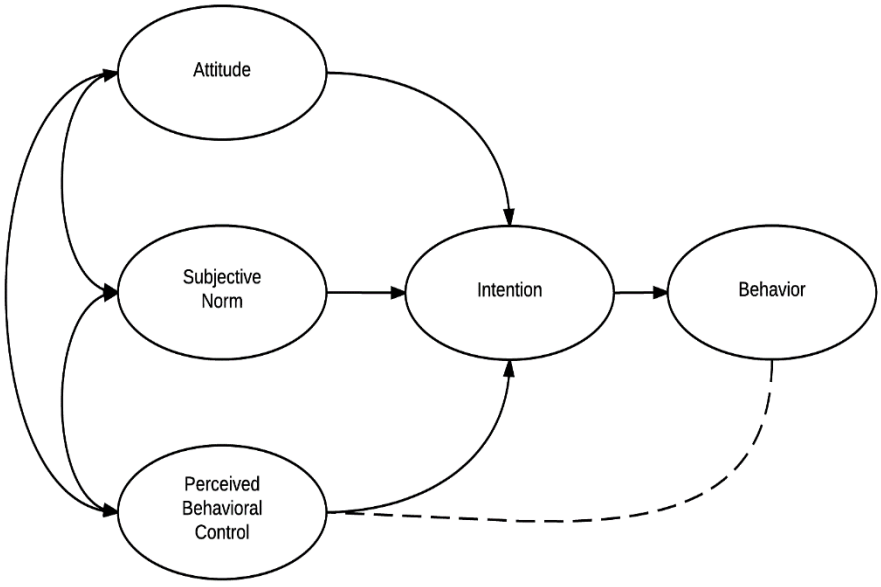

Figure 3: Theory of Planned Behaviour

Source: Adopted from Ajzen, 1985

The key component to this theory is behavioural intent. According to Dillon and Gayford (as cited in Sessi, 2014), behavioural intentions are influenced by the attitude about the likelihood that the behaviour will have the expected outcome and the subjective evaluation of the risks and benefits of that outcome. They further stressed that attitudes, subjective norms and perceived behavioural control predict the intention, which in turn predicts the behaviour. Background variables, as demographical factors (such as age, gender, location, occupation, educational and income levels) are supposed to influence the behaviour through the three determinants and the intention. Thus, attitudes, subjective norms and the perceived behavioural control explain the behavioural intention before the behaviour takes place hence the intention is a good predictor of the actual behaviour. Therefore, Shaw (2008) suggested that the perceived behavioural control is an estimate of the skills needed for expressing the behaviour and the possibility to overcome barriers. Therefore, a direct influence of perceived behavioural control on behaviour is supposed and the actual behaviour leads to feedback about the expectations of the behaviour.

Justifying the application of the TPB to the study, Staats (2003) indicated that the TPB is one of the theories most frequently used in the literature to explore pro-environmental behaviour including littering, recycling, travel mode choice, energy consumption, water conservation, food choice and ethical investment. However, he contended that a major limitation within this theory is an attitude/behaviour gap that exists as an inconsistency between one‟s values and actions. This relates to the discrepancy between people‟s concern over the environmental harm posed by household waste and the limited action by those same people to reduce their waste or engage in other pro-environmental behaviours (Staats, 2003). Succinctly put, this implies that there is a contrast between households concern about the state of solid

waste management and the actions expected to be taken to address the environmental challenge. Therefore, by applying the attitude/behaviour gap in the TPB to the study, it enabled the researcher to establish whether the cherished value of environmental cleanliness held by the households in Kasoa Township were translated into positive actions and a consequent desirable behaviour towards proper solid waste management practices.

Again, Sarpong (2015) also proposed that the TPB is suitable to predict a person‟s intent to exhibit a particular behaviour. Therefore, by relating the TPB to the study on the attitudes of households in Kasoa Township towards municipal solid waste management practices, it helped in ascertaining whether the individual household‟s in the study area were in need of specific resources in order to effectively manage solid waste generated or the household‟s had an attitudinal problem that influenced their behaviour towards solid waste management options at their disposal. Again, as a framework for understanding, explaining and predicting behaviour, the theory of planned behaviour served as a useful guide in making policy recommendations aimed at attitudinal change towards proper household solid waste management practices in the study area.

2.12 Summary of Literature Review

From the literature review, it emerged that solid wastes are generally unwanted substances from varied sources in the environment which are neither in the form of liquid nor gas. This may include organic and inorganic solid waste materials from sources such as households, commercial centers, farms, construction sites, mechanical shops and warehouses. The types of solid wastes mostly generated by municipal households comprise food wastes, paper, cardboard, plastics, textiles, glass,

metals, ashes, special wastes, consumer electronics, batteries, oil and household hazardous wastes.

The literature review revealed that conventional approach and community or participation- based approach are viable approaches to effective solid waste management in municipal households although commitment by all stakeholders is paramount to achieve the common goal of a clean environment. The literature review also highlighted that household‟s attitudes towards solid waste management options such as source reduction, reuse, recycling tend to change over time.

In addition, it was observed from the literature review that the challenges associated with municipal solid waste management particularly stems from financial or economic constraints, technological and logistical constraints, non- enforcement of laws on solid waste management, attitudes and perceptions towards solid waste management, institutional challenges as well as education and awareness creation on solid waste and management.

Moreover, the literature review pointed out that the consequences of inappropriate urban solid waste management on municipal households can be succinctly outlined under environmental effects, health effects and socio- economic effects. However, it appears that the literature review was silent on how the approach and the extent of involvement of households in making municipal solid waste management decisions influence municipal households‟ attitudes towards solid waste management practices. Therefore, the study focused on filling this gap in the study area.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter primarily focuses on how the study was conducted in order to achieve its purpose. The chapter discusses the philosophical paradigm, research approach, research design, description of the study area, population of the study, sample and sampling techniques as well as data collection instruments. The chapter further delves into the validity and reliability of quantitative data collection instrument, trustworthiness of qualitative data collection instruments, data analysis and ethical considerations.

3.1 Philosophical Paradigm

The study was conducted within the context of the pragmatic philosophical paradigm or worldview of research. Creswell (2014) perceives philosophical paradigm as a general philosophical orientation about the world and the nature of research that a researcher brings to a study. Guba and Lincoln (1994) also see research paradigms as worldviews or belief systems that guide researchers‟ action or an investigation. Thus, philosophical paradigms are the research worldviews or a set of beliefs that a researcher holds which informs his or her research practices. Creswell (2014) provides some hint on the nature of pragmatic research and contends that pragmatic researchers look at „what‟ and „how‟ to research based on intended consequences. According to him, pragmatic research worldview is problem- centered and it focuses on the consequences of actions. This applies to mixed methods research, in that inquirers draw liberally from both quantitative and qualitative assumptions when they engage in research (Creswell, 2014).

These prior explanations therefore informed the researcher to adopt the pragmatic philosophical paradigm for the study because the researcher was interested in understanding municipal solid waste management as a contemporary environmental challenge and how the attitudes of households contribute to the bane in Kasoa Township. Aside this, since the pragmatic philosophical paradigm is problem-centered focusing on the consequences of actions, it enabled the study to focus on the consequences of the actions taken so far by key stakeholders to mitigate the problem in the study area. Finally, since pragmatic inquirers draw liberally from mixed methods assumptions, this also informed the researcher to fuse the quantitative and qualitative research approaches for an insightful study.

3.2 Research Approach

The study was based on the mixed- methods approach in research. Creswell (2014) postulated that research approaches are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis and interpretation. Mixed- methods research approach involves the collection and "mixing" or integration of both quantitative and qualitative data in a study (Creswell, 2014). Thus, the mixed methods approach in research entails gathering, analyzing and fusing both quantitative and qualitative data from respondents or participants for an in-depth investigation into a phenomenon. Therefore, considering the nature of municipal solid waste management as a contemporary environmental challenge in Ghana, this led to the adoption of the mixed- methods approach by fusing quantitative and qualitative procedures to obtain detailed information on households attitudes towards the problem so as to use the findings as a basis to make policy recommendations to effectively address the problem in the study area and other municipalities.

3.3 Research Design

The study adopted the convergent parallel design based on the mixed-methods approach to find answers to the research questions posed. Burns (as cited in Kusi, 2012) opined that a research design is the overall plan for obtaining answers to research questions. Similarly, Adzahlie- Mensah, Agordah and Gyamfuaa-Abrefa (2017) also posited that research design refers to the overall strategy that a researcher chooses to integrate the different components of the study in a coherent and logical way thereby ensuring the researcher will effectively address the research problem. They further stated that research design constitutes the blueprint for the collection, measurement and analysis of data. Thus, a research design can be succinctly explained as is a blueprint for carrying out a study into a phenomenon.

According to Creswell (2014), convergent parallel design is a form of mixed-methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. He added that, in this design the investigator typically collects both forms of data at roughly the same time and then integrates the information in the interpretation of the overall results, contradictions or incongruent findings are explained or further probed. Estes, Hapner and O'Konis (2019) also postulated that the convergent parallel design is best suited to the pragmatic philosophical paradigm and enable researchers to obtain different but complementary data on the same research topic. The research design adopted therefore helped in providing much insight into the study due to the flexibility to use multiple data collection instruments including questionnaire, interview guide and observation checklist.

3.4 Description of the Study Area

The study was conducted in Kasoa Township, the capital of the Awutu Senya East Municipality. According 2010 Population and Housing Census analytical report on the Awutu Senya East Municipality, the Municipality has 6 zonal councils including Zongo, Ofaakor, Akweley, Opeikuma, Walantu and Kpormetey (GSS, 2014). In addition, it has 14 electoral areas and 1 constituency known as the Awutu Senya East Constituency. Specifically, the study was centered within the geographical demarcation of the Zongo zonal council which has 3 electoral areas including Zongo, New- Town and Iron City (GSS, 2014). This was due to the fact that these 3 electoral areas constitute the main Kasoa Township formally known as Oduponkpehe. Therefore, only households within Zongo, New- Town and Iron City were considered for the study.

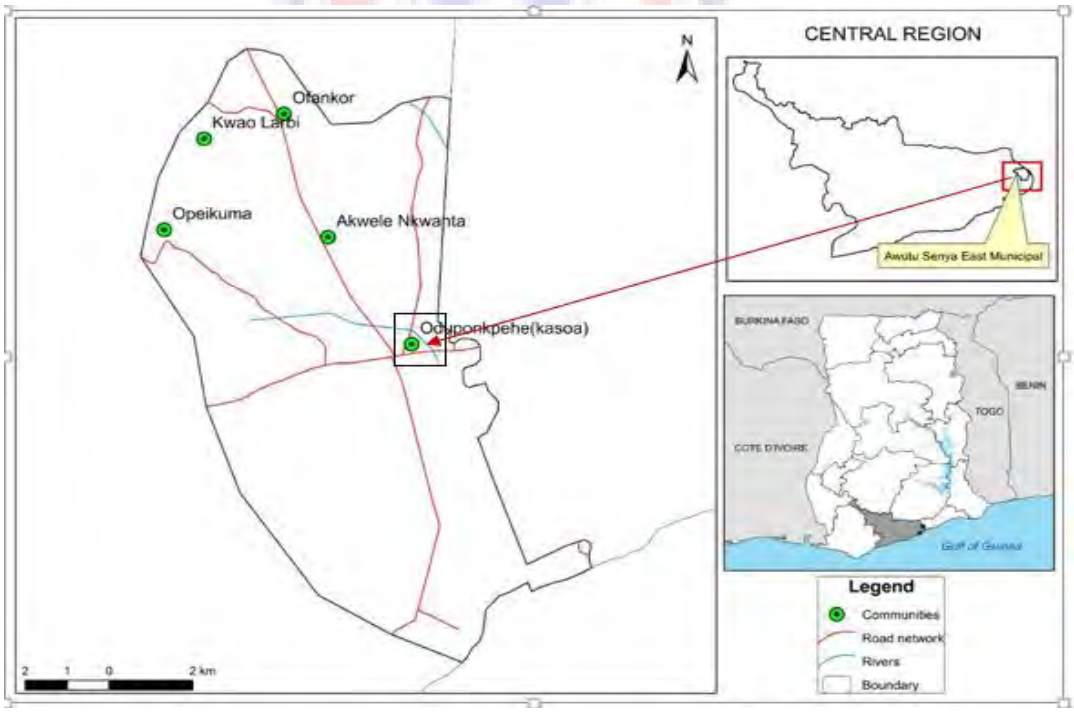

Figure 4: Study Area

Source: Sanda, 2019

3.4.1 Population size, structure and composition

The Awutu Senya East Municipal (ASEMA) is one of the newly created Municipalities in the Central Region. The Municipality was carved out of the former Awutu Senya District in 2012 and established as a Municipality by Legislative Instrument (L.I) 2025 with Kasoa as its capital (GSS, 2014). The rationale was to facilitate government‟s decentralization programs and local governance system. The population of Awutu Senya East Municipal, according to the 2010 Population and Housing Census, is 108,422 representing 4.9 percent of the region‟s total population. Males constitute 48.1 percent and females represent 51.9 percent. The proportion of the population living in urban areas is 94.1 percent compared to 5.9 percent in the rural areas. The Municipal has a sex ratio of 92.8. The population of the Municipal is youthful (38.3%) depicting a broad base population pyramid which tapers off with a small number of elderly persons (2.4%). However, the 2010 Population and Housing Census estimates that the population of Kasoa is about 69,384 people comprising 33, 157 males and 36,227 females (GSS, 2014). This represents the most densely populated settlement in the Municipality.

3.4.2 Household size, composition and structure

The Municipal has a household population of 105,231 with a total number of 25,322 households (GSS, 2014). The average household size in the Municipal is 4.3 persons per household. Children constitute the largest proportion of the household members accounting for 43.3 percent. Spouses form about 12.8 percent. Nuclear households (head, spouse(s) and children) constitute 34.9 percent of the total number of households in the district. More importantly, the 2010 Population and Housing Census estimates that there are about 16,445 households in Kasoa, the Municipal capital (GSS, 2014). This statistic suggests that the solid waste management problem

within Kasoa Township can be influenced by the attitudes of the households towards solid waste management practices.

