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Towards a Zero Waste:
Assessing Solid Waste Management in the Ledzokuku Krowor Municipal Assembly in the Greater-Accra Region, Ghana.

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DECLARATION

I, Raymond Acquah, hereby declare that with the exception of references used, which have been duly acknowledged, this work and the views expressed therein are my own under the supervision of Associate Professor Stig Halvard Jørgensen. This work has neither been submitted wholly nor partly elsewhere for another degree.

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(Supervisor)

DEDICATION

This work is dedicated to my only lovely daughter, Princess Kyra Eyram Acquah for been there for me all the time.

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The Lord has been my light and the source of my strength. To Him be glory forever, Amen. I would like to express my profound gratitude to my supervisor, Associate Professor Stig Halvard Jørgensen for the insightful guidance and motivation he provided to make this work a success.

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ABSTRACT

This study sought to explore solid waste management in the Ledzokuku Krowor Municipal Assembly in the Greater-Accra Region of Ghana. The various actors in solid waste management are identified as well as the roles they play. The study also explores Public Private Partnership as a tool in managing solid waste and the outcome of strategies used in managing solid waste in the Municipality. This is followed by a discussion on the challenges faced in solid waste management that prevents the strategies used in managing solid waste from achieving the desired objectives. The study focuses on household production of solid waste in view of the fact that majority of solid waste generated in the municipality is from households.

This study uses Norman Long's actor-oriented approach to identify the various actors in order to better appreciate their roles in solid waste management leading to social change. A combination of quantitative and qualitative method is used with questionnaires, semi-structured interviews, and observation deplored to gain a deeper understanding of solid waste management in this municipality. A total of 82 respondents participated in the survey with a response rate of 82% and 14 informants who were made up of 9 key informants and 5 primary informants with a response rate of 78%.

This study has shown that apart from the key actors in solid waste management, there are other actors who play various important roles that are not recognised. It has also revealed that most of the problems of solid waste which were supposed to be cured by strategies put in place to manage solid waste still exist and waste contractors are only able to collect 60% of total solid waste generated daily resulting in heaps of refuse lying in gutters, communal sites, households and other public places; a situation that may have serious health outcome for residents. One interesting finding is the fact that many households do not have problems paying for house-to-house solid waste services but are not satisfied with the level of service rendered by waste contractor due to irregularity in service provision. Also the study discovers a new set of actors in solid waste management in the municipality who operate with tricycles providing services to households for a fee.

The study has also shown that many of the problems of solid waste that still exist is the joint creation of the actors themselves through their actions as well as the challenges they face and by addressing these challenges, these problems may reduce drastically and the municipality will be rid of filth.

TABLE OF CONTENTS

FIGURES

TABLES

LIST OF ABBREVIATIONS

EPA	Environmental Protection Agency
ERP	Economic Recovery Programme
GOG	Government of Ghana
GSS	Ghana Statistical Service
JHS	Junior High School
LEKMA	Ledzokuku Krowor Municipal Assembly
MSWM	Municipal Solid Waste Management
N	Number of respondents
NIMBY	Not In My Back Yard
NTNU	Norwegian University of Science and Technology
OCHA	United Nations Office for Coordination of Humanitarian Affairs
PPP	Public Private Partnership
SAP	Structural Adjustment Programme
SHS	Senior High School
SWM	Solid Waste Management
UNCED	United Nations Conference on Environment and Development

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background

As a town grows and become urbanized, it becomes the centre of attraction for many economic and social activities. Urban growth in most African countries is taking place without planning resulting in low density development with deteriorating environmental conditions (Yankson and Gough, 1999). And because increase in population is not matched with planning, development suffers. This is because when large numbers of people migrate into a small area in pursuit of livelihood as a result of urbanization, a problem is created for waste disposal as a result of increased generation of waste that is associated with the increasing population (Yankson and Gough, 1999). In Africa the growing number of cities faces the challenge to provide their populations with adequate water supply, sanitation and solid waste services in view of the rapid rate of the urbanization process (Solomon, 2011).

The implementation of the Economic Recovery Programme in the mid-1980s saw improvements in the Ghanaian economy (Yankson and Gough, 1999), with Accra becoming an attractive destination for all manner of people from various regions of the country. This lead to an expansion and increases in the population rising from 450,000 in 1960 to 1.3 million in 1984 and in the year 2000, the population of Accra was estimated at two million (Boadi and Kuitunen, 2003). This increases in population made it a governance challenge for local authorities to provide effective public services including solid waste services. In view of the increase pressure on Accra, it was re-demarcated and Ledzokuku Krowor Municipal Assembly (LEKMA) created in 2007 as a new Municipal Assembly.

LEKMA is reeling with solid waste management challenges and has rolled out a strategy of contracting waste contractors in a Public Private Partnership in order to effectively deal with the problem of solid waste in view of the health implications associated with it. This study examines solid waste management in this municipality using a combination of quantitative and qualitative research tools in collecting data in addressing the research questions.

1.2 Problem Statement

When large numbers of people migrate to an area in pursuit of livelihoods as a result of urbanization, a problem is created for waste disposal as a result of increase generation of waste associated with the increasing population (Yankson and Gough, 1999). Solid waste is a problem caused by urbanization with many people in developing countries moving from rural areas into urban centres. In fact the United Nation's projections estimate that urbanization rate will increase from 24% in 2005 to 38% in 2030 (United Nations, 2006 in Solomon, 2011). This creates a problem for solid waste management as local authorities will have to fathom effective ways of dealing with the increased generation of waste due to urbanization.

The ever increasing quantities of solid waste are a growing environmental threat in urban areas worldwide (Barr et al., 2001). The blueprint for worldwide sustainable development agreed by national leaders in Rio de Janeiro in 1992, Agenda 21 (UNCED, 1992) identified waste as a major blockade to achieving environmental sustainability in the 21st century (Solomon, 2011). It is therefore important that effective and efficient strategies are put in place to solve waste management problems in view of the fact that waste management is critical to the protection of public health, safety and the environment.

Waste management has been recognised as a problem confronting many cities across the world including Ghana (Joseph, 2006, Giusti, 2009, Oteng-Ababio et al., 2013). In Ghana and particularly the Ledzokuku Krowor Municipal Assembly, it is common to see piles of waste that is left uncollected in the streets for several days. Some of these wastes end up blocking drainage channels. In other places there is littering and illegal disposal of solid waste in gutters, bushes and other public places which serve as a significant environmental health risks on people (Whiteman et al., 2001).

In addressing the solid waste management problems, local authorities have been blamed for not providing adequate services for managing solid waste (Fobil et al., 2008, Joseph, 2006, Solomon, 2011). Managing solid waste is about good governance and good governance approach in solving solid waste problems should involve key actors who are affected by solid waste problems (Boadi and Kuitunen, 2003) in the decision making process. The available management capacities for managing the increasing amounts of waste are often very poor and inadequate leading to heaps of waste that lie uncollected and become a public health hazard for residents. In the light of this, it is imperative that a study is conducted to understand the dynamics of solid waste management in the Ledzokuku Krowor Municipal Assembly.

1.3 Research Objective

This research was carried out to examine solid waste management in the Ledzokuku Krowor Municipal Assembly.

In order to achieve the research objective, the following research questions were addressed;

- Who are the actors in solid waste management and what are their roles?
- What are the strategies used for solid waste management in the Municipality?
- What is the outcome of the strategies used for managing solid waste?
- What are the challenges to solid waste management in the Municipality?

1.4 Significance of the study

The study will provide an understanding of current solid waste management practices within the municipality.

This study will add to knowledge about solid waste management in this municipality with very little study about the subject in this new Assembly and provide the basis for further research.

It will also inform policy makers, opinion leaders and the general public about weaknesses of current solid waste management strategies for action to be taken to improve the situation.

1.5 Organization of the study

This study is organised into seven chapters. Chapter one focuses on the general introduction which comprises the background of the study, problem statement, research objective and questions as well as the significance of the study. Chapter two presents the theoretical and conceptual framework as well as the relevant literature for the study. Chapter three deliberates on the methodology regarding the methods used in collecting data from the field. Chapter four places focus on the contextual background to pertinent characteristics of the study area. Chapter five focuses on the first two research questions by identifying the various

actors in solid waste management in the Municipal Assembly and goes on to discuss the roles of these actors in solid waste management. Chapter six discusses the outcome of strategies used in managing solid waste. Focus is also placed on the challenges to solid waste management in the municipality. Chapter seven presents a summary of findings by answering the various research questions. It also deliberates on the limitations to the study as well as recommendations and conclusion.

CHAPTER TWO

THEORY, RELATED LITERATURE AND ANALYTICAL FRAMEWORK

2.1 Introduction

Societies across space are dynamic and complex and hence the need to use theories and concepts in understanding 'messiness' of human societies (Crang and Cook, 2007). In order to appreciate and better explain solid waste management in the Ledzokuku Krowor Municipal Assembly, the actor-oriented approach is used to identify the various actors in Solid Waste Management and to gain a deeper understanding of their roles and actions leading to social change. The actor-oriented perspective was introduced in 1977 by Norman Long and it recognises the active roles played by various actors in development. Within the Municipal Solid Waste Management, there are various actors involved and each of these actors has roles to play and these roles affect solid waste management.

In this chapter, I discuss the actor-oriented approach and link it to Solid waste management. The concept of governance is also discussed with various governance strategies for solid waste management. Also, the concept of Public Private Partnership is discussed as a good governance strategy for effectively managing solid waste. The analytical framework which underpins the research is also explained.

2.2 Actor-oriented approach

Development has been perceived differently by different scholars and a look at many post-war literature on development and social change highlights differences between, studies that deals with aggregate or large scale structures and trends -often described as 'macro'- and studies that characterise the nature of changes at the local level -often depicted as 'micro'- (Long, 2001,p.10). These frames of analysis are drawn mostly from concepts of neo-Marxist and Modernisation theories where development and social change results from external centres of power through interventions by the state or international bodies and following

determined development paths. According to Long (2001, p. 11), ‘‘*these models are tainted by determinist, linear and externalist views of social change* ’’. These types of analysis fails to recognise the active role played by people (individuals) in development and are described by Long (2001, p.6) as ‘people-less’ as they fail to recognise the internal mechanisms at play in a society with regards to social change. Long argues that a way out of this is to pay more attention to the people involved in the development process by recognising the active roles played by the various actors through their actions in shaping society and eventually leading to social change (Long, 2001). He therefore proposed an ‘actor-oriented’ approach as a way of recognising the central role played by actors in the process of social construction and reconstruction. The actor-oriented approach starts with an interest in explaining how different actors respond differently to similar structural circumstances when even the condition appears the same. It conceptualises social life as a heterogeneous process where societies contain different lifestyles and cultural forms which forms part of the construction of their social life (Long, 2001). In view of this, interactions in the society have an influence on the ‘lifeworlds’ of actors which leads to continuous changes taking place. ‘Lifeworld’ is a term used to describe, the ‘lived-in’ and ‘taken-for-granted’ world of an actor (Schutz, 1967). Such world should be considered as the creation of individuals’ own self-assembling and re-evaluation of relationship and experiences. It is therefore very important to consider actors as active participants in development and not passive recipients of intervention by the state. This is because all forms of interventions enter the existing lifeworlds of individuals and social groups affected, and they are mediated and transformed by these same actors through their actions.

The actor-oriented approach requires the notion of agency (Bjerkli, 2005) which attributes to the individual actor the capacity to process social experiences and to devise strategies of coping with life, even under the most extreme forms of coercion. This also enables them to have the knowledge to perceive problematic situations and to respond to challenges (Long, 2001). This knowledge emerges out of a complex interplay of social, cognitive, cultural, institutional, and situational elements. An actor-oriented approach therefore states that one set of circumstance might be responded to in different ways due to the diversity of actions undertaken at the local level (Long and Long, 1992). And since social life is not homogenous as to be built upon by a single type of discourse, it follows that, notwithstanding the restrictions of their choices, actors always have some alternative ways of formulating their objectives, using different strategies and giving reasons for their behaviour. It is also a

necessary feature that actors could have acted either negatively or positively in the intervention process.

In actor-oriented analysis, a major objective is to identify and characterize differing actor practices, strategies and rationales, conditions that caused them, how they interlock, their importance or effectiveness for solving specific problems, and their wider social implications (Long, 2001). Therefore in actor-oriented approach, the assumption is that, the differential patterns that arise are partly the joint creation of the actors themselves through their interactions, negotiations and social struggles that ensues between them.

As Long (2001, p.27) argues, ''*Intervention is an ongoing transformational process that is constantly reshaped by its own internal organisational and political dynamic and by the specific conditions it encounters or creates, including the responses and strategies of local and regional groups who may struggle to define and defend their own social spaces, cultural boundaries and positions within the wider power fields*''.

Actor-oriented analysis have however been criticised for devoting too much attention to the everyday predicaments, subjectivities and social trajectories of individual actors who, in cooperation or in conflict with other acting persons, make up the fabric of social life to the neglect of structural issues that limit the choices of actors. Several other scholars (Alavi, 1973, Gould, 1997, Vanclay, 1994) have faulted actor-oriented analysts for centring too much on the agency and instrumental rationality of individuals.

Norman Long recognises the fact that structures exist. These structures are defined as stable and durable underlying arrangements of social relations, or background conditions that restrict the decisions and activities undertaken by actors within society (Røine et al. 2001 in Bjerkli, 2005). Even though it may be true that important structural changes result from the impact of outside forces, it is not satisfactory theoretically to base analysis on the concept of external determination. All kinds of external intervention enter the existing lifeworlds of the individuals and social groups affected, and are mediated and transformed by these same actors and structures (Long, 2001).

What we need is a move away from structural explanations in favour of a more 'agent' or 'actor' focused analysis. A dynamic approach to comprehending social change is one that stresses the interplay and mutual determination of 'internal' and 'external' factors and the relationships, and one which recognises the central role played by human action and consciousness (Long, 2001). In effect, the so-called 'powerless' actors can make their voices

heard and dramatically alter the course of events through their actions, thus the importance of an actor-oriented approach.

An actor-approach enables us to move beyond structural linkages to unique opportunities often bringing to light important roles played by key individuals towards the process of social change (Biggs and Matsaert, 2004). In actor-oriented approach, one should identify all relevant actors who share common problems (Bosman, 2004).

2.3 Actor-Oriented Approach and Solid waste management

The actor-oriented approach seems fruitful in studying and understanding solid waste management practices in societies and local communities by paying attention to the active roles played by the actors in Solid Waste Management. It also pays attention to the various responses of different actors to similar structural circumstances in solid waste management.

The actor-oriented approach starts with an interest in explaining how different actors respond differently to similar structural circumstances. It is an accepted fact that Solid Waste is an international problem affecting many developing countries (Chandrappa and Das, 2012, Oteng-Ababio, 2010, Joseph, 2006). And in the management of solid waste, there are different governance strategies (Whiteman et al., 2001) employed by societies across the world. One of such strategies is the Public-Private-Partnership arrangement which is an institutional arrangement between public and private sectors in managing solid waste. This means that management of solid waste is not entirely a sole preserve of municipalities but that there are various actors involved. The actor-oriented approach helps in identifying all relevant actors in solid waste management and how these actors respond differently to structural circumstances.

The actor-oriented approach recognises the fact that structures exist, so also in the management of solid waste, there are several structural issues limiting the actions of actors. In some societies, residents are expected to walk long distances to access communal dumping sites (Oteng-Ababio et al., 2013). Others have no choice of choosing the particular private solid waste company they want. There are other households who cannot simply afford to pay for the services of solid waste collection. Some households are able to afford the fees and enjoy solid waste services but have to bear the problem of service irregularity as a result of the inadequate dumping sites. These and other structural factors become a hindrance to

residents who have the power of agency under the actor-oriented approach. And no matter how restricted their choices are, actors always have alternative ways of formulating their objectives with their action (Long, 2001). These structural constraints to households in solid waste management become a motivation to engage in illegal dumping of solid waste. And in the process, creates a health hazard for societies. This sums up the assumption that, the differential patterns that arise are partly the joint creation of the actors themselves.

2.4 Governance

Governance is one very important aspect of government and is very critical in public service delivery including the management of solid waste.

There is a general consensus in the scholarly world about the fact that there is a difference between the terms government and governance (Bjerkli, 2013, Tsiboe and Marbell, 2004). Government is mainly about the state, the people, and about power (Devas, 1999, Owiti and Kibwana, 1994). Government connotes that real political authority is vested within the formal legal institutions of the state (Bratton and Hydén, 1992). According to these definitions, government can be said to be the authority and mandate to rule or govern a country. Governance on the other hand can be said to be the means by which power is exercised in the management of a country's resources for development (World Bank 1992 in Tsiboe and Marbell, 2004). And in a bid to exercise this power, the World Bank identified bureaucracy as the main barrier to development and a call for more open and efficient administration (Bjerkli, 2013). In view of this, governance has led to administrative reforms of states with a focus on institutional arrangements in order to reduce the bureaucracy and be more effective and efficient in service delivery. This is achieved by sharing power with lower levels of government and empowering non-state actors as a way of ensuring legitimacy and in a bid to increase accountability and transparency (Cavill and Sohail, 2004). This is consistent with decentralisation as a form of good governance.

Decentralisation includes the transfer of decision-making to lower levels of governments through the local units and most scholars have called it a switch from government to governance as a change in government process of how local communities are governed (Goss, 2001). Good governance has also been defined by United Nations Economic and Social Commission for Asia and the Pacific as the analysis of the formal and informal actors

involved in decision-making process (Tsiboe and Marbell, 2004). This involves the identification of various actors at the local level who are part of the decision-making process. Decentralisation is also an aspect of good governance which involves power sharing and the respect of opinions of local groups and communities. By sharing power local assemblies assume responsibilities in managing the affairs of communities under their jurisdiction.

2.5 Governance and Solid Waste Management

Governance is about decision making and a process of management which also involves various actors in the decision making process. According to Goss (2001, p. 11), ‘‘*governance describes the emerging new forms of collective decision-making at the local level which lead to the development of different relationships, not simply between public agencies but between citizens and public agencies*’’. These decisions are to be in the best interest of the society. Best interest in this sense focuses on providing effective and efficient public service with emphasis on value.

Local authorities are under obligation to secure the best value on behalf of their residents since they represent the government at the local level. Local governance is simply not about the local, but being the interface between levels of government, and to negotiate relationships with other levels of governance with the most important relationship being that of government and the people (Goss, 2001). Mark Moore also argues that the goal of public service is to add public value which is defined in terms of measureable improvement in social outcomes (Moore, 1996 cited in Goss, 2001). Adding public value, which is meeting the needs of the people, is a sign of good governance which is in the interest of those governed.

One of the problems confronting cities across the world is Solid Waste Management (Joseph, 2006, Giusti, 2009, Oteng-Ababio et al., 2013) and Waste management is one of the visible urban services. In view of this Whiteman et al., (2001) has argued that effective and sustainable waste management goes hand-in-hand with good local governance and sound municipal management. According to them, waste management is critical to the protection of public health, safety and the environment. They identified Solid waste management in less Developed Countries as a key source of livelihood and social capital, especially for the urban poor. They expressed worry over piles of waste that is left uncollected in streets that ends up blocking drainage channels as a major source of public health risk, and uncontrolled disposal

of waste which serve to threaten water resources and pose significant environmental health risks on people living nearby. Management of residential and industrial waste in Metropolitan areas is the responsibility of local municipal authorities or urban bodies (Guerrero et al., 2013, Whiteman et al., 2001).

Good governance is about having effective strategies to manage solid waste to the benefit of the society. Different countries have in place different strategies for managing solid waste. According to Whiteman et al., (2001), there is diversity in the nature and standards of waste management services within and between countries and different urban areas. Whereas in higher income countries attention is placed on maximising the recovery of resources from waste, in poorer countries, the focus is more on ways of providing basic collecting, treatment and disposal services to the growing urban population.

In designing an effective strategy for managing waste at the municipal level, several models have been designed for use. There are models that cover Municipal Solid Waste Management (MSWM) as a system. These models considered Solid Waste Management (SWM) as a system with interrelated parts and look at the relationship between each part in the waste management system, rather than looking at each in isolation (MacDonald, 1996). According to Seadon (2010, p.1640), the conventional waste management approach is that waste generation, collection and disposal systems are planned as independent operations but these three processes (generation, collection and disposal) are interrelated and should be treated as a system.

There are other models developed with an aim at minimising the costs of mixed waste management (Gottinger, 1988), and recycling was included in some of the models for managing solid waste (Englehardt and Lund, 1990). According to Morrissey and Browne (2004), in looking for an effective strategy for managing solid waste, there were other researchers (Motameni and Falcone, 1990) that focused on influencing the attitudes of people, so that they might change their behaviour in terms of recycling.

