PRESBYTERIAN UNIVERSITY COLLEGE OF GHANA

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DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES MANAGEMENT

EFFECTIVENESS OF POLLUTER-PAY-PRINCIPLE IN SELECTED   LOW AND HIGH

INCOME COMMUNITIES IN THE GREATER ACCRA REGION

A Dissertation submitted to the Department of Environmental and Natural Resources

Management of the Faculty of Development Studies, Presbyterian University College, Ghana, in

partial fulfillment of the requirements for the award of Master's in Environmental Science (Msc

Environmental Health and Sanitation)

BY

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NOVEMBER, 2020

DECLARATIONS

Candidate's Declaration

I hereby declare that this dissertation is a result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.
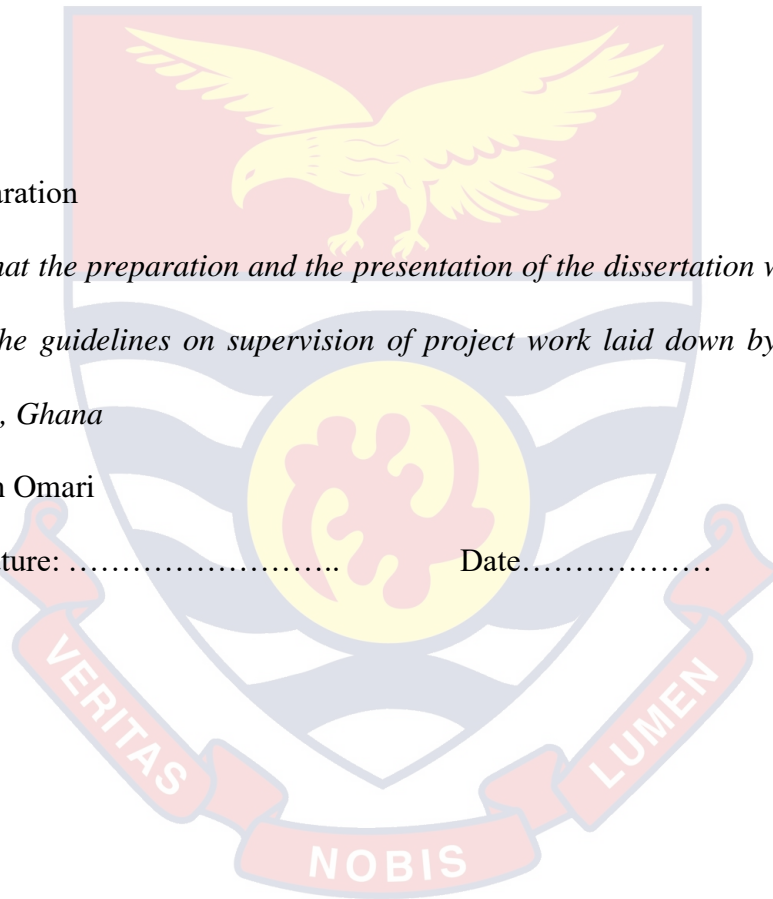
Name: Seth Appiah Ocran

Candidate's Signature: …………………   Date: ………………

Supervisor's Declaration

I hereby declare that the preparation and the presentation of the dissertation were supervised in accordance with the guidelines on supervision of project work laid down by the Presbyterian University College, Ghana

Name: Dr. Stephen Omari

Supervisor's Signature: ……………………..   Date………………

ABSTRACT

Waste management as a social problem has neither spared the developed nor developing nations as statistics have proven that some developed nations are seriously grappling with this bane. The study therefore sought to assess the polluter pay principle and its effect on full cost recovery in low and high-income communities. The study employed a descriptive survey design and the population of the study consist of 60 respondents selected from waste management companies within Greater Accra Region. Also respondents who represent households and beneficiaries of waste collection were made to contribute to the study. The Primary data collection involved the use of closed-ended questionnaire. Further to this, simple bar chart analysis on excel and SPSS were employed to explore the relationship between the variables from the data collected to meet the research objectives. The study revealed that 40% of respondents have been in the waste management business for about 1 and above years now. Thirty eight percent of the respondents preferred both house to house and communal collection service as the best mode for collecting their waste. The study clearly shows that although the polluter-pay-principle has aided in significant recovery of cost especially in high-income communities yet more can be done to expand the recovery rate and to improve upon service delivery. The study recommends that, the Assembly must provide subsidy to make up for the difference between the proposed fees and the actual cost of providing the waste collection service to waste management companies so that the cost on households will dwindle. Waste generators must be allowed to now play a more active role in determining the level of use fees, service levels and monitoring of service providers.

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My sincere gratitude to my family who supported me throughout the period of my studies.

Also, to friends and colleagues who contributed in diverse ways to make this work successful especially Fuad Tanimu, I say God richly bless you and thank you all.

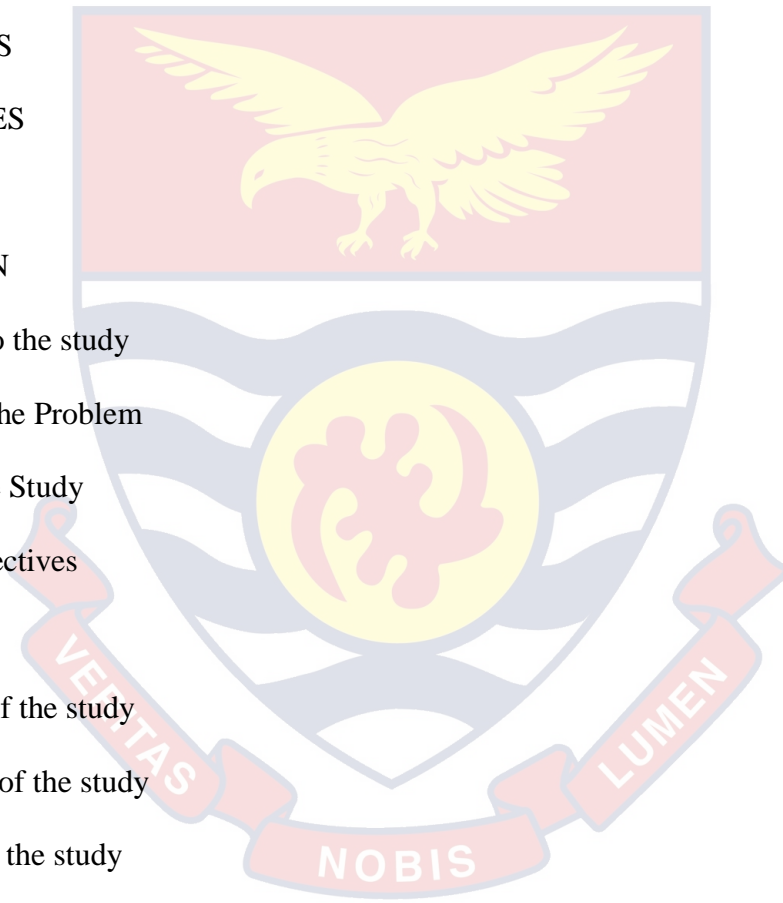Finally to my supervisor for his time and guidance.
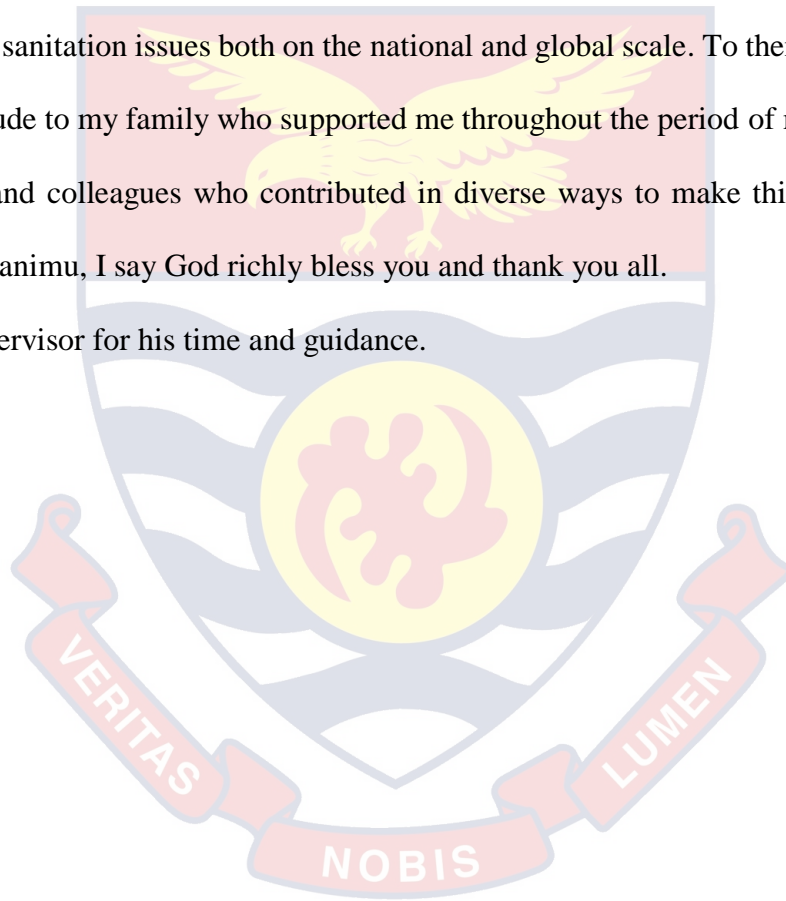
DEDICATION

To my wife, Rita Appiah Ocran and my children, David Ocran, Deborah Ocran and Victoria Ocran.
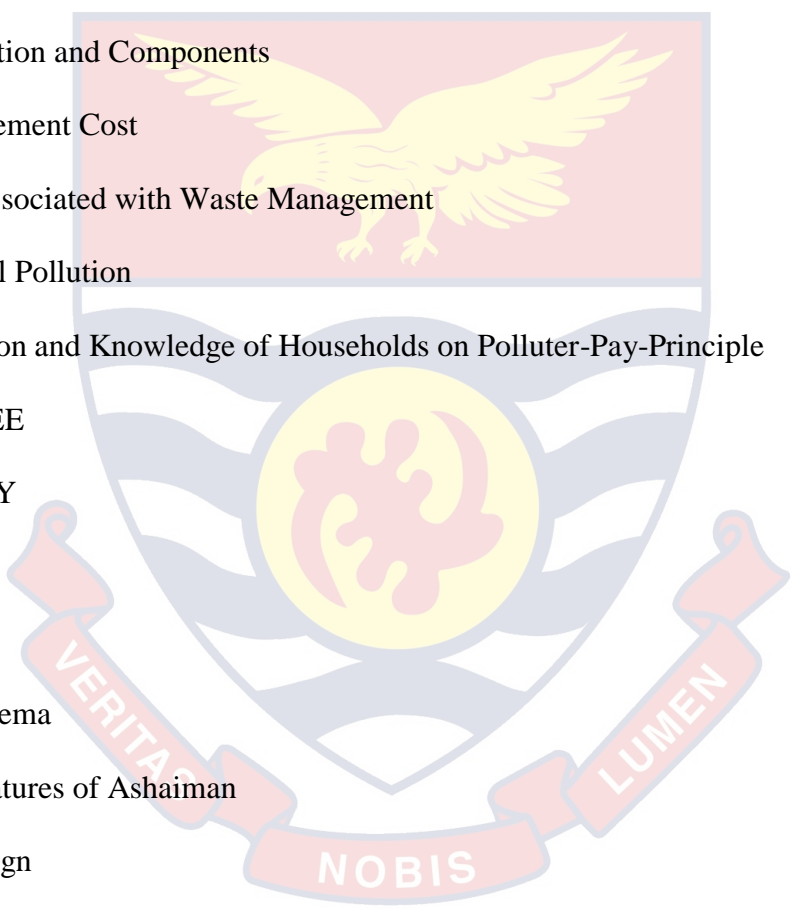
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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Managing waste is critical in governance, and a host of developing countries are confronted with challenges regarding polices to mitigate the challenges it poses to the environment. In spite of the numerous efforts by various governments all over the world to arrest it, technology has not been able to effectively control waste generated in cities around the globe. It appears to be worsened day by day, and the situation keeps getting out of hands (Kwawe, 2015). As a social problem waste management has neither spared the developed nor developing nations as research have revealed that some developed nations are seriously grappling with this bane (Chazan, 2012).