3.4.3 Method of solid waste disposal

Figures from the Ghana Statistical Service (2014) indicates that the commonest form of solid waste disposal among households in the Municipality is burning (43.4%) followed by collection by waste management companies (29.9%). Public dump using container, (8.3%) and public dump in open space (7.4%) are also common in the Municipality. Burning solid waste (44.7%) is the main means used by urban households while rural households mainly use public dump in open space (43.6). The second most common means of solid waste disposal by urban households is collection by waste management companies (31.0%) followed by public dump in containers (8.6%). For rural households, burning (20.8%) comes second followed by dumping indiscriminately (13.8%). Burying of solid waste is not very common in urban households (6.2%) just as collection by waste management companies is also not very common in rural households (11.4%); the two solid waste disposal methods come forth in order of commonly used methods in the urban and rural perking (GSS, 2014).

3.4.4 Economy

The main economic activities in the Municipal include trading (wholesale/retail), agro- processing, informal sector service and commerce. Trading and its related activities are the leading economic ventures which, according to the 2010 Population and Housing Census, employ about 35.7 percent of the working population in the Municipality. Livestock production is also practiced in the Municipality but on a smaller scale. The informal sector"s contribution is enormous as

the sector employs about 81.9 percent of the working population in the banking and service sectors but needs to be integrated with the formal sector. Other economic activities include manufacturing, wholesaling and retailing, transportation among others (GSS, 2014). Thus, as an emerging commercial hub, the high spate of economic activities in the Municipality contributes greatly to the generation a chunk of solid waste materials both in households and within the Central Business District (CBD).

3.5 Population of the Study

The population of the study comprised all the people within Kasoa Township. The target population included all residents‟ of Kasoa Township whereas the accessible population comprised only household respondents‟ and waste management officers (key informants) who were available and willing to participate in the study.

3.6 Sample and Sampling Techniques

Kusi (2012) explained a sample as a sub-group of the entire population studied. Adzahlie- Mensah *et al*. (2017) also intimated that research sample are the members of the study population from whom we collect data. Thus, a sample is simply a representative of a study population. Hence, sampling techniques imply the processes involved in selecting a sub- group of a population to be studied. The study sample was 16,445 households within Kasoa Township (GSS, 2014). In order to get a representative sample size for household respondents involved in the study, the Fisher, Laing, Stoeckel and Townsend formula (as cited in Gyimah, 2018) was adopted.

$$n = \frac{z^2pq}{d^2}$$

Where; n= the desired sample size (when population is greater than 10,000 people);

z= the standard normal deviation, usually set at 1.96 which corresponds to the 95 percent confidence level;

p= the proportion in the target population estimated to have a particular characteristic set at 0.8;

q= 1.0-p. Thus, q=1.0-0.8= 0.2; and

d= degree of accuracy desired, usually set at 0.05

Substituting these figures into the formula:

$$n = \frac{(1.96)^2(0.8)(0.2)}{(0.05)^2}$$

$$n = \frac{(3.8416)(0.16)}{0.0025}$$

$$n = \frac{0.614656}{0.0025}$$

$$n = 245.86$$

$$n = 246$$

From the equation, 246 household respondents were selected for the study. Gyimah (2018) asserts that the Fisher et al. formula offer statistical estimation of meaningful sample size which makes the estimated sample size more reliable. Estes, Hapner and O‟Konis (2019) also contend that a sample size of at least 100 is recommended to conduct a test of statistical significance.

Based on the sample size, the single-stage cluster sampling technique was employed in selecting the 246 household respondents for the study. To execute this, the study area was initially divided into 3 clusters based on the number electoral areas that constitute the Zongo Zonal Council (ie. Iron City, New- Town and Zongo). Subsequently, the total number respondents in households involved in the study (246) was divided by the 3 clusters and obtained a result of 82 household respondents per cluster. In each cluster, 82 household respondents were randomly selected using the lottery method. By using the house numbers in each cluster obtained from the Zongo Zonal Council as the sample frame, the researcher carried out lottery method by listing the number of houses in each cluster on pieces of paper, thoroughly mixed the pieces of paper together and picked them singularly without replacement. Respondents were then chosen from each household that corresponded with the number that was randomly picked. The cluster sampling technique was employed due to the heterogeneous groups in the study area. Therefore, the cluster sampling technique reduced variability of the study results because it was a more accurate reflection of the accessible population.

Coupled with the above, purposive sampling technique was used in selecting an additional 5 key informants as participants of the study. The key informants involved in the study comprised an official from the ASEMA Waste Management Department, 1 officer from Zoomlion Waste Management Limited and 3 Assembly members from the electoral areas. Monsur (2012) noted that purposive sampling technique is the process whereby the researcher selects a sample based on experience or knowledge of the group to be sampled. Therefore, the criteria for the inclusion of these key informants as part of the study sample was that the researcher was interested in selecting only participants who had expert information, adequate knowledge and

experience in solid waste management practices in the study area. On this premise, the researcher used his discretion in selecting such participants since they were directly responsible for solid waste management in the study area. In summation, a sample size of 251 respondents were involved in the study. Table 3 presents a summary of the total number of respondents involved in the study.

Table 3: Summary of Sample Size

Unit of sampling	Sample size
Household respondents	246
Municipal Waste Management Department	1
Zoomlion Ghana Limited	1
Assembly members	3
Total	251

Source: Field Data, 2020

3.7 Data Collection Instruments

In this study, the instruments used for data collection were mainly questionnaire, in-depth interview guide and an observation checklist. These instruments aided the researcher to gather information in the form of primary data from the field.

3.7.1 Questionnaire

A set of structured questionnaire items were administered to one respondent who could read and write from each selected household in the study area. The structured questionnaire with closed- ended items were divided into five sections namely A, B, C, D and E. Creswell (2014) explained that the data validation variant of the convergent parallel design allows for few open- ended items on the questionnaire to compare and validate the data obtained using the interview guide on the same issue. Hence, few open ended questions were also added to the questionnaire

to obtain information on how the problem of solid waste management affect the households. Section A dealt with the demographic characteristics of the respondents including their age, gender, household size, geographical location, sector of work, educational level and income level. Sections B, C, D and E were also designed to find answers to the research questions. With this motive, Section B of the questionnaire focused on the types of solid waste generated by households in Kasoa. Section C captured the attitudes of households towards solid waste management options in Kasoa. Section D was also centered on the challenges faced by Kasoa households in solid waste management. Finally, Section E sought to find answers on the effects of solid waste management problem on households in Kasoa.

To ascertain the attitudes of households towards solid waste management practices in the study area, a 4- point Likert scale statements were administered to respondents to choose an option ranging from „strongly disagree", „disagree", „agree" and „strongly agree" on each item. The determination of the attitude of respondents towards source reduction and reuse of household solid wastes was based on mean and standard deviation scores using the Statistical Package for Service Solution (SPSS) version 20 software.

3.7.2 Interview guide

An unstructured interview guide was used to obtain the qualitative data from the key informants involved in the study. The unstructured interview guide was also constructed in line with the research questions in order to gather additional information to complement the quantitative data collected from the household respondents through the structured questionnaire. Subsequently, face- to- face interviews were conducted on different occasions for the 5 key informants including an official from the ASEMA Waste Management Department, 1 Zoomlion Ghana

Limited officer and 3 Assembly members in the study area. The interviews were conducted at the convenience of the participants so as to gather much information from them. Through the interviews, the researcher gathered detailed information from the participants since they were responsible for solid waste management in the study area. By posing probing questions, the interviews provided much insight into the challenges that the participants regularly face regarding the attitudes of households towards solid waste management in the study area. The recorded interviews lasted between 30 to 35 minutes for each interview session.

3.7.3 Observation checklist

Observation is the process of taking a critical look at behaviours and real life situations and recording them according to a planned scheme. Bell (as cited in Kusi, 2012) believes that observation is useful in determining what people actually do or how they actually behave in their contexts. Hence, the field observation involved scouting through the study area to observe the attitudes of households towards solid waste management practices. Through non- participatory observation, the researcher visited the specified catchment areas to get first-hand information for the study using an observation checklist. Observation checklist was designed with indicators on how households in Kasoa manage their solid wastes. Therefore, the observation checklist served as a structure or a framework to the researcher for an insightful observation which enabled him to obtain spontaneous information from the study area.

The field data collection exercise commenced with the administration of sets of structured questionnaire to the household respondents between 27th January, 2020 and 5th March, 2020. To facilitate the field exercise, the researcher engaged the services of two data collection assistants who were briefed about the purpose of the study as well as the data collection procedures. Subsequently, the sets of questionnaire

items were administered to the household respondents in Iron City, New- Town and Zongo respectively. Throughout the process, we were mindful of the need to ensure equal geographical representation of respondents within these communities. Having already booked the interview appointments during the preliminary field visitation, the face-to-face interviews were rescheduled at the convenience of the key informants between 9th March, 2020 and 11th March, 2020.

3.8 Validity and Reliability of Quantitative Instrument

According to Patten (as cited in Gyimah, 2018), an instrument is valid if it measures what it is intended to measure and accurately achieves the purpose for which it was designed. Validity therefore involves the appropriateness, meaningfulness and usefulness of inferences made by the researcher on the basis of the data collected. The content validity of the questionnaire items was enhanced by drafting questions to find answers to the research questions posed in the introductory chapter. This was further subjected to scrutiny by the supervisor of the work and another lecturer before being administered to the respondents in households. Some of the items were modified and the few that looked ambiguous were dropped. The final questionnaire items came down to 46 items including the demographic data of the respondents.

Wang (2006) intimated that reliability provides information on whether the instrument is collecting data in a consistent way. In the quest to find out how reliable the questionnaire items were, a pre-test reliability mission was undertaken by piloting the questionnaire to few household respondents in areas within the Akweley zonal council in the Awutu Senya East Municipality. Thus, the exercise was carried out to weigh up the suitability and utility of the instrument prior to the actual data collection. This was done by administering questionnaire to 15 household respondents between

13th January, 2020 and 17th January, 2020. Akweley was selected for the pilot study because it has similar characteristics with the selected areas in Kasoa Township due to household‟s involvement in commercial activities in the new market which is similar to the increased involvement of households in Kasoa old market. Based on the number of the questionnaire items administered, a Cronbach alpha internal reliability score of 0.72 was obtained using the SPSS version 20 software. Hence, the interpretation of the internal consistency of the questionnaire items was acceptable. This interpretation of the internal consistency supports Neville (2007) assertion that the decision rule for Cronbach‟s alpha is that a reliability of 0.60 or higher is considered acceptable. After the pilot exercise, all the necessary changes were made before the actual field data collection begun.

3.9 Trustworthiness of Qualitative Instruments

The trustworthiness of the qualitative field data obtained was also ensured by the researcher. In this regard, the confirmability of the qualitative data obtained for the study was guaranteed by making sure that the researcher‟s bias did not skew the opinions shared by the participants who were interviewed as a fabricated narrative during the transcription phase. Hence, the opinions shared by the participants on the study were reported verbatim and were reflected in the analysis of data, findings and discussions. Put differently, to ensure the confirmability of the qualitative data, the researcher‟s analysis of the participant‟s standpoints were reflective of the participant‟s views expressed. In addition, the credibility of the interview data obtained from the study was enhanced by aligning the interview guide items and observation checklist items with the critical issues contained in the questionnaire. This aided the researcher to obtain insightful information from the participants interviewed by addressing the lapses in the questionnaire.

3.10 Data Analysis

Quantitative data collected from the field were coded and presented using descriptive statistics such as bar charts, frequency, percentages, mean and standard deviation with the aid of the Statistical Package for Service Solution (SPSS) version 20 software. The qualitative data were also transcribed and presented under emergent themes and used where applicable to buttress the quantitative data. This was done by ensuring that recurring themes or patterns from the participants‟ views were grouped under similar headings. From the aforementioned, both the quantitative data gathered from the household respondents and the qualitative data obtained from the key informants results were analysed through side-by-side comparison to either confirm or disconfirm the results obtained for a detailed understanding about the nature of the problem investigated in the study area. Pictures taken during the field observation were also used to highlight some of the key issues that came up from the questionnaire and the interviews conducted.

3.11 Ethical Considerations

Halai (2006) opined that there are laid down principles and guidelines for conducting studies in an ethically appropriate manner which require researchers to obtain approval from ethics committee or equivalent and from the participants. To this end, the study was guided by research code of ethics such as access, informed consent, confidentiality and anonymity of the respondents during primary data collection. Regarding access, the researcher initially requested for a permission or an introductory letter from the Department of Social Studies Education, University of Education, Winneba on 22nd January, 2020 before proceeding to the field for data collection. Subsequently, permission was also sought from the Awutu Senya East Municipal Assembly regarding my intention to interview an official from the

Municipal Waste Management Department on an agreed date and time. Similarly, permission was sought from Zoomlion Waste Management Company Limited branch in Kasoa who then referred my introductory letter to their regional office in Cape Coast before approval was given to interview one officer. Contacts with the Assembly members in the study area were also established before the interviews were conducted.

Aside this, the informed consent of the household respondents were also sought by the researcher during data collection. This involved giving them information about the purpose of the study, how it would be carried out, the nature of their involvement, the duration for engagement, the kind of data to be collected from them and how it would be used and reported. On this premise, the respondents were able to make a decision whether to voluntarily participate in the study or not.

To guarantee the ethic of confidentiality during the field data collection, I made sure that all identifiable personal information such as names and addresses obtained from the household respondents and the key informants involved in the study were deleted from the final report. Also, after audio recordings had been obtained from the participants interviewed, the audio files were saved as password- protected files the researcher‟s laptop which prevented intruders from getting access to either read or edit the transcribed data. Moreover, coding was done to protect the anonymity of the key informants who were interviewed and were used where necessary. Furthermore, secondary information from books, journals, newspapers and online thesis which provided relevant literature on the study was duly acknowledged to avoid plagiarism.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.0 Introduction

This chapter presents the findings and discussion of the study. The chapter encompasses two main sections. The first section provides a description of the demographic characteristics of the household respondents who were involved in the study. In line with the four research questions that guided the study, the second section of the chapter also focuses on the findings and discussion of the study under the following themes; types of solid wastes generated by households in Kasoa Township, attitudes of households towards available solid waste management options in Kasoa Township, challenges faced by Kasoa households in solid waste management and effects of solid waste management problem on households in Kasoa Township.