Most of these models cited above were only interested in managing waste once generated and failed to include minimisation or prevention aspects (Morrissey and Browne, 2004). The cost of managing waste is high and as much as possible there should be effective ways of minimising the amount of waste generated. Reducing the amount of wastes generated ultimately requiring disposal at the point of generation, is the most rational and cleanest means of solid waste management (Boyle, 1989).

There are other models for managing solid waste that consider economic and environmental aspects, but few consider the social aspects. As stated by Morrissey and Browne (2004, p. 298), ‘‘*for a waste management system to be sustainable, it needs to be environmentally effective, economically affordable and socially acceptable*’’. In accordance with sustainability, some scholars have also looked at the impacts of solid waste management practices on the communities with regards to effects on human health (Giusti, 2009), as well as on the environment (Bernache, 2003) with the view that a sustainable management to solid waste must be environmentally and socially acceptable.

The most effective management of Municipal Solid Waste has to relate to local environmental, economic and social priorities (Petts, 2000). In effect, an effective strategy for managing solid waste must be suited to the needs of the local community. A good governance approach to solid waste management should involve key actors in the public who are affected by solid waste problems (Boadi and Kuitunen, 2003) in decision making. How decisions are made, the various tasks undertaken by the decision-maker and the type of decisions that are made are not the focus of most of current research (Morrissey and Browne 2004). Effective waste management requires a participatory approach where all relevant actors are involved in the decision making process.

The next section looks at Public-Private-Partnerships as a form of governance strategy in managing solid waste.

2.6 Public Private Partnership in Solid Waste Management

It is very crucial that public services are carried out very efficiently and effectively and good governance has been identified as critical in carrying out public services (Mohammed Niyas, 2012). Public-Private Partnerships (PPP) has been described as a tool of governance (Klijn and Teisman, 2003, Hodge and Greve, 2010, Mohammed Niyas, 2012). It has been described as a long term cooperative institutional arrangement between public and private sectors to achieve different goals (Hodge and Greve 2010, Mohammed Niyas 2012).

For Public-Private Partnerships to be effective as a strategy, United Nations Economic Commission for Europe set up good governance principles which focuses on policy, capacity-building, legal framework, risk-sharing, procurement and to put people and the environment first (Mohammed Niyas, 2012). In effect the most conducive atmosphere must

be created with clear definition of intended goals accepted by all actors. These principles can lead to effective Public-Private Partnerships especially for solid waste services. PPP has also been identified as critical for improving solid waste management services (Adama, 2007, Davies, 2008, Onibokun, 1999). Hitherto, the management of solid waste has been described as the sole responsibility and duty of local authorities and the public was not expected to play a part (Vidanaarachchi et al., 2006) but there is a general agreement among many scholars that Solid Waste Management is no longer a local government monopoly but a domain open to various modes of Public-Private Arrangements (Obirih-Opareh and Post, 2002, Fobil et al., 2008).

Post et al. (2005 cited in Bjerkli 2013) argue that highly centralised governmental structures results in needs not been taken into consideration when plans and decisions are made leading to the lack of accountability and trust towards government and the need for good governance which involves participation by both private and public actors.

Some studies that recognise PPP as an effective strategy for managing solid waste, have cited weakness on the part of local authorities and their failure to effectively deal with solid waste as reasons for introducing PPP as an effective strategy for managing solid waste (Fobil et al., 2008, Joseph, 2006). According to Joseph (2006, p. 863), involvement and participation of all stakeholders such as waste generators, waste processors, formal and informal agencies, NGOs and financial institutions are a key factor for sustainable waste management. According to him, local authorities tasked with managing solid waste services have failed as these services continue to remain inefficient and outdated.

There are other studies which also link PPP as a policy initiative from the World Bank and IMF as part of neo-liberal policies for developing countries. These policies are from the Western world and do not consider the needs and context of the developing countries into perspective. According to Obirih-Opareh and Post (2002, p. 98), discussions on PPP is closely connected to decentralisation where privatisation and deregulation are part and parcel of neo-liberal initiatives proclaiming the resurgence of the market and a reduce role of the state which are imposed on developing countries. The evidence that this policies work perfectly is rather not tested in developing countries as these policies are drawn from the Western world (Burgess et al., 1997, Lee, 1997) which are different from their developing world counterparts (Ahmed and Ali 2004, p.475). In effect PPPs fail to achieve the desired results as the right environment is not created for them to thrive. According to Ahmed and

Ali (2004, p.475), if PPPs are to contribute to developing countries, appropriate institutions must be developed, fitting the prevailing settings, and meeting the particular needs of these countries. It is therefore crucial that PPPs should be appropriate and meet the current needs of developing countries.

Others have also shown that PPPs has led to inequality where the poor are marginalised and are unable to pay for waste services. Myers (2005), has shown that privatisation of waste services has led to increased segregation of poor areas due to the inability of the poor to pay for waste services. According to Post (1999, p.202) 'privatisation on the basis of the ability-to-pay principle is likely to exclude those who are beyond effective demand'. It must be noted that the provision of solid waste services cannot be left entirely to the dictates of market forces alone as other external forces such as social and cultural contexts of a given society play a part in achieving desired results of effectively managing solid waste (Fobil et.al 2008, p.263).

Many studies on Solid Waste Management have emphasised the relationships between actors in PPP and the role of non-state actors by identifying bottlenecks with the aim of improving partnerships and services (Ahmed and Ali, 2004, Bjerkli, 2013, Oteng-Ababio, 2010, Post, 1999, Obirih-Opareh and Post, 2002, Guerrero et al., 2013).

Sharholy et al. (2008), have indicated that the involvement of the private sector is an ingredient that could improve the efficiency of system of managing Solid waste. They argue that operational efficiency of solid waste management depends on the active participation of both the municipal agency and the citizens in decision-making. Oteng-Ababio (2010), argues that PPP is a sustainable approach to solid waste management. In his view, PPP can help mobilize resources, reduce risks, contribute to economies of scale and enhance service delivery. He cites unequal power relations between external partners and project beneficiaries, and the cost involved in dealing with different partners as obstacles that affect PPP.

PPPs are very important for managing solid waste and this requires the right environment to be created with the active participation of all actors in decision making leading to a favourable outcome where solid waste problems are resolved. On the other hand, a negative outcome can lead to solid waste problems still existing when PPPs are bedevilled by challenges and bottlenecks that are not identified and resolved.

2.7 Solid Waste Management in Ghana

Ghana's solid waste management started in 1898, with the establishment of Accra City Council (Oteng-Ababio, 2010). According to Oteng-Ababio (2010, p.323), ''*…In 1925, public dustbins, which were emptied by means of two pushcarts, were introduced. These were replaced with large carts drawn by mules and later, with special sanitary vehicles. Incinerators were also introduced in 1929. By the late 1950s, the existing arrangements had become stressed due to population growth, culminating in a total breakdown of the only incinerator by 1970. This led to the pile-up of refuse especially in the low-income areas. In an attempt to halt the decline, the City Council established the Waste Management Department (WMD) in 1985.Subsequently, refuse collection was by either house-to-house collection or communal container collection in the high-and-low-income areas respectively''*. Even though these arrangements existed, there were gaps as the country witnessed a general deterioration and breakdown of public sanitation facilities in the major cities mainly in the regional capitals of Ghana (Nuno-amarteifio, 1995, in Fobil et al. 2008). This led to a serious decline in environmental sanitation, particularly in solid waste management. Institutional failure to respond to the planning needs of a modern society was cited as responsible for this decline (Nuno-amarteifio, 1995 cited in Fobil et al. 2008, p264).

In 1988, a system of governance was put in place called local government, with an objective of empowering people through District Assemblies to be able to serve the local needs of the people (Obirih-Opareh and Post 2002, p.98). And as has been noted earlier, the collection, transportation and disposal of solid waste have moved from the control of local government authorities to the increased involvement of the private sector. This is on account that the public sector institutions have failed in performing efficiently in managing solid waste (Fobil et al., 2008) and therefore PPP was the solution to most inefficiency problems in public institutions. This concept was introduced in Ghana alongside other public sector reforms including Structural Adjustment Programme (SAP) and Economic Recovery Programme (ERP) (Fobil et al., 2008) and according to the Environmental Sanitation Policy of Ghana, 1999; the local assemblies were to set goals and standards for the private sector (Oteng-Ababio, 2010, p.326).

A study by Fobil et al. (2008) on the performance of PPP in solid waste management in Ghana found that the overall performance of waste collection services in Ghana increased under the system, with efficiency -in terms of total waste clearance and coverage of service

provision- increasing rapidly. Also a study conducted by Obirih-Opareh and Post (2002), concluded that PPP arrangements has benefited consumers in terms of wider coverage, higher frequencies, and more reliable services. What these studies have failed to show is how far these gains can be sustained in the long term.

Post (1999) conducted a study on the problem and potentials of privatising solid waste management in Kumasi, one of the cities in Ghana, and argues for a business-like approach to the management of solid waste. According to him, even though PPPs is on the increase, the entire process is still in its infancy. He argues that market conditions for solid waste management are imperfect and, therefore, the scope of commercial exploitation is limited considering the fact that poor customers cannot afford to pay which can lead to service exclusion. He therefore called for continued financial involvement on the part of local authorities. He argues again that privatised waste collection will only yield positive results if the government provides a proper legal and organisational framework. According to him, within the framework, contract management and performance monitoring will become core tasks of the renewed Waste Management Departments.

With regards to regulation, the Environmental Protection Agency (EPA) was established in 1994 under Act 490 of Ghana's Parliament. The EPA is empowered to enforce, monitor, and control environmental standards and regulations in Ghana (Tsiboe and Marbell, 2004). Solid waste regulations come from the Ministry of Local Government and Rural Development and the EPA. In 1999, the Ministry of Local Government and Rural Development came up with the National Environmental Sanitation Plan that seek to develop and maintain a clean, safe and pleasant physical environment for human settlement (Tsiboe and Marbell, 2004, p.34). The EPA in a view to help Local authorities deal with Solid Waste issues designed solid waste management guidelines for Municipalities and established standards for design, construction and management of solid waste disposal system to protect environment and human health. Among the guidelines, is a call for community participation, bringing on board all stakeholders (EPA, 2002).

Solid Waste is not efficiently managed in Ghana but the deep underlying reasons are poorly understood and a critical approach to solid waste is needed to gain a deeper understanding of the reasons for the situation at hand at the moment.

2.8 Analytical Framework

In defining the analytical framework (Refer to figure 2.1), I take a look the problems confronting developing countries in relation to solid waste. Some of these problems include uncollected solid waste that is generated, solid waste that is thrown in public places, waste that is burned and buried as well as waste that is thrown in gutters and bushes and all forms of illegal disposal of waste. Also the presence of rodents and vectors as a result of solid waste, as well as environmental and health problems related to solid waste management. In order to help solve these problems, the local authorities, representing the central government in governing the local area, has identified Public Private Partnership (PPP) as a tool for managing solid waste. This is a governance decision that tries to solve a problem using PPP as a governance vehicle to provide a public service. Within the Municipal Solid Waste Management system, there are various actors involved. These actors' actions, as well as their knowledge and interest impact on Solid Waste Management. PPP as a vehicle for managing Solid Waste results in outcomes. These outcomes can either be favourable or not favourable. A favourable outcome will lead to major reduction in the Solid Waste problems faced by Developing countries but an unfavourable outcome will lead to the continuation of the current solid waste problems. PPP as a Solid Waste Management tool come with some challenges that may affect its efficiency. These challenges also have effect on the outcome of PPP as a Solid Waste Management tool as well as on whether the problems are resolved or not.

2.8.1 Actors in Solid Waste Management

There are various actors within the Municipal Solid Waste Management system who interact with each other. The actor oriented-approach, as has been introduced above, tries to identify these actors and their roles in solid waste management. The term 'actors' does not only identify the class, gender, ethnicity, status and age group but includes active participants who have different powers and various resources. Therefore identifying the various actors involved in the problem may help in finding out their decision-making process and relationships of power (Mohammed Niyas, 2012).

The different actors who are engaged in Urban Solid Waste Management practices can be put into four major groups. These include, Public actors (Local authorities), Private actors, which

includes formal enterprises carrying out solid waste management services. Also includes private informal actors like scavengers who play a role in solid waste management. Another group is the service users who equally play a critical role in solid waste management.

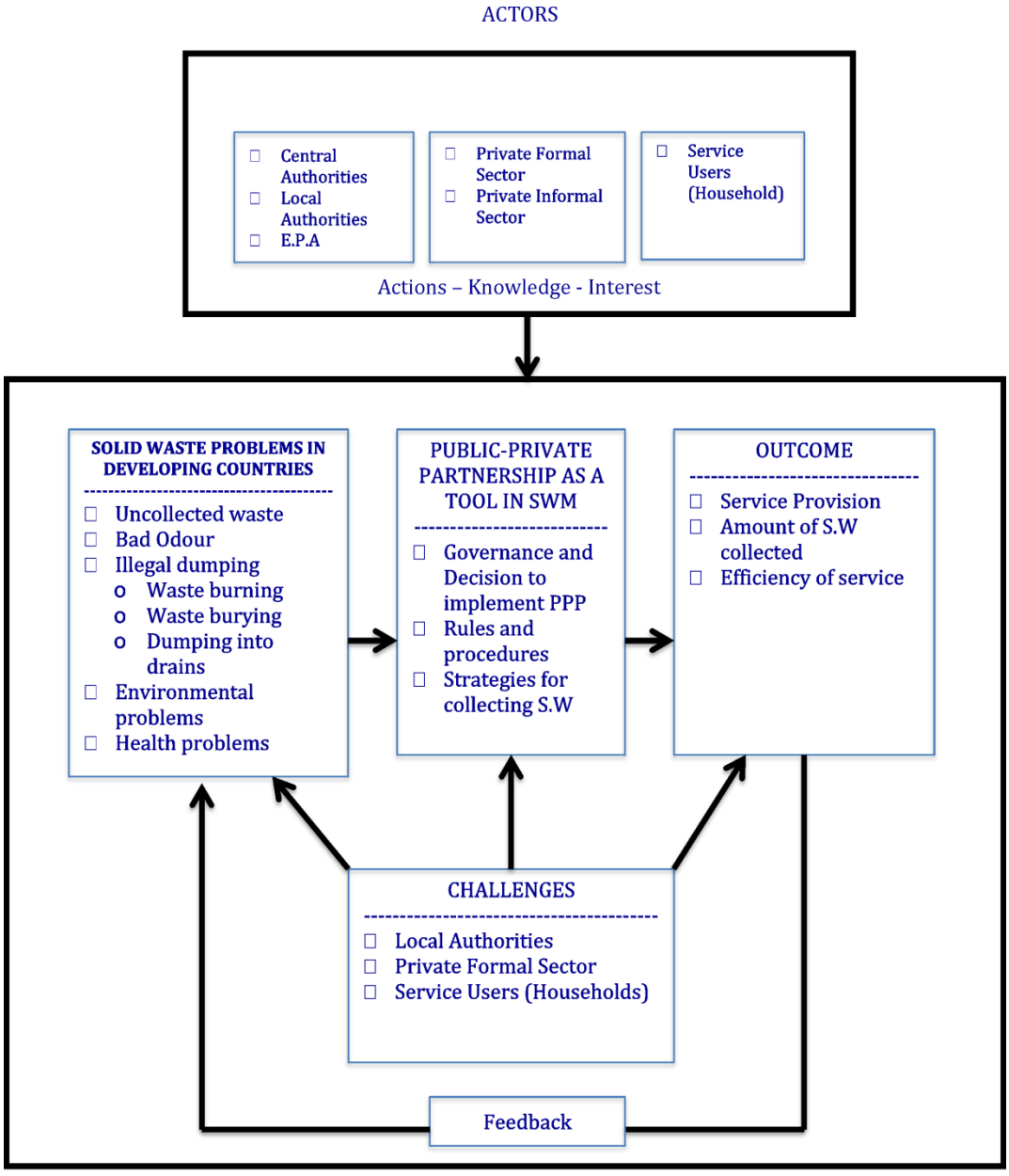

Figure 2.1: Analytical Framework

Source: Author's construct, July 2014.

2.8.2 Public Actors

This refers to public owned enterprises and institutions of state. Public sector agencies in Solid Waste Management generally mean central authorities who are represented by local authority actors (Ahmed and Ali 2004, p.468). Public sector actors in SWM have responsibilities which are defined by laws and regulations. The urban or municipal authorities are empowered by law through the central government to provide social services in solid waste management to the public. They take decisions and implement policies to solve solid waste problems affecting the society.

2.8.3 Private Formal Actors

These are made up of registered enterprises who are engaged in the provision of solid waste management services such as the collection, transportation, and disposal of solid waste. These are private sector corporations, institutions, firms and individuals, operating with official business licenses, organised labour force governed by labour laws, some degree of capital investment, and some level of technology (Mohammed Niyas 2012). These actors are contracted by municipal authorities to provide solid waste services on their behalf in many developing countries.

2.8.4 Private Informal Actors

This sector is defined by small-scale, labour-intensive, largely unregulated and unregistered, low-technology manufacturing or provision of services (Wilson et al., 2001). In the context of Municipal Solid Waste Management, the informal sector refers to the waste recycling activities of scavengers (Wilson et al., 2006). They are those engaged in the extraction of recyclable and reusable materials from mixed waste and in the process help reduce the amount of waste generated. Some of the informal actors such as scavengers visit houses to collect reusable and recyclable materials such as bottles, cans, paper cards, and used household appliances for a fee. Others also collect these items from the communal dumping sites.

These activities are carried out by poor and marginalised social groups who resort to scavenging for income generation and for their everyday survival (Wilson et al 2006, p.798). Informal sector activities are unregulated or controlled by agencies of government. The activities of scavenging are widespread throughout urban areas in the developing world and

the size is significant because of poverty, unemployment, or underemployment (Ahmed and Ali, 2004).

2.8.5 Households

These are beneficiaries of solid waste management services. They are also generators of household solid waste. They play very important roles in solid waste management. They serve as waste service clients by offering their solid waste materials for collection by waste companies. Households make decisions as to how to dispose of their solid waste materials. They choose from either patronising house to house collection by waste companies or sending their solid waste to the central container depending on the information and knowledge they have. Some households may also have arrangements with scavengers to either select some solid waste items of interest to the scavengers or offer them for free or for sale to be able to generate some extra income. Some households may also decide to choose illegal ways of disposing their solid waste based on information and knowledge available to them.

CHAPTER THREE

METHODOLOGY AND RESEARCH PROCESS

3.1 Introduction

Methodology can be understood as the methods that are used for conducting research (Kothari, 2004). It is therefore a general research strategy that outlines the way in which a research project is undertaken. There are two major types of research methods. These are quantitative and qualitative research methods. These are the research methods used in conducting research, however, the choice of the methodology is dependent on the type of research problem and the theoretical approach, which affect the view a researcher holds in the real world (Lindsay, 1997). The ultimate aim of every research is to answer the questions set forth in the beginning of the study and therefore the method that will best aid the answering of the research questions are best suitable for the research. In this study both quantitative and qualitative approaches were used to conduct the study and this chapter highlights the various approaches used in collecting data for the study.

3.2 Quantitative method

Quantitative methods can be simply defined as the techniques associated with gathering, analysing, interpreting, and presenting of results in numeric form (Tashakkori and Teddlie, 2010). This method is seen to be scientific in that it is standardized so that it can easily be replicated. Quantitative data can be analysed using both descriptive and inferential statistics. However, this method has been criticized by various scholars, with particular application of 'objective' scientific methods that conceptualizes people as rational actors without recognising people's multiple subjectivities (Clifford et al., 2010).

3.3 Qualitative method

Qualitative approach has been defined as techniques associated with the gathering, analysis, interpretation, and the presentation of narrative information (Tashakkori and Teddlie, 2010). It is an approach for studying problems that require deeper analysis and understanding of social phenomena. It is argued that human behaviour is subjective, complex, and sometimes contradictory and as such, the need to use methods that would allow to explore the emotions, meanings, intentions, and values that make up life world (Clifford et al., 2010). The emphasis is on considering the meanings different people ascribe to their lives and the process which operate in particular social contexts. This method allows people to express themselves about their experiences by describing and explaining their lives in their own words. The voices of informants are heard in ways which are non-exploitative and oppressive (Clifford et al., 2010). Some of the common methods in this approach include interviews and focus group as well as participant observation.

However, qualitative methods in general have been criticized for being too subjective and containing very few units but many variables, which makes it difficult in making generalizations (Limb and Dwyer, 2001).