Factors such as environmental protection, reservation of natural resource extraction base in the desire to achieve the Sustainable Development Goals (SDG's) are some of the key factors directing countries to pressure organizations to act more responsibly through creation of environmental management systems, vision and objectives that are nowadays evident from annual corporate responsibility reports or website (Muranga, 2014). These efforts are mostly designed to create environmental awareness to parties involved in the processes of good and service flow. In over three decades now, multiple research and studies have been conduct by organization aiming to improving and manage resources sustainably. These has been done through taking steps in understanding different parties affecting and being affected by the firm´s daily decision making process in what literature terms as stakeholder's management theory (Muranga, 2014).

Waste management remains a major challenge to most governments in Africa. In Ghana, the increasing rate at which waste is generated in the cities is alarming; yet government has not been able to respond in an equal measure. The proportion of populations living in urban areas in Africa

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is expected to increase from 40% in 2010 to about 57% in 2050 (UNDESA/PD, 2012). This incomparable rise in the level of urbanization in the first half of the twenty-first century Africa has goaded a variety of questions, apprehension, and agitation about the possible connotations of this development on the quality of life of Africa's rising population, and for environmental health in general (Cobbinah, Addaney & Agyeman, 2017). This phenomenon has unquestionably buoyed a pro-clivity to consider the twenty-first century as marshaling in a period of predominantly urban civilization in Africa where urbanism is rapidly dominating ruralism (Cobbinah & Aboagye, 2017). Yet, the challenge of considerable transformation in the manner and pattern of urban functionality becomes ever more complex in the midst of unsustainable waste management problems (Addaney & Oppong, 2015).

A study done by (Lyse, 2013) shows that 9 out of every 10 African cities are confronted with serious waste disposal problems, and major cities and towns in Ghana are not left out as aspects of the waste management problem such as heaps of uncontrolled rubbish, polythene bags scattered everywhere and disposal sites overflowing with filth which comes with its associated health hazards such as cholera, malaria and typhoid to residents who live near the dumping sites.

It is of no doubt that waste management has become one of the biggest challenges confronting developing countries, including Ghana. However, population growth and rapid urbanisationhave also contributed significantly to the generation of waste in large volumes in cities. Accra has grown very rapidly with a population of about 5 million inhabitants within a period of 15 years and has an annual growth rate of 4%, making it one of the fastest-growing metropolises in Africa. This phenomenal growth has contributed to many of the municipal waste management problems facing the country.

In the Ghanaian societal settings, cleanliness is broadly embraced as a virtue but most of the time the perception of cleanliness is restricted to one's immediate environs with little care for what happens outside one's household. The belief is that the state will take care of things hence one should not be bothered. This kind of orientation has some historical underpinning since in the colonial days; Ghanaians were alienated from events that took place outside their homes Tsiboe & Marbell, (2014). Moreover, sanitation and its related issues were seen as the preserve of the colonial administration that usually employed sanitary officers to take care of the environs (Kendie, 2011).

The practices of involving private sector have been a delineation of cities into zones, engagement of companies through competitive bidding or no bidding, and rendering of service with or without signed contractual agreements between companies and Local Governments. Notwithstanding the increasing involvement of the private sector, the involvement of households to pay for service provision, monitor service quality, and separate waste at source has been slow. A shift towards cost recovery through the charging of all households on the polluter-pay basis has become a means of revenue recovery in most communities. Local authorities such as Metropolitan, Municipal and District Assemblies (MMDA's) play a key role in ensuring all households within their catchment areas pay the required amount of fee as they pollute. The study, however, will conduct an assessment on the effectiveness of polluter pays principle in both low and high-income communities.

1.2 Statement of the Problem

The challenges in resolving waste management are not only emanating from households, but local authorities also have difficulties in keeping pace with solid waste facilities and in meeting the growing demand of solid waste services due to financial constraints. Poor access roads and streets

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in some portions of urban settlements make it challenging to collect waste in such neighbourhoods, and the needed solid waste infrastructure and equipment are often inadequate due to limited funds or budgetary allocations from central government to the local government. In many African states such as South Africa, Zambia and Zimbabwe the situation is not different. Rubbish bags are a major eyesore, South African black polythene bags are often referred to as the "national flower" because it lights landscapes and can be seen hanging on fences, in gutters and blocking drains (Chazan, 2012).

The is the need for stakeholders to ensure that the rural surroundings are also given equal attention when it comes to waste management, the repercussions associated with improper waste management do not know boundaries and sickness neither the rich nor the poor. Waste generation has become a daily affair, from preparing a meal to the manufacturing of a car, is accompanied by some production of waste material which shows the magnitude of the problem. The emerging challenges brought by improper waste management on the environment ought not to be placed at the doorstep of only the governments and the waste management operators to handle, but every stakeholder must ensure that his or her surroundings are kept free from filth by adopting a positive attitude towards waste management.

The participation of the private sector was to tackle the challenges within the waste management sector, and for many years now in Ghana, there has been a collaboration between the local government and the private waste management companies to tackle the waste menace in our communities. Some private waste management companies also operate without the involvement of the local government. The success and financial sustainability of waste management companies rely to some extent on their ability to collect revenue as well as the client's willingness to pay for the services. It has generally believed that if the households pay more, waste management

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companies or service providers could increase, review and improve service delivery, yet the challenges in getting households to pay for waste collection has led to the introduction of polluter-pay approach to help ensure full cost recovery. With rising population and urban drift into Accra, over 2 million inhabitants can be said to be dwelling in Accra, more than one quarter of whom are living below the poverty line, and this is a true reflection in major cities such as Tema, Kumasi and Takoradi etc. However, there are full waste collection services in parts of the city of Tema. Although some individual studies have attempted to look into this, thereare no such studies that look at the effectiveness of polluter-pays approach in low and high-income communities in Greater Accra.

Previous studies on solid waste management in developing countries did not explore much on the polluter-pay-principle and its effectiveness in low and high-income communities. The study involving local governance of solid waste services (Awotwi, 2013) and impact of decentralisation on solid waste management (Obiri-Opareh et al., 2004; Obiri-Opareh, 2002) conducted in Ghana focused on the policies for urban solid waste management. Moreover, studies conducted on solid waste management in other developing countries, for instance, Kenya (Karanga, 2005; Mwangi, 2003; Rotioch et al., 2006), and Tanzania (Mbuligwe, 2004; Kassim, 2006) focused on service quality, institutional and governance issues. There is a lack of empirical studies on polluter- pay - principle, especially in Ghana; thus, this study explores its effectiveness in low and high-income communities in the Greater Accra Region of Ghana.

1.3 Purpose of the Study

The purpose of this study is to provide education and awareness to waste management companies, environmental health officers and health professionals to improve sanitation, ensure healthy living and clean environment must be pursued with all the seriousness it deserves. Further, waste

management at the level of assembly and household must be a priority. The study is also relevant to future researchers who intend to research on a same or similar topic.

1.4 Research Questions

1. What is the perception, knowledge of households on polluter-pays principle?

2. Does the polluter-Pays approach to ensure full cost recovery in low and high-income communities?

3. What are the challenges regarding the implementation of polluter-pays approach in both low and high-income communities?

1.5 Research Objectives

The main objective of this study is to assess the effectiveness of polluter- pays- principle in selected low and income communities in the Greater Accra.

The specific objectives are:

1. To investigate the perception, knowledge of households on the polluter pays principle

2. To determine whether the polluter-pays approach has the potential for full cost recovery in low and high-income communities.

3. To identify the challenges regarding the implementation of polluter- pays approach in both low and high- income communities.

1.5.1 Hypothesis

Null Hypothesis:

a. Polluter-Pays-Principle has a positive effect on a full cost recovery

b. Polluter-Pays-System has a positive effect on service quality

Alternative Hypothesis:

a. Polluter Pays Principle has no positive effect on a full cost recovery

b. Polluter Pays Systems has no positive effect on service quality

1.6 Significance of the study

The study is to provide a common language, understanding and a practical way for waste management companies to improve service delivery to households and to adopt the best cost recovery approach. It provides ways of delving into what this research could not cover considering its limitations. The results of this study will help waste management companies either to continue the polluter pays approach or to develop new approaches. Though this dissertation is to partially fulfil an academic requirement for the award of a master's degree, it is expected that recommendations would be provided to complement the policies by central and local governments. However, this study will contribute significantly to the field of academics, especially for students and researchers.

Findings obtained from this research will assist future efforts to develop sufficient attention to waste management practices and the effectiveness of the cost recovery processes adopted and its consequent mitigating challenges to the efficient and effective management of waste and at the same time serving as a source of future research materials for future researchers. To a larger extent, it will also create awareness on how the polluter pays principle works. In terms of gaps in research, this study will fill the existing gap and provide empirical evidence on the literature regarding an effective way of recovering cost associated with the operations. Besides, investigating the issue from social, mental focal points, the study will unwind the degree to which community participation can influence the overall performance of waste management delivery in the various communities under study. It is important to note that, this study will give space to further researchers to fill in other valuable material to enhance analysts and stakeholders to appreciate the challenges and prospects regarding waste management practices in Ghana. Once more, the

investigation will give helpful data on issues of Polluter Pays Principle, which has turned into a worldwide concept.

1.7 Delimitations of the study

Waste usually ends up on illegal dumps on the street, open spaces and wastelands. Molambe (2014) argues that irregular services rendered to producers (thus households) of refuse by Municipal Councils compel them to dispose of refuse indiscriminately. The study focusses on Meridian Waste Management limited and two service centres,i.e. Tema and Ashaiman. These centres would be assessed in terms of household's perception, and knowledge of ''Polluter Pays approach'' which is a cost-recovery approach of Meridian waste management ltd. The reason for choosing Meridian waste management Limited is due to its permanency in the industry for some years now. However, the two communities depict low income and high income earning communities, and both are operational grounds for meridian waste management limited.

1.8 Limitations of the study

Expected time for the circulation and collection of the data with the respondent was problematic. The agreed time for the return of the data was not met by the respondents and led to consistent postponement. Financial constraints on transportation to both assemblies for the sake of data gathering, distribution and collection of the data, including the travelling risk, cannot be overemphasised. The refusal of some potential respondents to accept the questionnaire for answering on the ground of no time could be worrisome. Additionally, refusal to give detailed information on the operations of the company was limited, since the fear of disclosing confidential but critical information to competitors to their disadvantage emerged in their mind.