4.1 Demographic Data of Household Respondents Involved in the Study

The results obtained from the sets of structured questionnaire administered to the household respondents involved in the study produced demographic information on the gender, age range, educational level, place of residence, household size, sector of work/occupation and the income level of the respondents. These information were gathered using questionnaire items 1 to 7 and were presented in Table 4.

Table 4: Demographic Data of Household Respondents Involved in the Study

Variable	Category	Frequency	Percentage (%)
Gender	Male	79	32.1
	Female	167	67.9
	Total	246	100.0
Age range	< 20 years	68	27.6
	20- 29 years	108	43.9
	30- 39 years	32	13.0
	40- 49 years	34	13.8
	50 years+	4	1.6
	Total	246	100.0
Educational level	Basic	61	24.8
	Shs/Tech/Voc	146	59.3
	Tertiary	39	15.9
	Total	246	100.0
Place of residence	New-Town	82	33.3
	Iron City	82	33.3
	Zongo	82	33.3
	Total	246	100.0
Household size	1-4	62	25.2
	5-9	108	43.9
	10 and above	76	30.9
	Total	246	100.0
Sector of work	Formal	58	23.6
	Informal	146	59.3
	None	42	17.1
	Total	246	100.0
Income level	Less than ₵500	82	33.3
	₵500-₵1000	72	29.3
	₵1100-₵1500	41	16.7
	₵1600-₵2000	17	6.9
	*Missing system	*24	9.8
	Total	246	100.0

*= unanswered item

Source: Field Data, 2020

On the basis of gender, the statistics presented in Table 4 discloses that 79(32.1%) of the household respondents who were involved in the study were males whereas 167(67.9%) of the respondents were females. The gender imbalance gave the impression that there were more females than males in the selected households regarding their sex distribution. Also, the gender imbalance shows that females in Kasoa Township are more involved in household solid waste management practices compared to their male counterparts. This study result also points to the fact that females play a crucial role in household solid waste management practices in Kasoa Township, hence the need to get them on board for a successful implementation of a strategic plans geared towards ensuring effective household solid waste management and the promotion of environmental cleanliness in the study area. Most significantly, this statistic on gender distribution represents the attitudes of both gender groups towards household solid waste management practices in the study area.

In terms of age range, Table 4 portrays that 68(27.6%) of the household respondents involved in the study were below 20 years. This shows that teenagers play a decisive role in household solid waste management practices especially performing solid waste disposal responsibilities. Age range 20- 29 years were represented by 108(43.9%) which constitutes the majority of the household respondents. Also, 32(13.0%) of the household respondents represented ages 30- 39 years and ages 40- 49 years were represented 34(13.8%). The least of the household respondents involved in the study were captured from ages 50 years and above as represented by 4(1.6%) respondents. Taking the majority of the age range involved in the study into consideration, it can be inferred that most of the household solid waste management decisions and practices in Kasoa Township are engineered by householders who are between the age cohort of 20- 29 years of age. However, the

aged who are 50 years and above constituted the least respondents‟ involved in the study. Therefore, this suggests that the aged usually delegate most of the household solid waste management duties to the younger ones or children.

As shown in Table 4, out of the 246 household respondents, the educational attainments of the respondents were such that 61(24.8%) of the respondents have had basic education, a majority of 146(59.3%) of the household respondents have had Senior High School (SHS), technical or vocational education and only 39(15.9%) of the household respondents have had some form of tertiary education. This indicates that the most of the respondents involved in the study were knowledgeable about solid waste management situation in their respective households. Again, this implies that the respondents involved in the study understand and appreciate the importance or the need to maintain proper solid waste management practices domestically.

As illustrated in Table 4, 82(33.3%) of the household respondents involved in the study were selected from New-Town. Also, 82(33.3%) of the household respondents involved in the study were selected from Iron City and the final cohort 82(33.3%) were chosen from the Zongo community. These statistics emphasized that the household respondents involved in the study were equally drawn from the 3 electoral areas within the main Kasoa Township in order to obtain a fair representation of the study sample. Also, the household respondents in these areas were selected for the study because they have similar characteristics to other households within the Municipality regarding their solid waste management practices. By implication, the equitable selection of the household respondents from the three electoral areas allowed the researcher to ascertain the reasons underpinning the persistence of the problem in the study area from varying geographical locations.

In addition to the prior statistics, 62(25.2%) of the household respondents indicated that their household sizes were between 1- 4 householders as observed in Table 4. However, a majority of the respondents 108(43.9%) revealed that their household size were between 5-9 householders whereas 76(30.9%) of the respondents also disclosed that there were 10 or more householders in their abode. These figures suggest that most of the respondents involved in the study reside in compound houses where domestic solid waste management responsibilities are shared among the householders. In addition, the percentages of the household sizes shows that a greater number of the respondents were from large families as observed in areas such as Zongo and New- Town. This implies that the households with large family sizes tend to produce more solid waste materials which end up in their surroundings.

Moreover, Table 4 revealed that only 58(23.6%) of the household respondents involved in the study were formally employed. In contrast, a majority of 146(59.3%) of the respondents indicated that they were working in the informal sector. This points out that most of the household respondents are informally employed as businessmen and businesswomen due to the increasing commercial activities within the Central Business District (CBD) of Kasoa Township. This also implies that a majority of the household respondents were within the working class thereby contributing to the generation of solid waste materials from their daily activities. To add to this, 42(17.1%) of the household respondents revealed that they were not employed either in the formal or informal sector hence being dependents on the working class. This suggests that most of the garbage produced in the households are as a result of the informal business activities engaged in by the householders working in the informal sector such as trading hence worsening the problem of household solid waste management in the study area.

Furthermore, the monthly income levels of the working group as indicated by the figures in Table 4 indicate that a majority 82(33.3%) of the household respondents earn below GH₵500.00 a month and 72(29.3%) of the respondents earn between GH₵500.00- GH₵1000.00 a month. The rest were 41(16.7%) of the respondents earn between GH₵1100.00- GH₵1500.00 a month, 17(6.9%) of the respondents earn between GH₵1600.00- GH₵2000.00 a month but only 10(4.1%) of the respondents earn above GH₵2000.00 in a month. However, some of the household respondents were reluctant to state their monthly income levels as represented by 24(9.8%) as „missing system". These statistics implied that the monthly income levels of the household respondents involved in the study were generally between low and middle - income status.

4.2 Analysis and Discussion of Research Findings

4.2.1 Types of solid wastes generated by households in Kasoa Township

This research question primarily sought to ascertain the types of solid waste materials generated by the selected households in the study area. According to Quarcoo (2014), adequate knowledge on the types of solid waste generated in the Awutu Senya East Municipality gives the Municipal Waste Management Department and the private waste management companies a clear idea about the appropriate methods to be used for the management of solid wastes. In view of this, the household respondents involved in the study were made to answer questionnaire items 9, 11, 12, and 13 which were related to their perception about the nature of solid waste management problem within their respective households in Kasoa Township, the major component of the types of solid waste materials generated in their households as well as the means adopted in storing solid waste materials generated in their households. In the same vein, interview guide items 2, 3, 4, 5, 6 and 7 responses

obtained from the key informants including an officer from the ASEMA Waste Management Department, a Zoomlion Waste Collection Services officer and Assembly members were also used for the same purpose of finding answers to research question 1.

4.2.1.1 Perception on the nature of household solid waste management problem in Kasoa Township

Respondents‟ perception about the nature of solid wastes produced in their households offer municipal authorities and service providers an idea about the extent to which households are concerned in the quest to ensure source reduction and the maintenance of proper solid waste management practices within the households in Kasoa Township. To this end, the questionnaire administered produced results on the perception of the household respondents‟ about the nature of solid waste management problem in their various households as presented in Table 5.

Table 5: Respondents Perception on the Nature of Solid Waste Management Problem in their Households

Statement	NP(%)	mP(%)	SP(%)	MP(%)	Total (%)	Mean	SD
What is your perception about the nature of solid waste management problem in your household?	15(6.1)	52(21.1)	23(9.3)	156(63.4)	246(100.0)	3.30	1.002

Key: NP= Not a problem, mP= minor problem, SP= Slight problem, MP= Major problem

Source: Field Data, 2020

The results from Table 5 shows that out of the 246 household respondents involved in the study, a majority of 156(63.4%) of respondents indicated that managing solid wastes generated in their households was a daunting problem for them. On the contrary, only 15(6.1%) were of the view that solid waste management in their households was not a problem at all. With a mean score of 3.30 out 4 and a standard deviation of 1.002, the responses obtained were above average since the coefficient of variance is above 1 indicating high spread of response distribution. Hence, this implied that a significant number of the household respondents perceived the nature of solid waste management as a problem within their respective households in Kasoa Township. As observed from the study area, the problematic nature of SWM was evident in households mainly situated in the low income areas particularly in Zongo where residential solid wastes were littered indiscriminately in the environment as compared to few of the household respondents mostly in the middle-income areas such as Iron- City and parts of New- Town who stressed that solid waste management was not a daunting problem in their households.

Although the nature of solid waste management in the households was generally perceived as a major problem, the study also revealed that majority of the households‟ respondents were of the view that the ASEMA Municipal Waste Department and Zoomlion, the leading service provider in the study area, should be held responsible to address the solid waste management problems faced by the households. This study finding corroborates an earlier finding by Douti, Abanyie and Ampofo (2017) that a good number of household respondents had developed a perception that it was the sole responsibility of the Bawku Municipal Assembly (BMA) to manage their wastes and maintain the urban environment clean. They further claimed prescribed that there should be the need for public awareness and

strong public participation on issues relating to solid waste management and environmental quality in the Municipality. This finding also confirms a report by Songsore and McGranaham (as cited in Asante, 2016) which stated that with the establishment of the Waste Management Department (WMD) under Metropolitan, Municipal and District Assemblies (MMDA"s), the public tend to have the view that the WMD should be solely responsible for managing waste instead of it being a shared responsibility. This assertion therefore reflects the perception of many municipal households that solid waste management is the sole responsibility of the local authorities and private service providers and that households are not expected to contribute that much even though they are primary generators of these solid wastes.

Responding to this study finding, majority of the key informants interviewed also confirmed that solid waste management was a general problem among the households in Kasoa Township. The officer from the Municipal Waste Management Department estimated that the households within Kasoa Township generate not less than 400 tonnes of solid wastes monthly and about 4800 tonnes of solid wastes per year. In addition, the Zoomlion officer interviewed reiterated that most of the households they render services to within Kasoa Township were aware and concerned about the huge amount of solid waste materials they generate. The following views shared by the two key informants were indicative of the finding from the household respondents:

> Participant 1: *The households, they generate a lot of solid wastes. In terms of quantity, it won"t be less than 400 tonnes per month, so the annual quantity will be 400 tonnes multiplied by 12, which will be about 4800 tonnes of solid wastes in a year. So we have a situation whereby most of the households know that managing their solid wastes is a big problem for them but they can do little about it due to their income levels…they just have to find ways and means to deal with it.*

> Participant 2: *In most of the communities that we serve, the households have the awareness that the amount of solid wastes that they generate are not only a concern to them but the surrounding households as well…*

These excerpts further points out that though the key informants were aware about the perception of the households on the solid waste management problem in the study area, they expressed concern about the households‟ ability to manage the increasing amount of solid waste materials generated on their own largely due to the generally low income level of the households in the study area. Therefore, comparing both results obtained from the households and key informants interviewed shows that there was congruence regarding the problematic nature of household solid waste management in Kasoa Township. In line with this finding, Chukwudi and Oluwafemi (2014) argued that in towns and cities, high population amplifies household solid waste generation but often households are unable to effectively handle the waste generation rates hence the institutional arrangements for solid waste management methods are often organized. This also confirms the finding by Mensah and Larbi (2005) that the waste management problem is more serious in low-income residential areas.

4.2.1.2 Types of solid wastes generated by household respondents

In the sets of questionnaire administered to the households, the selected respondents were made to indicate the major component of the types of solid waste materials generated in their respective households. Table 6 presented the results obtained.

Table 6: Respondents Views on the Types of Solid Wastes Generated by Households

Solid wastes	Frequency	Percentage (%)
Metallic wastes	23	9.3
Food wastes	116	47.2
Plastic wastes	84	34.1
Cardboards/papers	14	5.7
Others	9	3.7
Total	246	100.0

Source: Field Data, 2020

A cursory view of Table 6 specifies that only 23(9.3%) out of the 246 household respondents indicated that they generate metallic wastes in their households. The data also shows that food wastes and plastic wastes account for a chunk of the solid wastes generated by the households in Kasoa Township as indicated by 116(47.2%) and 84(34.1%) of the respondents respectively. Also, 14(5.7%) households responded that the major component of the types of solid wastes generated in their households were in the form of cardboards or papers. The generation of other types of domestic solid wastes including ashes, glasses, tree trimmings, textiles or used clothing and other solid waste materials like damaged home appliances (mainly fridges, television sets, fans and irons) were the least of the solid wastes generated as represented by 9(3.7%) of the households involved in the study. Within this context, it can be deduced that the types of solid wastes normally generated by the household respondents generally signal the households‟ consumption pattern and their preferences for the usage of certain materials or gadgets.

These prior findings are consistent with a study conducted by Gyimah (2018) that plastic and food wastes are the two most dominant wastes generated by households in the Cape Coast Metropolis. Similarly, Baabereyir (2009) in a study in the Greater Accra and Sekondi- Takoradi Metropolis noted that most respondents in

the study indicated organic waste as the commonest household waste item which can be attributed to the general household consumption pattern where fresh food items like fruits, tubers, roots and vegetables form the bulk of purchases of the average household. The finding also reiterates Tchobanoglous *et al.* (as cited in Quarcoo, 2014) assertion that organic wastes include all animal, plant and vegetable residues which may result from the preparation, cooking and eating of food. Therefore, this presupposes that the purchase and consumption of food items generate a lot of organic wastes in households in the study area.

In the same vein, confirming these findings from the household respondents, the key informants interviewed stated that organic wastes and plastic wastes are predominantly generated by the households within Kasoa Township. On this note, one of the key informants who participated in the study elaborated that:

> Participant 2: *…Oh for the types of solid wastes generated by the households in Kasoa, we have the organic that forms the major component of the total solid wastes collected. Aside that, then the plastics. When I talk about the organic wastes, we have left-over food wastes, rotten vegetables and other foodstuffs. We also have cardboards and boxes but the least is the metallic wastes, ,,scrubs" as we term them.*

In affirmation, participant 1and 4 posited that:

> Participant 1: *You know, Kasoa is a busy commercial centre and as such foodstuffs and plastics are very common in doing business. So many households buy these foodstuffs from the traders who then package them in black polythene bags for them to take home. So I think that is why we have these types of solid wastes being common in this area*.