3.4 Combination of quantitative and qualitative methods

Researchers sometimes combine quantitative and qualitative methodologies in an attempt to get the best out of the two. This process of drawing on different sources of methods is known as triangulation (Clifford et al., 2010). It has been argued that both quantitative and qualitative methods have limitations and it is best to combine the two approaches to reduce the limitations and thereby increase the quality and flexibility of the data (Robinson, 1998). In view of the limitations inherent in the two approaches, it is hoped that biases in any single method could ‘neutralize’ the biases of other methods (Creswell, 2013). Therefore to capture the best of both methods, it is appropriate to combine them to be complimentary in seeking an understanding of society. Nevertheless, mixed methods could also mean that weakness of both methods is reinforced.

3.5 Justification of methods used

The most appropriate method for research is dependent upon the questions it seeks to ask and the information required (Clifford et al., 2010). This research was carried out using a combination of quantitative and qualitative methodologies. This was done to offset any weakness in each single method by the counter-balancing strength of the other to increase the validity of the results. Both methods have specific limitations and particular strengths and their combination compensate for their mutual and overlapping weakness (Johnson and Turner, 2003). This also provides an opportunity for greater assortment of divergent views (Tashakkori and Teddlie, 2010).

The natural order of reality is seen and perceived differently by different people and groups (Silverman, 1993) and therefore the need for interpretive methods which can grant special attention to the knowledge and understanding of individuals and groups (Robinson, 1998). Both methods can help fulfil different yet complementary purposes.

Quantitative method makes it easier to capture heterogeneity and variance by making it easy to collect information about great numbers of persons (Kelle, 2006). The largest actors in solid waste management in this Municipality are the households who are recipients of solid waste services. In order to capture many households' views for representativeness, questionnaires were used. This was to offset the critique on qualitative methods for lacking representativeness because of the small number of cases which makes the results less representative and biased to some extent. And also the resources required in terms of time to carry out a study of such importance with household actors, will be minimal when quantitative method is used. Quantitative method could also give clear statistical data with regards to level of satisfaction of solid waste services to households as well as regularity with solid waste services by private waste collectors. This may take away criticism of qualitative method for being too subjective in their analysis, data presentation, and the drawing of conclusion (Crank and Cook, 2007). Open-ended questions were used to allow respondents to express themselves freely.

Qualitative methodology afforded the chance for informants to explain their realities and experiences in their own words and for that matter interviews were used to provide that platform for informants to share their experiences. Interviews were very helpful as they allowed for detailed narratives and thereby allowed informants to communicate much more than the standardized questionnaires. The purpose was to get a deeper understanding to the

problem through lengthy engagement with informants (Gatrell and Elliott, 2009). Using quantitative approach to understand the 'why' and 'how' of solid waste strategies by the Ledzokuku Krowor Municipal Assembly may provide inconsistent and incomplete data. It requires deeper understanding of issues from the perspective of key informant who are the main actors in solid waste management and interviews provided the right method to capture these detail information. It was equally useful for the other informants who were also able to share their experiences on the study.

Aside the interviews, participant observation was used in order to inform myself of what was actually happening with regards to solid waste management within the study area and to also corroborate what has been said by the various actors particularly when it comes to illegal dumping of solid waste. This would not have been possible if quantitative method was the only method used.

3.6 Methods used in the field in collecting data

3.6.1 Questionnaires

Questionnaires were used to collect primary data from households. Questionnaire is an instrument used for data collection that is made up of a carefully structured and ordered set of questions aimed at obtaining the needed information without ambiguity or bias (Johnston 2000b, p.668 in Cloke et al., 2004). With this, every respondent answers the same set of questions in the same way and sequence. However, biases could occur as expected or desirable answers. I therefore asked respondents to be as candid as possible as it is a study for academic purposes only.

Closed ended and open ended questions were used. A closed ended questionnaire is one that the respondent is given options to choose from but with the open ended type, the respondent is given no options to choose from (Kitchin and Tate, 2013). These open-ended questions allowed respondents the opportunity to fully express themselves about the topic under study. The questionnaires were administered by the researcher and two assistants to the households using the face-to-face approach and some filled in by respondents in the medium-high income neighbourhood. This had the advantage of churning out a high response rate in that they took less time to complete. The other medium of administering questionnaires, like

using the post to send out questionnaire was not appropriate because most of the respondents in this municipality had no postal boxes to operate with. A lot more had no access to the internet in order to reach them via e-mails and it was also time consuming getting access to their phone numbers to administer the questionnaire on phone aside the high cost involved. In view of these disadvantages, the only option which was cost-effective was to administer the questionnaires by face-to-face to get the same results. The face-to face method also had the disadvantage of respondents not feeling comfortable providing answers that present themselves in an unfavourable manner. This might lead to respondents not providing accurate and honest answers. It also had the disadvantage of interviewer effect with respondents likely to give expected answers.

In the administration of the questionnaires, two research assistants were used. One was a female of 23 years of age and a male of 25 years. They were selected on the basis of the fact that they were university graduates and had both taken part in other surveys before. They also had the advantage of communicating in multiple Ghanaian languages and were well placed to interpret the questionnaires in the local languages. These facts were revealed after I interviewed them. It was important to employ their services because of the vastness of the study area as well as the time at my disposal which was very limited. After their selection, I had to give them further training on how to administer the questionnaires and also took them through the sampling procedure for the questionnaires. In administering the questionnaires, I had to go with them to familiarize with the study area. During this phase, the research assistants visited some households to make appointments. This was followed up by the administering of the questionnaires in the study area. In all, the research assistants administered 60% of the questionnaires within the areas assigned to them. The research assistants were largely helpful in ensuring that the data was collected within the stipulated time. One disadvantage of using the research assistants was the cost I had to pay to them. I had to pay their transport on a daily basis aside their allowance agreed for the exercise.

3.6.1.1 Solid waste management at the household level

The questionnaires were used to find out from the various households the various ways they use in collecting and storing solid waste. It was also administered to illicit response regarding the choice of disposal of solid waste materials as well as recycling options the household

considered. The questionnaires were also instrumental in finding out from respondents the challenges faced by households regarding solid waste management.

The questionnaires were also vital in assessing the level of satisfaction of solid waste services provided by waste contractors to households as well as the regularity of service.

3.6.1.2 Characteristics of Respondents

Table 3.1 Characteristics of Respondents

	Level of Education						
Neighbourhood	Sex	No Edu %	J.H.S %	S.H.S %	Tertiary %	Total %	Total Res
Low income (LI)	Female	57.9	36.8	5.3	0	100	19
	Male	43.5	21.7	17.4	17.4	100	23
	Total (LI)	50	28.6	11.9	9.5	100	42
Medium-High income (MH)	Female	0	0	11.8	88.2	100	17
	Male	0	4.3	21.7	73.9	100	23
	Total(MH)	0	2.5	17.5	80	100	40
Total	Female	30.6	19.4	8.3	41.7	100	36
	Male	21.7	13	19.6	45.7	100	46
	Total	15.9	14.6	43.9	25.5	100	82

Source: Author, Fieldwork July, 2014

No Edu – No formal education, J.H.S – Junior High School, S.H.S – Senior High School,

Primary data for survey were gathered from respondents within the Municipality and in all, a total of 82 respondents participated in the study out of 100.

42 respondents who participated were drawn from the low income neighbourhood and consisted of 19 females and 23 males. Out of the total of 42 respondents in the low income

neighbourhood, 50% has no education meaning that they had no formal education. 28.6% had Junior High School education, 11.9% had Senior High School education and no respondent from this neighbourhood had tertiary education.

The other 40 respondents who participated were from the medium-high income neighbourhood and consisted of 17 females and 23 males. Over here, no respondent recorded 'no education' 2.5% had Junior High School education, 17.5% had Senior High School education with 80% having tertiary education. Table 3.1 above sheds more light on the characteristics of respondents.

This is an indication that of the two neighbourhoods, the medium-high income neighbourhood has the area with highly educated respondents when it comes to formal education.

3.6.1.3 Sampling procedure for questionnaire

Sampling is one of the most important steps in the research process. It is important to sample because of constraints of time and resources, making it practically impossible to capture all candidates in the study, thus the need to select a subset of the population of interest as the sample.

Two towns, Nungua and Teshie, were purposively selected by the researcher for displaying certain characteristics the researcher was interested in. These are the two most dominant towns in this municipality with a cosmopolitan population from different ethnic groups in Ghana. Nungua as compared to Teshie has a well laid out and planned outlook with middle to high income earners. It also has some low income dwellers as well in some neighbourhoods. Teshie on the other hand consist mainly of low income earners with some few medium to high income dwellers. These two towns were separate traditional towns with their cultures and were two separate sub-metros which were later merged into one to become a Municipality for effective governance and administration (LEKMA, 2014). This informed the basis for selecting the households within these towns to aid in collecting data by using questionnaires. Two neighbourhoods within Nungua and Teshie were considered for data collection using questionnaires. One neighbourhood within Nungua with medium to high income dwellers was selected and the second neighbourhood selected from Teshie consist of low income dwellers. Quota sampling was used in selecting 50 respondents each from the

medium to high income area and the low income area. In all 100 respondents within the municipality were selected to take part in the completion of questionnaires and the head of each household was mandated to complete the questionnaires after some of them were contacted face-to-face for appointments. The head of the households are the ones responsible for taking decisions regarding solid waste management in each household in consultation with members of the households. A household is defined as a person or group of persons, who live together in the same house or compound and share the same catering arrangement (GSS, 2010). For the purposes of this research, a household is defined as a person or group of persons who live together in the same house or compound and share the same refuse bin or other means of storing solid waste for disposal.

Out of the total of one hundred respondents sampled, 82 households completed the questionnaires representing a response rate of 82% (Refer to table 3.1for details).

Table 3.2 Distribution of questionnaires

Questionnaires	Nungua	Teshie	Total
Disseminated	50	50	100
Filled and returned	40	42	82
Not returned	8	5	13
Withdrew	2	3	5

Source: Author, Fieldwork July, 2014

Table 3.2 displays information on the number of questionnaires distributed in each neighbourhood and the number of respondents who completed and returned it. It also has information on the number that failed to return the questionnaires and those that withdrew.

3.6.2 Qualitative Approach

There are a number of techniques to employ when using the qualitative methods, but in this research, interviewing was used to get responses from the informants and a tape recorder

used to capture the responses. There was also the use of observation to complement and corroborate responses.

3.6.2.1 Interview

It has been described as 'conversation with a purpose' (Cloke et al., 2004). Their purpose is to give insight into people's experiences with conversations varying from structured, semi-structured and unstructured formats (Silverman, 1993). This method enables informants to be an active subject, mediating and negotiating what is told to the interviewer in their own word (Cloke et al., 2004). Interview has been described as a complex social interaction where the researcher tries to learn about experiences and thoughts of a person on a particular subject (Kitchin and Tate, 2013). There are various approaches to interviews, such as closed quantitative interview, structured open-ended interview, the interview guide approach (semi-structured interview) as well as the informal conversation interview (Kitchin and Tate, 2013). In this study, semi-structured interviews were used with the subjects to be covered well specified ahead of time in the form of an interview guide (Refer to appendix II to VI for interview guide). This allowed for the free flow of conversation while ensuring that all relevant topics to the research were explored (Kitchin and Tate, 2013).

There were five categories of informants for the study and each of these categories had different set of interview guide (refer to appendix VIII for categories). The same set of interview guide was prepared for the scavengers to identify their individual responses to the same situation. Also a different set of interview guide was also prepared for the supervisors at the communal sites. These assembly workers at the communal sites also answered the same sets of questions prepared for their category. Another set of guide was developed for private waste collecting companies in the municipality (waste contractors). For the municipal waste managing officer and the E.P.A, the interview guide was varied as well.

The interview guide ensured that there was direction without deviation and it covered the subject matter of the research. However, interviews have been criticized for been too subjective and prune to bias (Kitchin and Tate, 2013). I ensured that any personal bias was avoided and remained objective throughout the process.

3.6.2.2 Strategies for solid waste management in the Municipality

All the interviews were conducted by the researcher. Semi-structured interview was used in finding out from the municipal assembly through the waste managing officer, the strategies used for managing solid waste in the municipality. Before the interview, I had to present my letter of consent from the University (NTNU) to the municipality for an appointment to be booked for me to meet the one in charge of waste management in the municipality. After meeting with the one in charge after a week, a date was fixed for the interview spelling out the kind of information I was requesting. I had an interview guide prepared before the interview to serve as a guide in order to avoid deviating from the subject matter. During the interview session we explored the main subjects of the research. She responded to questions on topical issues with regards to the strategies for managing solid waste in the municipality including ways of collecting solid waste, ways of disposal and the choice available to households as well as illegal disposal of solid waste. She was also interviewed on the challenges to solid waste management in the municipality. I made use of the interview guide as a pointer for direction and used follow-up questions as and when the need aroused and this was very effective in ensuring that I got a vivid explanation of the subject under study. This interview session took 52 minutes to complete.

I also needed information from workers who were always there on the ground participating in the collection of solid waste on behalf of the municipal assembly at the communal sites on a day-to-day basis, interacting with households and who could also provide an insight on what goes on there. In view of this, the supervisors charged with taking care of the communal solid waste collecting sites were interviewed. These were people who were seated always at the communal sites directing people who had come to dump solid waste where and how to dump. They determined the amount to be paid before dumping. There was one supervisor at each communal site at the time I visited. I interviewed them on strategies for collecting solid waste and challenges to solid waste in their operating sites as well as the impact of their solid waste management strategy on the areas they were operating. The same sets of questions were put to all four informants in this category manning the communal sites. Each interview lasted not more than 30 minutes for this group of key informants.

Private solid waste collecting companies who were one of the key informants were also interviewed. In all five different private companies were contracted to provide solid waste collecting services to the municipality with each company, assigned to a particular region to collect solid waste. The representatives of four companies were interviewed separately. The

two research assistants were instrumental in finding out the locations of the offices of these companies and the interviews were carried out by me.

They were interviewed on the strategies employed by the municipal assembly to manage solid waste and their role in collecting solid waste. They also provided answers on the challenges to solid waste management in the municipality and the challenges they face on the field regarding solid waste management. The interview with Daben cleansing was the lengthiest lasting 55 minutes followed by the one with Zoomlion which lasted 25 minutes. The other two lasted for 20 minutes each.

There were four scavengers I interviewed as well within the municipality. They were also purposively selected. Each of them was interviewed separately by me on their operations within the municipality. The interview centred on how they operated and their roles in solid waste management with regards to recycling of solid waste as well as the benefits they get in their operation. All of them were located at the communal dumping sites in the municipality. These were primary informants and the length of the interviews did not exceed 20 minutes for each informant.

There was another interview session with the Environmental Protection Agency who was one of the primary informants. This is an institution established under Act 490 as a regulatory and enforcement agency. The interview was centred on issues of solid waste management as well as illegal dumping of solid waste. It also featured issues on regulation and enforcement of environmental laws. This interview lasted for 25 minutes with a representative of the E.P.A.

3.6.2.3 Tape Recording

During all the interview sessions, I used a tape recorder to capture the conversations we had. This has the ability of enabling the researcher to fully focus on the interaction (Clifford et al., 2010). This enabled me to concentrate more on how to conduct the interview without struggling to get all the words on paper which would have distracted the interview process. A tape also produces an accurate and detail record of issues discussed without missing a point while concentrating on conducting the interview (Flowerdew and Martin, 2013). Another advantage with this method is the ability of listening to the conversation over and over again to take all missing point for the study. However, not everybody likes to be taped and this can prevent people from speaking their true feelings about the study (Robinson, 1998). This can

be due to the fact that some informants perceives it as a means of surveillance (Gatrell and Elliott, 2009). Before starting each interview, I asked the interviewee permission to record the conversation assuring them it was only for academic purposes. All respondents had no problem with me recording the conversation, apart from the one interviewee from the Environmental Protection Agency who first objected to the use of my recorder. But after explaining again to him the reasons for recording, he was at peace with me to record the conversation.

3.6.2.4 Sampling Procedure for interviews

Purposive sampling was adopted in selecting 9 key informants and 5 primary informants for the interview session. These respondents were selected from the Municipal assembly, the Environmental Protection Agency, and Private waste collecting companies operating in the region under contract. The researcher arranged to meet these respondents separately before agreeing with each of them a specified date to conduct the interview. The Municipal assembly through the waste managing officer provided the researcher with a list of the four private waste collecting companies contracted by the municipal assembly to collect solid waste on their behalf. These companies were contacted by the researcher to seek their permission to partake in the study which they obliged. Four scavengers were also purposively selected for the study. All sampled informants participated in the interview in exception of three scavengers who failed to show up at the appointed time with no reason. They were subsequently replaced by other three scavengers the researcher met on different dumping sites (Refer to Appendix VIII for table) who expressed interest.

All informants were chosen in view of their experience regarding the topic under study (see Clifford et al., 2010). The Municipal assembly is sorely responsible for the management of solid waste in the whole municipality. They are responsible for drawing up a strategy for managing solid waste in this municipality. In view of this fact, the municipal waste managing officer was purposively sampled as one of the key informants for an interview because of her experience on the job. Apart from this, four other supervisors at the communal container sites working to supervise disposal of solid waste at the site were also included for study due to their experience in the field and were conversant with the issues on the ground when it comes to solid waste disposal and related issues with residents. Also four solid waste private collecting companies were included. Their inclusion was due to the fact that they were the

private companies contracted by the municipal assembly to collect solid waste on its behalf. Their selection was very necessary because they interacted with various households on regular basis and were in the right position to offer information to aid the research. Four scavengers were also selected for study. This was done to understand how solid waste materials moved from place to place as a way of recycling them. The Environmental Protection Agency was also purposively sampled because of their experience with the issues at stake and as a regulatory body. In all fourteen informants were interviewed.

3.6.2.5 Observation

This involves the researcher watching activities taking place in front of their eyes in the study area while they record their impressions. Their impression can be recorded in field notes, tallies, photographs and other forms of material evidence (Flowerdew and Martin, 2013). Observation focuses on the behaviour of people with the view of learning about the meaning behind their actions (Kitchin and Tate, 2013). This method is very direct in the sense that the researcher observes what people do and has direct access to what is observed without having to rely on anyone. It also served as complementary to the other methods I used for data collection. A potential weakness however is that, it is susceptible to observer bias where personal interests of the observer are likely to colour perceptions of what is observed (Kitchin and Tate, 2013). It can also pose danger where people feel uncomfortable being watched. In one such instance I was nearly attacked by angry residents I observed disposing solid waste illegally.

Observation can be carried out actively or passively within the study area. In this study, I employed a passive type of observation where I observed without participating. I did a preliminary observation to know what was happening with regards to how solid waste was disposed at the household level in the first week of data collection. In the last two weeks of data collection, I returned to some of these areas to observe. I spent 30 minutes observing in each location and had to walk to the next location. On a daily basis for these two weeks I used two hours observing and three hours moving between locations. On the field, I observed individuals illegally dumping solid waste in the bush. I also observed that some households were burning solid waste on their compound. Majority of households I observed kept their refuse bins inside their compound and not outside. I went on to observe some gutters choked with solid waste and serving as breeding grounds for mosquitos. I also observed refuse

containers filled to capacity at the communal sites for several days without being hauled to the final disposal site. Meanwhile, other people still brought their solid waste materials from home to dump. Some refuse bins at some households were also not picked for some weeks. I captured what I observed on camera as photographs.

3.7 Secondary Data

Secondary data is information collected by other researchers and is available for access. This is information that is publicly available for access. Secondary data are vital resources that provide guidance to researchers. They are a vital source of reference for primary data collection (Flowerdew and Martin, 2013). Secondary data helps comprehend ideas of other researchers in the subject under study.

Secondary data were sourced from books, articles, related thesis and other relevant literature from national institutions including the Ledzokuku Krowor Municipal Assembly and the Environmental Protection Agency. I ensured that all the secondary data used were materials that were relevant and credible to this research (Cloke et al., 2004). The secondary information used in this study consists of related work undertaken in Ghana and other developing countries in Africa and Asia.

3.8 Reliability and Validity

Reliability and validity is one of the essential components of a scientific research which must be met. Reliability refers to the ability of a research to produce consistent results while validity indicates that a measure in fact measures what it purports to measure (Rudestan and Newton, 1992). It means that the research should produce results that are reliable and not biased or based on distorted answers. Lincoln and Guba (1985) proposed four ways of establishing rigor in qualitative research including ‘credibility’, ‘transferability’, ‘confirmability’, and ‘dependability’. These approaches seem also relevant to a certain degree to quantitative research.

Credibility is defined as the authentic representation of experience. This means giving reliable accounts of respondents’ experiences. Giving reliable accounts require trust and so

before commencing both interview and questionnaire, we established rapport with respondents by discussing the performance of our country in the world cup tournament. This was a way of creating a good atmosphere for data collection. I had to then explain the purpose of the research and its objectives clearly to all respondents. I also explained to them that all information given me by them were highly confidential and was not going to be used for anything apart from my thesis work and that their names or identities were not going to be disclosed. I did this to gain their trust and confidence to participate freely in the research and to give very candid answers. However, it is difficult to ascertain honest answers regarding illegal dumping since it is a punishable act by law.