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1.9 Organisation of the study

Chapter One of the study look at the introduction of the topic and sets out the problem of the study, objectives and research questions as well as the significance of the study. Chapter Two reviews various literature both the theoretical and empirical, and attempts to relate it to the topic under study. Chapter Three describes the various methodologies to be employed on the topic: effectiveness of polluter pays approach in lower and high- income communities. The same chapter include data collection techniques, research design & instruments and data analysis. Chapter Four constitute data presentation and analysis. Chapter Five ends the study with the summary of findings, conclusions and recommendations.
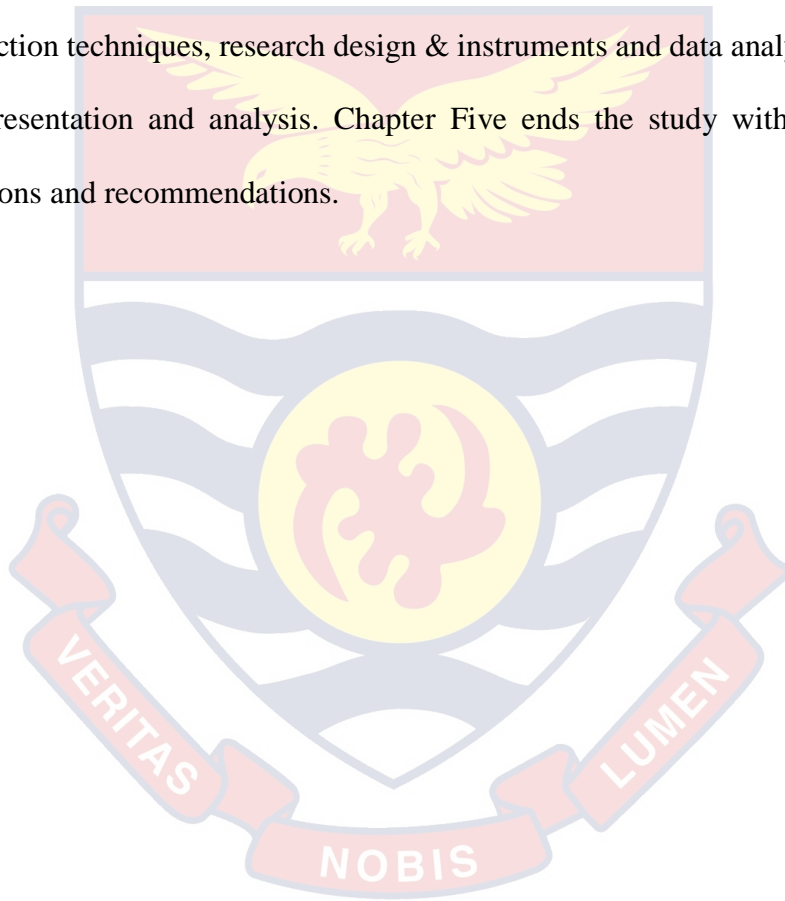
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter deals with the review of relevant literature related to the subject matter under study. Thus the chapter explored the various literature cited from publications, books, articles and journal by different researchers on similar topics.

2.2 The Conceptual Framework

2.2.1 Explanation of the Conceptual Framework

The conceptual framework depicts the relationship between the polluter-pay system, full cost recovery, waste collection and effective service delivery. The conceptual framework further draws the effectiveness of the polluter pay principle on the various variables Full cost recovery, waste collection effectiveness, and service delivery.
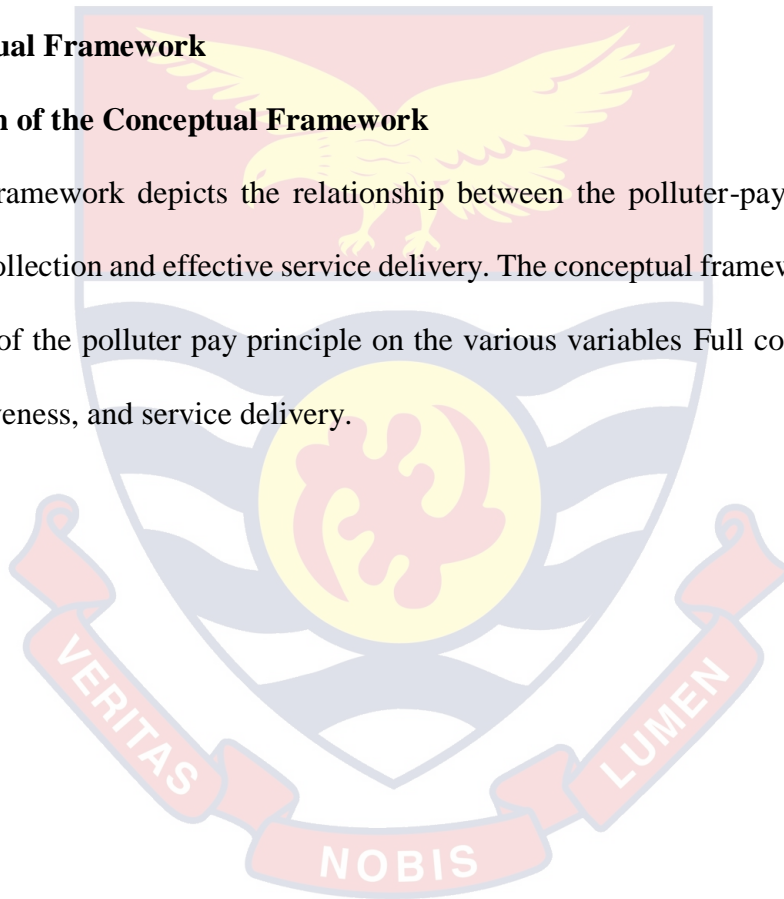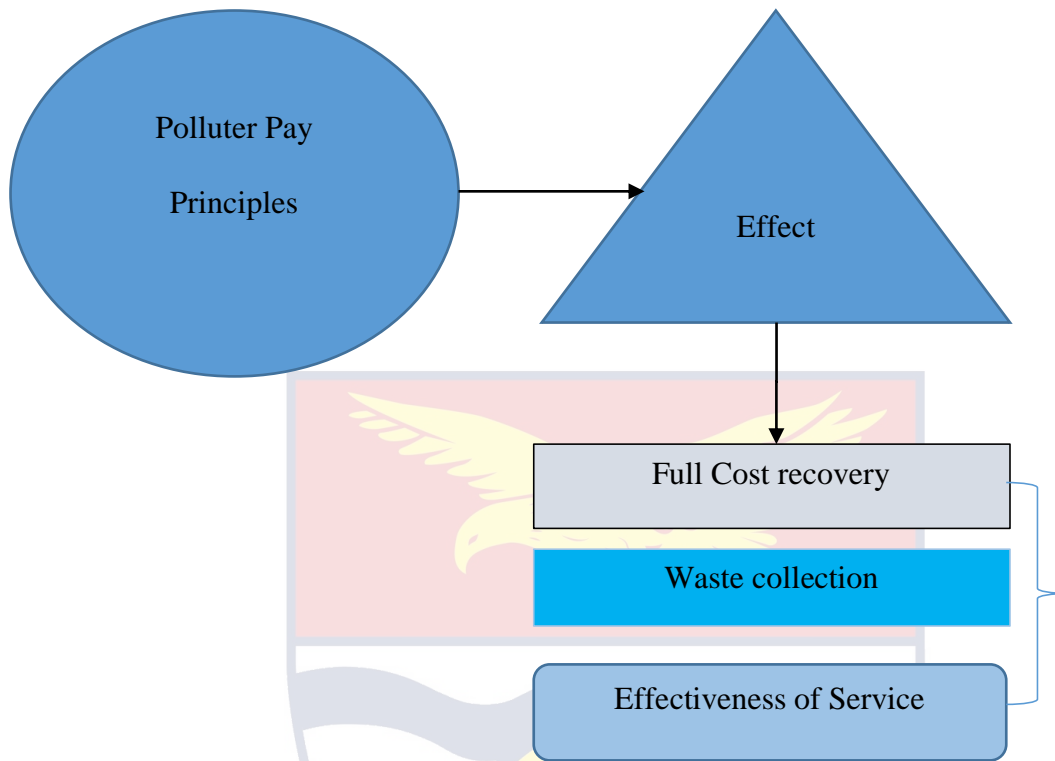
Figure 1: The Conceptual Framework

2.2.2 The "Polluter Pays Principle

The "Polluter Pays Principle" is one of the fundamental principles of modern environmental policies, both nationally and internationally. In simple terms, it means that the cost of pollution abatement should be paid by the polluters and not by their governments (Gregory & Rosencrantz, 2011). This cost is added by the polluter to the production cost of the goods and is passed on to the consumer. The PPP is considered to be the most efficient economic instrument in current environmental policies and is used as such in most African member states (World Bank, 2010).

The PPP is included in a number of regional and international agreements on pollution. Its idea, however, remained in economic circles since the 1920s. However, in the early day's pollution and waste generation was not a concern. The discharge of gases or wastes into the air and water was considered legitimate (World Bank, 2010). Workers lived and died in squalid and dangerous

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conditions. Cities disappeared for months on end in the impenetrable fog created by the coal-fired furnaces. However, when the side effects of pollution were felt the concern for damage to the environment, human health, and property started. Pollution became a common concern and economists were in the forefront of those who were looking for solutions (OECD, 2016).

The knowledge of environmental science made us know that environmental pollution can result from common and anthropogenic causes. There can be natural environmental pollution that is not caused by human activities. For instance, the lava from a functioning volcano can cause pollution. This indicates environmental pollution from a natural cause as a result of the volcano. However, civil engineering activities, deforestation, gas flaring and urban garbage constitute anthropogenic causes of pollution (Sands & Peel, 2017). Concerning PPP, identifying a polluter from pollutionthat result from natural causes may be practically impossible because no one is liable for legal action. Be that as it may, only humans are capable of polluting and be referred to as a polluter. Accordingly, the European Commission characterises a 'polluter' as any person who knowingly or unknowingly causes damage to the environment or anyone who creates an avenue for the occasion of such harm. The OECD defines pollution as the overt or indirect introduction of substances into the environment by man, capable of causing harm (Olawuyi, 2012). Apart from human polluters, legal persons such as corporate bodies are also polluters because their operations sometimes result into pollution. In Ghana, organisations especially within the mining and hospitality secor, have been legally involved in various pollution cases.

The 'polluter-pays-principle' (PPP) underpins most of the regulation pertaining to the environment in particular and sustainable development generally (Kenneth, 2010). Originally an economic principle, it has evolved into being both an environmental principle and a legal principle.In economic terms, the PPP is designed to correct improper cost allocation (Joseph, 2014). This

improper cost allocation has resulted from the common belief that resources such as air and water were not scarce and, as a result, freely available. By not taking the cost of these resources into account in the production and/or consumption of goods and services, an 'externality' arises. An externality (or external cost) results when someone's actions cause an uncompensated loss of welfare to others (Joseph, 2014). This is generally referred to as a cost on society. Costs associated with pollution are considered to be externalities.

2.2.3 Waste Collection and Service Delivery Effectiveness

Several gaps exist within efficiency and effective waste domain in Ghana. Although some work has been done, more questions remain unanswered (Kretchy et al., 2019; Boateng et al., 2019; Owusu-Nimo et al., 2019). First, efficient waste management requires data on the geographical location of landfill and dumpsites; this is critical for an effective and timely waste management regime. Thus, leading to efficient waste collection and consumer satisfaction; whilst sustained ineffective services leads to dissatisfaction on the part of the client resulting in indiscriminate refuse disposal by various households that may result in environmental pollution and spread of disease (Francis-Xavier *et al*., 2018). The efficiency of waste management service as relates to human interface within the waste management delivery domains remains largely unknown. For example, a holistic assessment of clientele perceptions of efficiency across districts regarding the services of a given waste management provider is virtually non-existent. Yet it is critical to have integrated information about the efficiency of waste management delivery as well as customer satisfaction in order to aid policy directions and enhance sustainable waste management. However, holistic assessments of the efficient or quality of waste management services cannot be complete without views from the patron of the waste service so provided (Udofia *et al*., 2018).

2.3 Definition of Waste

Wastes that are solid are termed to as"refuse"or solid waste (Pfeffer 2010). Waste hasbeen defined differently by many Authors with different meaning. One definition isthat waste is 'unwanted' by the first user. It is therefore anything that is no longer 'unwanted' dependent on the time and the prevailing circumstances. Solid waste today is increasingly defined as "natural resources out of place" or as "new materials for technologies not yet found" (Dorvil, 2017). Many governments now regard waste as a useful source of income and as such policies have been geared toward this potentialby both the government and the public sector to harnessing this potential. The recycling subsector for example, is an essential industry generating revenues andjobs for a larger number of people in the world today. Waste Watchers (Watchers, 2014) defined solid waste management as everything that must be done to handle all the solid waste produced in a community, including collecting, transporting, processing and disposal of waste. Similar to this is the one put forward by Tchobanoglous et al., (2013) that SWM involves the collection, treatment and disposal of non-hazardous waste.