> *Participant 4: Most of the time it is about the plastics and then the organic ones too…when they cook the leftovers. You know when these households they go out they buy raw foodstuffs or cooked ones which are mostly wrapped into one or two polythene bags. So when you are about 3 or 4 in a household and you always come home with these number of polythene bags it adds up to the plastic wastes. And then after they cook, the leftovers are also thrown away. So this is why these are the two most generated wastes in the households*.

The prior expressions from the key informants validates Agyapong (2012) findings that food wastes and plastic wastes dominated in all the households and communities in the Berekum Municipality. Therefore, comparison between the findings from the household respondents and the key informants interviewed revealed that there was consistency regarding food wastes and plastic waste materials constituting a chunk of the types of solid waste materials produced by the households in the study area. This finding affirms a previous research by the United Nations Environment Programme (2005) which indicated that the highest component of solid wastes generated in developing nations consist of organic materials. As observed in the study area, a considerable proportion of plastics in the household‟s waste stream can be attributed to the high spate in the use of plastic products in packaging food items and water. Also consistent with this finding, Douti, Abanyie and Ampofo (2017) contended that plastics are being used in Ghana as stretched High Density Polyethylene (HDPE) in sachet water packaging, Polyethylene Terephthalate (PET) bottles for bottling drinks and water, Low Density Polyethylene (LDPE) and Polystyrene (PS) as bags thereby leading to widespread generation of plastic wastes. Hence, this accounts for the proliferation of plastic waste materials in many urban households.

Sarpong (2015) however argued that the number of households coupled with the nature of work engaged by inhabitants in households influence the types and volume of municipal solid waste generation to a large extent. Omoleke (as cited in Wahab, 2012) therefore alluded that information about the physical and chemical properties of solid waste is important in evaluating equipment needs, systems and management programmes and plans, especially with respect to the implementation of disposal, resource and energy recovery options.

4.2.1.3 Means of solid wastes storage used by household respondents

Primary storage of solid wastes entails the storage of waste at the household level prior to disposal (Monney, Makimula & Bagah, 2013). The storage of solid waste materials prior to their collection and final disposal by the service providers is an essential characteristic of household solid waste management practices. According to Quarcoo (2014), solid waste storage is of primary importance because of the aesthetic consideration. He further opined that the storage of wastes generated by households before collection and transportation to the dump site involves the use of various receptacles such as polythene bags, propylene sacks, metal bins and card board boxes. In the light of this, the study sought from householders how they stored their solid waste before collection and disposal. Figure 5 portrays a graphical representation of responses relating to the various means of household solid wastes storage in Kasoa Township which included the use of metal containers, plastic bins, sack containers, polythene bags among others.

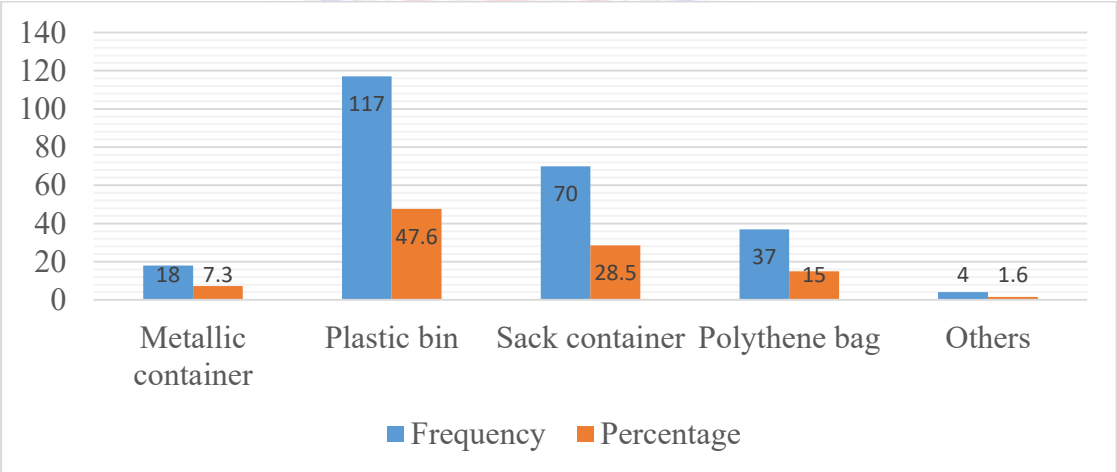

Figure 5: Means of Solid Wastes Storage used by Household Respondents

Source: Field Data, 2020

As observed from Figure 5, 117(47.6%) of the respondents involved in the study indicated that the means of storing their household solid wastes were through the use of plastic bins although this statistic represented less than a half of the entire household respondents. This represents the commonest means of solid waste storage within households in Kasoa Township. However, a majority of these respondents mainly resided in Iron City and parts of New-Town areas with only few respondents in the Zongo area whose income levels were much better. Hence, these few middle-income households were able to afford the plastic waste bins from their service providers or waste contractors. This was followed by the use of sack for solid waste storage as put forward by 70(28.5%) of the respondents as portrayed by the results in Figure 5.

Also, 37(15.0%) of the respondents‟ indicated the use of polythene bags for solid waste storage in their households. In addition, the use of metallic containers was also touted as a storage means for keeping solid wastes by a few of the household respondents‟ 18(7.3%) while other means of solid waste storage including the use of empty paper boxes and broken rubber buckets were indicated by 4(1.6%) of the respondents. Based on the field observation, the use of either sacks or polythene bags for solid waste storage were very predominant within the Zongo community. This suggest that most of the households could not afford the cost of securing waste bins to keep their solid wastes generated hence they resort to use other alternatives which are considerably less expensive. Figure 6 therefore affirm the observation made.

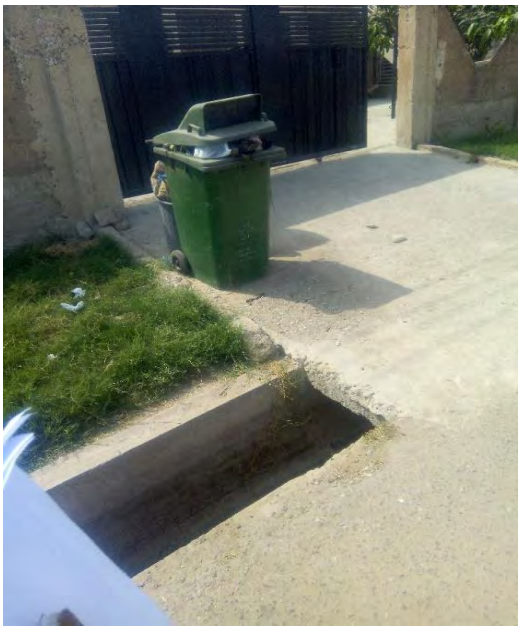

Figure 6: Use of Sack and Plastic Bags for Waste Storage at Kasoa Zongo

Figure 7: Storage of Solid in Solid a Bin at Iron City

Source: Field Data, 2020

Responding to these findings, two of the key informants interviewed also stressed that most of the communities in Kasoa Township store their solid wastes in a sack or polythene bag in the low income areas but the situation is quite different in some parts of the middle- income areas. They opined that:

> *Participant 1: The ASEMA Waste Department officers often report that in most of the communities within Kasoa Township, the households store their wastes in sack and polythene bags in the low and parts of the middle income areas but the situation is improving now than then because there has been increase in the use of waste bins lately especially in areas like New-Town and Iron City.*

> *Participant 3: In this community, only few households show concern about acquiring waste bins for storage. They prefer the traditional means of waste storage like the use either sacks and polythene bags for solid waste storage.*

Consistent with these findings, Monney, Makimula and Bagah (2013) asserted that primary storage is generally very poor among low- and middle- income households. They further asserted that approximately a quarter of all households in Wa store their waste in a sanitary bin whereas the remaining fraction store their waste in either old gallons, buckets, basins or baskets. Hence, comparing the findings from the household respondents and the key informants involved in the study, it can be interpreted that the means of solid waste storage among the households within Kasoa Township is dependent on the household income level as most of the middle-income households could afford waste bins for storage but generally the low- income households resort to the use of sacks, boxes and polythene bags. The findings also support a research conducted by Owusu-Ansah (2011) in the Accra metropolitan area which revealed that solid waste stored in polythene bags, card board boxes and in old buckets were prevalent in both the low and middle-income areas. Therefore, this implies that much need to be done by the ASEMA WMD to subsidize the cost of procuring waste bins for households in the low- income areas to enhance proper storage of solid wastes.

4.2.2 Attitudes of households in Kasoa Township towards solid waste management options

This research question primarily sought to assess the attitudes of the household respondents towards solid waste management practices in Kasoa Township. In specific terms, the household respondents involved in the study were initially made to answer questions relating to their attitudes towards source reduction and reuse of household solid wastes generated. Also, the household respondents answered questions regarding the available methods in which they normally use for solid waste disposal in their respective households. To this end, questionnaire items

16, 17, 21, 22, 25, 27, 29 and 31 were used in gathering the quantitative data from the household respondents. Subsequently, further views in finding a detailed information in response to research question two were elicited from the key informants who participated in the study using interview guide items 8, 9 and 10.

4.2.2.1 Attitudes of household respondents' towards source reduction and reuse of solid wastes in Kasoa Township

Source reduction and reuse of solid waste materials are the foremost and integral elements of the waste management hierarchy. According to the United States EPA (2017), source reduction (also known as waste prevention) means reducing wastes at the point of generation and it is the most environmentally preferred strategy in waste management. It can take different forms including reusing or donating items, buying in bulk, reducing packaging, redesigning products and reducing toxicity (United States EPA, 2017). The attitudes of households towards source reduction and reuse of solid waste materials therefore presents the first step towards tackling the persistent solid waste management problems faced by the households in Kasoa Township. To this end, the household respondents involved in the study were asked to indicate the extent to which they agreed or disagreed with statements about their attitudes towards source reduction and reuse of household solid wastes on a 4- point Likert scale. The determination of the attitude of household respondents towards source reduction and reuse of household solid waste materials were therefore based on the mean and standard deviation scores obtained. The scale of attitudinal measurement statistics were therefore interpreted as 0-1.4 (strongly disagree); 1.5- 2.4 (disagree); 2.5- 3.4 (agree); and 3.5- 4.0 (strongly agree). The results gathered were presented in Table 7.

Table 7: Household Respondents Views on Attitudes towards Source Reduction and Reuse of Solid Waste Materials

Statement	SD(%)	D(%)	A(%)	SA(%)	Mean	SD
I am concerned about the solid waste generation situation in my household	20(8.1)	34(13.8)	144(46.9)	78(31.7)	3.04	0.89
Littering is a common practice in my household	46(18.7)	58(23.6)	106(43.1)	36(14.6)	2.54	0.94
I often take actions to reduce the volume of solid wastes generated in my household	76(30.9)	110(44.7)	46(18.7)	14(5.7)	1.99	0.85
I usually prefer to reuse reusable solid waste materials in my home	95(38.6)	102(41.5)	41(16.7)	8(3.3)	1.85	0.81
I frequently separate the types of solid wastes generated for sale	104(42.3)	86(35.0)	37(15.0)	19(7.7)	1.88	0.93
The cost of managing solid wastes influence my attitude towards proper solid waste management	8(3.3)	28(11.4)	90(36.6)	120(48.8)	3.31	0.79
My attitude towards household source reduction and reuse generally affect waste management efforts by the authorities in Kasoa Township	11(4.5)	32(13.0)	89(36.2)	114(46.3)	3.24	0.85

Key: SD= Strongly Disagree, D= Disagree, A= Agree, SA= Strongly Agree

Source: Field Data, 2020

The results presented in Table 7 reveal that most of the respondents were concerned about the solid waste generation situation in their households (M = 3.04, Std. = 0.89). The results however shows that a slight majority of the respondents agreed that littering was a common practice in their households (M = 2.54, Std. = 0.94). Also, the low mean and standard deviation scores indicated that most of the household respondents disagreed that with the statement that they often take actions to reduce the volume of solid wastes generated in their homes as represented by a mean of 1.99 and standard deviation of 0.85 respectively. In evidence of this, most of the

household respondents indicated that they prefer buying plastic packaged stuffs to unpackaged stuff from the market and retail shops to their homes.

In addition to the results presented in Table 7, a mean score of 1.85 and standard deviation 0.81 of shows that a significant majority of the respondents disagreed with the statement that they usually prefer to reuse solid waste materials once used. As observed from the study area, the attitudes of the households towards reusing of plastic bottles for storing or as drinking water bottle as well as reusing plastic bags for shopping of food items were absent among most of the householders as such reusable waste materials like sachet water rubber, bottled water and „take away" food packages were immediately thrown away into bins or open space after use.

Moreover, the household respondents were asked to indicate their attitude towards separation their solid wastes generated. Consequently, the mean and standard deviation scores of 1.88 and 0.93 respectively obtained disclosed that a significant majority of the household respondents in the study area rarely separate the various types of solid wastes generated. Both organic and inorganic components of solid wastes are directly discarded into receptacles without consideration for the sale of the recyclable components to waste pickers. Affirming this finding, similar study conducted at the Ga East Municipality in Accra, Yoada *et al*. (2014) intimated that about 83% of the household respondents do not separate their waste before disposal.

Furthermore, the statistics in Table 7 reveal that most of the respondents agreed that the cost of managing solid wastes influence their attitude towards proper solid waste management (M = 3.31, Std. = 0.79). Furthermore, the statistics presented in Table 7 indicate that most of the household respondents agreed with the statement that their attitude towards household source reduction and reuse generally affect waste

management efforts by the authorities in Kasoa Township as represented by a mean of 3.24 and a standard deviation of 0.85.