Questions in the questionnaire were pre-tested to ensure that they were relevant and with a valid content. The instructions were duly explained in the language most appropriate to the respondent. Some respondents in the household category who could not read and write English were taken through the questionnaires and everything explained to them in the Twi and Ga languages depending on which language was well understood by the respondent. Also the scavengers were interviewed in the Twi language which was not a problem for me. Having in mind that translation, if not done with proper care may affect the outcome of the data. This is because poorly translated concepts or phrases can change the theme and may give a different meaning to the respondent which can affect his/her response (Squires, 2009). In view of this all translations were done in the language that was understood by respondents.

Dependability is defined as the minimization of idiosyncrasies in interpretation. I made use of different methodological approaches to ensure that information gathered was consistent with the issues at stake and also that my interpretation do not misrepresent the information given by respondents. I cross-checked most of the information I got from the household respondents from other similar works done in the Accra Metropolitan Assembly as well as during my observation. However, responses to questions like; 'How often does the company collect solid waste from your household?', 'Rate your level of satisfaction with your waste collecting company?', 'Do you enjoy regular service from the waste collecting company?', in the questionnaire may change with the passage of time when more landfill sites are constructed which will enable solid waste companies to have a regular dump sites which may result in service reliability for households. Presently there is only one landfill site for the whole Greater-Accra region which is over-stretched.

I also observed what actually happened with regards to illegal disposal of solid waste and took photographs to that effect. To be very sure of these acts for consistency, i ensured that I visited each site twice to witness the illegal dumping at unapproved sites. It might also be that some illegal dumping might have been taking place at very odd times (e.g. deep in the night) when I am not around.

With regards to the interviews, I had to go to informants' official offices to conduct them because they were more comfortable there. To ensure that the data represented the experiences of the key informants, adequate time was given to them to prepare on the subject matter to give an accurate account of their experiences reflecting the theme of the research. However, it was difficult to gain the trust of some of the scavengers who initially thought I had come to arrest them but after explaining to them the objective of my visit, they accepted to take part in the interview even though some of them refused to take part. Even though I can hardly say emphatically why they did not want to partake in the study, I fathom it was due to the fact that they saw me taking pictures and thought I was from one of the governmental agencies or somehow felt I was working in a television station and was going to capture them and put them on air. I had to do a lot of explanations to be able to have their views on the subject under study.

I constantly reflected and evaluated the process to ensure its effectiveness in making the results dependable.

Confirmability refers to the extent to which biases, motivations, interests or perspectives of the inquirer influence interpretations. A researcher's position can have effect on results and interpretation (Moser, 2008). As an insider due to my background as a Ghanaian, I knew my position could affect the data received in one way or the other. And even though I had that advantage in lieu of the fact that I could freely communicate in the local languages and relate with respondents, it was equally a disadvantage as three scavengers originally contacted for interviews declined participation and had to be replaced. Also some households felt uncomfortable giving responses to questions regarding illegal dumping thinking they might be exposed for arrest. I assume this will have little effect on the outcome. In view of my position, I was more reflexive in my approach on the field (Dyck, 1993).

Transferability is defined as the fit of the research findings outside of the specific study situation. I am very convinced that any similar study conducted within the study area with the same methodology will result in the production of similar findings. Most of the results in this

study can fit other urban contexts especially Sub-Saharan Africa and some Asian countries. This is because of the presence of similar physical, socio-economic, political, and urban conditions

3.9 Limitations encountered on the field

The limitations are discussed under the various instruments of data collection below.

3.9.1 Limitations on Questionnaire

There were a number of challenges to this study. There was a challenge of restricted accessibility regarding time. The time of data collection coincided with the Fifa world cup tournament and Ghana -being a football country and also participating in the tournament-, it was difficult to get respondents from the household category to participate in the survey. In view of this, I had to review the entire field work plan by scheduling the time for the survey questionnaires to be administered in the morning while we closed thirty minutes to the start of the first game of the day from Brazil with the consent of respondents. Also due to this same tournament some respondents were unwilling to take part in the survey. This was a challenge because we had to spend much time going from one house to the other. Also due to busy schedules, some respondents who requested to complete the questionnaire for us to pick at a later date were not met at the appointed date and time and the questionnaires were not returned. This affected the response rate but largely did not affect the results in any way.

There were language barrier issues where some respondents were not able to read and write in English and we had to translate into Ga and Twi languages for their comprehension. It took a long time to complete questionnaires from households who were unable to read and write in English Language.

When it came to the question of how the households dispose of their solid waste, some of the respondents were unwilling to disclose their true means of disposal. This might be because most of their method of disposal was illegal and might also be as a result of the position of the research assistants as natives who were aware that illegal waste disposal was a crime. Punishment for illegal dumping might have played a role in their inability to give honest responses. It is difficult in this scenario to identify which responses are honest and dishonest. Others might have also given distorted answers to put themselves in a better light. Where

some households freely disclosed their means of disposal, it turned out that they were unaware it was illegal. For instance, some households engaged in solid waste burning in their backyard but were not aware it was illegal.

3.9.2 Limitations on Interviews

I had difficulty in making appointments for some of the interviews. With regards to the E.P.A, I had to keep making calls and following up until I got the time to conduct the interview. This was because the officer in charge of waste issues was very busy and had to continuously cancel and reschedule appointments with me.

It was equally difficult getting scavengers to book appointment for interviews. Most of those who had appointments with me failed to make it and refused to make another appointments except one. In view of this, the original scavenges who failed to show up had to be replaced by others who were willing which also affected the response rate. I assume they might have thought I was in to make life difficult for them by exposing their activities to the public.

The Municipal Assembly were also unwilling to provide information on finances especially when it comes to amount of money paid to waste contractors operating in the communal container sites as well as other finances on waste management in the municipality. This made it difficult to quote figures on solid waste management in the study.

There was also the discovery of a new group of actors in solid waste management who were not known to me before commencing this study. They are known as 'Kaya borla'. They operate using tricycles to collect solid waste from house to house. This is a new group of informal actors in solid waste management who operate illegally but their activities are becoming visible. In view of the fact that there was no preparation done to include them in the study, their views were not taken. Also because this group is the shy type who will not want their activities to be documented because of the requirement for them to register formally in order to gain permit to collect solid waste, their inclusion at the last hour would have been difficult. Their activities were however included in the study as well as how they affect waste contractors.

3.9.3 Limitations on Observation

I visited some areas where illegal dumping of solid waste was taking place to observe. I observed some people dumping solid waste illegally at a site not permitted for dumping. Those I observed dumping illegally prevented me from taking pictures even though I had sought permission. On one occasion, my camera was seized but after pleadings from me and the people around who gave me permission to take pictures, they released it to me on the one condition that I delete the pictures I took. This affected my work because the other pictures I took from different locations I was observing was equally deleted by these people. I had to allow it to save myself from harm. Afterwards, I made another visit to those places whose pictures were deleted and had them retaken but I never returned to this very spot again for fear of attack. This episode illustrates the sensitivity of the issues of illegal dumping and the fear of being observed and reported. It may also be as a result of some incentives to dump illegally. Some of these incentives may well be the fact that these people want to avoid paying fees before dumping to enable them save some money and for some; it may be due to the long distances they would have to travel to the approved dump sites.

The above challenges enumerated above had very little impact on the study because of the different methodological approaches employed.

3.10 Ethical Issues

One of the requirements of a scientific research is that of ethical principles which must be adhered to.

Before the start of the research, permission was sought from the Ledzokuku Krowor municipal assembly. A letter of introduction was presented to the office of the Municipal Chief executive. I was later invited to meet with the municipal waste managing officer, where I explained the objective of the research as well as the areas I planned visiting. Permission was granted me to proceed with the data collection. Before administering the questionnaires, I sought permission from the respective households by contacting the head of each household in the chosen towns (Nungua and Teshie). I explained to them the objective of the research and made them aware that participation was voluntary and not mandatory and that they had the right to pull out any time they felt like no more participating. Some of the households who did not want to take part in the questionnaire were allowed to withdraw after agreeing

initially to participate. The two research assistants were well briefed on ethical principles and in addition I had to administer couple of questionnaires with them to get them started. This ensured that they were well into it and knew exactly what they were doing and I was convinced they knew what we were doing.

It has been argued that unlike quantitative method, there are more ethical difficulties in maintaining confidentiality and privacy of informants engaged in the research when it comes to qualitative methods (Cloke et.al, 2004). Permission was sought from individual informants and the objective of the subject under study was well explained and ample time given to them to prepare their minds well. I also made sure I explained to them that all information they provided to me was going to be treated with confidence. I assured them that they were going to remain anonymous. This is because of the importance of the issues of confidentiality and anonymity in research ethics (Clifford et al, 2010). In order that they felt at ease and not pressured, I interviewed them at their own convenience at their own chosen venue which was not also detrimental to me. I made sure that the language used was well understood by them. I made use of the 'twi' and 'Ga' languages sometimes to respondents who could not speak or understand the English language to complete the questionnaires.

I also knew that questions could sometimes be detrimental and painful to respondents (Cloke et al., 2004) and as much as possible, I avoided such questions. Before every interview, I sought permission from the interviewee to use a tape recorder to capture our conversation. I explained to them I did not want to interrupt the process by asking them to pause for me to write a particular statement or to repeat. I wanted the process to favour them to speak freely without interruption from me to write. Knowing that it was an academic exercise and seeing my letter of introduction, they agreed. At the Environmental Protection Agency office, I was not initially permitted to use the recorder. But I explained to them that the information was only for academic purpose and that they were going to remain anonymous in the research. I was then allowed to use the recorder.

During my observations, I ask permission from the municipal waste managing officer to take pictures at the communal sites as well as all the illegal dumping sites I find for which she consented. In Ghana it is dangerous taking pictures in the neighbourhood without asking permission, so even though I sought permission from the municipal assembly to take pictures, it was very risky not asking neighbours around before taking pictures. So I asked permission from the neighbours who were around where some of the illegal dumping had taken place to

take the pictures. It is very important that some of these illegal acts are brought to the notice for such violators of rules to stop perpetuating such acts which only worsens the environmental problems at stake. Most of the neighbours were not in agreement with these illegal acts. I was granted permission to proceed with the picture taking except one spot where I was refused permission.

CHAPTER FOUR

PROFILE OF STUDY AREA

4.1 Introduction

This chapter gives background information about the study area which is relevant in examining solid waste management practices. This is essential in appreciating some of the issues related to solid waste management. It begins with a brief profile on Ghana where the study area is located and goes on further to profile the Ledzokuku Krowor Municipal Assembly where the study took place. It then discusses relevant aspects of the study area including; population and migration, employment and socio-economic factors, politics and governance, and how solid waste is organised in the Ledzokuku Krowor Municipal Assembly.

4.2 Brief Profile of Ghana

Ghana is located on the West coast of Africa about 750 kilometres north of the equator on the Gulf of Guinea. It has a total border of 2,093 kilometres (1,300 miles), including 548 kilometres (341 miles) with Burkina Faso to the north, 688 kilometres (428 miles) with Côte d'Ivoire to the west, and 877 kilometres (545 miles) with Togo to the east. Ghana has a tropical climate, warm and comparatively dry along the southeast coast, hot and humid in the southwest, and hot and dry in the north.

Ghana's population currently stands at 27,043,093 with a life expectancy of 64 years for men and 66 years for women (GSS, 2014). Ghana has ten administrative regions with their various capitals and the seat of government is in Accra which is in the Greater Accra region. Accra has been the centre of attraction with most people migrating from the various regions into Accra for various reasons including economic, social, and education.

4.3 Profile of Ledzokuku Krowor Municipal Assembly (LEKMA)

Accra has been the centre of attraction and the hub of many economic and social activities. This resulted in massive movement of people from different parts of the country to Accra. According to Yankson and Gough (1999), the implementation of the Economic Recovery Programme in the mid-1980s led to some improvements in the Ghanaian economy with Accra becoming an attractive destination for all manner of people in search of economic opportunities. Accra witnessed a massive increase in its population as a result, reaching two million people by the year 2000 (Boadi and Kuitunen, 2003). This huge population created a lot of pressure on the existing infrastructure and was also a governance problem. In view of this, Accra was re-demarcated and the Ledzokuku Krowor Assembly carved out of it in 2007. In 2008, 32 new additional districts were inaugurated; amongst them was the Ledzokuku Krowor Municipal Assembly (GSS, 2010).

The Ledzokuku Krowor Municipal Assembly shares boundaries with La-Dade-Kotopon Municipal to the west, Tema Metropolitan Assembly to the east, with Ashaiman Municipal Assembly to the north, and to the south with the Gulf of Guinea.

4.4 Population and Migration

In view of the massive population in Accra, many people have moved and continue to move into the Ledzokuku Krowor Municipal Assembly (LEKMA). Aside the movement from Accra, others also move from the countryside and other regions into this municipality to seek greener pastures. This has partly led to an increase in the population of this area. There are 83,009 migrants here out of which 26,621 were born elsewhere in the region (GSS, 2010). LEKMA has a population of 227,932 which is made up of 109,185 male populations and a female population of 118,747 (GSS, 2010). The population of LEKMA is a mixture of different ethnic groups consisting of 34.7% Akan, 15.6% Ewe, and a majority of 43.5% being Ga-Dangme. The other 6.2% of the population are made up of Guans, Gurma, Mole-Dagbani, Grusi, and Mande. The Total fertility for the area is 2.13 which is lower than the national figure of 3.28 (GSS, 2010).

4.5 Employment and Socio-economic factors

In the Ledzokuku Krowor Municipal Assembly, 111,046 of its population are economically active, with 91.1% of them employed in the formal and informal sectors whilst 8.9% are unemployed (GSS, 2010). Majority of those employed are services and sales workers, followed by craft and related trade workers. Others include elementary occupations, professionals, plant and machine operators, assemblers, managers, skilled agricultural workers, forestry and fishery, technicians and associate professionals, as well as clerical and support services. The two leading occupations are services and sales workers, and craft and related trade workers. These require neither expertise nor high educational training and most of them are self-employed.

This Municipality is also host to a wide range of industries ranging from the production of cement products to filtered water. There are also many Banks and Financial institutions located here.

There are 21,366 houses within the Municipality consisting of 60,859 households. According to the 2010 Population and Housing Census, a household is defined as 'a person or a group of persons, who live together in the same house or compound and share the same catering arrangements' (GSS, 2010). In general a household is made up of a man, his wife, children and some other relatives or a house help who may be living with them. It is worthy to note, that members of a household are not necessarily related by blood or marriage, but non-relatives may also form part of a household.

There are different types of houses here ranging from semi-detached buildings, flats/apartments, and improvised structures such as kiosks and containers. Majority of households stay in compound houses made up of rooms rented out to them by the owners of such buildings. Out of the total number of houses here, 33.2% are owner occupied with 48.2% being rented and rent-free for the rest with an average household size of 3.6 people (GSS, 2010). It is also worth noting that there are squatters and other unauthorised structures that exist within the municipality.

The municipality is mainly a mixture of low income and medium to high income status dwellers.

4.6 Politics and Governance

In order to promote efficiency in the administrative machinery and to meet the pressing demands for amenities and essential services, Teshie and Nungua, which used to be sub-metros, were merged and updated to a Municipal status. There are currently 25 communities within this municipality.

The Political administration of the Municipal Assembly is through the Local Government system which derives its authority from the 1992 Ghanaian constitution and the Local Government Act of 1993 (Act 462). In view of this, the Municipal Assembly is primarily responsible for the development of this area (Crook and Manor, 1995).

Under the Local government system, the Municipal Assembly is administered by the Municipal Chief executive who is appointed by the ruling government and represents the Central Government. The institutional and administrative framework for the Assembly (Refer to Fig 4.1 below) is made up of the General Assembly is the highest decision making body within the Municipal Assembly and it comprises twelve assembly members and the Municipal Chief Executive. Eight of the assembly members are elected by the public while three of them are appointed by the government.

The Executive committee comprises the Administration Department which is the coordinating centre of all the Departments of the Assembly. It incorporates the office of the Municipal Chief Executive. Some of the functions includes; providing secretarial services to the MCE, organising meetings of the General Assembly and that of the sub-committees.

The Metropolitan Co-ordinating Directorate serves as the secretariat to the Municipal planning authority as well as advising on planning, programming, monitoring, evaluation, and coordination of development plans and projects within the Municipality.

Functions of the internal audit include; revenue audit, pre-audit of expenditure, verification of assets and other items of the Assembly. Cases of financial investigation are referred to the Department by the Assembly.

There are currently fourteen Departments under the Municipal Assembly and they assist in the performance of its functions as shown in fig 4.1 below. Waste management is under the Municipal Health Directorate and it’s responsible for keeping the Municipality environmentally sound and healthy. It is also responsible for solid waste management including cleaning of streets and drains, public open places and weeding of grass on the sides

of roads and open places. The department supervises and monitors the activities of private waste contractors engaged by the Assembly in solid and liquid waste management. It is also engaged in public education on waste management and the provision of sanitation facilities in homes.

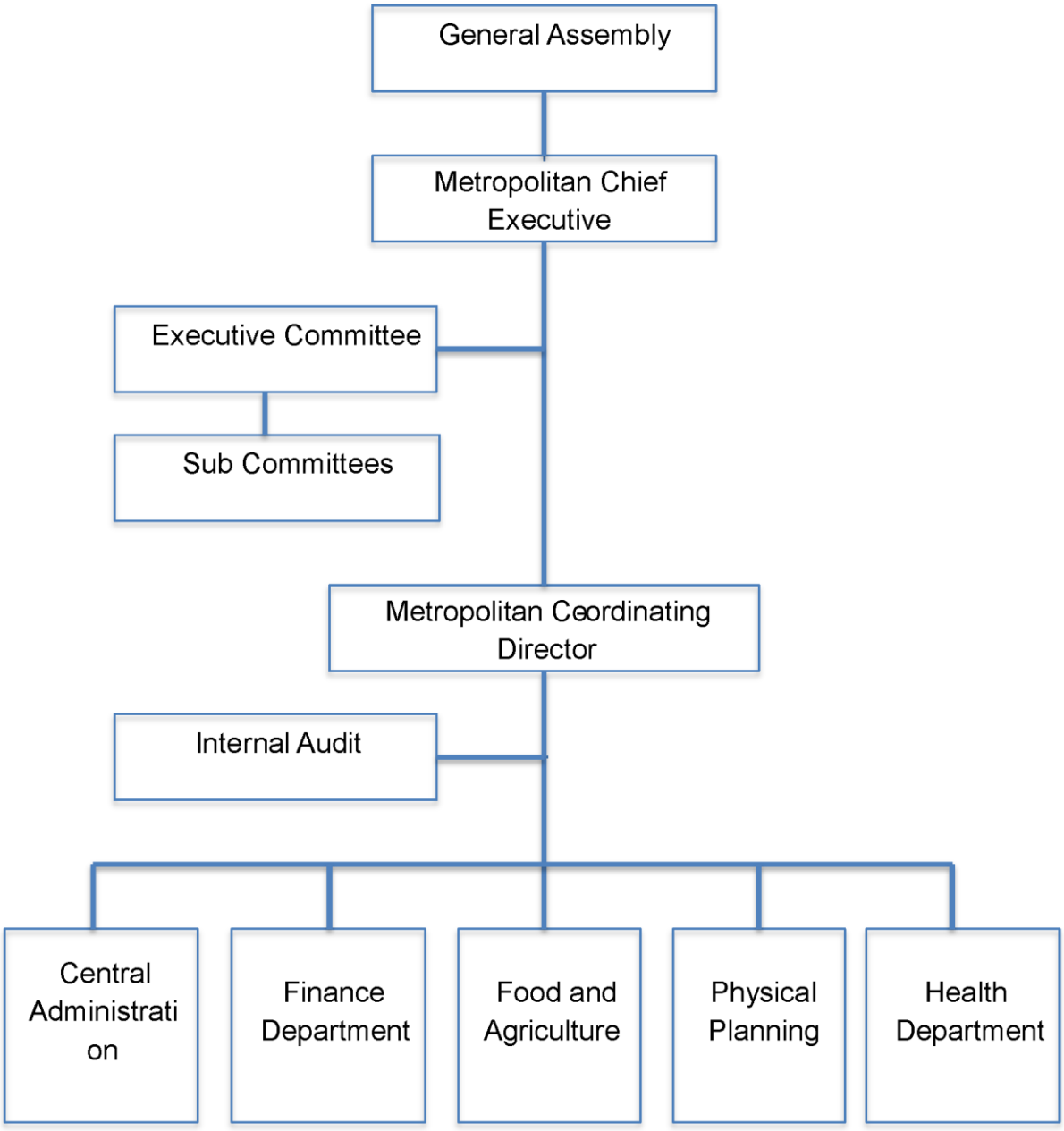

Figure 4.1 Institutional and Administrative framework for LEKMA

Source: A document from LEKMA provided during interview, Fieldwork, July2014

Other Departments

- Works department
- Industry and Trade department
- Transport Department
- Disaster Prevention Department
- Urban Roads Department
- Social Welfare and City Development Department
- Fire Service Department
- Education, Youth and Sports Department
- Community Development Department

4.7 Organization of Solid waste in the Ledzokuku Krowor Municipal Assembly

Solid Waste Management continues to be one of the challenges in many Municipalities in Ghana including the Ledzokuku Krowor Municipal Assembly. Common solid waste problems include uncollected solid waste, solid waste thrown in public places, as well as drains that are chocked with solid waste. Accompanying this is the bad stench and odour that emanates from uncollected solid waste that lie for several days leading to health related problems (Boadi and Kuitunen, 2003). This is coupled with the springing up of unauthorised temporary structures like kiosks and containers, and in the process increasing the number of squatters in the municipality.