Wastes are an unavoidable part of human activity. They either come from human production activities or as a by-product of the materials consumed by human. The rising quality of life and high rates of resource consumption patterns have had an unintended and negative impact on the urban environment - generation of wastes far beyond the handling capacities of municipal governments and agencies. Cities are now grappling with the problems of high volumes of waste, the costs involved, the disposal technologies and methodologies, and the impact of wastes on the local and global environment (Srinivas, 2006).

Events of the 20th century and early into the 21st century indicate that waste, in whatever form or classification (solid, liquid, or toxic,) has become a significant consequence of modernisation and

economic development. In our quest for 'Western-styled' development, humanity did not budget for the associated problems related to the management of waste (Tsiboe & Marbell, 2014).

Much literature has been found on the term waste. However, no clear cut definition has been provided by most of these authorities. As stated by Palmer (2005, cited by Baabereyir, 2009) "the term is frequently left as an undefined primitive despite its critical importance" And "frequently, a list of types of waste is substituted for the underlying definition "However, as he further notes, definitions of waste are rather found in dictionaries and government publications. For example, the Longman Dictionary of Contemporary English (1995) defines waste as "the unwanted material or substance that is left after you have used something" while the New Shorter Oxford English Dictionary on Historical Principles defines it as "the unusable material left over from a process of manufacture, the use of consumer goods etc., or the useless by-products of a process". According to Davies (2008, cited by Baabereyir, 2009) waste is "unwanted or unusable materials that emanate from numerous sources from industry and agriculture as well as businesses and households and can be liquid, solid or gaseous in nature and hazardous or non-hazardous depending on its location and concentration". Davies further notes that what might be considered waste to some people can be a source of value to others.

Waste has become a serious social and environmental issue, qualifying now as a waste crisis (Jung, 2016). According to the World Bank's estimations, world cities annually produced approximately 1.3 billion tons of solid waste (World Bank, 2012). Moreover, the World Bank expects the amount of solid waste per year will reach 2.2 billion tons by 2025. This waste crisis has resulted from these three following factors; technological advances, mass consumption, and changes of people's practices in consumption and waste disposal behavior (Jung, 2016).

However, data is generally lacking in the waste sector of developing countries, available studies on the topic suggest that solid waste management in generally characterized by inefficient collection methods, insufficient coverage of the collection systems and improper disposal of municipal waste (Onibokun and Kumuyi, 2010; Hardoy, 2011; Pacione, 2015). Major urban settlements are, therefore, characterized by waste accumulations and poor environmental sanitation (Hardoy, 2011; Pacione, 2015).

2.4 Management of Waste in Ghana

A study conducted by Adu-Boahen *et al*., (2014), found that the dominant form of waste that is mostly generated by residents were solid in nature. It was also revealed that a considerable number of the residents disposed of their waste mainly by burning. Waste recycling has also become a viable means to manage waste, and it also serves as an economical option in the country despite the considerablecost of collection. Waste recycling technologies are being used by some few industries tocircumvent the need for treatment and the discharge and disposal of large volumes of waste andto reduce demand for raw materials, energy and water. In many instances, these industries havefound waste recycling as effective ways of improving the economic competitiveness of theirproducts. For example, Guinness (Ghana) Limited, Kumasi, derives part of its revenue from the sale of yeast and spent grain used as animal feed. However, most major industrial establishmentsstill practice very little recycling (UNEP/UNIDO, 2010).

To OECD (2011), solid waste management refers to the supervised handling of waste material from generation at the source through the recovery processes to disposal. Tchobanoglous, Theisen & Vigil (2013) make us understand that for solid waste management to be accomplished in an efficient and orderly manner, fundamental aspects and relationships involved must be identified and understood clearly. Othman (2012) also refers to solid waste management as the control of

waste generation, storage, collection, transfer and transport, processing and disposal of solid waste consistent with the best practices of public health, economics, finance, engineering, administrative, legal and environmental considerations.

According to Skinner (2012), solid waste management in its broad sense means integrated systems for waste generation, gathering, storage, collection, transportation, recycling, energy recovery, treatment and disposal. Solid waste management is recognized as a major feature of the indigenous community organization and traditional home management; hence every house has a designed area for solid waste collection (Sanda, 2010). It can be said that these writers are in sync with the definitions of solid waste management and agree that waste management is necessary and must be performed in a particular way that adheres to best practices and principles.

In most developing countries, the urban authorities, such as municipalities are responsible for waste management. Waste management is one of the most visible urban services whose effectiveness serves as an indicator for good local governance, sound municipal management and successful urban reforms. In the African context, the waste management in urban centres has for a long time been centralised (Liyala, 2011), with the use of imported refuse truck (Rotich, Yongsheng & Jun, 2016; Okot-Okumu & Nyenje, 2011) that collect waste from sources or transfer point and deliver to designated waste dumps. Land filling has become the immediate most possible way of managing solid waste in most of the African countries because of the high prevalence of indiscriminate waste dumping. The authorities that primarily bear the responsibility to clean up the cities, towns and residential areas find it easier and time saving to collect the waste and carry it to a landfill rather than sorting out the wastes -for recycling and composting. This latter rarely takes place (Okot-Okumu & Nyenje, 2011).

2.5 Waste Collection in Ghana

The solid waste collection system in the city of Accra is inadequate. Only 11 percent of an estimated 1.4 million residents, in 2012, had home collection services (Songsore, 2012). The amount of waste generated far exceeds the volume collected. The current 300000 tonnes of solid waste collected per annum in the city represents only 60 percent of the total waste generated (Global Network, 2000; World Resources Institute, UNEP, UNDP & World Bank, 2010). Solid waste collection services are not adequate to cover a large part of the city, particularly in poor squatter settlements, and inaccessible neighbourhoods (UNDP and World Bank, 2010). Waste collection in high-income areas is a direct system in which the Waste Management Department and private formal enterprises collect the waste directly from households with compactor trucks for dumping. In some low and middle-income areas, residents carry their waste to public waste containers provided by the Waste Management Department at communal collection points. The containers are woefully inadequate due to their small volume, and the small numbers serving large communities. This is evident in many low-income areas; the containers are not removed in time, and this causes people to dump waste in unauthorised dumps (Asomani-Boateng & Haight, 2011). Substantial amounts of wastes are dumped into canals, water bodies, and surface drains. A recent survey of some selected low-income areas indicated that, 3.3 percent of households.

2.6 Waste Generation and Components

Waste generation is the most important aspect to look at in order to haveeffective SWM system. The generation of waste varies considerably betweencountries based on the culture, public awareness and management (Hazra & Goel, 2012: Wagner & Arnold, 2010). Waste generation comprise those activities in which materials are identified as no longer of any value by the owners/users and either thrown away or gathered for disposal (Puopiel, 2010). Generally,

developed countries generate more waste than developing countries (Kathiravale & Muhd Yunus, 2018). Countries in Asian and African region produce waste in the range of 0.21–0.37 tonnes/capita/year, while European countries generate higheramount of waste with 0.38–0.64 tonnes/capita/year (International Panel on Climate Change (IPCC), 2016). The waste generated bya population is a function of consumption patterns and thus of socioeconomiccharacteristics and the interest in and willingness to pay for collection services (Schübeler, Wehrle & Jürg, 2019).

The residents of Accra, in total, generate an estimated 1200 tons of solid waste per day (Benneh, 2011) with an annual increase of 6 percent (Songsore, 2012). 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/m 3, respectively (World Resources Institute, UNEP, UNDP and World Bank, 2010; Kramer, Jechimer, Lengsfeld & Nartey-Tokoll, 2010). The organic fraction is made up of kitchen waste, including food leftovers, rotten fruits, vegetables, leaves, crop residues, animal excreta and bones (Asomani-Boateng & Haight, 2011). 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 an additional burden on an overstrained collection system (UNDP & World Bank, 2010). 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. The amount and components of solid waste generated in Accra vary with income levels. Low-income areas generate less waste per capita than in 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 0.68kg per capita per day, and high-income residential areas range with 0.62 kg per capita per day.

The waste generated in low-income areas, has a high-density of 0.50kg/l, obviously due to the high share of inert matter (sand and dust) and organic matter of the waste composition (Kramer et al., 2010). Of the non hazardous waste the organic (Allison & Harro, 2010), paper and plastic make up the bulk of the county SW composition and is anticipated that these will continue to be the leading SW composition in the future and also projected to pose danger to the population and the environment as the county economy grows (Henry, Yongsheng & Jun, 2016). On one hand, earlier researches have attempted to draw frameworks to prevent this future problem by recommending the implementation of an integrated SWM system (JICA, 2010: Losai management limited, 2011). On the other hand, the current unsustainable practises among the stakeholders in SW handling hinder the implementation and success of the system proposed which has also affected the ability of the county government to offer efficient SWM services. This therefore, certifies the claims from Freeman 2010 that concluded that stakeholders hold the power to influence organization objectives positively or negatively and can influence the 3R system of waste control, product flow, purchase and lifecycle. Particularly the consumers or the residential have the capability to determine the final destination of a product that is, recycling, reuse or dump filled (Ngau & Kahiu, 2010). Creating stakeholder's awareness and participation plus building of the institutional capacity in handling and monitoring these issues need to be given a priority if the Integrated SWM system is to gain ground (Marshall & Farahbakhsh, 2013).

2.7 Waste Management Cost

It is estimated that the municipality spent about 0.17 percent of its Gross National Product (GNP) on solid waste management services in 1994 (World Bank, 2010). Like in most developing cities,

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the municipality allocates a greater proportion of its solid waste management budget to the collection and transport services than the development of proper disposal sites, equipment acquisition, and maintenance (Cointreau-Levine & Adrain, 2012). The Waste Management Department is mandated to charge service fees to recover its costs of operation (UNEP, 2012).

As in most developing cities, collection fees are usually based on a communities' wealth, ability to pay and the quality of services desired. This system places low social class areas at a disadvantage since the quality of their primary collection service suffers (World Bank, 2012). Poor people have a lower willingness to pay for environmental quality or amenities due to income elasticity of environmental services.

2.8 Challenges Associated with Waste Management

The United Nation Centre for Human Settlements (UN-HABITAT, 2018) report indicate that a significant percent of solid waste generated within most cities in low and middle-income countries, (including Ghana) are not collected. These uncollected waste are illegally dumped on the streets, open spaces and wastelands. A further argument by Malombe 2014 explained that irregular services rendered to households by waste management companies necessitate improper disposal of refuse. This argument is very pertinent in Ghana, where waste management services are largely inefficient and ineffective. It is on records that at least 83% of the population dump their refuse in either authorized or unauthorisedsites in their neighbourhood and due to poor handling of solid waste, unsanitary conditions are created (Benneh, 2011).

In most countries it has been known to be responsibility of the local government to offer Solid Waste Management (SWM) services (UNEP, 2012). However, the quandary associated with the SWM in a developing country is more acute than in a developed country. Favoured by stakeholder's willingness to comply and own up responsibility, financial capabilities, SW handling

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knowledge and skills, the local governments in developed countries have managed to eliminate the problems caused during SWM processes. Furthermore, these countries have invested in stakeholder's awareness, infrastructures, technology, law and legislation dealing with pollution (Tanskanen, 2010). But the situation is different for most local government in the developing countries as SWM is a major challenge. These challenges develop as a result of unsteady SW and environmental legislation, lack of (waste handling skills, knowledge, finance, technology and infrastructure) required when handling waste (World Bank, 2012; Kuniyal, Jain & Shannigrahi, 2011). In addition to these challenges, unsustainable SWM such as dumping, stakeholder's resistance and unwillingness to take responsibility, negative attitude and perception in SW catalyse the situation (Henry *et al*., 2016). The domination of the famous slogan "not in my backyard" [NIMBY] (ISWA, 2012) is generally felt on the ground as stakeholders push waste away from their premises.

Onibokum (2010) explained further by indicating that efficient and effective service delivery depends on managerial and organisational efficiency, accountability, legitimacy, response to the public, transparency in decision making and pluralism of policy making and choice.