Confirming the preceding findings, the key informants interviewed stressed that the general attitude of the households in the study area towards source reduction and reuse of solid wastes was not all that positive. They revealed that some of the households still have the primitive mindset that solid wastes are worthless materials hence they generate and dispose them at their own will. The Municipal Waste Management Department official and Zoomlion officer interviewed respectively opined that:

> *You know, here is a commercial and at the same time settlement town. So, the households generate a lot of refuse and they put them anywhere. When you tell them that Kasoa is now developing so they have to reduce the amount of waste they produce, they see that to be so strange. . They still have the traditional mindset that "borla ɛyɛ borla, adɛn nti na ɛw) sɛɛ me b) ka w) ho?. The attitude towards source reduction is not all that positive but gradually it is improving.*

> *Not at all, the households usually combine the types of solid wastes they generate into their bins. I haven't seen even one household that reuse or separate their waste in this area. They add the plastic bottles, the food wastes, papers, take-away rubbers and put all of them into one dustbin.*

However, one of the Assembly Members interviewed remarked that there are only few of the households who usually resort to picking of recyclable solid waste materials from the neighbouring households or communities and resell them to those who occasionally come around to purchase recyclable wastes. He asserted that:

> *There are a few people who go around picking sachet water rubbers and plastic bottles. Though it is not all of them that are interested, few of them see it a business venture so try to separate these sachet water rubbers and plastic bottles so that they will sell them to those who normally come around to purchase them.*

The juxtaposition of the study findings from the perspectives of both the household respondents and key informants involved in the study reveal that majority of the households in Kasoa Township have poor attitudes towards source reduction and reuse of solid wastes materials even though they are concerned about the generation rates. By relating this study finding to the TPB (Figure 3) element on attitude, this suggests that the poor attitudes developed by majority of the households tend to influence their intentions towards source reduction and reuse of solid wastes which culminate in their undesirable SWM behaviour. In consonance with this study finding, Babaei *et al.* (2015) in a study about household‟s knowledge, attitudes and practices towards solid waste management in Abadan observed that only 1.7% of the household participants did practice source reduction and reuse of solid wastes materials. Also corroborating with this finding, Al-Khatib *et al.* (2009) opined that a negative attitude often associated with the mismanagement of household solid wastes in developing countries is the incidence of littering. Tsiboe and Marbel (as cited in Asante, 2016) therefore concluded that for efficient waste management, households should separate their domestic solid waste into glass, paper, plastic categories; thereby enabling easy collection and consequently reuse. This would effectively minimize solid waste generation through source reduction.

4.2.2.2 Available solid waste disposal methods used by household respondents in Kasoa Township

The disposal of household solid waste materials is one of the major components regarding domestic solid waste management. Information on where households‟ dispose of their domestic solid wastes generated provides a hint on the type of solid waste management system available in a municipality. The 2010 Population and Housing Census analytical report from the Ghana Statistical Service

(2014) indicates that burning of solid wastes is the main means used by urban households in the Awutu Senya East Municipality. The second most common means of solid waste disposal by urban households in the municipality is collection by waste management companies. Public dump in containers and public dump in open space are also common in the municipality. However, burying of solid waste is not very common in urban households (GSS, 2014). The questionnaire administered therefore directed the household respondents involved in the study to indicate the preferred methods through which they dispose of their solid wastes in Kasoa Township. Results gathered were presented in Figure 8.

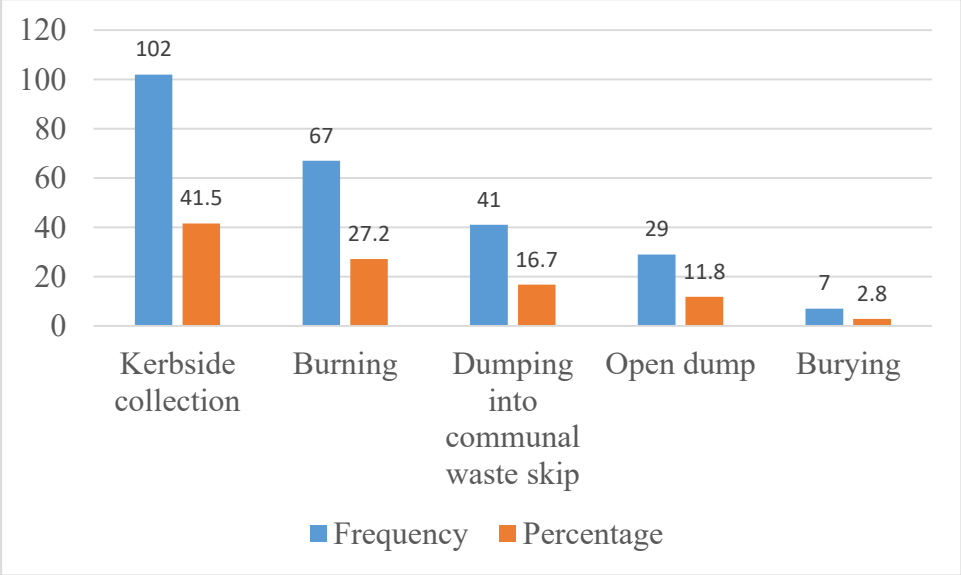

Figure 8: Available Solid Waste Disposal Methods used by Households in Kasoa Township

Source: Field Data, 2020

Results from Figure 8 elucidates that the commonest method of solid waste disposal used by households in Kasoa Township was through kerbside collection service as represented by 102(41.5%) of respondents. This finding indicates that almost half of the household respondents were adhering to the Polluter Pay- Principle (PPP) which is integral in the participation-based approach to solid waste

management. The study however found out that the kerbside collection service were in two main forms. One of such solid waste disposal method employed by the households was subscription for door-to- door solid waste collection from Zoomlion which was the main service provider in the study area or other contracted private solid waste management companies like Alliance Waste, Atallis, Network Collection and Sisbro Waste. With this solid waste disposal method, the households indicated that they directly dispose of stored solid waste materials from bins into Zoomlion compactor trucks for a monthly fee of GH₵40.00 per bin at weekly intervals. The study however found out that this method of solid waste disposal was only prevalent among the middle- income households due to the cost of purchasing the waste bins at price ranging between GH₵250.00 to GH₵400.00 depending on the quality and the size. The other form of kerbside collection as indicated by the household respondents was the use of tricycles as known in the local parlance as "Kaya borla" for household solid waste collection. This method of solid waste disposal was more common in the low-income households where the respondents dispose of their solid wastes stored in receptacles including metal containers, sacks or plastic bags into tricycles usually on daily basis at an affordable fee depending on the volume of solid wastes generated.

Reacting to the prior finding, one of the key informants interviewed affirmed that the disposal of household solid wastes by subscribing for collection by service providers was the commonest means through which households dispose of their solid wastes within Kasoa Township. According to the Municipal Waste Management official interviewed:

> *They all prefer the door-to- door service offered by the contractors but for some households the means is not there. So, we have the tricycles that also go around to the low-income households to collect the solid wastes. You know, some households can"tpay GH₵40.00 per dustbin at the end of the month so they just register with the tricycles. So they pay either GH₵1.00*

or GH₵2.00 for daily refuse collection. So, that one too is an option for the households to dispose their solid wastes and this is working a lot.

Another key informant interviewed also opinionated that although most of the households in Kasoa Township now prefer to dispose of their solid wastes materials by subscribing to the service rendered by the waste contractors, the few households who cannot afford the kerbside collection service resort to burning their solid wastes materials either in front of their houses or behind their walls. The Zoomlion officer stressed that:

The preferred option is they registering for door-to-door collection with a private service provider. Upon this, they are given dustbins to put all their refuse in them and then the services providers will come and empty them into their compactors at least once a week. That"sfor those who have registered for the door-to-door services. However, a few who have not registered keep on burning their refuse in the open or behind their walls.

The observation made by the Zoomlion officer interviewed was initially confirmed by 67(27.2%) of the respondents who disclosed that burning of solid waste materials was the disposal method used by households as depicted in Fig.8. The household respondents indicated that open burning of combustible solid waste materials such as paper, wood, plastics, textiles among others was their preferred solid waste disposal method. However, it emerged from the study that open burning was second in the perking order as compared to the subscription for the kerbside collection service provided by the waste contractors. In throwing more light on this finding, one of the Assembly members interviewed made the following observation:

Participant 4: *The households often negotiate with the private waste collectors for the bins, some pay in installments others pay in cash but when it comes to the collection of the monthly fees then it turns into all sort of problems. Some of the households have decided to store their wastes in the bins but burn them in front of their houses when they become full because they don't have money to pay every month.*

The situation on open burning of solid wastes by some of the households in the study area was also confirmed in Figure 9 as observed in the study area.

Figure 9: Open Burning of Solid Wastes by a Household at Kasoa Zongo

Source: Field Data, 2020

Comparing the findings from the household respondents and key informants involved in the study, it was therefore deduced from the study that in terms of solid waste disposal methods, majority of the household respondents in Kasoa Township prefer the Kerbside collection services offered by the private contractors to open burning of solid waste materials. This study finding was in contradiction to the 2010 Population and Housing Census analytical report from the Ghana Statistical Service (2014) which was indicative that burning of solid wastes is the main means used by urban households in the Awutu Senya East Municipality. The second most common means of solid waste disposal by urban households in the municipality is collection by waste management companies (GSS, 2014). Therefore, this new trend of solid waste

disposal method suggests that over the years, most of the households within Kasoa Township have drifted from open combustion of solid waste materials generated to subscription for kerbside collection services since it is comparably environmentally friendly and modernized.

As shown in Figure 8, 41(16.7%) of respondents involved in the study also disclosed dumping their household solid wastes into communal waste skips provided by the ASEMA Waste Management Department as their method of solid waste disposal. It was observed that these communal waste skips which were supervised by individuals appointed by the ASEMA Waste Department in consultation with the Assembly Members mostly sited around the Zongo community and some parts of New-Town. Confirming this finding, participant 1 succinctly noted that;

> *In the areas that the Zoomlion trucks and the tricycles cannot go or the households find it too difficult to pay for door-to-door collection, the Assembly has stationed communal waste skips for them to dump their solid wastes at affordable charges. So it a way of assisting them so that they will not suffer from the effects of poor household waste management.*

The study found out that in places like the Zongo community and some parts of New-Town where the communities are densely populated and relatively poor, few households comply with the use of the communal waste skips provided by the ASEMA Waste Department for their solid waste disposal. In congruence with this finding, Puopiel (2010) noted that the use of communal waste skips is highly popular and patronized by residents of low-class areas in the Tamale Metropolitan Assembly. The finding is also in line with Yoada *et al*. (2014) conclusion that most poor residents dispose their waste into public containers. Hence, this suggests that in areas where the communal container services provided by the local assembly are available, they tend to be a more viable option for poor households to dispose of their solid

wastes appropriately in Kasoa Township. Rahman *et al*. (2005) therefore opined that in conventional system of collection and disposal of wastes, the municipal waste department trucks visit the waste storage station point at a regular intervals to collect and haul the stored wastes to the final disposal site.

More so, Figure 8 portrays that 29(11.8%) of respondents used open dumping as the method for disposing of their solid wastes generated but burying of households solid waste materials was the least method of solid waste disposal used by the households in Kasoa Township which was represented by only 7(2.8%) of the respondents. This showed that less than a quarter of the respondents in households indicated that they employed open dumping and burning as methods for disposing of their solid wastes. However, as observed from the study area, it appeared that the practice of open dumps were particularly peculiar among households in low-income neighbourhoods such as Gadambo and Zongo 94 within the Zongo community as well as some parts of New- Town. These observations were captured in Fig.10.

Figure 10: Pictures Showing the Practice of Open Dumping at Gadambo and Zongo 94 Area in Kasoa Zongo Community

Source: Field Data, 2020

Similarly, the researcher observed open dumping among some low-income households in parts of New-Town as portrayed in Figure. 11.

Figure 11: Picture showing Open Dumping in part of Kasoa New-Town

Source: Field Data, 2020

The observations in Figure 10 and Figure 11 within the low-income areas were also echoed by an Assembly member and the Zoomlion official interviewed respectively:

> *As an Assemblyman for this area, I frequently engage the landlords to make sure that the refuse generated by their households are properly disposed off. Although some of households are trying to do this, most of them do carry their refuse to the nearby open dump site because they don"t even understand why they should pay for their wastes generated.*

> *Well….for those in the middle-income areas like Iron City and parts of New-Town, for them they can manage it but it is a general problem for the low-income households. Sometimes what to eat is even a problem, so for some of them they resort to undesirable means of getting rid of their solid wastes by indiscriminate dumping in the environment. That"swhy sometimes at dawn or in the night they dump their wastes*

along the streets. Sometimes too when it rains, they dispose of their rubbish into the running water to be carried away.

In the interview with the Municipal Waste Management official, he however disclosed that the rate of open dumping of solid waste materials is gradually declining among the households within Kasoa Township as compared to some years ago due to the formation of a sanitation monitoring team by the Municipal Waste Department and prosecution of perpetrators at the district court. He further explained that the monitoring team comprised the members of the ASEMA Waste Department, delegated sanitation officers in the 3 electoral areas as well as the Assembly members. The following narrative shows the view shared by the participant:

The Assembly has a team that routinely monitor the various communities. When they go out for supervision, the report that they bring shows that the situation is improving now than then. Yet, some households indiscriminately throw their refuse around. For instance, like they are carrying some garbage, if they get to a place and they see that no one is coming then they drop it but this is not a desirable option. When they are caught, they are prosecuted at the district court and the news spreads quickly within the communities. So the households try not to find themselves in that similar situation by being sent to court.

The preceding assertion together with the field observations portrayed in Fig.10 and Fig.11 respectively suggested that most of the household respondents especially within the low- income in areas such as Gadambo and Zongo 94 in the Zongo community as well as parts of New- Town who were involved in the study were reluctant to disclose that they indiscriminately dump their household solid wastes generated due fear of being sanctioned by the authorities. This indication supports Quarcoo (2014) observation that as many as 29.5 % of the low-income households in the Awutu Senya East Municipality resort to indiscriminate methods of solid waste disposal. These include dumping refuse in open depressions, open spaces, in front of their houses and in their backyards. Therefore, this implies that household

attitude towards open dumps can be changed when prosecution for flouting sanitation laws are greatly enforced.