The Assembly is unable to effectively manage solid waste alone due to the inadequate equipment for collection and disposal. It is also due to the fact that it is financially challenged and lacks the proper technology to manage solid waste.

In view of the solid waste problems, the Municipal Assembly in a bid to effectively manage solid waste engaged the services of five solid waste contractors in a Public-Private-Partnership (PPP) arrangement to collect solid waste in the municipality. This is in sync with Act 462 of the Local Government Act which empowers the municipality to carry out such management arrangement in a bid to provide solid waste services. It is envisaged that PPP can help mobilize enough resources, reduce risks, be able to deliver prompt service to households and help save cost through combining skills and resources of various players

(Oteng-Ababio, 2010). This is directly linked to the policy of decentralisation which seeks to empower people through the District, Municipal and Metropolitan Assemblies in order for decisions to be made at the local level by the people.

The companies contracted by the Assembly to provide solid waste services are Zoomlion Ghana Limited, Asadu Royal, Daben Cleansing, Rural Waste and Ashbod Waste. These companies are assigned to different neighbourhoods within the municipality according to their capacity. These areas are zoned by the Municipal Assembly and each waste company is expected to operate within her assigned jurisdiction. Some of these private waste collecting companies are in charge of the communal sites and responsible for emptying the containers while others provide house-to-house services. These companies were selected based on their ability to fulfil some necessary requirements (Refer to Appendix VII for requirement). These included their ability to possess a minimum of three compactors, two multi Lift Trucks, Ten central communal containers as well as their ability to supply 240 litre bins to clients.

The organisation of the current solid waste management system operates on two key elements. These are *house-to-house* and *communal container* service.

The door-to-door service is provided mostly in medium to high income neighbourhoods within the municipality where the areas are well laid out in terms of easy access to roads and the housing structure is well planned. These areas are easily accessible by vehicles collecting solid waste and therefore provides basis for house-to-house service. In the administration of the house-to-house service, refuse bins are used in storing solid waste for collection. Some of the households provide their own refuse bins which they use in storing solid waste while in other neighbourhoods, private waste companies provide refuse bins for households to use for free. The refuse bins are collected and emptied once a week by waste companies assigned to specific locations.

Service providers are paid directly by beneficiaries for the house-to-house service through a franchise arrangement by the Assembly. This arrangement empowers the companies to provide such services and the disposal of solid waste attracts fees per month from the house-to-house service and these fees are determined by the Municipal Assembly. Some of the areas that enjoy house-to-house services include Manet, Mariville estates, Regimanuel Grey estates, and Teshie-Nungua estates. These areas are well regulated with a well laid out housing structure and the inhabitants here are mostly medium to high income inhabitants.

The communal container service is another type of solid waste collecting service which is very prominent in low income neighbourhoods. Large containers are placed at various vantage points in these communities for households to come and dispose their solid waste materials for a fee. These containers are evenly distributed across the low income areas including markets and lorry stations. There are a total of twenty five (25) communal sites distributed across these areas and some of them include; Nungua market, Nungua old cemetery, Nungua Coco beach, Teshie Lascala market, Teshie Adoemi, Teshie Zongo, and Teshie Kponkpa. Unlike the house-to-house service where there are monthly fees paid to service providers, the situation is different with the communal container service. Here, there is a fee charged as one disposes of solid waste (called pay as you dump) at the communal site and the fee is based on the weight of the solid waste brought. These containers, which are of two sizes (15 cubic meters and 23 cubic meters), are emptied every two days in all the communal areas by Trucks from private waste collectors.

The Municipal Assembly pays these companies with national budgetary allocations from the state government (Known as the 'Common Fund) and internally generated funds. The Common Fund is a pool of resources created under section 252 of the 1992 constitution of Ghana. It is a minimum of 7.5% of the national revenue set aside to be shared among all Districts, Municipal and Metropolitan Assemblies in Ghana (CommonFund, 2014). It is a development fund that is intended to ensure equitable development of the various assemblies in the country.

The task of solid waste management is discharged by the waste management outfit under the Health Department of the municipality. It plays the role of ensuring that it monitors the activities of the private waste companies to ensure that they are providing efficient solid waste services to areas assigned to them as well as ensuring that they are adhering to sanitation laws. The waste management department is also to ensure the monitoring of residents in order to prevent illegal disposal of waste.

The types of solid waste generated here include, plastic waste, glass waste, paper waste, household appliances, food waste, bottles, and metallic substances. Solid waste is not separated at source before being collected or sent to the communal sites for dumping but all types of solid waste are put in the refuse bin or sent to the communal sites by households. Some heavy household appliances like refrigerators, television sets, microwave ovens, computers (both desktop and laptop), air conditioners, and washing machines do not normally

end up in the refuse bins or the communal containers. This is because some of them are too big to enter refuse bins or are simply not accepted by the service providers. Refrigerators for instance are not accepted by waste contractors. Many households have informal arrangements with scavengers who take these household appliances, bottles, and some plastic materials for a fee.

There is little recycling of plastics and polytene which occurs with private recycling companies but not on a large scale as the recycling base of Ghana is generally weak (Thompson, 2012). Some households also use and reuse materials like bottles, paper, cardboards, and cans until they are no more needed.

All solid waste collected within the Ledzokuku Krowor Municipal Assembly are sent to the Kpone Landfill site for final disposal. The Landfill site is located in the Tema Metropolitan Assembly and has a capacity of 2500 tons of waste a day (Ghana, 2014). It was originally constructed to cater for refuse from Tema and Kpone for a period of fifteen years but has now become the dumping ground for many communities and municipalities including the Ledzokuku Krowor Municipal Assembly.

Illegal dumping also occurs in this Municipality in the bush, gutters, and beaches. Some households also engage in illegal burning of solid waste materials while others bury their waste. Long distances to communal container dumping sites, inability of some households to pay for solid waste services, and the irregular and unreliable services of private waste collecting companies, are some of the incentives for illegal dumping in this Municipality as is the case for many other Districts, Municipalities and Metropolis in Ghana.

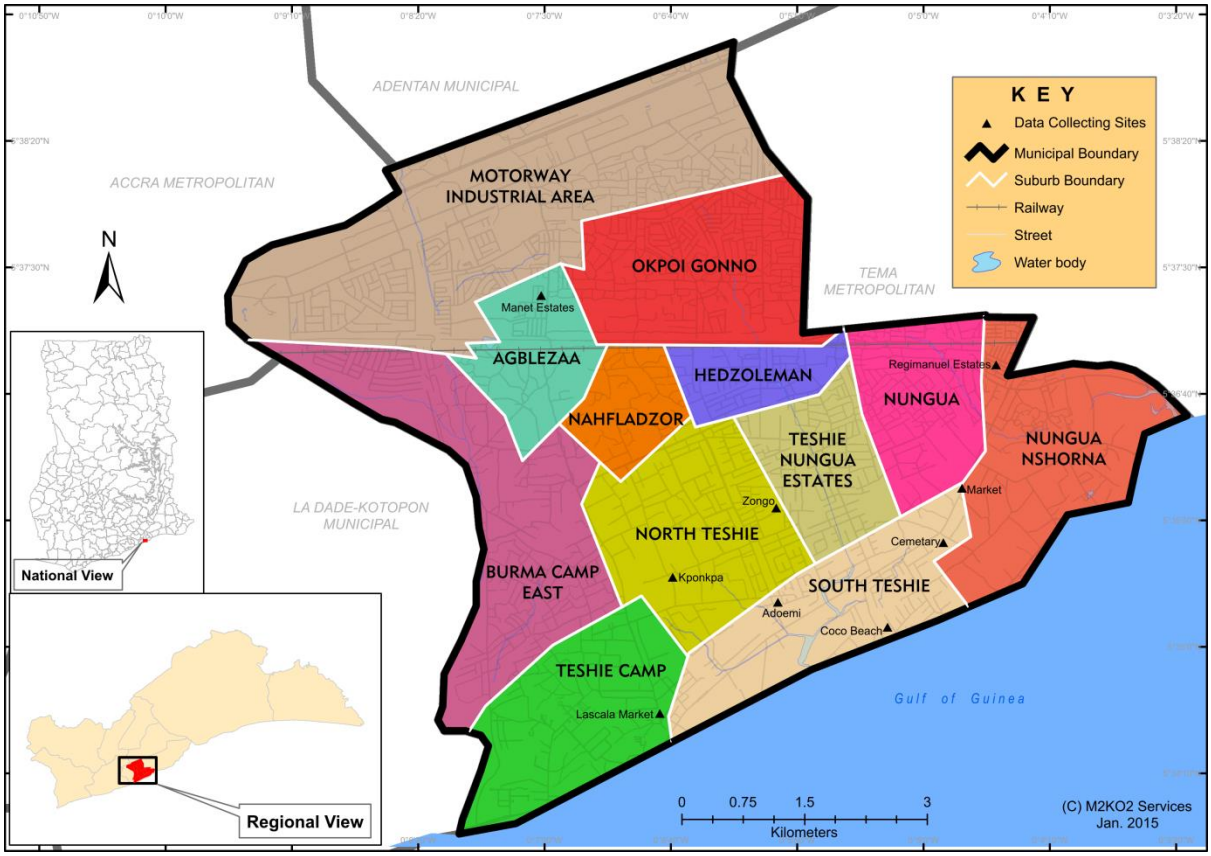

Figure 4.2 Map showing the Ledzokuku Krowor Municipal Assembly.

Source: Author's G.I.S construct 2014

CHAPTER FIVE

ACTORS IN SOLID WASTE MANAGEMENT AND STRATEGIES FOR MANAGING SOLID WASTE

5.1 Introduction

This chapter identify the actors in solid waste management and discusses their roles. It also throws more light on strategies by Municipal Assembly authorities to manage solid waste and the responses from the various actors in the municipality to these strategies. It is significant to note that the information and discussion here are based on empirical data collected from respondents and informants in this study area.

5.2 Actors in Solid Waste Management and their roles

Solid Waste Management is seen as part of a generation, collection, and disposal (Seadon, 2010). And in the management of solid waste in the Ledzokuku Krowor Municipal Assembly, there are actors who play several vital roles and it is very important to identify all relevant actors in solid waste management (Bosman, 2004). In this research three key actors in solid waste management were identified by the Municipality Assembly. The most important actor in Solid Waste Management is the central government which is represented at the local Assembly level by the Municipal Assembly. Their importance is because they have an oversight responsibility of designing the strategies for solid waste management and providing resources to carry out such strategies. The other two important actors identified were the private waste companies who are the service providers in solid waste management in the Municipality, and households in the Municipality who are the generators and clients of waste services. According to the head of waste management department at the Municipal Assembly,

‘‘…*When it comes to solid waste management, there are three important actors who matter. The municipal assembly plays a vital role in the management of solid waste by designing the strategies for managing solid waste. Private waste contractors also play important roles by*

ensuring that they collect solid waste materials in areas assigned to them by the assembly. The third category is the households who are recipients of solid waste services'' (Head of waste management, LEKMA).

This indicates that in the view of the Municipal Assembly, which is the main actor, there are only three important actors in solid waste management in the municipality and these are the ones considered when it comes to solid waste management.

Other actors who also play some roles in solid waste management who were not identified by the Assembly include scavengers, the Environmental Protection Agency, and a new group of actors known as 'kaya borla' who use tricycles for solid waste collection.

All these actors are discussed further in detail in the next section below.

5.2.1 The Ledzokuku Krowor Municipal Assembly (LEKMA)

The Ledzokuku Krowor Municipal Assembly (LEKMA), as one of the key actors, plays a major role in solid waste management. The Municipal Assembly is empowered by Act 462 to provide public services to the entire municipality. And as part of their role to develop the municipality, the Waste Management section under the Municipal Health Directorate is tasked with the responsibility of managing solid waste. LEKMA, like other Municipal and Metropolitan Assemblies in Ghana, is faced with solid waste management problems. The Municipal Waste Management Head asserted that;

''*The Municipality is faced with many solid waste problems including chocked drains filled with solid waste materials, solid waste that is illegally disposed of in various public places, as well as piled solid waste in various places within the municipality that lie uncollected for several days. As a municipal assembly our responsibility is to ensure the management of solid waste in view of its health implication''.*

The illegal disposal of solid waste in various places such as in gutters, beaches, bushes and market places makes it probable for pollution and contamination of water bodies with attendant's health risk to emerge in the municipality.

According to the municipal assembly, their interest is to ensure that they have a healthy environment devoid of filth for people to live healthy lives. They therefore put in place good

strategies with expert advice from technocrats to ensure that they achieve their desired goal of bringing development to the people.

One of the problems in the municipality is that of solid waste management and the strategy to deal with solid waste to ensure a clean environment by the Assembly, is to engage private waste collecting companies (also referred to as waste contractors) in a Public Private Partnership. The waste contractors are contracted to provide solid waste services on behalf of the Municipal Assembly after fulfilling an initial contract requirement (refer to Appendix VII for requirement).

This requirement qualifies a private waste collecting company to apply to the assembly to provide solid waste services. Based on the requirement, the assembly makes a decision to employ or not. This decision to employ is based also on whether there is the need for a waste contractor (vacancy) in the municipality (Head of waste management, LEKMA).

The Municipal Assembly is responsible for fixing the fees to be paid by individual households in the house-to-house and communal container service. These fees, fixed by the Assembly, are supposed to be charged by private waste contractors when they provide solid waste services to households in the house-to-house category. The same amount is paid by households to all waste contractors. At the communal container sites, the fees collected are paid into the Assembly's account by the assembly members who take charge of these sites.

The Municipal Assembly has a watchdog role to ensure that all sanitation bye-laws are adhered to by all residents and solid waste service providers. In enforcing the sanitation bye-laws, they have a duty to monitor residents and waste contractors to ensure that they are adhering to the laws. This is especially important to prevent illegal waste disposal which is a health threat to the municipality. Those who are found to be engaging in illegal waste disposal are fined GHc20 (US$5.4) by the Municipal Assembly and this is to serve as a deterrent to prospective offenders (Head of waste management, LEKMA). Residents have active roles to play in ensuring that they report individuals found engaging in illegal disposal of solid waste to the Assembly. The monitoring team from the Municipal Assembly are also responsible for monitoring every neighbourhood to ensure that no one is violating sanitation laws and they also have a responsibility to charge any resident found engaging in illegal disposal of waste with the same fine of GHc20. This monitoring is to be done in collaboration with the Environmental Protection Agency (E.P.A) and are responsible for enforcing

environmental standards and regulations set by the E.P.A (Environmental Sanitation Policy of Ghana, 1999, p.17).

The Assembly is also responsible for monitoring waste contractors to ensure they are providing good service to the municipality and adhering to their contractual obligations. The Assembly applies sanctions to any private waste contractor not adhering to contractual agreement.

5.2.2 Private Waste Contractors

These are registered private waste collecting enterprises that are contracted by the assembly to provide solid waste services such as collection, transportation, and disposal of solid waste materials. Some of the private waste contractors are contracted to provide both house-to-house service and to operate in the communal sites as well while others are engaged in providing house-to-house services. Waste contractors operating house-to-house service are paid directly by consumers for their services but those contractors responsible for hauling solid waste from the communal sites are paid by the assembly. All solid waste collected from the municipality is disposed at a landfill site in Kpone in the Kpone Katamanso District which is 24 kilometres away from the municipality. These waste companies are required to pay Ghc20 (US$5.4) per ton of refuse carried by trucks at the landfill site when they go to dump. They pay according to the weight of the load they carry to the landfill site and the trucks carry between five to seven tons of solid waste per truck.

There are currently five private waste contractors operating in the municipality. These are Zoomlion Ghana Limited, Asadu Royal, Daben Cleansing, Rural Waste, and Ashbod Waste. According to the municipal assembly, Zoomlion and Daben Cleansing were already in operation, collecting solid waste from the municipality when it was under the Accra Metropolitan Assembly before being carved out in 2007. In view of this experience of already knowing the area well and operating there, the Municipal Assembly decided to engage them to continue working in the municipality after already satisfying the requirement. The other three were selected based on the fact that they were able to fulfil the requirement set by the assembly.

All waste contractors are assigned to specific neighbourhoods within the municipality for solid waste service provision. Every contractor is assigned to locations according to their

capacity in terms of equipment and personnel and in view of this Zoomlion, which is well equipped than any of the other companies, takes a greater coverage of location. They operate in neighbourhoods such as Manet Estates, parts of Teshie-Nungua Estates, Frempomaa Estates, as well as Mariville Estates. They are also in charge of hauling solid waste from some of the communal container sites as well as operating in the house-to-house neighbourhoods.

Asadu Royal on the other hand, also operates house-to-house in Tsuibleoo, North and Southern part of Regimanuel Estates while Daben Cleansing is in charge of house-to-house in Teshie-Nungua Estates as well as some of the communal container sites. Rural Waste operates only house-to-house in Nautical Down and Nungua Methodist while Ashbod Waste operates in the Regimanuel Grey Estates (Head of waste management, LEKMA).

All the waste contractors have a monopoly over their areas of jurisdiction where they are assigned to provide solid waste services and no one has the right to cross over into other locations not assigned to them. In other words, there is no competition between the waste contractors. Households within a neighbourhood assigned to a particular waste contractor have no choice than to patronise the services of this contractor.

5.2.3 Households

These are the recipients of solid waste services in the municipality and they form the largest group of recipients of this service. Households are responsible for generating majority of the municipal solid waste that is collected (Head of waste management, LEKMA). They pay for solid waste service delivery from the private waste collecting companies. They are responsible for deciding how to dispose of their solid waste. They make decisions based on alternatives at their disposal and decide whether to opt for house-to-house or communal container sites based on the choices available to them.

This group of actors play a very critical role in the management of solid waste in this municipality and form the largest category of actors in solid waste management (Joseph, 2006). Some of their roles include storing solid waste for disposal, making solid waste available for collection, sending solid waste to communal collecting sites for disposal and ensuring that their homes are kept clean. Some of the households also engage in re-using of

waste materials within the household while others also sell some of the solid waste materials to scavengers who depend on these materials to make a living (Ahmed and Ali, 2004).

Households have an obligation to pay for solid waste services rendered to them in the house-to-house as well as the communal container service. Households who are not able to pay for services in the house-to-house are blacklisted by service providers and service are not provided to them until they pay up. Households patronising the services of house-to-house have a duty to report non-performing waste contractors to the Municipal Assembly for redress. At the communal sites, individuals who refuse to pay are equally not allowed to dump until they pay. These conditions become a restriction and hindrance for some households and give room for illegal disposal of solid waste in the municipality with health risks for residents and the entire municipality.

The households have a responsibility not to engage in illegal dumping of solid waste but to choose the appropriate means of solid waste disposal which is either house-to-house or the communal container service depending on the type of neighbourhood the household is located. Engaging in illegal disposal of solid waste is a breach of the sanitation bye-laws which is punishable by a fine.

5.2.4 Scavengers

This group of actors are the ones engaged in extracting recyclable materials from the various dumping sites within the municipality as well as visiting house-to-house to pick or collect solid waste materials that are of use to them.

Even though this group of actors also play some important role by helping in the reduction of amount of solid waste generated and collected, they were not considered by the municipal assembly as an important actor when it comes to solid waste management.

This group of actors go round almost all communal container sites to collect recyclable and reusable materials which others consider waste and do not make any attempt to separate them for sale to scavengers. Some of the waste materials they collect include plastic, paper, glass bottles, and metal cans. There are stationery buyers who operate small shops to buy waste brought to them by scavengers. These scavengers engage in this activity as a way of making a living to supplement family meagre budget. This is consistent with the findings of Ahmed and Ali (2004) that many poor people make a living in cities of developing countries from

picking waste. Others also pay their school fees out of this activity. In making a living out of this, they reduce the amount of solid waste generated in the process. They also have special arrangements with households, some of who reserve these recyclable materials for them to pick up. Whereas some households give these items out for free to the scavengers, other households sell them for a paltry sum of money. Some of the scavengers sometimes pick waste items from some households illegally and this sometimes leads to quarrels and this happens especially in households where the refuse bin is kept outside the house or where the house is a compound house without any fence wall. When such issues come up, it is resolved and the scavenger is asked to put the item back or pay a fee for it (interview with an 18 year old scavenger boy).