A number of cities in Africa developed their municipal solid waste management strategies and programmes by government agencies with no considerable public involvement in the 1980s. However, common setbacks that confronted most of the cities were managerial and organisational inefficiencies and thus lack the distribution of responsibility for different activities of waste management (Onibokum, 2010). It is of no doubt that the consequences of waste disposal on the environment and health, and inappropriate disposal of waste have had a major adverse impact on the natural environment and the lives of the people and in many cities, it is common to experience intense odour, pests and ground and surface water contamination from leachate which in the long

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run, causes landfills to reach capacity and to construct a new landfill is costly and a time-consuming process.

Air pollution can also often lead to the formation of acidic rain which is dangerous to crop life since it hastens the removal of soil fertility from the surface of the ground. It also affects drainage, when solid wastes are dumped in drainage channels and gutters they block the flow of the sewerage. This may cause flooding which destroys human lives and properties. Onibokum, (2010) explained that wastes also affect soil drainage, which hinders the growing of crops. In communities where inhabitants litter around, it devalues the land around it, and this has impacts on tourism, businesses and residents alike. Most at times, it causes harm to tourist industries of that particular area or country. Improper disposing of waste prevents resources from being recycled example, plastics, metals and paper, health, are dangerous to aquatic life. It can also lead to high mortality of fish stock as well as diseases to man such as dysentery and cholera. When waste like broken bottles are dumped anywhere, they spread diseases because water collects in them, and they became breeding ground for mosquitoes and other vectors. Molambe (2014) argue by indicating that waste like human excreta causes diseases when poorly dumped as the flies will carry the germ from the excreta to food and water.

2.9 Environmental Pollution

The result of the deteriorating environmental situation in various countries and regions where environmental pollution is the most intense climate is warming; the ozone layer is depleting, desertification. According to the definition adopted by the UN organisation, "pollution is exogenous chemical substances encountered in a suitable place, at the appropriate time and in inadequate quantities (Belgrade 2010).

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According to the analysis (taken in early 20th century), it is concluded that the most polluted spheres are atmosphere and hydrosphere. Even the state of cosmic space around our planet raises serious concerns.

Poor sanitation and municipal solid waste management has contributed to pollution and unsightly conditions hindering economic development and causing public health problems. Domestic wastewater in Ghana is mostly discharged directly into drainage systems that empty into water bodies such as rivers, lagoon and streams (Sally, 2014). By 2000 about 80% of sewage treatment facilities in Accra were not functioning thus placing a lot of pressure on the receiving streams and rivers in the city (Environmental Protection Agency (EPA), 2010). The extent of pollution especially in the Odaw River in Accra is so intense leading to drastic decline in desirable aquatic organisms. It is also estimated that the Chemu lagoon in Tema also receives over 2million m3 of discharges per day from industries in the catchment area.

2.10 The Perception and Knowledge of Households on Polluter-Pay-Principle

The Polluter Pays Principle (PPP) is a principle of international environmental law that holds a polluter liable for the damage done to the environment. It is one of the essential principles of environmental protection intended to shape the advancement of environmental law (Elvis-Imo, 2016). The polluter pays principle suggests that in general, polluters typically have to cover the cost of pollution and counteraction measures, regardless of whether these costs are caused as the consequence of the imposition, or arein response to some immediate regulation prompting some authorised reduction in pollution (Khan, 2015). The principle opines that polluters would pay for the pollution which results from their activities, with the goal that the cost of their goods and services would be a reflection of the actual cost of the measures which the state embraces to reduce, eliminate and treat the polluters' emissions (Elvis-Imo, 2016).

In many developing countries, there is little household and public awareness about the precautions and proper management of e-waste. In a study on e-waste knowledge and attitudes in India, Sivanthanu (2016) indicated that consumer awareness has a direct relationship with willingness to recycle e-waste, which is a crucial condition for efficient e-waste management. Furthermore, there are ineffective e-waste recycling efforts in developing countries such as Bangladesh and India because large proportions of their populations are relatively unaware about the precautionary measures necessaryfor handling and disposing e-wastes (Sivanthanu, 2016: Ansari, Ashraf, Malik & Grunfield, 2010). However, literature also points out that households in these cities are willing to pay for the effective disposal of e-wastes (Sivanthanu 2016: Borthakur & Govind, 2017).
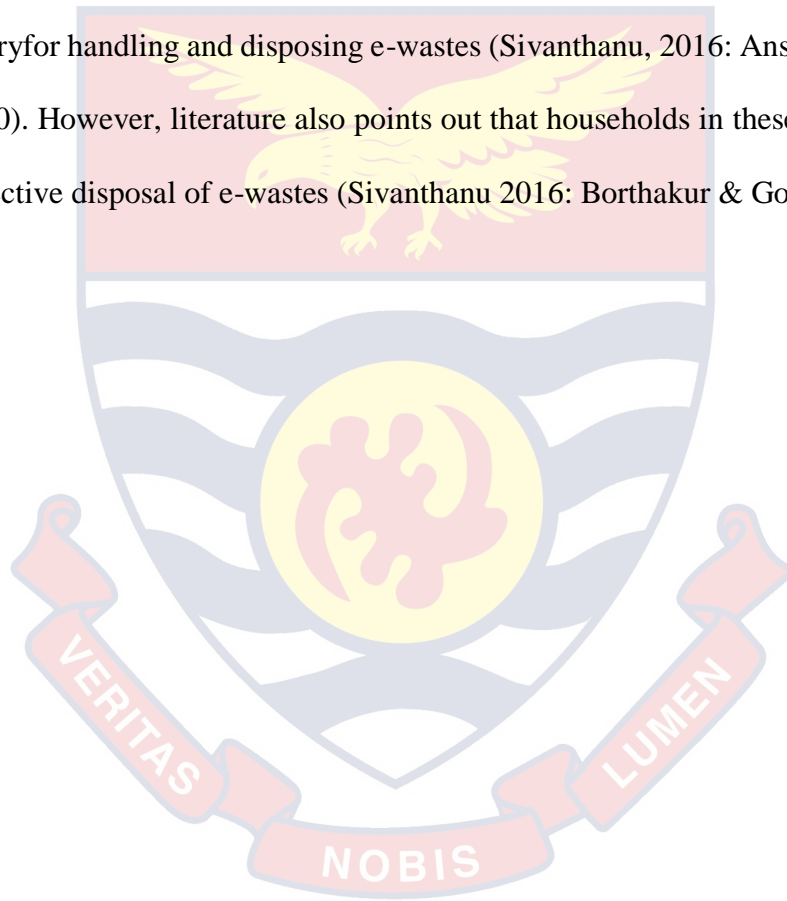
CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodological approaches adopted in collecting data for the research. It specifically covers the study area; the research design; sample size; sources and instruments of data collection; sampling procedures; ethical consideration and data analysis technique.

3.2 Study Area

The study area of research refers to a specific discipline in which research work is dwelt on. There are various areas in which research work can be carried out. However, a study area is choosing a geographical area to focus on a study. The study comprises of two municipalities i.e. Ashaiman and Tema Metropolitan. Ashaiman is estimated to have 190,972 population according to 2010 census while Tema has a population 292,773.

Tema metropolis is a coastal district located 30 km East of Accra, the capital city of Ghana and found in the Southern part of Greater Accra Region-one of the 10 administrative regions of Ghana which covers approximately 786.59km2. The district is located within longitude 0° 00' 5.40" Eand latitude 5° 38' 19.19" N. It covers a total land areas of approximately 87.8 km2 (constituting about 11 percent of the total land area of Greater Accra Region of Ghana) and shares boundaries with Dangme West District tothe North East, Ledzokuku Krowor Municipal to the South west, Adentan Municipal and Ga East Municipal to the North-West, Akwapim South District to the North and Gulf of Guinea (sea) to the South while Ashaiman Municipality is appears to be an enclave located at the center of Tema Metropolis (Ghana Statistical Service (GSS), 2014).

Ashaiman Municipal Assembly covers a total land area of about forty five (45) square kilometers with a population size of190,721 according to the 2010 Population and Housing Census. It was

carved out of the then Tema Municipality,now Tema Metropolitan Authority,as one of the newly created Districts in 2008 by LI 1889 and Local Government Act of 1993(Act 462).The Local Government Actof 1993(ACT 462) and the National Development Planning System Act of 1994 (ACT 480) designate the Municipal Assemblyas the Planning Authority with the mandate to plan, initiate and implement development programmes at the local level.

Figure 2: Map of Tema and Ashaiman

Source: Ghana Statistical Service, 2014

3.2.1 History of Tema

The metropolis has three main sub-metropolitan councils: Tema West, Tema East and Tema Central. However, in 2018, Tema West was carved out into its own district. Tema was created out of a cluster of small fishing villages. History has it that "Torman", as it was originally called was founded by a migrating people called the 'Kpeshie's' who were Gas. They brought along seeds of the gourd plant, which they planted at their new-found site. The seeds thrived very well producing lots of gourds. Hence, with time, the area became known as "Torman", meaning a town of gourds. It was located at the current location of the old Meridian Hotel. The traditional people were later relocated to their present location at Tema Manhean in 1961 when the Tema Harbour was constructed. The Tema Harbour was officially opened in February 1962 and since then, it has been the center of economic activities in the Metropolis and Ghana in general. Located on the Greenwich Meridian and 28.5 km East of Accra, it provides the appropriate facilities to handle efficiently the expected growth in trade and industry in the country. To ensure that this political ambition is met, the Tema Development Corporation (TDC) was established by the Tema Development Corporation Ordinance No. 35 of July 1952 and the government compulsorily acquired about 166 square kilometersfor the construction of a harbour, industrial and commercial establishments and a township (Kasanga & Kotey, 2011). Tema Manhean had to be resettled compulsorily to give way for these developments. Today the Metropolitan area serves as the industrial hub of Ghana with over 500 industries engaging in mainly industrial, service and commercial activities. According to GSS (2014), the development of Tema Manhean was initially planned. However, with time, the area has experienced an organic growth pattern.

3.2.2 Physical Features of Ashaiman

Ashaiman Municipalityis located about 4kmto the North of Tema and about 30km from Accra, the capital of Ghana. Whiles Tema is situated on the Greenwich Meridian on the Longitude00, Ashaiman falls within Latitude 5° 42' North and Longitude 0° 01'west. Ashaiman shares boundaries tothe North and East with Kpone-Katamanso District andtothe South and West with TemaMetropolis. Ashaiman covers a total land area of 45km2. Its proximity to Tema and Accra makes it easy for community members to have access to high level social facilities and infrastructure such as good roads, water, Hospitals and electricity. It also serves as a dormitory town for workers in most industries in the Tema Township. The area is underlain by the Precambrian rocks of the Dahomeyan formation: metamorphic rocks mainly consisting of granite, gneiss and schist probably derived from sedimentary layers. These rocky formations are weathered or decomposed at the surface with a thickness (of the weather component) not exceeding 12m in the area. The soils are mostly sandy clays which are suitable for the cultivation of vegetables: okro, peppers, cabbage, cucumber are major vegetables produced in urban gardens. Most crop farmers in Ashaiman therefore cultivate these crops and market them to surrounding restaurants and hotels. The relief of the area is generally flat and forms part of the Accra-Togo plains. However, there are isolated hills in the general area but even these barely reach 65m high. The relief makes it easy for construction of roads and drains. Ashaiman lies within the Accra-Togo plains, and therefore experiences a climatic condition that extends from the east coast of Ghana into Togo. Rainfall in this area ranges from 730mm to 790mm. The rainy season starts from April to July (the major season) and September to November (the minor season). Temperatures are high throughout the year. March –April is usually the hottest period with temperatures reaching 32°c during the day and 27°c at night. Cooler temperatures occur from May-September with a range of27-29°c during

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the day and 22-24°c in the night. Humidity varies with the seasons with a height of 60-80% in the wet season and less than 30% in the dry periods. The vegetation consists of savannah grasses and shrubs due to the low rainfall regime. However, as a result of human activities, the natural vegetation no longer exists.