Finally, on the reason why burying was the least preferred method of solid waste disposal among the households in Kasoa Township, the key informants were of the view that this was due to the limited land space for the households to bury waste materials in the backyards of their houses. Participant 4 attested that:

> *Oh…burying of solid waste materials has reduced among the households. Instead of burying, they prefer burning. Already, the land size is limited for the population. In almost every little available space people are putting up structures. So where are you going to bury your refuse? So, a few households openly burn their solid waste materials but burying has gone down completely.*

As reported by Ghana Statistical Service (2014), burying of solid waste is not very common in urban households in the Awutu Senya East Municipality. Therefore, the report confirms the study finding that burying of solid wastes was the least solid waste disposal method used by the households in Kasoa Township.

4.2.3 Challenges faced by Kasoa households in solid waste management

This research question was set out to examine the challenges encountered by households in managing their solid wastes in Kasoa Township. To find answers to this research question, the households respondents involved in the study were made to indicate the challenges they regularly encounter in managing their solid wastes generated. Also, the household respondents answered a question pertaining to the approach to solid waste management decisions used by the institutions charged to manage wastes in addressing the challenges encountered. Questionnaire items 34, 35 and 39 were used for the household respondents whilst interview guide items 15 and 19 were used to elicit the views of the key informants who participated in the study.

4.2.3.1 Challenges regularly encountered by households in managing their solid wastes in Kasoa Township

The set of structured questionnaire items were specifically employed as part of the researcher‟s quest to uncover the problems associated with household solid waste management in Kasoa Township. Table 8 presents the information gathered from the household respondents.

Table 8: Respondents' Views on Challenges Regularly Encountered in Managing Household Solid Wastes in Kasoa Township

Responses	Frequency	Percentage (%)
High cost of waste bins	74	30.1
Unreliable waste collection schedule by Zoomlion and other private service providers	49	19.9
High fees charged by Zoomlion and other private service providers for solid waste collection	96	39.0
Low education on proper household solid waste management practices by the ASEMA Waste Department	23	9.3
Others	4	1.7
Total	246	100.0

Source: Field Data, 2020

From the data collated and presented in Table 8, the study uncovered that the high cost of procuring wastes bins and high fees charged by Zoomlion and other private waste collectors were the major challenges regularly encountered by the households in Kasoa Township as represented by 74(30.1%) of the household respondents and 96(39.0%) of the household respondents respectively. Also, 49(19.9%) of the household respondents identified the unreliable waste collection schedule by Zoomlion and other contracted private service providers as a challenge in the study area. However, only 23(9.3%) of the respondents pointed at low education

on proper household solid waste management practices by the ASEMA Waste Management Department as an inhibiting factor to ensure best practices in managing their household solid wastes generated whereas few 4(1.7%) of respondents" identified long distance to communal waste skips before waste disposal as a challenge.

Coincidental to the results presented in Table 8, the key informants interviewed also agreed that majority of the households in the study area complain a lot about the affordability of the waste bins as well as the monthly payments for the kerbside collection services offered by Zoomlion and other private waste contractors due to their low-income status. The following quotes were illustrative of their assertions given by the Municipal Waste Management official and the Zoomlion official interviewed:

> Participant 1: *Erm, the cost of managing it especially the households. They complain that it is not affordable to some of them. For now, they complain a lot about the cost of the door- to-door service offered by the contractors. Also, the service providers sometimes their trucks break down so sometimes they are not able to service their clients on schedule. As stated in the MoU, the contractual agreement states that the contractors are supposed to service their clients at least twice a week but sometimes their compactor trucks break down so they are not able to follow their schedule.*

> Participant 2: *Oh for now, we the private waste collectors are doing well. As I said earlier, in a month they pay GH40.00 per bin but most of them complain that it is too much for them. Anytime you see somebody"s waste uncollected then it means that household has not been paying on time*.

An Assembly Member also admitted that:

> Participant 3: *Most of them complain about money to pay for the private waste collectors. Most of them ask that "why should I pay for my wastes?" They don"teven understand why they have to pay for the wastes they generate. They often quarrel with the private waste collectors. So mostly it is about the money to pay for the waste collection.*

Comparing the quantitative and qualitative data sets presented, it emerged from the study that a significant majority of the household respondents as well as the key informants interviewed were in consensus that the cost of procuring the waste bins and payment of the monthly kerbside collection service charges are major affronts to ensure effective household solid waste management in Kasoa Township considering their low income levels. By implication, this especially influence the willingness of the low-income households to pay for the services rendered to them by the private contractors. The reason accounting for this was highlighted by the TPB (Figure 3) adopted for the study that the attitudes of most residents in low-income areas are influenced by cost of managing their solid wastes generated hence they have difficulty in paying for the private waste collection services since they have not been paying for waste disposal over the years.

Consequently, it was deduced from the study that these challenges directly compel some of the low-income households to seek other means of disposing of their solid wastes through burning and open dumping which are not environmentally appropriate as depicted in Fig. 9 and Fig. 11 respectively. In accord with the finding, Oteng-Ababio (2011) maintains that urban householders often complain of high cost of bins for use as solid waste receptacles, as a result, they often resist paying the charges levied and instead prefer to dispose by informal dumping. However, Addai and Danso-Abeam (2014) as well as Aggrey and Douglason (2010) hypothesized that the higher people‟s level of education, the more they would appreciate the consequences of mishandling solid waste and the more they would be willing to pay in order to avoid the risk of being victims of an unclean environment. Hence, this suggests that it has become imperative for municipal authorities to continually educate households on the repercussions of solid waste mismanagement irrespective

of the disparity in households‟ income level in order to engender the attitude of willingness to pay for solid waste collection services.

4.2.3.2 Type of approach to solid waste management decisions in Kasoa Township

On the face of the challenges highlighted by the study, the researcher sought to ascertain the approach in which household solid waste management decisions are made by the authorities in Kasoa Township. The responses gathered from the household respondents involved in the study were suggestive that the type of approach to household solid waste management decisions adopted by the authorities in Kasoa Township was top- down. The study revealed that households were rarely involved in the decision- making process hence this has made them less vocal in expressing their plight in bargaining for a reduction of the cost of the solid waste bins as well as the service charge for waste collection. Data gathered was presented in Table 9.

Table 9: Household Respondents' Views on the Type of Approach to Solid Waste Management Decisions in Kasoa Township

Response	Frequency	Percentage (%)
Bottom- up approach	29	11.8
Top-down approach	186	75.6
Participatory approach	19	7.7
None of the approaches	12	4.9
Total	246	100.0

Source: Field Data, 2020

The statistics from Table 9 elucidates that a greater majority 186(75.6%) of the household respondents involved in the study were indicative that the decision-making approach regarding household solid waste management in the study area was predominantly top- down whereas only 12(4.9%) of the household respondents

indicated that there was no clear-cut approach used in making solid waste management decisions by the authorities in Kasoa Township. This suggested that solid waste management decisions are solely left in the hands of the institutional personnel with the concerns of the households rarely sought. This situation creates a gap between the households and the municipal authorities in arriving at holistic decisions to facilitate effective and efficient solid household solid waste management in Kasoa Township.

Contrary to this finding, clarification sought on the waste management decision- making approach from the Municipal Waste Management official interviewed disclosed that the institution embraces a participatory approach. However, he further admitted that each electoral area within Kasoa Township usually organize such meetings once in a year. He contended that:

> *You know, because of decentralization, we say we are bringing governance to the people. So, we bring the waste management decision- making process to the people. Anything that the Assembly want to do, it is mandatory that the Assembly engages the communities sometimes too, the Assembly members will go and then talk to their people and then they will bring the feedback to the Assembly. With this, the Assembly members have community meetings with them on matters about solid waste management practices in their households. Also, they have associations like the landlord"s association and community watchdog committee who are also engaged in the decision- making process. So, decision- making is not top- down it is rather participatory. At least every electoral area organizes it once in a year*.

From the preceding paragraphs, it was clear from the study that not all stakeholders were involved in the solid waste management decision making- process as in the case of the households. Aside this, the irregular periodicity in organizing town hall meetings on solid waste management once a year coupled with the inactiveness of some of the Assembly members to regularly engage and relay information on solid waste management decisions from the Assembly to majority of

the households in the study area reflect the top- down approach adopted by those in authority in making waste management decisions in Kasoa Township**.** Corroborating with this finding, Eshun *et al*. (2014) in a study on the attitude of people towards private sector participation in solid waste management in the Komenda- Edina- Eguafo- Abrem (KEEA) Municipality, observed that almost all management decisions concerning solid waste management in the Municipality is taken by only management members. In the same vein, McAllister (2015) indicated that most community members are not involved in decision making so they develop the attitude of not being concerned which makes them not responsible for solid waste management. Hence, the study finding re-echoes Douti *et al*. (2017) conclusion that there is the need for public awareness and strong community participation on issues relating to waste management and environmental quality in the Bawku Municipality. This further imply that the top-down approach to decision- making on solid waste management should be discouraged since it sidelines the very people it is meant to serve.

4.2.4 Effects of solid waste management problem on households in Kasoa Township

The failure to properly manage domestic solid wastes generated can have implications on municipal households. Aligning with this assertion, Zahari (2007) noted that improper municipal solid waste management tend to affect households and municipalities in general by posing problems which are environmental, social and economic in nature. Therefore, in finding out answers to satisfy the fourth research question, the study further delved into how the problem of solid management affect the households in Kasoa Township. To this end, data was gathered from the household respondents by answering the few open-ended questionnaire items 40, 41, 44 and 45 whilst in-depth interview guide items 20, 21, 22 and 23 were used for the key informants. The varying responses obtained from majority of the household

respondents and key informants on the subject were grouped under emerging patterns which included environmental, health, economic and social effects. Subsequently, the in-depth interview information obtained from the key informants provided insightful expositions into the emergent themes.

4.2.4.1 Environmental effects

The key informants interviewed during the study expounded a number of environmental issues that the households in Kasoa Township had to grapple with due to their unsatisfactory attitudes towards the solid waste management problem that they are confronted with. Consequently, the study revealed that environmental issues such as perennial flooding, aesthetic blight, odour from choked gutters and stench from open dump sites stemming from improper household solid waste management practices was a bane to majority of the households in Kasoa Township. The proceeding quotes were illustrative of the viewpoints shared by some of the key informants:

> Participant 1: *Erm…the problem that the households" in Kasoa face is largely environmental pollution. This has affected aesthetic beauty of the township due to the unsightly view and stench from gutters in some parts of the communities...in fact you can see litter scattered around in some neighbourhoods as if they don't care about their surroundings*.

> Participant 3: *In this area, we have two neighbourhoods which are waterlogged….Gadambo and Zongo 94. When it rains and the plastic wastes goes to choke the drains, so they experience over flooding in every rainy season. Also, because most households in these areas have the attitude to dump their refuse indiscriminately, it has made the whole place filthy. When you walk around these areas, there is normally bad odour coming from stagnant water in front or behind of people's houses because they are filled with sachet water rubber and black polythene bags. This doesn't give a pleasant view about the neibourhoods.*

In accord with the views shared by participant 1 and 3, participant 2 and 5 added that:

> Participant 2: *Some of the places like New-Town and Zongo low-lying areas. So, for those who throw their rubbish into gutters, when it rains you will see that the places become easily flooded. Sometimes the flood enters into enter into people"s rooms in some parts of Zongo itself and then New- Town during the rainy season and it destroy their household properties. It doesn"t hdp at all.*

> *Participant 5: The environmental effect of waste management on the households in Iron- City is not that serious like the other electoral areas. Aside the householders being cautious about handling the solid wastes in a proper manner, the ASEMA has also provided waste bins at vantage for use by the residents. So, this has reduced the environmental impact but you know at times when the rains set in, the rain water sometimes become stagnant in the gutters and overflow the banks due to choked drains downstream.*

Inferences from the excerpts revealed that majority of the households in Kasoa Township were greatly affected by environmental pollution attributed to the inappropriate SWM decisions by some households. The concerns about littering by some of the low-income households coupled with delayed waste collection schedule by the service providers wanes the aesthetic beauty of the settlement and the entire landscape. In consonance with this finding, Agyapong (2012) observed that solid waste management situation in the Berekum Municipality has visible implications on poor households as garbage accumulation in communities, wastes clogged in drains, water bodies and stinking gutters are prevalent. He further added that heaps of polythene bags, empty water sachets and other waste materials can be found all over the streets and backyards of houses. Nonetheless, the study brought to light that the aesthetic blight on the households in Iron- City was not quite alarming as compared to Zongo and parts of New-Town because the Assembly has mounted waste bins at vantage points within the neighbourhoods. Corroborating to this finding, Boadi and Kuitunen (2003) argued that home collection of waste is limited to high and some middle income areas in municipalities while the poor are left to contend with the

problem on their own hence this leads to indiscriminate disposal of waste in surface drains, canals and streams thereby creating unsanitary and unsightly environments in many parts of the city.

Aside this, the study brought to bear that majority of the households were susceptible to annual flooding whenever it rains heavily due to clogged storm drains from solid wastes materials which are openly dumped. Views expressed by the key informants who participated in the study revealed that most of the householders in Gadambo, Zongo 94 and parts of New- Town were cited as constantly bearing the brunt of the floods because their rooms and surroundings waterlogged from the onset of the rainy season leading to loss of properties and rarely human lives. In line with this finding, Achankang (2003) opined that urban flooding leads to loss of lives, destruction of properties, halting of economic activities, displacement of affected households in low- lying areas and increment in municipal authorities expenditure to provide relief packages to support flood victims. Similarly, Sarpong (2015) contended urban floods occur when drainage systems and other storm control devices over flow their embankments due to water blockages from uncontrolled domestic solid wastes generated.