5.2.5 Kaya Borla

This is a term that is used to describe the activities of porters who carry solid waste from residents and markets in sacks, and baskets to a dumping site for a fee. (Oteng-Ababio, 2010, Oteng-Ababio et al., 2013). In its newest form, the activities of kaya borla is characterised by individuals using tricycles and operating from house to house to collect solid waste for a fee. This is a new group of informal actors in solid waste management not yet explored by research.

In view of the fact that their equipment is small, they are able to operate in both low income and medium-to-high income neighbourhoods and their services are patronised. In the low income neighbourhoods where compactor trucks are not able to operate due to inaccessibility issues, they are able to provide solid waste services there. They are able to collect solid waste from a maximum of three households per a trip due to the small nature of the tricycle.

They are not registered as companies and operate illegally within the municipality and are sometimes in competition with waste contractors in the house-to-house collection. Their mode of operation is characterised by environmental problems as they do not have the mechanism to off-load their collected waste and end up littering the environment and illegally off-loading collected waste in unapproved location (Oteng-Ababio, 2010).

5.2.6 Environmental Protection Agency (E.P.A)

The E.P.A was established in 1994 under Parliament Act 490 and was empowered to enforce, monitor, and control environmental standards and regulations. They were also tasked with offering advisory roles to the Ministry of Environment as well as local government structures (Tsiboe and Marbell, 2004). They are also to collaborate with relevant organisational bodies such as Districts, Municipalities as well as Metropolitan Assemblies in waste management such as the control and prevention of discharge of waste into the environment. And to also help protect and improve quality of the environment (An Official of E.P.A in an interview session).

In specific reference to solid waste management, the E.P.A has designed a manual that provides guidelines for the preparation of waste management plans across all Districts, Municipal and Metropolitan Assemblies across Ghana (A male supervisor at E.P.A). According to the E.P.A they have a mandate to ensure sound environmental practices when it comes to solid waste management and they collaborate with all relevant bodies such as Ministries, Departments, and Agencies including LEKMA to ensure that they are adhering to environmental laws.

5.3 Strategy for Solid Waste Management

In the past solid waste management was sorely handled by Municipalities across the country but there were still gaps that ensured that waste problems existed because municipal authorities did not have the requisite technology and resources. In view of this there was a shift in strategy to partner with the private sector in a Public Private Partnership in dealing with solid waste. PPP is a long term cooperative institutional arrangement between the Municipal Assembly and the Private waste contractors to manage solid waste (Akintoye et.al. 2003 in Mohammed Niyas, 2012). PPP has been identified as critical for improving solid waste services (Adama, 2007, Davies, 2008, Onibokun, 1999).The Ledzokuku Krowor Municipal Assembly took this step to solve the problem of solid waste which include uncollected solid waste in households and many public places, waste thrown in public places, leading to various health and environmental problems. In view of solid waste that lies uncollected for several days, bad odour emanates from the waste to the discomfort of many

residents. Vectors and rodents also feed on the solid waste that lies uncollected and aid in the transmission of diseases.

These strategies are discussed below and it was envisioned by the Municipal Assembly that this would be the cure for the problems of solid waste.

5.3.1 Strategies by Municipal Assembly to collect Solid Waste

In ensuring the effective management of solid waste, the municipality as a responsibility contracted five private waste contractors in a public private partnership arrangement. According to the Municipal Assembly authorities, *''...The assembly does not have the capacity to collect solid waste and therefore an effective way is to engage the private waste companies''* (Head of waste management, LEKMA). This arrangement according to the municipal assembly is the cure to the solid waste problems faced and PPP can help mobilise resources and contribute to economies of scale and enhance service delivery (Oteng-Ababio, 2010). These companies are mandated to provide solid waste services to the households. The waste management section of the municipality has the role of monitoring these companies to ensure that they are complying with the regulations set out in their contracts. Defaulting companies are sanctioned and these sanctions include the non-payment of monies to defaulting waste contractors as well as revoking contracts of non-performing waste contractors.

In collecting solid waste in the municipality, the assembly has in place two strategies which is the House-to-House and the Communal Container service.

The Communal Container service is available in low income neighbourhoods where there is poor layout while the house-to-house service is provided in medium-to-high income neighbourhoods with adequate and well layout roads. This arrangement illustrates that households in low income neighbourhoods have just one choice to dispose of their solid waste, which is the communal container site. Most of these neighbourhoods have no access roads and this makes it very challenging for trucks to go round collecting solid waste from house-to-house and therefore the only option is to carry their solid waste to the communal container site for dumping.

There are a total of 25 communal sites distributed across the municipality for solid waste dumping where various containers with various sizes ranging from 15 cubic meters to 23

cubic meters are placed for solid waste dumping. The size of the containers varies with the number of people living in an area (Head of waste management, LEKMA). These containers are to be hauled by compactor trucks every two days to dispose of the solid waste at the landfill site. Households who come to dispose of solid waste pay as they dump. The fees are determined by weight which is done by the supervisors at each site.

The communal container sites are operated by the assembly members who are part of the Municipal Assembly and they employ the services of supervisors to supervise these sites. The supervisors collect fees from residents as they dispose of their solid waste and account to the assembly members who in turn pay to the Assembly. This structure of supervision is decided by the Assembly and the assembly members carry them through.

The households in the medium-high income neighbourhoods also have one choice which is the waste contractor assigned to that neighbourhood. This is because in the medium-high income neighbourhoods there are no communal container sites. These communal sites are mostly located in the low income neighbourhoods. Households in the house-to-house category have a duty to register with the waste contractor assigned to that neighbourhood and upon registering they are offered a free refuse bin.

All waste contractors are assigned to different neighbourhoods to collect solid waste. According to the Municipal Assembly, the assigning of a particular waste contractor to an area depends on the capacity of the contractor in terms of vehicles, equipment and personnel (Head of waste management, LEKMA). In view of this, Zoomlion has the biggest territory. The Municipal Assembly is responsible for demarcating and zoning the municipality and assigning each territory or neighbourhood to each waste contractor.

According to the head of waste management in an interview, the assembly is responsible for the payment of the haulage of solid waste from the communal container services. This means that, the assembly pays the companies that are engaged in the communal container services directly from the Municipal Assembly's share of the Common Fund. With regards to the house-to-house service, the companies have a franchise arrangement with the households who pay directly to them. These fees from the house-to-house services are supposed to be collected once a month and fixed by the municipal assembly (Head of waste management, LEKMA). This amount is currently fixed at GHc35 (US$9.5) a month. This means that any waste collecting company who goes contrary to this arrangement is in breach of the contract agreement and liable to punishment.

5.3.2 Solid Waste Handling in households

Various households have their own ways of storing solid waste materials for disposal. In the house-to-house collection, it is part of the requirement that refuse bins are supplied to households on behalf of the Assembly by Private waste collecting companies operating in the various locations in the municipality. It is important for households to have a refuse bin to store solid waste to prevent the waste from spreading or scattering to other places which can be the source of health risk to residents.

According to the survey conducted, out of total respondents (82 respondents), 23.2% are provided with refuse bins to be able to store solid waste for disposal. Out of this number (82), 50% provide their own refuse bin in storing solid waste for disposal. 26.8% of respondents have no proper refuse bins but store solid waste in polythene bags, sacks, and paper cardboard. These types of provisional storage materials normally results in more litter and are less hygienic than when approved plastic bins are used (Obirih-Opareh and Post, 2002). A similar study in the Accra Metropolitan Assembly conducted by Boadi and Kuitunen (2003, p.213) concluded that solid waste was stored in open baskets in low income areas but in this study, no such case was recorded in this Municipality.

Table 5.1 Storing of Solid Waste by household and Neighbourhood

	Storing of solid waste by household			
Neighbourhood	Bin by Assembly (%)	Bin by household (%)	Others (%)	Total (%) N
Low income	0	47.6	52.4	100 (42)
Medium-High income	47.5	52.5	0	100 (40)
Total	23.2	50	26.8	100 (82)

Source: Author, Fieldwork July, 2014

N=Total number of respondents

From table 5.1 above, no household in the low income group is provided with refuse bin with the majority (52.4%) having no approved refuse bin. It is only in the medium-high income neighbourhood that refuse bin is provided and this is because it is only in the house-to-house that households have a contract with private waste collecting companies for which the waste collectors are obliged to provide refuse bin. In the communal container service households have no contract with waste collectors and they provide their own refuse bin for storing solid waste. By providing their own refuse bin, they use sub-standard materials that are cheap such as polythene bags, sacks, and paper cardboard to be able to save money for family expenditures.

From observations from the households, indoor storage of solid waste is very common in all the medium-high income neighbourhoods as well as in some low income areas. This is because of straying animals that are able to scatter and spread the waste which leads to littering with some of the waste ending up in gutters. It also seems easier for household members to easily access them quickly. Also when it comes to sorting of solid waste, no household was found separating their solid waste except when the household decides to give out or sell a particular solid waste item to scavengers. This is also partly because the private waste contractors provide one bin per household in locations where they have provided one. Households who are able to afford bins also purchase only one to store solid waste. There is currently no rule or law regarding the separation of solid waste into different types so everything solid waste is put in the same refuse bin for disposal. This practise is also consistent with similar findings in the Accra Metropolitan Assembly by Obirih-Opareh and Post (2002, p.106) that found out that the solid waste collection system did not encourage people to sort their solid waste.

The households here make a decision as to which choice of solid waste disposal to patronise. This decision is based on knowledge and information available to them. Their choice of option is also limited when it comes to solid waste disposal. There are two options to choose in order to dispose of solid waste legally and this is either house-to-house or communal container service. Households who decide against these two options engage in illegal dumping. These become a restriction on the choices of the actors in the household group. Out of the total respondents sampled, 41.5% use the communal container service with another 41.5% patronising house-to-house services and 17% of the total respondents use illegal means of disposing solid waste in the municipality (Refer to table 5.2 below).

Table 5.2 Choice of disposal and level of education

	Choice of disposal				
Level of Edu	HtH (%)	CCS (%)	Illegal dump (%	Total (%)	Total Res
No Education	0	66.7	33.3	100	21
J.H.S	7.7	76.9	15.4	100	13
S.H.S	25	58.3	16.7	100	12
Tertiary	83.3	8.3	8.3	100	36
Total	41.5	41.5	17	100	82

Source: Author, Field Work July 2014.

HtH= House-to-House Service, CCS= Communal Container Service

Out of the total number of respondents in the low income neighbourhoods (42 in all), 66.7% use the communal container service while the remaining 33.3% use illegal ways of disposing of solid waste. Respondents using the communal container service cited how convenient and short the distance to the communal container site is as reasons for using the service. Others also mentioned the fact that it was the only option available to them even though they would have opted for the house-to-house service which is not available to them due to the inaccessible nature of their location.

The households using the house-to-house service in giving reasons for their choice of disposal mentioned that it was very affordable and convenient to them. Others were also of the opinion that it was safe, easy and a faster way of solid waste disposal. Ironically, some of the households here engaged in waste burning which is illegal due to the irregularity in service provision.

From table 5.2 above we notice a relationship between the level of education and the choice of disposal. This is because the correlation in SPSS is significant at 0.01 on a two-tail test. The correlation is also positive with a P value of 0.435 (refer to appendix IX-6). From table 4, majority of respondents (66.7%) in the low income neighbourhood who patronise the communal container service have no education. Indeed, in this area, there is a high incidence of illegal dumping (33.3%) whereas the medium-high income neighbourhood has 83.3% tertiary education with a zero percent ‘no education’.

We may deduce from this that the level of education may determine if a household disposes of solid waste illegally or not and whereas the level of education is low in the low income neighbourhood, the level of illegal dumping is the highest compared to the medium-high income areas with a high level of education. Also households with high level of formal education have a likely chance of getting better paying jobs which may increase their status and living standards and their likely preference for living in a medium-high income area where they enjoy house-to-house services.

In all the households, household appliances like television sets, air conditioners, refrigerators, washing machines, microwave ovens, as well as computers are not added as part of solid waste materials for disposal. This is simply because of the weight and size which is also not acceptable by the waste contractors, a situation which may lead to illegal dumping. Various households have their own arrangements with scavengers to pick these items either for a fee or for free.

Domestic solid waste that is generated and stored for disposal here include, plastic waste, glass waste, paper waste, food waste, as well as bottles and cans.

5.3.3 Waste Recycling

Recycling is beneficial in directing materials from the waste system so that they can be used again. It helps in conserving resources and saves energy as well as collection and disposal costs (Seik, 1997). Solid waste recycling in households begins with the use of bottles cans, plastics, paper, and cardboards for domestic purposes. They are only disposed of when they are no more relevant or of any use to the owners.

Some of the households also make additional income by selling some solid waste materials to scavengers. The collection of these materials also provides jobs for the people who engage in the collection. These people also sell these solid waste materials to other informal recycling entities.

When asked if households store solid waste for reuse, 52.4% said they do not always store solid waste for reuse, 3.7% said they always stored solid waste for reuse but 43.9% do not store solid waste for reuse (Refer to table in Appendix IX-1 for details). This means that apart from the 3.7% of respondents who always store solid waste to reuse later, the other 52.4% sometimes store solid waste in order to reuse. This goes to indicate that more than half of the

households sampled engage in recycling. This helps in reducing the amount of solid waste to be collected by waste contractors and suggests that more households engage in recycling.

When asked if they store solid waste materials for sale to scavengers, 45.1% of respondents said they did not always sell solid waste materials to scavengers. 52.4% said they do not sell any solid waste materials at all to scavengers. 2.4% however said they always sold solid waste materials to scavengers (Refer to Appendix IX-2 for table).

Again this illustration portrays the fact that many households in this municipality have some arrangements with scavengers and the fact that scavengers also have a role to play in solid waste management even though the municipality fails to recognise them as relevant actors in solid waste management. In fact they help reduce the amount of solid waste generated for collection and their presence also helps in promoting more separation at the household level. The 45.1% of respondents who said they do not always sell to scavengers show that they have done so before and given the chance will still do so in the future. The activities of scavengers is not only limited to the households but is extended to the communal container sites within the municipality where they go to search and pick various solid waste materials of use to their activities for sale.

This is an indication that, with the restrictions on their choices, household actors have alternative ways of using different strategies to overcome perceived difficult situations.

5.3.4 Solid Waste Service

The Public Private Partnership arrangements is tested on the basis of the quality of service provided as well as to ascertain if private waste contractors are able to abide by the agreement set out in their contracts by the municipal assembly. Under the current arrangement with the waste contractors, collection of solid waste from house-to-house is to be carried out once every week for each household and once every two days for the communal container site. This is to ensure that garbage is cleared to make way for other ones that will be brought as well and to also empty those from the house-to-house so that solid waste will not pile up for a long time due to health implications.

With regards to the house-to-house service and particularly on how many times waste contractors collect solid waste from households, responses were varied. The table in Appendix IX-3 indicates the results clearly. Out of a sample of 40 respondents from the

house-to-house neighbourhood, 47.5% of the respondents indicated that their solid waste materials were collected once every week. 27.5% respondents indicated that their solid waste was collected once every two weeks, and another 25% of respondents stated that in their case the collection was done once a month.

Going by this results, it clearly indicates that service delivery is not in tandem with the provision in the agreement between private waste collecting companies and the municipal assembly which stipulates the collection of solid waste from households once a week from these locations. A situation which may lead to many of the households having their solid waste pile up for days without being collected which is a health threat.

It shows that they are only able to meet this requirement for 47.5% of respondents in the house-to-house category without meeting same for the other majority of 52.5% who do not enjoy the once a week collection.

When it comes to the communal container service for low income neighbourhoods, the containers are sometimes left unattended for weeks creating heaps of refuse at these sites. These sites are without any fence wall or security restrictions and residents can access the sites any time without any strict control. This encourages residents to dump anywhere without control. Other residents who bring their solid waste to dispose of, dump anywhere around the containers since they are filled. These conditions have health implications for the residents around these sites as many residents resort to indiscriminate dumping around the communal site because there is no space in the container to dump. These waste washes into water bodies during rainy seasons and are exposed which may lead to typhoid fever and cholera epidemic.

Another requirement by the municipal assembly to the private waste collectors was for them to have a fee system collected only once a month. This was to enable the households plan well their budget for the month. On this requirement, respondents were asked about the fee system they have with the waste collecting companies. This was to identify whether they paid once a month or not. Refer to Appendix IX-4 for table.

With regards to the fee system, 75% of households (from house-to-house) pay once a month which indicates that the majority pay in accordance with the directive to pay once a month for the service. The minority 25% still do not have the opportunity to pay once a month and whereas 7.5% pay per weight of their solid waste which is calculated without using any device but just by taking a view of the size of the refuse bin to price, another 7.5% also pay

once every week. The other 10% also pay per bin. Even though we can deduce from these figures that the majority still pay once a month, we cannot conclude that the waste contractors are not flaunting the directive to allow all households under their jurisdiction to pay once a month for solid waste service which is a clear breach of contract. This is because it is only 75% that pay monthly and not everyone which is clearly in violation with the agreement. According to the 25% respondents who do not pay once a month, they end up paying more than what their counterparts who pay once a month pay when they calculate how much they pay in total every month.

When it comes to the fees charged by private waste collecting companies, respondents were asked how they perceived the fees. This was done to ascertain whether they had problems with their ability to afford the payment.

The table in Appendix IX-5 indicates that, out of the total number of respondents from the house-to-house neighbourhoods, 20% of the respondents perceived the fees charged by the private waste collecting companies as high, another 2.5% see it as low and a majority of 77.5% of the respondents think it is moderate.

Indications from these views show clearly that even though 20% of respondents view the fees as high, the majority have no problems with the fees charged by waste contractors. Therefore for the majority they have no problem with their ability to pay for solid waste services which is very interesting in the sense that other findings in the Accra Metropolitan Assembly have concluded that majority of residents patronising the house-to-house services complain of their inability to afford paying for such services in the low-to-medium income areas (Obirih-Opareh and Post, 2002).

Table 5.3 Regularity of Service from house-to-house

Responses	Percentage (N)
Always	12.5 (5)
Yes most of the time	22.5 (9)
Not often	65 (26)
Total	100 (40)

Source: Author, Field Work July 2014

N=Total number of respondents.

Table 5.3 shows responses from respondents who were answering a question regarding regularity of service rendered by waste contractors. This question was a check on an earlier question requesting how often solid waste was collected from households (Appendix IX-3). The required service provision to house-to-house is that solid waste is collected once every week.

From table 5.3 above, 22.5% of respondents in the house-to-house category said they received regular service most of the time but not all the time. 65% of the respondents also said regularity of service by waste contractors was not often. This indicates that whereas these respondents received some service, these services are not often. 12.5% of respondents indicated that they always enjoyed regular service from the waste contractors. This clearly shows that whereas 12.5% of respondents receive regular solid waste service, the majority are not enjoying regular solid waste service in the house-to-house category.

Many of the households who indicated that they do not often enjoy regular service from the private waste contractors stated that this posed danger to the health of their household. Low frequency and irregularity of solid waste collection has a detrimental effect on public health and environmental quality (Obirih-Opareh and Post, 2002). They cited the bad odour and scattering of solid waste by animal when solid waste is left uncollected for a long time as some of the dangers. Others also mentioned the spread of insects and mosquitoes as a result of heaps of solid waste that lie uncollected for several days which leads to the spread of malaria.

These actors have agency which empower them to process social experience and cope with life and this enable them to have the knowledge to perceive problematic situations and respond to challenges (Long, 2001). These conditions are motivating factors for illegal dumping because households are rational actors with the power of agency and will find alternatives to avoid these dangers from happening and may resort to disposing of their solid waste illegally. In view of the high organic and moisture contents together with the prevailing high temperatures, waste decomposes quickly and begins to smell. The accumulation of decaying waste is a breeding place for insects and vermin that may spread diseases (Obirih-

Opareh and Post, 2002). There is therefore the need for frequent removal of solid waste from households and where the frequency is not regular, foul smell emanates from the waste to the discomfort of the households (Boadi and Kuitunen 2003, p.212). It is instructive to note that these irregularity issues were not limited to just some particular waste contractors but all.

Even though as indicated earlier, with majority of households having no problem with their ability to pay for solid waste service, the level of satisfaction of such services is not encouraging. As can be deduced from table 5.4 below, majority of households (52.5%) are not satisfy with the solid waste services they receive, whereas 42.5% of respondents are satisfied with the service they receive. Also 5% respondents were very satisfied with the level of service they receive. This is attributable to the fact that the majority who are dissatisfied are not getting regular service provision from waste contractors.