3.3 Research Design

The study adopted the use of both qualitative and quantitative data collection using a survey method. Sources of data were key informant interviews, questionnaire survey and secondary data. According to Cooper and Schindler, (2003), deciding on the most suitable methodology in any research process is the next most critical steps after identifying the research questions and the study of literature. The methodology additionally informs the necessary strategies and procedures to be employed in conducting the research agenda. The research approached the subject by using both primary and secondary data. The study began with a critical and extensive review of related literature on the effectiveness of Polluter-Pays-principle in waste management operations. The reviewed literature further helped to primarily uncover the quality of waste management delivery in the municipalities chosen for this study. This aided in revealing the probable theoretical framework for the study. Noting the correlations and predictive analysis leans towards the positivist paradigm (Lui, 2009; Ahadzie, 2007; Xie, 2002), the study through the critical synthesis and considerations of the epistemological, ontological and axiological positions on the study adopted positivist paradigm as the main philosophical stance for the study. The Primary data collection will involve the use of a closed-ended questionnaire. A structured questionnaire will be developed and pre-tested before given out for data collection from the waste management company and heads of households in the two communities, i.e. Ashaiman and Tema.

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The perceptions, knowledge of polluter-pays approach adopted by waste management companies will be gathered while as the effectiveness of the approach will also be gathered from the case study organisation. The survey questionnaires, measuring all the constructs for this study would be sent to a total of 60 respondents which will include staff, managers of the case study organisation (Meridian Waste Management Ltd) and heads of households in the selected communities. Descriptive and inferential statistical tools were employed in evaluating the study's proposed relationships. The analysis will be conducted using Statistical Package for the Social Sciences (SPSS) version 20.

3.4 Study Population

This study focused on residents of Tema and Ashaiman municipality who gets their waste collected by a waste management company. Meridian Waste services. The population considered for the study included 15 management/ staff and 45 residents.

3.5 Sample Size

The sample size for the study was 60 respondents which comprised of management/ staff and residents of Tema Metropolitan.

3.6 Data Collection Instruments

Research instruments are the tools used in the gathering data for specific research. Questionnaire was the basic instrument that was employed to collect data for the study. However, the researcher also carefully observed to examine whether the responses given by the personnel corresponded to the situation being experienced. A self-developed research questionnaire was employed to collect data for the study. The questionnaire was in five sections. Section A consist of Respondent's Background information, Section B consists of Firm's Background Information, Section C, also

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consist of Cost Recovery and Financial Aspects, and finally, Section D Challenges of Polluter-Pay-Principle.

3.7 Sampling Procedure

Approval was sought from the management of the company to administer questionnaires. The survey chose sixty (60) respondents to get a fair representation of the population. A form with a detailed description of the aim of the research was provided to the employees for them to have a balanced opinion of the study and have the opportunity to choose on whether or not to engage in the study. Social desirability effects were prohibited by notifying all participants that their participation was voluntary and that their responses were confidential. The questionnaire was given to respondents in their offices so that they could conveniently and comfortably provide accurate responses. Respondents were provided with instructions and clarity of any potential questions. Also, respondents who felt uncomfortable answering the questionnaire in the presence of the researcher or a bit busy to respond to the questionnaire instantly were permitted some reasonable time to answer the questionnaire.

3.8 Sources of Data

The sources of data for this study were from primary and secondary sources. The primary data was obtained from the field through various data collection techniques, including questionnaire survey, interviews, and field observation. Secondary data were sourced from books, relevant articles, journals and magazines as well as relevant publications and researches conducted on the subject matter by individuals and institutions.

3.9 Ethical Considerations

Ethical considerations play a crucial role on whether a participant will engage in an interview process, and also share his or her true feelings. According to Bryman & Bell (2015) a researcher

needs to consider the ethical aspects when conducting interviews and selecting samples for a research work. This study considered the needs and concerns of participants so as to ensure their safety and protect their dignity and privacy. Subsequently, informant consent were sought from participants before collecting data. However, the researcher followed all laid down procedures in ethical academic works including privacy, non-disclosure, no plagiarism and other considerations.

3.10 Data analysis

This comprises of given explanation and meaning to data gathered from the field or respondents. Statistical tools to help in analysing includes the Statistical Packages for Social Science (SPSS). Also, the use of Excel, graphs, charts, bar charts etc. are also great means of analyzing data. The study, however, dwelt on the use of SPSS to analyse the data gathered from the field. Frequency table, graphs etc. was also used to project the outcome of the study.

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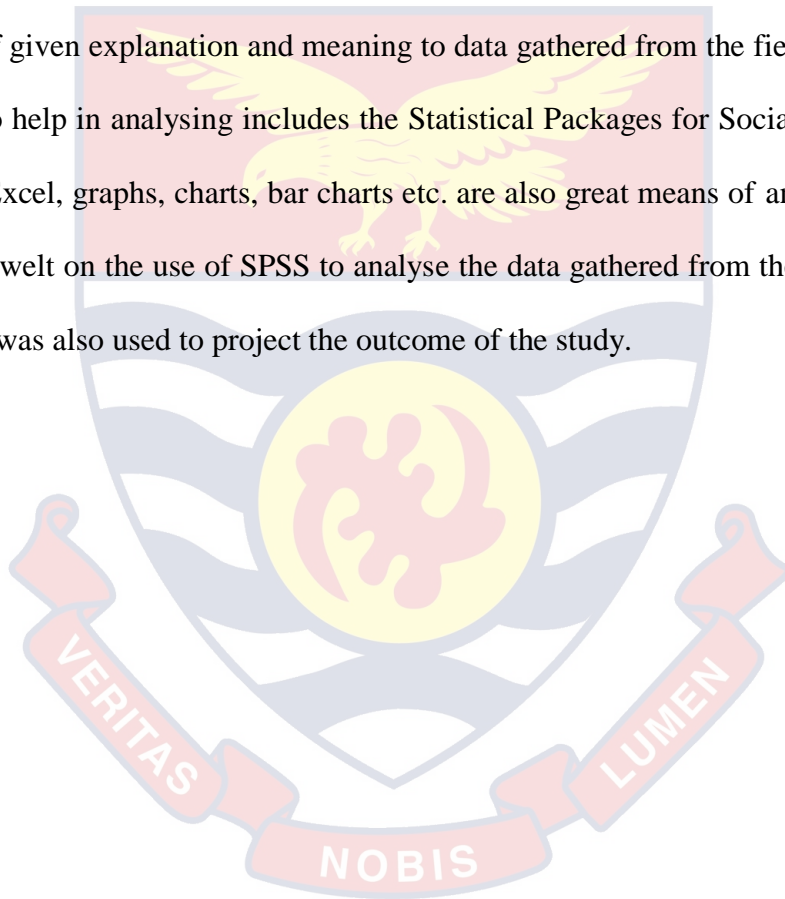
CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter is a presentation of the results of the analysed data based on the data gathered from the study area. It also discusses the findings obtained from the study by assigning reasons and implications of the results in relation to the information obtained.

4.2 Demographic Characteristics of Respondents

It is essential for the background information of all participants to be outlined in order to give a general background to the persons that were involved in the study. The background to the study considered gender, age, level of education etc.

4.2.1 Sex of Respondents

From Table 1, it was revealed from the study that there is a strong dominance of male over female counterparts. 42 of the respondents representing 70% are males while 18 of the respondents representing 30% are females. This affirms the fact that in Ghana, there are more males than females in the formal sector of employment. Also certain type of work are so rigorous in nature, it is of no exception that more men are counted within waste management sector.

Table 1: Sex of Respondents

Sex	Frequency	Percent (%)
Male	42	70
Female	18	30
Total	**60**	**100**

Source: Field study, November 2020

4.2.2 Age of Respondents

The finding reveals that 48% of the respondents were between the ages of 34-41 years, 26% of the respondents were 42 years and above, 20% of the respondents were between the ages of 18-25 years whiles 6% of the respondents were also between the ages of 26-33. This indicates that majority of the respondents fall within the youth group considering the various age groups as indicated in Table 2.

Table 2: Age of Respondents

Ages	Frequency	Percent (%)
18-25 years	12	20
26-33 years	4	6
34-41 years	28	48
42 years and above	16	26
Total	**60**	**100**

Source: Field survey November, 2020

4.2.3 Education Level of Respondents

Table 3 depicts Educational level of respondents. Most respondents had O' level as their highest level of education followed by HND, WASSCE and then Degree. This is so because the nature of sanitation work requires a lot more working force who are on the field and the qualification of such workforce does not require a higher academic level. Management and administrative personnel's constitute a smaller population of the entire workforce, and so the degree holders and HND holders fall within such categories. Since most of the respondents have had some form of education, it is of no doubt that respondents can easily understand and provide relevant information to the study.

Table 3: Education level of respondents

Educational level	Frequency	Percent (%)
O'level	17	30
HND	16	28
WASSCE	14	22
Degree	13	20
Total	**60**	**100**

Source: Field study, November 2020

4.2.4 Position of Respondents

From Table 4 it can be seen that collection vehicle drivers, operation supervisors and collection workers constitute the highest among the study's population. This depicts that there are more field workers as compared to respondents who are at the managerial or supervisory level. The number of respondents whose job role falls within collection vehicle driver and waste collection is encouraging to this study because of the likelihood of quality information what really pertains on the field.

Table 4: Position of Respondents

Position	Frequency	Percent (%)
Operation supervisor	17	28
Collection vehicle drivers	17	28
Engineer	9	16
Collection workers	8	12
Accountant	7	12
Others	2	4
Total	**60**	**100**

Source: Field study, November 2020

4.2.5 Respondents Duration of years in the firm

From Table 5, most of the respondents engaged in this study have worked in their respective positions for 1 year and above. This is good because they will be able to provide information that is based on experience and relevant to the study.

Table 5: Respondents number of years in the firm

Duration of years	Frequency	Percent (%)
1-3 months	12	20
4-6 months	3	6
7-11 months	20	34
1 year and above	25	40
Total	**60**	**100**

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Source: Field study, November 2020

4.2.6 Type of Collection Services Engaged by Respondents

Majority of respondents as shown in Table 6 indicated that services rendered to communities are both houses to house and communal collection service. Majority of respondents indicated that both communities and households are the recipients of waste collection. A typical waste management company like Meridian Waste operate within most of the communities and other social grounds within the municipality and beyond to some selected communities in Ashaiman, Adjei Kojo, Kanewu etc. collection dates are mostly communicated to various households to get their bins ready for collection. The assembly also have arrangement with waste management companies to collect refuse from public places such as street and other social grounds. Waste collection drivers, street sweepers, etc. are mostly engaged in this fieldwork.

Table 6: Type of collection services

Type of collection services	Frequency	Percent (%)
Both house to house and communal	23	38
Only house to house	20	34
Only communal collection	17	28
Total	**60**	**100**

Source: Field study, November 2020

4.2.7 Provision of Standard Bins

When respondents were asked about those responsible for the provision of standard bins, the study as indicated in Table 7 shows that bins are provided by sanitation companies to households at a fee which then becomes the owner of the household. NGOs and local governments also give out bins as a means to support good sanitation practices. Participation of NGOs in the provision of

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bins is a good intervention due to the fact that a lot more households engage in inappropriate waste disposal because they don't have money to buy bins. Waste bins provided by waste management companies come with a fee, and not everyone is able to afford. A respondent upon further interrogations lamented that:

"Majority of the waste bins you see around were bought by each household, but my concern is what about the free dustbins that the government said it will provide to us………and the unfortunate thing is all has been packed at the assembly" (Kwesi, 13th November 2020).