4.2.4.2 Health effects

Describing how the solid waste management problem affect the health of households in the study area, it emerged from the interviews conducted that the health effects associated with the household solid waste management problem in Kasoa Township were directly linked to the detrimental environmental effects on the households. Admittedly, the key informants opined that majority of the households persistently suffer from malaria, diarrhoea, cholera, typhoid and other skin infections

due to improper handling of solid wastes generated. The accounts given by the interviewees were that:

> Participant 1: *In areas that the storm drains become choked with solid waste materials, the water become stagnant so it breeds a lot of mosquitoes so the households complain a lot about malaria… they fall sick often. According to the Kasoa Ghana Health Service (GHS) polyclinic statistics, about 60% of the OPD cases recorded are due to poor sanitation. The households usually suffer from malaria, typhoid, cholera and those things because of improper environmental hygiene in these communities. So that one it has a big toll on the heath of the households and the GHS records shows that it brings a lot of diseases to them.*

> Participant 2: *It will even surprise you that in one of the clean-up exercises that the ASEMA Waste Department and Zoomlion jointly did recently, in one of the communities some of the people were storing their garbage in their rooms because if they bring them out and the environmental sanitation officers see them, there will be trouble for them. So when we took the compaction trucks there, you could hear the people shouting "borla car no aba ooo" and they were bringing refuse from their rooms. So for such households, how they manage their solid wastes affect their health.*

Admittedly, an Assembly member added that:

> Participant 5*: You and I know that when a household fails to manage their waste properly it brings a lot of health effects on them. So for the households who throw their rubbish into the environment it generates diseases like malaria, cholera and other things in this area.*

Subsequently, it was deduced from the prior excerpts that the way majority the households managed their solid wastes had a toll on their health. As indicated by participant 1, figures from the Ghana Health Service (GHS) at Kasoa polyclinic shows that about 60% of the Out-Patient- Department (OPD) cases including malaria, diarrhoea, typhoid, cholera and other skin diseases reported by the households were mainly due to improper environmental hygiene. This finding confirms the UNFCCC (as cited in Fearon & Adraki, 2014) report that majority of the diseases in municipal households are related to poor sanitary conditions with dire economic and social

costs. The finding also corroborates the literature reviewed by Hardoy and Stirling (as cited in Sessi, 2014) that accumulated wastes in the cities become hot spots for the breeding of pathogens that cause disease like dengue fever, malaria, leprosy and even elephantiasis while the blockage of drainage systems by waste materials creates stagnant waters which also become ideal breeding grounds for mosquitoes and other vectors that spread pathogens. Other sanitation related diseases include guinea worm, cholera and bilharzia (Boadi & Kuitunen, 2003).

Moreover, the study revealed that due fear of prosecution by the sanitation officers, a few of the low-income households sometimes hide their solid wastes generated in their rooms. Obviously, this poses a serious threat to the health of such households. The finding therefore affirms Sarpong (2015) assertion that the decomposing piles of wastes especially in communities of the poor have the potential to attract and harbour vermin and rodents which spread diseases. The accumulated wastes also attract foraging animals like dogs and goats which scatter infected waste materials, spreading diseases and causing a nuisance (Songsore & McGranahan, 1996).

4.2.4.3 Economic effects

In expressing their views on how the cost of managing solid wastes generated affect the economic wellbeing of the households within Kasoa Township, the key informants interviewed revealed that this was relative among the householders and the communities due to disparity in income levels between the middle- income households and low-income households. The following narratives were illustrative of some of their standpoints:

> Participant 2: *Well…those in the middle-income areas like Iron City and parts of New- Town for them they can manage it but it is a general problem for the households in a low-income community like Zongo. Sometimes what to eat is even a problem, so for them they resort to undesirable means of getting rid of their solid wastes by indiscriminate dumping in the environment. That"swhy sometimes at dawn and in the night when it rains they dispose of their rubbish into the running water to be carried away.*

The view of participant 2 was re-echoed by participant 5:

> *Well…..in Iron- City, we have a lot of residents who are businessmen and women working in Accra. In New-Town most of the households are traders and then in Zongo the people are petty traders as well. So as for Iron City, because most of the households are businessmen and they work in Accra, the cost of managing their wastes doesn"t affect their economic life that much like the other electoral areas.*

However, participant 1 was of the opinion that majority of the households within Kasoa Township complain about cost of managing solid wastes by the households. He lamented that:

> *You know the households complain a lot about the cost of the getting waste bins at GH₵250.00 to GH₵400.00 and the GH₵ 40.00 they pay for monthly collection but as an Assembly we cannot do anything about it. If they are not able to, then it means they have to find other means of getting rid of their solid wastes generated.*

Juxtaposing the views expressed by participant 2 and 5, the study found out that the household expenditure on managing solid wastes generated in Kasoa Township was averagely not much of a problem for the middle-income households in Iron City and in parts of New-Town as compared to the low-income households in Zongo. Nonetheless, the assertion by participant 1 was clearly indicative that the households generally complain about the cost of getting the waste bins between GH₵250.00 to GH₵400.00 from the private waste contractors and the unwillingness of most of the households to pay GH₵ 40.00 per bin for the monthly waste collection charges. Consistent with this finding, Tamura (as cited in Boateng *et al*., 2016), in analyzing the individual attributes of the demand for solid waste collection in Accra,

found that the more income people have, the more willing they are to pay for solid waste collection. This implies that there is positive relationship between income and people‟s willingness to pay for solid waste disposal services (Boateng, Amoako, Poku, Appiah & Garsonu, 2016). In line with this, it is very important and timely to look at the possibility of cost sharing by households, and to do this the question of demand needs to be analysed for improved solid waste management (Aggrey & Douglason, 2010). Moreover, this finding also suggests that in the short term, there is the need for the ASEMA to subsidize the amount for procuring the waste bins for the low-income households to engender proper and effective solid waste management practices among such households.

4.2.4.4 Social effects

To ascertain whether how the households manage their solid wastes affect their social climate or social life with others within Kasoa Township, the information gathered from majority of the key informants who participated in the study confirmed that most of the householders in the study area were not overly bothered about that partly because they have lived in such environments for a long time hence it has become part of their lifestyle. Two of the participants recounted that:

> Participant 2: *Those in the low-income areas they are „I don"t care people", so these things doesn"taffect them. Whether you tell them that they are living in a dirty environment or not, they themselves know it. So, it doesn"taffect their interpersonal relationships at all. They know it is normal so they won"teven talk about it. Even if you say it, they will not mind you. That"show it is.*
>
> Participant 1: *Ooh for that, it doesn"taffect their social relationships. I have not heard a comment like that…. You see, some of the people are hustlers, they come home to take some rest in the evening and then quickly they go back to sell in the morning. So for their social life, they see it as normal. You know, Kasoa is a market town, so for them they don"teven have time for such discussions. They don"teven have time and the mindset to look at those things. So, for the solid waste*

> *situation, among themselves they see it as normal because they see it that they are living in the same community or area. It has become part of them, it is like a culture for them.*

In accord, participant 4 also admitted that though people would naturally give respect to households who manage their wastes properly, someone would also not mind going to the dirtiest house and be happy with the householders there. He succinctly remarked that:

> *You know, when you pass by a house and the place is dirty or they don"t manage their solid wastes well…naturally you will not respect them. Let"s say you have two households with one handling their solid wastes properly than the other, definitely you will not show respect to those living in the dirty house but over here somebody will not mind going to the dirtiest house and be happy with the people staying there. This has been part of us for long so people don't normally mind.*

The study was clearly indicative that the social climate among the householders in the study area were not largely affected by the way they manage their solid wastes since it has become part of their way of life. This depicts the TPB (Figure 3) element on subjective norm which denotes perceived social pressure to exhibit or not to exhibit a particular behaviour. Therefore, since there was no social pressure among the households irrespective of the way a household handle their solid wastes generated, improper household solid wastes management was regarded as a normal practice which does not affect the inter- personal relationships between majority of the households in the study area. Congruent with this finding, Tahulela (2017) in a study on the effect of social norms and attitudes towards domestic waste management in a selected formal settlement in the Western Cape, South Africa hypothesized that there is no influence of household waste management practices on the kind of social interactions among urban dwellers in unclean environments.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter highlights the summary of the study, major findings, conclusions, recommendations, limitations of the study and suggestions for further studies.

5.1 Summary

The study sought to the examine attitudes of households towards solid waste management in Kasoa Township in the Awutu Senya East Municipality. Quantitative data for the study were gathered using structured questionnaire administered to 246 household respondents who were selected through single-stage cluster sampling and simple random sampling techniques. In addition, qualitative data for the study was obtained from 5 key informants who were purposively selected and interviewed as part of the study sample. This included the an official from the Municipal Waste Management Department, an officer from Zoomlion Waste Management Company Limited and 3 Assembly members in the electoral areas within the Zongo Zonal Council. The quantitative data obtained were analyzed and discussed using descriptive statistics such as bar charts, frequency, percentages, mean and standard deviation with the aid of the Statistical Package for Service Solution (SPSS) version 20 software. The qualitative data were also analyzed and discussed under emergent themes.

5.2 Major Findings

The major findings of the study were presented in line with the research questions set out for the study:

1. The study found out that food wastes and plastic wastes account for a greater chunk of the solid waste materials generated by the households in Kasoa Township as indicated by 116(47.2%) and 84(34.1%) of the respondents respectively. The generation of other types of solid wastes including metallic wastes (scrubs), cardboards, papers, textiles, ashes and glasses were less than a quarter percentage of the solid wastes generated by the households. The study revealed that the households generate not less than 400 tonnes of solid wastes monthly and about 4,800 tonnes of solid wastes per year. Finally, the study disclosed that the commonest means of solid wastes storage employed by the households was the use of waste bins particularly in the middle-income areas such as Iron- City and some parts of New-Town. However, the use of sacks, polythene bags, metallic containers, empty boxes and broken rubber buckets for solid wastes storage were more prevalent in the low-income households in Zongo community and other parts of New-Town.
2. It emerged from the study that majority of the households in Kasoa Township have poor attitudes towards source reduction and reuse of solid wastes materials although they were concerned about the generation rates. The low mean and standard deviation scores indicated that most of the household respondents disagreed that with the statement that they often take actions to reduce the volume of solid wastes generated in their homes as represented by a mean of 1.99 and standard deviation of 0.85 respectively. Also, the mean score of 1.85 and standard deviation 0.81 respectively shows that a significant

majority of the household respondents disagreed with the statement that they reuse some of the solid wastes materials generated in their households. Aside this, the study revealed that the commonest methods of solid waste disposal options used by the households in Kasoa Township were through kerbside collection services provided by private waste contractors as represented by 102(41.5%) of the respondents followed by open burning 67(27.2%).

3. The study uncovered that the high cost of procuring wastes bins and high fees charged by Zoomlion and other private waste collectors were the major affronts in managing solid wastes effectively by the households in Kasoa Township as represented by 74(30.1%) of the household respondents and 96(39.0%) of the household respondents respectively. It emerged from the key informants interviewed that majority of the households in the study area often complain about the affordability of the waste bins as well as the monthly payments for the kerbside collection services offered by Zoomlion and other private waste contractors due to the low-income status of most households. More so, the study brought to light that type of approach to household solid waste management decisions adopted by the authorities in Kasoa Township was mainly top- down. The study found out that not all stakeholders were involved in the solid waste management decision making- process as in the case of the households. Hence, this has made them less vocal in expressing their plight concerning the challenges they encounter in managing their solid wastes.
4. The study revealed that environmental issues such as perennial flooding, aesthetic blight, odour from choked gutters and stench from open dump sites stemming from improper household solid waste management practices were a

bane to majority of the households in Kasoa Township particularly in neighborhoods like Gadambo, Zongo 94 and parts of New-Town. Also, it emerged from the study that the health effects associated with the household solid waste management problem in Kasoa Township were directly linked to the rippling environmental effects on the households. The study revealed that figures from the Ghana Health Service (GHS) in Kasoa polyclinic shows that about 60% of the Out-Patient- Department (OPD) cases including malaria, diarrhoea, typhoid, cholera and other skin diseases reported by the households were mainly due to improper environmental hygiene.

In addition, the study found out that the household expenditure on managing solid wastes generated in Kasoa Township was averagely not much of a problem for the middle-income households in Iron City and in parts of New-Town as compared to the low-income households in Zongo and other parts of New-Town. In furtherance, the study was clearly indicative that the social climate among the householders in the study area were not largely affected by the manner in which they manage their solid wastes since it had become part of their way of life.

5.3 Conclusions

The following conclusions were drawn based on the major findings of the study:

The study established that organic wastes (food wastes) and plastic wastes dominate the types of solid wastes generated by the households in Kasoa Township. The proliferation of these types of solid wastes were attributed to the commercial nature of the study area which is located within the Central Business District (CBD) coupled with high consumption level of food stuffs by the large household sizes. Again, the increasing demand for plastic products in the form of sachet water, bottled water, bottled drinks as well as the persistent usage of polythene bags for packaging food stuffs also exacerbate the generation of plastic wastes by the households in the study area.

The attitudes of households towards source reduction and reuse of solid waste materials were undesirable. Hence, this affect solid waste management efforts by the local authorities in Kasoa Township and account for the persistence of the solid waste management problem in the study area.

Low-income households in the study area often grumble about the high cost of disposing off their solid wastes generated. This therefore influences their willingness to pay for the services rendered by the private solid waste management contractors. Again, most of the households were not involved in the solid waste management decision-making process hence their grievances are not directly sought by the authorities.

The households in the study area continually suffer from environmental, health and economic effects linked to the solid waste management problem they face, however, their social relationships remain intact as it has become part of their culture.

This was reflected in the friendly way in which the householders relate to one another especially in communities such as Zongo and parts of New-Town in the study area.

5.4 Recommendations for Policy and Practice

In tandem with the preceding conclusions drawn on the attitudes of households towards solid waste management in Kasoa Township, the researcher recommends the following for policy- making and practice:

The study concluded that organic wastes (food wastes) and plastic wastes are the two major components of the solid waste materials generated by the households in Kasoa Township. It is therefore recommended that since solid wastes are valuable economic resource, reuse and recycling of the household solid waste materials should be touted as viable options to ameliorate the menace. Hence, the Ministry of Sanitation and Water Resources should collaborate with the Awutu Senya East Municipal Assembly (ASEMA) to prioritize the establishment of a recycling and a compost plant in Kasoa Township to convert the organic waste and plastic waste materials into organic fertilizer and other reusable plastic products to minimize source generation. Another way of achieving this is that the ASEMA should consider public-private-partnership to set up a recycling and a compost plant in the study area.

It was also realized from the study conclusions that the attitudes of the households in Kasoa Township towards source reduction and reuse of solid waste materials were generally not positive. In line with this, the researcher recommend that there is the need for a stricter enforcement of solid waste management by-laws by ASEMA waste department coupled with intensive monitoring of household solid waste management practices devoid of attaching human face in meting out sanctions to culprits who flout the laid down sanitation by-laws. To achieve this, the imposition of hefty spot fines and a mandatory communal clean- up service by the ASEMA as

punishment for flouting solid waste management laws would go a long way to drive attitudinal change towards proper household solid waste management. Again, the ASEMA should consider continuous public sensitization through the mass media (radios, televisions, newspapers, posters, magazines) to expedite change in attitudes of households‟ towards solid waste disposal. To add with, advocacy for proper household solid waste management practices would also help a lot in changing household‟s attitude towards solid waste generation and disposal. To this end, more sanitation clubs should be formed by the householders to champion the course of cleaning homes and communities at regular intervals. By undertaking this citizen action, the households would be conscious about best practices for generation, disposal and overall management of solid wastes.