Table 5.4 Level of satisfaction of house-to-house solid waste service

	Level of Satisfaction of solid waste service				
Regularity of service	Very satisfied (%)	Satisfied (%)	Dissatisfied (%)	Total (%)	Total Res
Always	0	100	0	100	5
Yes, most of the time	22.2	77.8	0	100	9
Not often	0	19.2	80.8	100	26
Total	5	42.5	52.5	100	40

Source: Author, Fieldwork July, 2014.

There is a relationship between level of satisfaction and regularity of service and that relationship is significant at 0.01 based on two-tail test in SPSS. There is a strong positive correlation with a Pearson correlation coefficient of 0.758 (refer to appendix IX-7). It thus suggests that regularity of service influences the level of satisfaction and with majority (65% from table 5.3) of respondents in the house-to-house not often having regular solid waste services. And because many households do not enjoy regular service from waste collectors they are dissatisfied with their service.

5.3.5 Illegal Solid Waste Disposal

Illegal solid waste disposal has characterised many metropolitan and municipal assemblies in Greater-Accra and the Asante Regions of Ghana and Ledzokuku Krowor Municipal Assembly is not left out in this menace. Many similar studies in Ghana have echoed this problem citing various causes. According to a study by Oteng-Ababio et al (2013) conducted in Accra; solid waste is often dumped in gutters, drains and streams. This they attribute to the fact that solid waste in communal container sites are left unattended to for several days up to three weeks. In view of this many residents find the communal sites unattractive to dispose of solid waste and resort to illegal dumping. In this study, similar findings were also made.

Figure 5.1 Communal Container site with uncollected solid waste

Source: Author, Field Work July 2014.

With reference to table 5.2, 17% of the total respondents from the two areas use illegal means of solid waste disposal and out of these two locations, the low-income neighbourhoods were found to be the locations most dominant when it comes to illegal dumping. Out of a total of 42 respondents in the low-income neighbourhoods, 33.3% of them use illegal means of

dumping solid waste. These include sending solid waste to the bush to dump as well as burying of solid waste in pits. Burning of solid waste was also very common in some of the households in the medium-high income neighbourhoods but very dominant in low income neighbourhoods. Some of the respondents were not even aware the burning of solid waste on their own compounds was illegal. Some of them engage in solid waste burning because of the irregularity of service they enjoyed from the private waste collecting companies in the house-to-house category.

Some residents dispose of solid waste in open pit and burn them when the pits get filled up. Solid waste burning was not only limited to the households in the municipality but also in some of the communal container sites. Some of the supervisors burn paper and other wastes (Figure 5.1). This is to make up space for more residents to be able to dump when private waste collectors fail to haul containers on time. This is a cause for concern because when household hazardous waste is burned, chemicals can easily leach to pollute underground water during rainy season (Oteng-Ababio et al., 2013). The smoke that emanates from burning of solid waste also affects the health of people.

Solid waste in many communal container sites are left unattended to and the whole place becomes very filled up with heaps of waste as shown in figure 5.1 above. This condition does not encourage residents to dump solid waste here and resort to other illegal means of disposing solid waste due to the fact that they are also limited by choice.

Many of the households that engaged in illegal solid waste disposal cited long distances to communal sites as well as the unhygienic conditions that prevail at the communal container sites as reasons for their choice of solid waste disposal. Studies like (Oteng-Ababio et al., 2013) has established that there are maximum travel thresholds within which residents will voluntarily walk to access communal container sites and once this is exceeded, utilization begins to reduce drastically. The long distances they travel only to find an unhygienic site is enough to deter them from accessing the communal container site.

Some were also of the view that it was easy, convenient, and cheap to burn solid waste and that explains why they engage in it.

Illegal dumping is unacceptable and it is punishable by a fine by the Municipal Assembly. It can only be detected through monitoring and the combined cooperation of the public since good sanitation is a shared responsibility. The co-operation of the public in reporting illegal disposal of solid waste is a useful means of control (Coad, 2011). Many residents who

witness illegal dumping fail to report it for fear that they may be socially ostracised by social groups within the neighbourhood for not caring about the people they report. Also loyalties with some actors could prevent people from reporting illegal dumping. This shows that there are many social interactions between actors that also encourage illegal dumping.

Figure 5.2 Illegal dumping of Solid waste close to a road in the Municipality.

Source: Author, Field Work July 2014

From the above it has been shown how strategies have been put in place by municipal actors to manage solid waste and the restrictions that these strategies have put on the actions of household actors. Waste contractors have also responded by offering services to households but these services have been dogged by irregularities leading to many households not receiving regular services, a situation that come with health problems. In the midst of all these barriers, household actors also have in pace alternative strategies of engaging scavengers and re-using waste materials in order to reduce amount of waste generated. Others have also resulted to illegal dumping as a way of response to the structural issues that limits their choices of waste disposal. The next chapter discusses the outcome of these strategies for managing solid waste.

CHAPTER SIX

Outcome of Public Private Partnership and Challenges faced by actors

6.1 Introduction

This chapter presents discussions on the findings made regarding the outcome of using Public Private Partnership as a tool in addressing solid waste management problems and the challenges faced by actors. A positive outcome will lead to an effective and efficient service provision by waste contractors leading to over 90% collection of solid waste generated daily. This may lead to a sharp reduction or a halt to illegal dumping and an improved health outcome. I also discuss the challenges solid waste management is currently facing. The discussion show that the outcome of PPP currently, as a tool for managing solid waste, is as a result of these challenges and that if these challenges are addressed, the results will greatly improve.

6.2 Current outcome of solid waste management in the Municipality

The PPP arrangement was put in place by the central government and implemented by the Ledzokuku Krowor Municipal Assembly to help in dealing with solid waste problems in the municipality. These strategies were laid up to enable household solid waste to be properly disposed in order that the municipality is rid of filth. Also this strategy was to help curb illegal dumping in order that waste thrown in public places and drains are things of the past. This way, attendant health implications will be avoided.

The outcome of the PPP arrangement has been to some extent, beneficial and helpful in the sense that this has helped in the collection of solid waste from households in the municipality (Head of waste management, LEKMA). Data on the total amount of solid waste generated in the municipality are unreliable due to variation in population estimates and the improper keeping of records at the Municipal Assembly. According to the head of waste management in the Assembly, waste contractors currently are able to collect about 60% of total solid waste

generated. The amount of solid waste generated daily is 333.5 metric tons and out of these 257 metric tons is collected every day (Head of waste management, LEKMA). It has also led to solid waste services being offered to households by private waste contractors at the doorsteps of many households.

Even though it can be said that there has been some improvement, there are still some outcomes that are not encouraging. As has been discussed from the preceding chapter, service provision from private waste contractors has not been the best as evident from dissatisfaction expressed in the survey. Their services have been plagued by irregularity in service leading to heaps of solid waste left uncollected for so many days which has a detrimental impact on public health and environmental quality. The country recorded more than hundred cholera related deaths last year with over 20,000 cases and most of the initial cases were recorded in the Ledzokuku Krowor Municipal Assembly (OCHA, 2014). The causes of these cases were generally linked by the to the sanitation problems facing the country.

The communal container system is also most likely to generate environmentally unsound practices within the low income neighbourhoods. This is due to the unhygienic nature of the place as well as the bad odour as a result of uncollected solid waste. This coupled with the distance residents have to travel to dispose of solid waste encourages illegal dumping which is a source of environmental degradation and a public health hazard (Obirih-Opareh, 2002, p.105).

Based on my observation in the Municipality, there is still waste thrown in drains and water bodies with many places left with waste uncollected for days leading to the negative health implications. Because most of the drains in this municipality are choked, there is constant flooding during rainy seasons leading to many residents rendered homeless.

As to whether the PPP arrangement in managing solid waste has been a success, the head of waste management in the Municipal Assembly has this to say;

‘‘*...I think at the moment I can safely say that introducing private waste contractors to help in collecting solid waste in the municipality has been beneficial but has not been successful due to the fact that service provision has not been regular and there are many complaints from households in the house-to-house about irregularity issues’’.*

This statement coupled with responses from the survey as well as my observations clearly shows that there are still problems with solid waste management in the municipality even though the introduction of PPP has to some extent been beneficial.

''...Well for me I think it (PPP) has been successful because we (Private Waste Contractors) are able to collect up to about 60% of solid waste generated daily and that I think is better than leaving it to the Assembly alone to collect knowing very well they lack the resources needed for solid waste collection. It would have been worse without us and I think if the problem with landfill site is solved we can improve a lot and be able to collect more than 90% of solid waste generated daily'' (Operations Manager of one of the private waste collecting companies).

In the view of the private waste contractors, engaging them to collect solid waste has been successful largely but they are of the view that if the current challenges they are facing are addressed, they can do far better than they are doing. This shows that the current outcome being experienced in the municipality can be associated with the challenges and should these challenges be resolved, a much improved service should be expected.

As indicated earlier, the outcome of PPP in solid waste management in this municipality is as a result of challenges faced by the main actors leading to the existence of the problems of solid waste and by addressing these challenges; it may lead to massive improvement in solid waste management. These challenges are discussed in the next section.

6.3 Challenges faced by main actors in managing solid waste in the Ledzokuku Krowor Municipal Assembly.

The outcome of the strategies to deal with solid waste in this municipality can be attributed to the challenges faced by the main actors in solid waste management within the municipality. When these challenges identified are dealt with properly, solid waste problems will be greatly improved and PPP can work efficiently and effectively as a tool to deal with solid waste in the municipality.

6.3.1 Challenges at the Municipal Assembly

The assembly is plagued by financial challenges which affect its day-to-day administration. According to the head of Waste Management in the assembly, the budgetary allocation to the department is inadequate and these pose a lot of challenges to solid waste management. Also the money that the assembly generates from the communal container sites is not enough due to the refusal of many residents to pay for disposing solid waste at the dump sites.

‘‘*…I have had lots of report from the supervisors at the communal container sites of residents not willing to pay fees charged as well as others paying below what they are told to pay*’’ (Head of Waste Management LEKMA).

This means that if many resident refuses to pay at these dump sites, the Assembly loses revenue to be able to run its recurrent expenditures which affect the Waste Management Department’s budget as well as the entire Assembly.

All the private waste contractors working on lifting the communal containers are paid by the assembly and according to the assembly; majority of their expenditure goes into paying these contractors.

‘‘*…a chunk of the assembly’s money allotted to waste management which is not even enough, goes into paying private waste collecting companies leaving the assembly with no money to purchase refuse bins for use in the municipality*’’ (Head of Waste Management LEKMA)

It is the municipal assembly’s duty to provide refuse bins at all public places in order to avoid littering but the assembly is unable to provide adequate refuse bin in all public places such as lorry parks, markets, clinics, schools, hospitals, and parks due to financial constraints. This situation has also increased the scope of littering in public places much to the displeasure of many residents. The financial constraints also affect the operations of private waste contractors collecting solid waste from the communal container sites. This is because there are many times, delays in payments which lead to a total halt to solid waste collection at the communal sites. According to the head of Waste Management Department in the assembly, the contractors are grounded when the assembly is unable to pay them on time because they have to also pay at the landfill site before dumping and pay staff salaries.

Waste contractors assigned to the communal sites depend solely on payment from the assembly to operate and provide solid waste services to the communal sites in the

municipality. Payments of salaries, servicing of vehicles, buying of fuel as well as payments at the landfill site are all drawn from what the assembly pays. In view of this, any delay or non-payment by the assembly to waste contractors brings waste collection to a standstill with waste collectors refusing to provide solid waste services to the communal container sites. This is partly a contributory factor to the heaps of solid waste at communal sites which is left uncollected for several days to weeks leading to negative health implications.

The municipal assembly is also responsible for monitoring and regulating the quality of service delivery by private waste contractors. They are also to monitor sanitary conditions in the municipality and sanction possible offenders especially illegal dumping (GOG, 1999). From observation, official monitoring is very weak and this is attributed, by the assembly, to inadequate logistics and low remuneration. Similar findings were made by Obirih-Opareh and Post (2002) in Accra Metropolitan Assembly where it was revealed that monitoring was exceptionally weak due to bad logistics, under-staffing, low remuneration and corruption. Weak monitoring only allows defaulting waste contractors to perform poorly which also may lead to illegal dumping. According to the Environmental Protection Agency (E.P.A), due to the policy of local governance, waste management is a sole preserve of the assembly and the assemblies have a responsibility to apply sanctions to culprits who are in breach of sanitation bye-laws.

‘‘*…Most of the problems we are seeing now in the Ledzokuku Krowor Municipal Assembly is also true in most of the other Districts, Municipal and Metropolitan Assemblies in Ghana because even though we (E.P.A) have helped in coming out with environmental policies and laws which have been rectified by the parliament of Ghana, the political will to execute them is always lacking due to political expediencies. This is why there is illegal dumping and authorities are simply not doing enough to sanction offenders’’* (An Official of EPA in an interview session).

There have been several issues of irregular solid waste collection from house-to-house by private waste collectors and many of them flouting the contractual agreement by solid waste service providers but they go unpunished. According to the head of Waste Management Department, sanctions are applied to non-conforming waste contractors who are not performing well. Sanctions include the non-payment of monies owe to the offending waste contractor. This becomes difficult sometimes to execute because of the power relations that exist between some of the big waste companies and the Ministry of Local Government and

Rural Development. These waste companies (who are mostly the offending parties) have a direct contract from the Ministry of Local government and Rural Development. In view of this, these companies receive their monies directly from the Ministry and not the assembly. These monies are deducted from the common fund allocated to the municipal assembly before the remainder is paid to the assembly. This situation makes it difficult sanctioning these companies by withholding their payments.

In view of the weak monitoring and sanctioning, some of these waste contractors cross over to other locations within the municipality not assigned to them to collect solid waste. This leads to constant conflicts between private waste collectors operating in the municipality.

Coupled with weak monitoring is also the fact that the sanction that apply to illegal dumping according to the sanitation bye-law is not punitive enough with offenders having to pay a small amount of GHc20 (US$5.4) which does not deter residents from dumping waste illegally (Head of Waste Management, LEKMA).

According to the municipal assembly, one of the greatest challenges facing the assembly when it comes to solid waste management is the lack of dumping site to dispose of solid waste collected from the municipality. Currently, there is just one landfill site located in the Kpone district which is outside of LEKMA where all waste collecting companies go to dump solid waste from the municipality. This landfill site was constructed to take care of waste from Kpone District Assembly and Tema Metropolitan Assembly only with a capacity of 300 tons of refuse a day. But due to the lack of dumping site in the whole of Accra and its suburbs, this landfill site is been used by almost all the Districts, Municipal and Metropolitan Assemblies in the Greater-Accra region including the Ledzokuku Krowor Municipal Assembly. The Kpone Landfill site now receives about four times its daily capacity with an average of about hundred trucks a day. An average of 1200 tons of refuse is dumped by about hundred trucks a day while an estimated 37,000 tons of refuse is dumped in a month with the refuse coming from Tema, Kpone, as well as Accra and its suburbs including Achimota, Ashaiman and Ledzokuku Krowor (Ghanaweb, 2013).

In view of the numerous trucks that come to dispose of solid waste from various locations, there are numerous queues of trucks waiting to dump and they are served based on ‘first-come’ ‘first-serve’ basis. This leads to a situation where many trucks from LEKMA would have to queue for several hours and sometimes days to get turns to dispose of solid waste to be able to return to the municipality to continue collecting solid waste. The situation gets

worse when there is power outage that last for a day or two or when the engineering facility breaks down. This breakdown is sometimes due to the pressure on the facilities resulting from the excess tons of refuse. This situation holds up many of the trucks used by private waste collecting companies to collect solid waste leading to non-collection in the municipality.

This according to the head of waste management department is the cause of the delays and irregularity problems being encountered in the municipality and stressed the need for these companies to purchase more trucks. For instance, out of the 45 refuse containers spread across the municipality for use in the communal container sites, seven are supposed to be lifted and disposed of daily but only one is dispose of a day due to the traffic at the landfill site which is about 24 kilometres away from the municipality.

‘‘…*This traffic at the landfill site which holds up most of the trucks for waste collection is the cause of absenteeism and lateness to work amongst refuse workers resulting in residents dumping solid waste indiscriminately. This creates sanitary problems for the entire municipality with health implications and in view of that the municipal assembly purchased some trucks as a backup plan when trucks from private waste contractors are held up at the landfill site’’* (Head of Waste Management LEKMA).

Buying these trucks according to the assembly, comes with extra cost because they have to fuel and service these trucks constantly to avoid breakdown. Even with this initiative the situation has not improved due to the unavailability of dumping sites apart from the Kpone landfill site. These new trucks are equally held up in the queues and are unable to return on time for waste collection.

Figure 6.1 Landfill site located in Kpone 24 km away from the Municipality

Source: Author, Field Work July 2014

The dumping ground at Kpone has been turned into an ordinary dumping ground with solid waste spread all over the site and making the whole site smelling with bad odour. Residents who live close to the landfill site have complained about the stench emanating from the site and want it closed down. According to the Waste Management Department head in LEKMA, this was the same situation that led to the shutdown of the other dump site in Abokobi District with residents complaining of bad stench leading to several protests and the eventual closure of the site. Also the shutting down of compost and recycling plant in Teshie contributed to the already bad sanitation situation in the municipality. The plant recycled about 600 tons of garbage daily and its shut down has put more pressure on the Kpone landfill site. It is feared that should the landfill site in Kpone be closed down, solid waste management in the municipality will become worse (Head of waste management, LEKMA).

This comes at a time many residents in various locations in Accra constantly are resisting the construction of landfill sites in their locations. A situation which is akin to NIMBY (Not In My Back Yard), a language in current research which is used to describe opponents of new

developments who recognise that a facility is needed but are opposed to its sitting within their locality (Dear, 1992). It is argued that members of the public are not passive but active in weighing the usefulness of information and NIMBY responses is seen as prudent and based on well-grounded concern about the negative impacts of new developments (Burningham, 2000). Many residents have information about complaints of bad odour and health implications of siting landfill sites. Information from other locations where these dumping sites were constructed and the bad odour that filled those towns have caught public attention in Ghana and the resolve by many residents not to allow the siting of landfill sites in their backyards.

6.3.2 Challenges at the communal container sites

There are a number of challenges here that encourages illegal dumping of solid waste in the municipality which also affects the operations at these sites.

At the communal container sites, irregular lifting of solid waste containers creates challenges for solid waste management. Firstly, it is very difficult to prevent households from disposing their solid waste when the containers are full. This is because the residents have no other place to dump their waste apart from these sites and preventing them sometimes leads to disagreements. This situation accounts for the indiscriminate dumping at the communal sites in the full glare of the site supervisors who are helpless when the containers are not hauled when they become full.

‘‘*...The truck drivers are not regular in collecting the waste and this leads to a situation where there is no place to dump solid waste and it is practically impossible to turn residents away when they bring solid waste to dump because they have nowhere to dump them. I try sometimes to prevent them from dumping but it always end up creating a problem for me with some residents threatening to beat me up*’’ (50 year old female supervisor).

And to make matters worse, some of the containers are also damaged and needs to be replaced by the Municipal Assembly but due to financial challenges the assembly is unable to afford new ones at the moment which is a contributory factor to the bad sanitary conditions at the communal sites. One supervisor at the sites spoke about damaged containers and said;

‘‘*..The containers we use here are too small and when they get filled up they are not picked on time. Look at those containers, they have been damaged for a long time and we have made*

several reports to the assembly but nothing has been done to help repair them and we cannot stop residents from dumping here'' (A 28 year old male supervisor).

In view of the fact that damaged containers are not being repaired or replaced, truck drivers most of the time refuses to haul them to the final dump site because the condition of such containers makes it dangerous to travel with on such a journey. It also leads to most of the refuse spilling on the road which in itself is a health hazard and illegal. When solid waste spills from the trucks on the road, they gradually get blown away by the wind into gutters and add to the already choked gutters. Their accumulation may lead to more choking of many gutters which may lead to flooding during rainy seasons and these gutters may also become breeding grounds for mosquitoes. A situation which becomes a health threat to many residents in the municipality.

These communal sites are run by assembly members on behalf of the municipal assembly with supervisors operating at the site daily. There are normally two supervisors per site who run shifts for the smooth operation of these sites. They make a living out of the fees they collect from residents and pay GHc140 (US$37.8) to the assembly member who intend pay this amount into the assembly's account. In view of this, when residents refuse to pay the fees at the dumping site, it affects the supervisors and the assembly as a whole.