Table 7: Provision of Standard Bins

Provision of standard bins	Frequency	Percent (%)
Household owned	24	40
NGO's	18	32
Waste management company	15	22
Local government	3	6
Total	**60**	**100**

Source: Field study, November 2020

4.3 Determination of User Fee Charged

The study also shows how user fee is charged based on a fee per bin and also fee per house. Compound houses with only one bin pay for that bin, and a self-contain house with one bin also pays for a bin. Majority of respondents indicated that fee per bin is what they are being charged on. Most households within high-income communities are self-contain houses, and thus they have a waste bin to each household, unlike low-income communities where a household comprises of many tenants who share the bill to pay for one waste bin. A respondent said:

"I think compared to other areas, our area is far better as far as the prompt payment of waste management services is concern…...you generate waste always and why will you not be ready to pay the managers of the waste?" (Glady's, 13th November, 2020).

4.3.1 Criteria that informs the charges of user fee

The study further reveals in Table 8 that there is the reduction in charges for low-income communities. Low-income household pays waste tariff lower than high-income individuals or households. Waste management companies do not exist to serve the rich, or the poor but rather focuses on making sure that the environment is free from pollution and physical waste.

Table 8: Criteria that informs the charges of user fee

Criteria	Frequency	Percent (%)
Reduction in charges for low income communities	47	78
Similar charges for low and high income communities	13	22
Total	**60**	**100**

Source: Field study, November 2020

4.3.2 Monthly Cost Recovery Collection

The percentage of cost recovery is estimated at 50% and above which reflects recovery rate from both high-income and low-income communities. The study further reveals that out of the 50% low-income communities contribute between 10-15% of the recovery on monthly bases. By virtue of the nature of high-income communities its quiet easy to identify households and heads of such households to collect fees. In some low-income communities it is difficult to identify one person

to hold responsible for the payment of fees. In most households where there are number of tenants in the house, it is difficult to hold one person responsible. This is indicated in Table 9.

Table 9: Monthly Cost Recovery Collection

Monthly Cost Recovery Collection	Frequency	Percent (%)
50%	30	50
20-30%	20	32
5%	7	12
10-15%	3	4
Total	**60**	**100**

Source: Field study, November 2020

4.3.3 Polluter-Pay-Principle and Full Cost Recovery

Low income communities according to the study as shown in Table 10 contributes between 10-15% to the overall cost recovery. There are instances where it becomes difficult to trace individuals for the waste fees especially in households where there is multiple tenants and none of them owns up to coordinate for the payment of waste management fees. Most of these households gets their services cut off due to nonpayment of service fee.

Table 10: Polluter-Pay-Principle and Full Cost Recovery

PPP and full cost recovery	Frequency	Percent (%)
Minimal extent	28	46
To some extent	25	40
To a large extent	4	8
Not at all	3	6
Total	**60**	**100**

Source: Field study, November 2020

4.4 Challenges of Polluter Pay Principle

4.4.1 Condition of Road Network to Waste Collection Area

Poor road network has been a key challenge faced by waste collectors for so many years. The challenges faced by waste management company's included bad roads to some waste collection areas. Especially during raining season where trucks can be stuck in mud. Again some roads are uncontrollable while others make it difficult to access. These are challenges that relates to low income communities and affect quality of service delivery. Further details are shown in Table 11.

Condition of road	Frequency	Perecnt (%)
Fair	28	46
Good	17	28
Poor	15	24
Total	**60**	**100**

Source: Field study, November 2020

4.5 Perception and Knowledge of Households on Polluter-Pays-Principle

Perception plays an important role in the generation, disposal and overall disposal of solid waste. Dango, Zurbrugg, Cisse, Obrist, Tanner and Biemi (2010) in a study conducted in Abidjan indicated that people in poor settlements had low levels of awareness of health implications of solid waste disposal. They therefore had negative perceptions towards handling of solid waste and the negative health implications therein.

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4.4.1 Disposal of Waste

From Table 12, most of the, respondents attest to the fact that their means of waste disposal is through door to door collection where sanitation companies brings their trucks to load waste. There are instances where a bigger bin is placed in vantage points for low income communities to throw their waste though it comes with a cost.

A respondents when further interrogated said:

"Since I subscribed to the door-to-door collection of my waste, it has been very helpful to me and my family including my surroundings, now those little sicknesses I use to have is gone and my home is always clean" (Razak, 13th November, 2020)

Table 11: Disposal of Waste

Disposal of waste	Frequency	Perecnt (%)
Door to door collection	26	44
Communal collection	24	40
Open dump	10	16
Total	**60**	**100**

Source: Field study, November 2020

4.4.2 Rating of Existing Tariff

Most of the respondents as shown in Table 13 indicated that the current tariff charged by sanitation companies are high hence their inability to pay. 40% of respondents indicated that the current tariffas against 20% who sees the current tariff is moderate. It is not surprising to see varied reaction on tariff since it pertains to both low income and high income households.

Rate	Frequency	Percent (%)
High	40	66
Moderate	20	34
Total	**60**	**100**

Source: Field study, November 2020

4.4.3 Willingness to Pay for Waste Management Services

Most private waste management companies are privately financed and operate through cost recovery by directly entering into contracts with households for waste management services. The success and financial sustainability of waste management companies therefore rely to some extent on their ability to collect revenue as well as clients' willingness-to-pay for SWM services. Majority of the respondents indicated that they want to be charged for their waste on the bases of ''pay as and when you pollute'' while others also indicated that they want to pay a ''different mount of charge for different quantities''. This is shown in Table 14. A respondent who was very concern about the cleanliness of the environment said:

"I believe if the waste management companies should re-strategise their mode of payment for waste management service, it will encourage more households to subscribe to their services….." (Malam Yakubu, 13th November, 2020).

Table 12: Willingness to Pay for Waste Management Services

Willingness to pay	Frequency	Percent (%)
Pay as and when you pollute	36	60
Pay a different amount of charge for different quantities	24	40
Total	**60**	**100**

Source: Field study, November 2020

4.5 Discussions

The study sought to determine the effectiveness of polluter pay principle in both low and high income communities in the Greater Accra Region. The population of the study consist of 60 respondents selected from waste management companies within Greater Accra Region. Also respondents who represents households and beneficiaries of waste collection were made to contribute to the study. The study reveals that majority of respondents indicate that waste management services rendered to their communities are both house to house and communal collection service. Again it's understood by respondents that waste bins are provided by sanitation companies to households at a fee which then becomes the ownership of the household. NGO's and local governments also give out bins as means to support good sanitation practices. Although these intervention from NGO's support access to waste bins to enable effective waste collection but in all these there will still be waste left uncollected. This is confirmed by World Bank & UNDP (2010), which stated that only 60 percent of of the total waste generated gets collected. This means that collection services are not adequate to cover a large part of cities and especially in poor squatter settlements and inaccessible neighborhoods. Mostly containers are woefully inadequate due to small volume and the small numbers serving large communities. In many low

income areas containers are not removed in time, and this causes people to dump waste in unauthorized dumps Asomaning Boating & Haight, (2011).

The study also shows how user fee is charged based on fee per bin and also fee per house. Compound houses with only one bin pays for that bin and a self-contain house with one bin also pays for it. The polluter-pay-principle therefore does not charge multiples especially in houses of more occupancy but rather charges according to the number of waste bin available to that households. Low-income household pay waste tariff lower than high-income individuals or households. This enables the low-income communities to also pay their fees to enable them to be served continuously. This findings is supported by UNDP & World Bank (2010) which stipulates that waste management companies or departments is mandated to charge service feee to recover its cost of operation and as in most developing cities, collection fees are usually based on a communities wealth, ability to pay and the quality of service desired. This system places low social class areas at a disadvantage because the quality of their primary collection service surfers (World Bank, 2010).

On the issue of cost recovery it's estimated at 50% and above which reflects recovery rate from both high-income and low-income communities. The study further reveals that out of the 50% low-income communities contribute between 10-15% of the recovery on monthly bases. This however, leaves a lot of unpaid debt which is carried on to the next month. The inability for respondents to pay these fees are as a resulted of several things which includes, low-income earnings among some communities, high tariff, negligence, difficulty in getting hold of individuals to pay fees etc. According to (Benneh, 2011), poor people have a lower willingness- to-pay for environmental quality or amenities, due to income elasticity of environmental services. Only 31

percent, out of about 82 percent of the population that relied on communal waste disposal sites, paid a levy.

Apart from few respondents who indicated their means of waste disposal to be communal disposal site, majority of respondents could attest to the fact that their means of waste disposal is through door-to-door collection where sanitation companies bring their trucks to load waste. These number of respondents who dispose of waste their into communal dump sites constitute a large number of individuals across the country who practice indiscriminate waste management disposal. This is supported by Malombe (2014) who explained that 83 percent of the population dump their refuse in either authorized or unauthorized sites in thier neighborhood.

The challenges facing waste management companies includes inaccessible roads to some part of collection points, households refusal to pay tariffs, breaking down of waste management vehicles, only 10 to 15% rate of waste collected fee payment and the overall rate of 50 percent and above, improper disposing of refuse etc.

The study shows that waste management companies are working hard to serve communities well and to get rid of waste through introduction of new technology, tariff reduction. Provision of bins and to make it accessible to households so they can conveniently dispose of waste has become paramount. Cost recovery which is fundamental mandate of waste management companies has seen green light in high-income communities due to their effort and readiness to pay as compared to low-income communities. This is a hurdle to most of the waste management companies and it affects the sustainability of their business operations leading to inefficient waste collection and unsatisfactory customers (Kretchy et al 2019).

The study further revealed that majority of the respondents indicated that they want to be charged for their waste on the bases of ''pay as and when you pollute''.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary, conclusions and recommendations of the study. That's this chapter provides information on the summary of the findings of the project work, conclusion and also recommendations for further studies and policy making.

5.2 Summary

Waste management as a social problem has neither spared the developed nor developing nations as statistics have proven that some developed nations are seriously grappling with this bane. The study, therefore, sought to assess the polluter pay principle and its effect on full cost recovery in low and high-income communities. The study employed a descriptive survey design and the population of the study consisted of 60 respondents selected from waste management companies within the Greater Accra Region. Also, respondents who represent households and beneficiaries of the waste collection were made to contribute to the study. The Primary data collection involved the use of a closed-ended questionnaire. Further to this, simple bar chart analysis on excel and SPSS were employed to explore the relationship between the variables from the data collected to meet the research objectives. The study clearly shows that although the polluter-pay-principle has aided in significant recovery of cost, especially in high-income communities yet more can be done to expand the recovery rate and to improve upon service delivery.

The study recommends that the Assembly must provide subsidy to make up for the difference between the proposed fees and the actual cost of providing the waste collection service to waste management companies so that the cost on households will dwindle.

A planning unit should be set up (i.e. if not already in existence) within the Waste Management Departments of the Assemblies to continuously review and plan all activities with waste management entities. It should constantly analyse the volume of waste collected and disposed of, the level of mechanisation, labour situation, and changing cost of collection and disposal of a unit volume or weight of waste and recommend appropriate action or technology.

5.2.1 Key Findings

The findings of study shows that:

Objective 1. To investigate the perception, knowledge of households on the polluter pays principle

The study reveals that majority of respondents indicated that waste management services rendered to their communities are both house to house and communal collection service. Again it's understood by respondents that waste bins are provided by sanitation companies to households at a fee which then becomes the ownership of the household. NGO"S and local governments also gives out bins as a means to support good sanitation practices. Respondents however, sees polluter pay system as very expensive hence a call for subsidy from the municipal assembly.

Objective 2. To determine whether Polluter- pays approach has the potential for full cost recovery in low and high income communities.

The study also shows how user fee is charged based on fee per bin and also fee per house. Compound houses with only one bin pays for that bin and a self-contain house with one bin also pays for it. The polluter pay principle therefore does not charge multiples especially in houses of more occupancy but rather charges according to the number of waste bin available to that household. Majority of respondents admitted to their acceptance of fee per bin while others support fee based on the quantity of refuse made.

The study further revealed that there is reduction in charges for low income communities. Low income household pay waste tariff lower than high income individuals or households. This enables the low income communities to also pay their fees to enable them to be served continuously.