Moreover, it was concluded that the households in the low-income areas often complain about the high cost of managing their solid wastes generated thereby influencing their willingness to pay for the kerbside collection services rendered by the private waste contractors. It is therefore suggested that the introduction of an intervention scheme such as subsidies for the cost of procuring waste bins and solid waste collection services by the ASEMA waste department for the low-income households would be a laudable step to curb the attitude towards littering or open dumping in the low-income areas. Zoomlion and the other private waste collectors should expand their services to cover wide areas especially in the low-income areas to minimize open dumping by restructuring affordable packages for such households. Additionally, the approach to solid waste management decisions by the Municipal Waste Management Department should be made practically participatory by involving all stakeholders. This would widen the scope and address the concerns of all stakeholders particularly the households.

Furthermore, urban planning or zoning reforms relating to solid waste management should be taken seriously by the Urban planning or zoning reforms should be taken seriously by the decentralised Town and Country Planning Department (ASEMA) to expedite communal collection of solid wastes from inaccessible households. This would help minimize the detrimental environmental and health consequences of the solid waste management problem on the households in the study area.

5.5 Limitations of the Study

The study was constrained by a number of factors prior to completion. Among the limitations was difficulty in getting access to interview some of the key informants. This delayed the progress of the work since the original interview dates had to be rescheduled at the convenience of the interviewees. Another challenge encountered by researcher was the quantitative data collection due to large sample size used for the study. This was addressed by engaging the services of two data collection assistants. Lastly, some of the household respondents were reluctant to disclose the exact amount of their monthly income due to notion that it would serve as a basis to the ASEMA for a hidden motive whilst others argued that there was no need for them to reveal their salary. This challenge was also rectified by explaining to such household respondents that the study was purely for academic purpose.

5.6 Suggestions for Further Studies

The current study focused on the attitudes of households towards solid waste management in Kasoa Township. Hence, a detailed study on the attitudes of households towards private sector participation in solid waste management in the Awutu Senya East Municipality needs to be undertaken to pave way for a greater understanding of urban solid waste management and environmental sustainability in the Municipality. Also, further research needs to be carried out on the factors influencing environmental attitudes and behaviours of households towards source reduction, reuse and recycling domestic solid wastes in other municipalities in Ghana and beyond.

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APPENDICES

APPENDIX A

UNIVERSITY OF EDUCATION WINNEBA

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF SOCIAL STUDIES EDUCATION

ATTITUDES OF KASOA HOUSEHOLDS TOWARDS MUNICIPAL SOLID WASTE MANAGEMENT

Questionnaire for household respondents

This study is mainly for academic purpose. Therefore, responses given will be treated as confidential by the researcher. Thank you.

Section A: Demographic data of respondents

Please kindly tick „√' ONLY THE BOX of the corresponding responses given.

1. Gender: Male ☐ Female ☐
2. Age range: <20 years ☐ 20- 29 years ☐ 30- 39years ☐ 40- 49 years ☐ 50 and above ☐
3. Educational level: Basic Level ☐ SHS/ Tech/Voc ☐ Tertiary ☐
4. Place of residence within Kasoa Township: New-Town ☐ Iron City ☐ Zongo ☐
5. Number of householders: 1- 4 ☐ 5-9 ☐ 10 and above ☐
6. Sector of work (Occupation): Formal sector ☐ formal sector ☐ None ☐
7. Income level: Less than GH₵500.00 ☐ GH₵ 500.00- GH₵1000.00 ☐

   GH₵ 1100.00- GH₵ 1500.00 ☐ GH₵1600.00 - GH₵ 2000.00 ☐ Above GH₵2000 ☐

Section B: Types of solid wastes generated by households in Kasoa

Please read and answer the following questions accurately and honestly. Tick [√] in the blanks where applicable.

8. Do you agree that your household contribute to the generation of solid wastes in Kasoa? (a) Strongly disagree [ ] (b) Disagree [ ] (c) Agree[ ] (d) Strongly agree [ ]
9. What are the types of solid wastes normally generated by your household? (Select all that apply)

Metallic wastes [ ] (b) Food wastes [ ] (c) Plastic wastes [ ] (d) Cardboards [ ] (e) Others (specify): .....

10. What is the major component of the types of solid waste generated in your home?

(a) Metallic wastes [ ] (b) Food wastes [ ] (c) Plastic wastes [ ] (d) Cardboards [ ] (e) Others (specify): .....

11. How do you perceive the nature of solid waste management problem in your household?

    (a) Not a problem [ ] (b) A minor problem [ ] (c) Slight problem [ ] (d) A major problem [ ]

12. Which container does your household use for storing solid wastes? (a) Metal container [ ] (b) Bin [ ] (c) Sack container [ ] (d) Polythene bag [ ] (e) Others (specify)…….....
13. How many times is your container usually taken out to be emptied? (a) Once a day [ ] (b) Once every three days [ ] (c) Once a week [ ] (d) Twice a week [ ] (e) Others (specify)……

14. Who usually takes the container with its waste contents out to be emptied? (a)Any male adult [ ] (b) Any female adult [ ] (c) Any child between the ages of 10 and 15 [ ] (d) Anyone
15. How frequent do you separate the types of solid wastes generated by your household before final disposal? (a) Very frequently [ ] (b) Frequently [ ] (c) Occasionally [ ] (d) Rarely [ ]

Section C: Attitudes of households towards available solid waste management options in Kasoa Township

Please, indicate the extent to which you agree or disagree with the following statements in the table where; Strongly Disagree = (SD), Disagree = (D), Agree = (A) and Strongly Agree= (SA) by ticking [√].

Item No.	Statements	SD	D	A	SA
16.	I am concerned about the solid waste generation situation in my household				
17.	Littering is a common practice in my household and community				
18.	I normally dump solid wastes generated into gutters or on the streets at night				
19.	Attitudes of households towards solid waste generation in my locality is undesirable				
20.	Available solid waste management options for households in my locality are inadequate				
21.	I take actions to reduce the volume of solid wastes generated in my home				
22.	I usually prefer to reuse some reusable solid waste materials				
23.	I sometimes bury solid wastes generated in my backyard				

24.	I sometimes burn solid waste materials in the open				
25.	I frequently separate the types solid wastes generated before disposal				
26.	I prefer subscribing for door- to-door collection service offered by the contractors				
27.	The cost of managing solid wastes influence my attitude towards proper solid waste management				
28.	I normally opt for public dumping using container or communal waste skip for solid waste disposal				
29.	My attitude towards household source reduction and reuse affect waste management efforts by the authorities in Kasoa Township				
30.	I have been educated on source reduction and reuse of solid waste materials generated in my household				

31. Which method does your household employ in disposing of solid wastes generated? (a) Subscribing for kerbside collection [ ] (b) Open burning (c) Dumping into waste skip in the neighbourhood [ ] (d) Open dump in the neighbourhood [ ] (e) Burying in the backyard

Section D: Challenges faced by Kasoa households in solid waste management

Please read and answer the following questions accurately and honestly. Tick [√] in the blanks where applicable.

32. Are you satisfied with the way solid wastes are being managed by the Municipal Solid Waste Department in your community?

    (a) Very dissatisfied [ ] (b) slightly dissatisfied [ ] (c) slightly satisfied [ ] (d) Very satisfied [ ]

33. What about the services rendered to you by the Zoomlion and other private waste collection service providers?

    (a) Very dissatisfied [ ] (b) slightly dissatisfied [ ] (c) slightly satisfied [ ] (d) Very satisfied [ ]

34. What are the challenges you face in managing solid wastes generated in your household? (tick all that apply)

(a) Inadequate waste bins and waste skips [ ]

(b) Unreliable waste collection schedule by ASEMA Waste Department and Zoomlion [ ]

(c) Low education on proper household solid waste management practices [ ]

(d) High fees charged by the ASEMA/Zoomlion for solid waste collection services [ ]

(e) Others (specify): ……..

35. Which of the above challenges above do you regularly face?

(a) Inadequate waste bins and waste skips [ ]

(b) Unreliable waste collection schedule by ASEMA Waste Department and Zoomlion [ ]

(c) Low education on proper household solid waste management practices [ ]

(d) High fees charged by the ASEMA/ Zoomlion for solid waste collection [ ]

(e) Others (specify): ……..

36. To what extent does the attitude of households towards solid waste management pose a challenge to the waste situation in Kasoa? (a) To a large great extent [ ] (b) Somewhat [ ] (c) Very Little [ ] (d) Not at All [ ]

37. Which of these stakeholders should be held responsible to address the solid waste management challenges in Kasoa?

(a) ASEMA Waste Department [ ] (b) Zoomlion [ ] (c) EPA (d) Households [ ] (e) Others (specify): …….

38. How often are households involved by the authorities in making solid waste management decisions in Kasoa? (a) Very often [ ] (b) Sometimes [ ] (c) Rarely[ ] (d) Never [ ]
39. Generally, how will you describe the nature of the solid waste management approach employed by the authorities in Kasoa? (a) Top- down approach [ ] (b) Bottom- up approach [ ] (c) Participatory approach (d) None of the approaches [ ] (e) Others specify……

Section E: Effects of solid waste management problem on households in Kasoa

Please read and answer the following questions accurately and honestly. Tick [√] in the blanks where applicable.

40. What are the environmental threats posed by poor solid waste management to households in Kasoa?

……..

……

.....

41. How often does the solid waste management situation affect your health and others in your community?

……

42. What are some of the diseases associated with poor household solid waste management practices that affect your community?

……

……

……

43. How much do you households spend on subscribing to waste collection services in a month?

……

44. To what extent does the cost of managing solid waste affect your household expenditure?

……

……

……

45. In this community, does the way in which a household manages solid wastes generated sometimes bring societal respect and recognition to them? Why?

……

……

……

……

46. Other comments/ suggestions:

……

……

……

……

APPENDIX B

UNIVERSITY OF EDUCATION WINNEBA

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF SOCIAL STUDIES EDUCATION

ATTITUDES OF KASOA HOUSEHOLDS TOWARDS MUNICIPAL SOLID WASTE MANAGEMENT

In-depth Interview Guide for Key Informants (Municipal Waste Management Department, Zoomlion and Assembly Members)

This study is mainly for academic purpose. Therefore, responses given will be treated as confidential by the researcher. Thank you.

Name of institution:
……

Position of interviewee:
……..

Date of interview:
.....

Section B: Types of solid wastes generated by households in Kasoa

1. What is the scope of the activities performed by your office in terms of solid waste management in Kasoa?
2. It is very common to see tonnes of solid wastes generated by households in Kasoa Township. In your view, which areas do these solid wastes mostly emanate from?
3. What is the quantity or volume of solid waste generated by the households on daily, monthly and annual basis?
4. What are the types of solid waste generated by households in Kasoa?
5. Which of these types of solid waste generated by households in Kasoa is most common in terms of quantity?
6. Which factors account for the high generation of the type of solid waste stated in response to Q5?

7. Do you segregate the types of solid wastes collected from households before final disposal at the landfill? Any reasons?

Section C: Attitudes of households towards solid waste management options in Kasoa

8. In your view, what is the general attitude of households towards solid waste management in Kasoa?
9. How does the attitude of littering by households influence the success your work?
10. What are the available solid waste management options for households in Kasoa?
11. Which of these solid waste management options is most preferred by the households?
12. Are there any reasons why the other solid waste management options are least preferred by the households?
13. In your opinion, how satisfied are you with the way solid wastes are handled by households in Kasoa?
14. What are the initiatives put in place by your office to drive attitudinal change among the households in Kasoa to ensure effective and efficient solid waste management practices?

Section D: Challenges faced by Kasoa households in solid waste management

15. What are some of the challenges associated with households‟ solid waste management in Kasoa?
16. What measures have been instituted to address these challenges faced by the households in managing their waste properly?

17. How effective are these measures introduced by your office to curb the situation?
18. Why does the problem of solid waste management persist in Kasoa households despite the measures adopted?
19. What is the nature of the waste management approach employed by your department?

Section E: Effects of solid waste management problem on households in Kasoa

20. What are some of the environmental effects of solid waste management on Kasoa households?
21. How does this affect the public health of households in Kasoa?
22. How does the cost of subscribing to waste collection services affect households in Kasoa?
23. In general, how does the nature of the solid waste management problem affect the social climate among households in Kasoa?
24. Are there any available support systems for households who are affected by the solid waste management situation in Kasoa? How?
25. Any other comments or suggestions?

APPENDIX C

UNIVERSITY OF EDUCATION WINNEBA

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF SOCIAL STUDIES EDUCATION

ATTITUDES OF HOUSEHOLDS TOWARDS SOLID WASTE MANAGEMENT KASOA TOWNSHIP

Observation Checklist

Attitudes of households towards solid waste management options	**Was the resultant behaviour observed**? Yes ( ) or No ( ). If applicable.	**Comment(s)**
Source reduction of solid wastes generated in households		
Reuse of solid waste materials by householders		
Separation of solid waste materials by householders for recycling		
Disposal of solid wastes in open spaces, backyards or into gutters		
Dumping of solid waste into available waste skips or bins		
Open burning of solid waste generated		
Awareness on proper waste management practices		
Regular periodicity in conveying filled waste bins to communal skips for final transportation to landfill/dump site.		

APPENDIX D

Introductory Letter

UNIVERSITY OF EDUCATION, WINNEBA
FACULTY OF SOCIAL SCIENCE EDUCATION
DEPARTMENT OF SOCIAL STUDIES EDUCATION

22nd January, 2016

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION: MENSAH PHILIP OKAI

We write to introduce Mensah Philip Okai to your outfit. He is a Master of Philosophy Social Studies student with registration number 8 [illegible]017 from the above-named Department.

As part of the requirements for the award of Master of Philosophy in Social Studies Education, he is undertaking a research on "[illegible]" which [illegible].

We wish to assure you that any information provided would be treated confidential.

Thank you.

Yours faithfully,

Lucy Effah Attom
Ag. Head of Department