On the issue of cost recovery it's estimated at 50% and above which reflects recovery rate from both high income and low income communities. The study further reveals that out of the 50% low income communities Contribute between 10-15% of the recovery on monthly bases. This however, leaves a lot of unpaid debt which is carried on to the next month. The inability for respondents to pay these fees are as a result of several things which includes, low income earnings among some communities, high tariff, negligence, difficulty in getting hold of individuals to pay fees etc. the results however shows that cost recovery is higher in high income communities than low income communities.

Objective 3. To identify the challenges regarding the implementation of polluter- pays approach in both low and high- income communities.

The study shows that there are quite a number of challenges facing waste management companies from inaccessible roads in some part of communities, household's refusal to pay tariffs, breaking down of waste management vehicles etc.

5.2 Conclusions

The study sought to determine the effectiveness of polluter-pay-principle in both low and high income communities in the Greater Accra Region. On the issue of cost recovery it's estimated at 50% and above which reflects recovery rate from both high income and low income communities. The study further reveals that out of the 50% low income communities contribute between 10-15% of the recovery on monthly bases. This however, leaves a lot of unpaid debt which is carried on to the next month. The inability for respondents to pay these fees are as a result of several factors

which includes, low income earnings among some communities, high tariff, negligence, difficulty in getting hold of individuals to pay fees etc.

Majority of respondents engaged in this study could attest to the fact that their means of waste disposal is through door to door collection where sanitation companies brings their trucks to load waste. The study shows that waste management companies are working hard to serve communities and household well and to get rid of waste through introduction of new technology, tariff reduction, making bins accessible to households so they can conveniently dispose of waste and also to introduce the polluter pay principle to ensure that cost is recovered.

The study clearly shows that although the polluter-pay-principle has aided in significant collection of cost yet more can be done to expand the recovery rate to higher amount so that operations of the company can be sustained and enhanced. Findings of the research will serve as a reference point for all especially students interested in environmental waste management and the Polluter-Pay-Principle.

5.3 Recommendations

1. **Policy:** The Assembly must provide subsidy to make up for the difference between the proposed fees and the actual cost of providing the waste collection service to waste management companies so that the cost on households will dwindle.

2. A planning unit should be set up (i.e. if not already in existence) within the Waste Management Departments of the Assemblies to continuously review and plan all activities with waste management entities. It should constantly analyse the volume of waste collected and disposed of, the level of mechanisation, labour situation, and changing cost of collection and disposal of a unit volumeor weight of waste and recommend appropriate action or technology.

3. Regularity of collection should be supervised by the assembly to ensure that household's collections are done on agreed days.

4. The study recommends that the level of fees paid by each household, should be based on the 'ability' and wellness of generators to pay rather than the actualamount required to pay for the service especially in poor communities

5. The waste generators must be allowed to now play a more active role in determining the level of use fees, service levels and monitoring of service providers.

6. The study recommends that education and awareness creation by environmental health officers and health professionals through community gatherings, durbars and other social meetings to improve sanitation, ensure healthy living and clean environment must be pursued with all the seriousness it deserves. Further, communal labour must be organized by assembly members and communities frequently in order to deal with the menace.
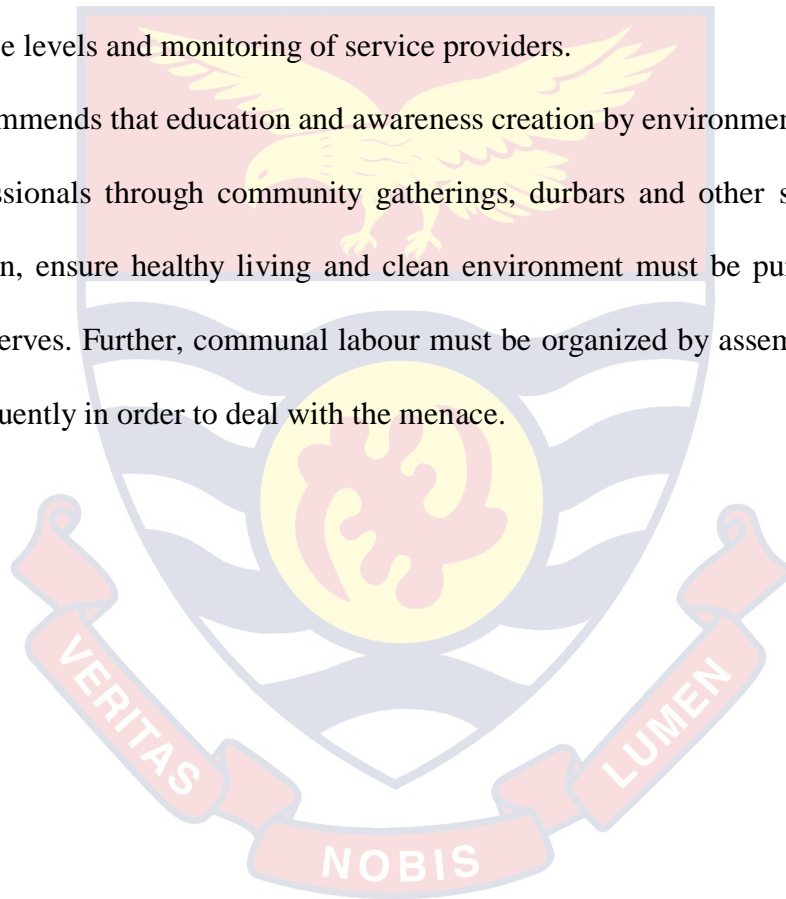
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APPENDIX I

QUESTIONNAIRE

PRESBYETRIAN UNIVERSITY COLLEGE, GHANA

FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES

MANAGEMENT

Dear Respondent,

Thank you for your participation in this study on **''THE EFFECTIVENESS OF POLLUTER-PAYS- PRINCIPLE IN TEMA METROOLISE IN THE GREATER ACCRA REGION**.

The questionnaire seeks your opinion on the above subject matter, and I would be grateful if you could take a couple of minutes to respond to the questions asked. There is no right or wrong answer what matters is that your fair opinion is provided-based on your experiences. Though some questions appear similar, please answer them anyway as this is deliberately done for statistical analysis purposes.Thank you for taking the time to participate in this study.

PART 1: Questionnaire for Management and staff

SECTION A:Respondent's Background information

1. Gender   [ ] Male   [ ] Female

2. Age [ ] 18- 25 [ ] 26 – 33 [   ] 34 – 41 [   ] 42 and above

3. Education level

[ ] O' Level [   ] WASSCE [   ] HND [   ] Degree [   ] Masters [ ] Others……………..

4. Indicate your current position in this firm

Managers/Administrator [ ]

Engineer [ ]

Operations supervisor [ ]

Accountant [ ]

Collection vehicle drivers [ ]

Collection workers (loading of waste) [ ]

Workshop staff (Mechanics) [ ]

Other, specify…………………………………[ ]

5. Please how long have you held this position in this firm? …………………

SECTION B: Firm Background Information

6. What type of collection service does the company render? (tick)

[ ]Only house-to-house service (curbside/door to door)

[ ]Only communal collection service

[ ]Both house-to-house service and communal collection services

7. Who provides the standard bins for house-to-house service rendered by your company?

[ ] the company [ ] local government [ ] households provides own bins [ ] NGO's

Other ……………………………………………………

SECTION C: Cost Recovery and Financial Aspects

8. How is user fee charged under the polluter pay principle for house-to-house service?

[ ] Fee per household   [ ] fee per house   [ ] fee per bin   [ ] fee per volume of waste

9. What criteria do you use to charge the user fee for all house-to-house service users in different communities? [ ] consideration for low-income communities [ ] same charges for both low income and high income [ ] reduction in collection service in low-income areas [ ]

10. What percentage of the number of house-to-house users/beneficiaries who regularly pay in low-income communities? [ ] 5%   [ ] 10 -15%   [ ] 20- 30%   [ ] 50% -above`

11. How many months are defaulters of fee payment allowed to be in arrears?

[   ] 1-2 months [   ] 3-4 months [   ] 5-6 months [   ] 6 months & above

12. What percentage of cost recovery collection is achieved on monthly bases?

[   ] 5% [ ] 10 - 15% [   ] 20- 30% [   ] 50% - above`

13. What percentage of cost recovery collection comes from low income areas?

[   ] 5% [ ] 10 - 15% [   ] 20- 30% [   ] 50% - above`

14. What sanctions are applied to defaulters of house-to-house service fees payment?

[ ]redrawal of services [ ] court summon [ ] payment of penalty [   ]

15. What factors contribute to the defaulting of user fee payment for house-to-house service?

[ ] wrong billing [   ] absence of household heads [   ] high cost of bills [   ] financial challenges

16. Does the polluter pay principle ensure full cost recovery?

[ ] to a large extent [ ] to some extent [   ] to a minimal extent [   ] not at all

SECTION D: Challenges of Polluter Pay Principle

17. How would you judge the cooperation of residents served on the polluter pay principle?

[   ] Very poor[   ] poor [   ] fair [   ] good [   ] very good

18. What are complaints about service beneficiaries often received from collectioncrew?

[   ] spillover of waste [ ] delays in waste collection [   ] over billing [   ] none of the above

19. How would you rate the condition of road used for waste collection

[ ] Very poor [ ]poor [ ] fair [ ] good [ ] very good

20. How would you rate the nature of traffic conditions along collection routes?

☐ Slow/low congestion ☐ moderate congestion ☐ high congestion

21. What is the payment system most household prefers?

[ ] Pay a fixed amount of charge for any amount of waste you generate on a monthly bases

[ ] Pay a different amount of charge for different quantities of waste

[ ] pay as and when you pollute

Thank you!!!

APPENDIX II

QUESTIONNAIRE

PRESBYETRIAN UNIVERSITY COLLEGE, GHANA

FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES

MANAGEMENT

Dear Respondent,

Thank you for your participation in this study on**"THE EFFECTIVENESS OF POLLUTER-PAYS- PRINCIPLE IN TEMA METROOLISE IN THE GREATER ACCRA REGION**.

The questionnaire seeks your opinion on the above subject matter, and I would be grateful if you could take a couple of minutes to respond to the questions asked. There is no right or wrong answer what matters is that your fair opinion is provided-based on your experiences. Though some questions appear similar, please answer them anyway as this is deliberately done for statistical analysis purposes.Thank you for taking the time to participate in this study.

PART 2: Residents' survey questionnaire

SECTION A: Household Characteristics

1. City ……………………… Locality/Suburb …………………

2. Gender   [ ] Male   [ ] Female

3. Age a. [ ] 20 or less18- 24 b. [ ] 21 - 30 c. [   ] 31 - 40 d. [   ] 41 – 50 e. [ ] 51 – 60   f. [ ] 61 – 70   g. [ ] 71 and above.

4. Educational background a. [ ] none formal   b. [   ] basic   c. [ ] secondary d. [ ] tertiary

5. Are you the household head? [   ] Yes [   ] No.

6. Occupation of the household head (s).

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(a) Unemployed (b) Trading (c) Government employee/Retired (d) Self-employed

(e) Agriculture/farming (f) others, specify……………

SECTION B: Perception, Knowledge of Households on Polluter pays principle

7. Where do you empty or dispose of your waste? [ ] Door-to-door collection [ ] Communal collection (a skip container in the neighborhood) [ ] An open dump (waste is collected regularly)

8. How often do you pay for your waste bill? a. all the time [ ] sometimes [ ] not at all

9. How would you rate the quality of collection service in your community? [ ] very good [ ] good [ ] Poor [ ] very Poor [ ] I don't know

10. Does the bin/container overflow? a. [ ] sometimes b. [ ] very often c. [ ] never happens

11. How often does the vehicle come for collection? a) [ ] Every day, b) [ ] once a week c) [ ] twice a week d) [ ] thrice a week

12. How do you rate the existing tariff? a) High b) Moderate, c) Low

13. How would you want to be charged for your waste?

[ ] Pay a fixed amount of charge for any amount of waste you generate on a monthly basis

 [ ] Pay a different amount of charge for different quantities of waste

 [ ] pay as and when you pollute

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