''...We make a living out of this job and I have to pay GHc140 to the assemblyman every week but some of the residents always want to cause confusion here by refusing to pay after dumping their waste. It becomes even worse when the truck drivers do not come regularly to lift the containers and sometimes we have to call them and beg them before they come. At times to, we have to pay them some money from our own pockets before they come and if we do not do that, it means we here will not also get our food to eat which will affect our families so we are compelled to bribe them for prompt pick up'' (A supervisor in his mid-30s).

This situation has created a problem for some of the supervisors who would not pay the truck drivers bribes for hauling of solid waste from the sites. One of the supervisors complained of truck drivers deliberately neglecting the site she was operating because she had no money to pay as bribe for the container to be lifted. This corruption contributes to some extent to the sanitary conditions at some communal container sites which results in illegal disposal of solid waste.

In this municipality like others such as the Accra Metropolitan Assembly, Tema Metropolitan Assembly, and many others within Greater Accra Region, majority of people lack toilet

facilities in their homes and resort to patronising the very few public toilets available. According to the Environmental Sanitation Policy of Ghana (1999, p.12), public toilets are provided for the transient population and not for households in the municipality because the households have a duty to provide toilet facilities in their homes. Because of the very few public toilets available, there are always queues at these public toilets and pressure is mounted on them, a situation which creates a lot of inconveniences. Majority of these public toilets are also not in good hygienic conditions because of the public pressure on them. In view of this, many residents defecate in plastic bags and hide these plastic bags in the garbage for disposal at the sites.

‘‘*..Many residents dispose of solid waste but because there is no sorting, they mix it with human excreta and because it is concealed in a plastic bag it is difficult to identify. It is only when the truck drivers come to pick up the containers and are trying to compact the waste in order to create more space in the truck to accommodate more solid waste, that these excreta splashes on their bodies. It sometimes becomes so bad that we have to provide them with places to wash down in order to clean themselves up’’* (A 32 year male supervisor).

It has become a constant occurrence for residents to always mix excreta with refuse which is not detected because there is no sorting done and supervisors have no means of verifying. This becomes a source of health hazard for operators of communal sites and for refuse workers who go with truck drivers to haul solid waste at these sites.

It has been challenging to manage the communal sites from the point of view of the assembly.

‘‘*…It is very expensive for the municipal assembly to manage the communal sites because we spend so much money here but we do not get any returns due to non-payment by some residents. We intend to leave the management of the communal sites in the hands of the private waste contractors so that we can concentrate on our watchdog role of monitoring*’’ (Head of Waste Management LEKMA).

Currently these communal sites are managed by the Assembly and the only role played by waste contractors is to haul the containers and get paid for such services but they have no hand in its day-to-day management.

6.3.3 Challenges faced by Private Waste collecting companies

The private waste collecting companies are equally faced with certain challenges that impede the progress of solid waste management in the Ledzokuku Krowor Municipal Assembly.

The Waste contractors collect solid waste within the municipality and would have to travel for a long distance to the Kpone landfill site to dump before returning to the municipality to continue with their work. Most of the day is spent at the landfill site just waiting for turns to dump which takes a very long time aside the travel time getting to the site and back.

‘‘*…The volume of garbage generated and the long travel distance to waste disposal site, coupled with the heavy vehicular congestion on the road to the dump site make the work not only difficult but unprofitable’’* (Operations Manager of one of the private waste collecting companies).

According to the private waste contractors they spend more money on fuel and paid overtime allowances to some of the truck drivers who are compelled to spend nights at the landfill site to be able to dump. The landfill site is operated day and night but dumping is not allowed in the night except during day time from 6 in the morning. Clearly, the distance and the time it takes to get to the landfill site may add to the problem because they will get to the dump site late and join the queue.

‘‘*..Sometimes you get to the dump site and you are told the facility is broken down or they have closed for the day. In such situations the truck driver cannot come back to the office with the waste but will have to wait and sometimes spend the whole night there’’* (A 35 year male representative of one of the waste companies).

Certainly the effect of delays at the landfill site is felt in the municipality by the heaps of solid waste that is left uncollected for days as well as the unreliability of service by waste contractors to households because these same trucks responsible for collecting the waste are held up at the landfill site. These are encouraging factors for the existence of illegal dumping being experienced in the municipality.

When it comes to issuing out free refuse bins to households, out of the five waste contractors operating in the municipality, only one is able to give out free bins to their clients. The rest are financially challenged and are not able to afford providing bins for all their clients.

''...Initially we were providing free bins to the households but due to our financial strength we could not continue with it so we ask households to provide their own refuse bin'' (Public Relations Officer of waste collecting company).

Not providing refuse bin to households also comes with its challenges and according to the Assembly most households bag their waste in polythene bags and are thrown into water bodies which cause contamination and a health threat to residents (Head of waste management, LEKMA). The only company which is able to provide free bins is also faced with the challenge of households stealing the bins belonging to their clients when these bins are left outside the houses.

''*...Some households steal our clients refuse bins at night and we spend money buying more to replace which adds to our operating cost but the most interesting aspect is that some of our clients instead of using the bins to store garbage for collection, they rather use them in storing water because they consider them too nice to be used for storing solid waste. They instead prefer storing solid waste in sacks and polythene bags''* (Operations Manager of waste company).

This portrays the actor conflicts at play in solid waste management between waste providers and some household actors.

There are constant zoning challenges in the municipality with some private waste collecting companies crossing into other zones not assigned to them to provide waste services in those areas. It becomes even more challenging when the assembly decides to do a re-zoning in order to reassign the neighbourhoods to the various waste contractors.

''*...We as a company are able to provide refuse bin to all our clients and imagine when there is re-zoning, we are most affected. This is because we would have to leave our bins with our present clients and start all over again by providing new bins to our new location assigned to us which is not financially viable. We therefore have no choice than to maintain those clients while we work with our new clients in the new location''* (Operations Manager of Waste collecting company).

This comment draws attention to the challenge faced by some private waste contractors who blame the Assembly for doing nothing when other private waste contractors cross the boundary to provide solid waste services to areas not assigned to them.

Apart from these five waste contractors working in the municipality, there are other individuals operating illegally known as 'kaya borla' who go to some households with tri-cycles to provide services for a fee (See figure 6.2 for tricycle). These are new actors in solid waste collection who provides house-to-house services in the municipality for a fee and their activities have not attracted much research. The operations of these individuals also affect the waste contractors in various ways as they operate in competition with waste contractors for the same customers.

''*…They operate illegally and sometimes go to collect solid waste at very odd times of the day making it difficult to track them and arrest. They are also responsible for some of the illegal dumping in the municipality because they are unable to travel that long distance (24km) to the Kpone landfill site to dispose of what they collect from the houses and end up disposing them of in the bushes''* (Representative of one of the private waste companies).

Even though the activities of the 'kaya borla' are illegal, they are helpful in accessing the difficult areas within the municipality where the compactor trucks cannot access. And according to one of the waste contractors, they have decided to overlook the operations of these individuals because even though they operate illegally, they are helpful to them in reaching the unserved households. This is an indication of the dilemmas and conflicts between actors in providing solid waste services and households responses to difficult situations. The households turn to these kaya borla actors because of the irregular services they get from waste contractors and the kaya borla also have identified a niche and are taking advantage of it.

Figure 6.2 A tricycle providing solid waste services illegally

Source: Author, Field Work July 2014

From observations these tricycles are seen in broad day light operating in neighbourhoods assigned to other waste contractors without been arrested and this encourages them to continue.

Also the Municipal Assembly is required to fix the fees charged by the private waste collecting companies once every year. Even though the assembly complains of reports received from households to the effect that some waste contractors are charging in excess of the official fees, waste contractors on the other hand also blame the assembly for not considering economic situations before announcing fees. These fees are announced once a year but sometimes prices of petroleum products and other spare parts used by waste contractors increase more than three times within a single year resulting in financial burden on these companies.

‘‘… *The assembly fails to take future increases in petroleum products into considerations when fixing the fees which affect our operations*’’ (Public Relations Officer of waste collecting company).

The fees are fixed by the assembly without the other major actors in solid waste management which in itself takes away participation in Public Private Partnership. This takes away the involvement of households and waste contractors, as major actors in solid waste management, in decision making.

''...Fixing of fees without our knowledge affects our operations because the Assembly does not take our cost of operation into account'' (Representative of waste company).

The private waste contractors sometimes face the challenge of non-payment by some few clients which also causes sanitation problems because they tend to stop serving such clients and these clients resort to illegal dumping which does not help the municipality.

''...We blacklist households who fail to pay the fees by first sending them messages. We still serve them until the second month and if by the third month they still do not pay up, we blacklist them and stop collecting their waste'' (Operation Manager of Waste company).

Blacklisting households and denying them access to solid waste services may only perpetuate existing illegal disposal of solid waste and add to the health risk in the municipality.

6.3.4 Households Challenges

In the households, the most challenging issue has to do with the unreliable nature of service provision from the waste contractors, a situation the waste contractors have blamed on the unavailability of landfill site for dumping. Results from the survey conducted shows many households are not satisfied with service delivery and are very concerned about the health dangers related to refuse that is not collected on time. Irregular collection of solid waste by waste contractors only gives room for the operations of the 'kaya borla' operators on tricycles to provide their services to households who do not enjoy regular waste service and give room to illegal dumping.

Another challenge for some households is their inability to access the house-to-house service. Some of the households in the low-income neighbourhoods are ready to patronise the house-to-house services but are denied because of the fact that house-to-house is only offered in medium-to-high income neighbourhoods. This also becomes a structural hindrance to the actions of some household actors.

The communal container service is likely to generate environmentally unsound practices within the locations they are cited. This is because of the filth that is also around the overflowing containers which lie for so many days without been hauled. This together with the long distances some residents travel to dump their waste is likely to encourage illegal dumping. This is a source of environmental degradation and a public health risk (Obirih-Opareh and Post, 2002).

There is also the unavailability of refuse bins and the fact that the municipal assembly is unable to provide refuse bins at public places. This situation creates indiscriminate littering within the municipality. Apart from the fact that waste contractors are unable to provide free refuse bins to households, there is also the challenge of not replacing damaged ones on time. Not providing refuse bins to households may likely enable them to bag solid waste in polythene and dispose them of in gutters. During rainy seasons, gutters are used by most households to dispose of solid waste which may likely wash into water bodies leading to harmful health implications.

When refuse bins are not provided in public places like markets, schools, lorry parks and stations, clinics and hospitals, individuals are likely to litter the ground with waste especially with 'pure water' sachets. This is because from observation, many people in Ghana do not carry water bottles with them when moving from one place to the other and the tendency to be thirsty is high calling for the purchasing of water sold in 'pure water' sachets. It is very common to see people throwing these sachet bags in public places after drinking water from them because of the inadequate provision of bins.

Households are also not consulted by the municipal assembly and waste contractors before increasing service fees. This situation creates tension between the households and the service providers leading to the refusal of some households to pay for services rendered. Consultation with actors within solid waste management is very essential for participation in order to have a successful cooperation of all actors for effective solid waste management.

Illegal disposal of solid waste has a health implication for other households who may not even be disposing their waste illegally. This is the situation for households in this municipality where garbage is thrown into gutters and drains leading to floods during rainy season. The effect of solid waste burning in households also pollutes other neighbours living in the same neighbourhood.

CHAPTER SEVEN

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

7.1 Introduction

The management of solid waste is a very important public service that if not properly carried out will have impacts on the health of many people in the community. Solid waste management has been one of the problems confronting many municipalities in Ghana including the Ledzokuku Krowor Municipal Assembly. In view of the solid waste menace in this Municipality, this study was carried out to examine solid waste management practices here.

To be able to examine the solid waste management practices, the various actors who played various roles in solid waste management were identified. The strategy for solid waste management within the Municipal Assembly was also spelt out and how these strategies operate. Attempt was also made to shed light on the outcome of solid waste strategy as well as the challenges that solid waste management was facing in this municipality.

To be able to achieve the stated goals, both quantitative and qualitative methods were used. This was useful in ensuring that many respondents in the household category who are recipients of solid waste services participated in the study for representativeness with the use of survey questionnaires and to also afford the opportunity for key and primary informants to be able to fully express themselves using interviews. In effect, questionnaires were used to solicit responses from the household actors with a response rate of 82% while interviews were used for the rest of the informants with a response rate of 78%. There was also the use of observation to provide corroboration to information given by the various actors in the study.

This chapter gives a brief summary of the major findings of the study with regards to the focus areas of the study. It also discusses recommendations in improving solid waste management as well as the conclusion.

7.2 SUMMARY OF FINDINGS

This section briefly summarizes the findings of the study with regards to the focus area of the study. The findings are presented according to the research questions they seek to answer.

7.2.1 Who are the actors in SWM and what are their roles in solid waste management in the Ledzokuku Krowor Municipal Assembly?

In the management of solid waste in LEKMA, there are several actors who play various roles. The most important actors identified were the Municipal Assembly, the Waste Contractors and Households.

The Municipal Assembly play a key role in solid waste management and are mandated by law to design and implement strategies for dealing with solid waste to avoid negative health implications. They design solid waste management strategy and engage waste contractors to provide solid waste services to households and residents in the municipality. They ensure that all residents are adhering to sanitation laws by monitoring residents and waste contractors. They apply sanctions to defaulting waste contractors and residents engaging in illegal disposal of solid waste.

Waste contractors are registered private waste collecting enterprises contracted by the Municipal Assembly to provide solid waste services to households in the municipality. They are assigned to various locations by the Municipal Assembly to provide their services by collecting solid waste from households and the municipality to a final disposal site at Kpone Landfill site. Their services include that in the house-to-house and the communal container.

The households are the largest recipients of solid waste services and they generate majority of the Municipal solid waste that is collected. They make decisions as to how to dispose of solid waste based on options available to them. Some of them engage in recycling by re-using waste materials while others sell to scavengers in order to make some money. Some households are also responsible for engaging in illegal disposal of solid waste. Other actors who play important roles but are not recognised by the Municipal Assembly as important include the Environmental Protection Agency (EPA), Scavengers and kaya borla.

The E.P.A is an agency of the central government empowered to enforce, monitor and control environmental standards and regulations. They also provide advisory roles to all Districts,

Municipal and Metropolitan Assemblies including the Ledzokuku Krowor Municipal Assembly. They collaborate with all these bodies in solid waste management.

Scavengers are other actors who engage in the extracting of recyclable materials from households and from various communal container sites across the municipality. Their activities help in reducing the amount of solid waste generated. They make a living out of this activity and help in household separation of solid waste materials.

The last group of actors identified during the research are the 'kaya borla'. These are hidden group of actors who operate from house to house collecting solid waste for a fee using tricycles. They are able to operate in areas that are not easily accessed by trucks. They are not registered and their activities are deemed to be illegal.

Even though the Key actor in solid waste management (Municipal Assembly) recognises only three actors, there were other actors such as E.P.A, Scavengers and the Kaya borla who equally play various roles in the management of solid waste in the municipality.

7.2.2 What are the strategies for managing solid waste in this Municipality?

The Municipal Assembly which is the key actor recognises that there is a problem of solid waste management and they design the strategy to overcome the problem. They engage the services of five waste contractors in a Public Private Partnership as a strategy to collect solid waste in the Municipality.

In this strategy, two mechanisms are in place. These are the house-to-house and the communal container service. House-to-House is mostly found in medium-high income neighbourhoods where waste contractors collect solid waste from households for a fee of GH35 (US$9.5) a month. Communal container service is provided in low income neighbourhood where residents send their waste to the sites for disposal upon paying the required fee. These strategies are put in place to ensure that solid waste generated from households are collected and properly disposed to prevent any health hazard.

The findings reveal that many residents find the communal sites unattractive due to the unhygienic nature of the place with solid waste left several days uncollected. In the house-to-house neighbourhood, most striking is the fact that majority of respondents have no problem affording to pay for solid waste services but are generally not satisfied with solid waste

services due to service irregularity leading to health risks as a result of the non-removal of solid waste on time. In view of these problematic situations, some household actors also have in place some strategies which include engaging the services of scavengers to reduce the amount of waste generated as well as patronising the services of kaya borla to dispose of their waste. Others also resort to illegal means of disposing solid waste, an activity which is most common in low income neighbourhoods.

It was also discovered that waste contractors were breaching contractual agreement with households regarding regularity of service and payment plans.

This reveals how the various key actors have responded differently to the strategy to manage solid waste even in the midst of barriers that restricts their actions. This indicates that one set of circumstance might be responded to in different ways due to the diversity of actions by actors (Long, 2001).

7.2.3 What is the outcome of the strategy to manage solid waste?

The strategies to deal with solid waste problems were put in place to enable households properly dispose of solid waste in order that filth is gotten rid of in the municipality. This was to also curb illegal dumping to avoid health implications.

The findings reveal that this strategy has enabled solid waste services to be provided to some households at their doorsteps. A total of 257 metric tons representing 60% out of the 333.5 metric tons of solid waste generated daily is collected.

Non-collection of solid waste on time at the communal container sites coupled with the unhygienic nature of these sites and the long distances residents travel to dispose of their waste encourages illegal dumping which is a source of environmental degradation and public health hazard. Also the irregular service provision in the medium-high income neighbourhoods encourages illegal dumping.

There are still uncollected wastes that lie in many public places for days, waste thrown in gutters and bushes that have serious environmental and health implications. Many households engage in waste burning and burying.

So even with the introduction of this strategy many solid waste problems which this strategy was supposed to cure still exist.

7.2.4 What are the challenges to solid waste management?

The outcome of strategies to manage solid waste was linked to the various challenges faced by the main actors in solid waste management in this municipality.

The Municipal Assembly is faced with financial challenges in running its day-to-day affairs and are not able to meet solid waste budget including paying for solid waste services at the communal container sites which sometimes leads to a halt in solid waste collection by waste contractors. This situation prevents the Assembly from performing its watchdog role of monitoring to prevent illegal dumping. Coupled with this is the non-availability of a final disposal site for solid waste in the municipality leading to irregular lifting of solid waste materials from the central container sites as well as in the house-to-house locations.

Waste contractors also are faced with the situation of traveling long distances of 24 km to the only landfill site at Kpone to dispose of solid waste collected from the municipality. In view of the travel time and the time spent at the landfill site, they are unable to provide solid waste services on a regular basis leading to illegal disposal of solid waste.

They are also faced with financial constraints and this limits their ability to offer free refuse bins to all households in their operation areas. Coupled with this is the zooning problems encountered with other waste contractors operating illegally in other jurisdictions as well as the illegal operations of kaya borla. This takes away some of their customers which affects their operations. Waste contractors are also not consulted in the fixing of prices for solid waste services in the house-to-house neighbourhoods.

Actors in the households are also faced with their inability to have choices open to them for solid waste services. Whereas some are willing to patronise house-to-house services, they find themselves in low income neighbourhoods where the service is not available. Households are also not consulted in fixing solid waste prices and are not part of the decision making process in solid waste management in the municipality. Also unavailability of refuse bins to store solid waste means many households store waste in polythene bags which is sometimes disposed of illegally leading to health risks.

7.3 Limitations of the study

This section gives a brief overview of the weakness of the study in terms of its conception and approach and gives an avenue for further research.

- The study focused on household production of solid waste with the view that in many urban settings in Ghana, the main component of municipal solid waste is from residential. Focus could have been placed on solid waste generation from institutions as well as from industries.
- Not all respondents were willing to participate in the study. This might have affected some of the information in that their inclusion might have reveal some vital information such as the extent of illegal dumping to aid the research.
- Punishment for illegal dumping might have affected respondents giving honest answers while others might have given distorted answers to put themselves in a better light. This might have affected the truthfulness and accuracy of information on illegal disposal of solid waste.
- Although survey questionnaires helped in reaching many respondents within a short time, in-depth interviews could have helped households tell their own stories and the reasons behind their stories.
- The kaya borla group of actors were a hidden group who were only discovered during the study and are the shy group who do not want to disclose any information about their activities for fear of arrest and were not interviewed.
- Stronger focus could have been placed on the effect of illegal dumping on the health of residents in the municipality. This gives room for further research.
- The result of this study cannot be said to be representative in all the cities in Ghana. However, many of the findings have been established in related studies in Ghana which gives a clue of similarities in solid waste management.

7.4 Recommendation and conclusion

Based on the findings of this study, the following recommendations are made for consideration in future policies and practices to help improve solid waste management in the Ledzokuku Krowor Municipal Assembly and the country of Ghana as a whole.

Improper waste disposal is a health threat and as a matter of urgency, government should consider waste management as a topmost priority and all attempts should be made to provide funds for the construction of engineered landfill site. The provision of these landfill sites should be done in consultation with the community to educate them on the need for the engineered sites as well as possible risks. The provision of such engineered landfill sites will greatly help improve solid waste management as this will lead to improved frequency and regularity of service which will help reduce the level of illegal dumping.

There should be improved monitoring and enforcement of sanitation bye laws to curb the state of illegal disposal of solid waste. Preventive mechanisms such as increasing fines on possible offenders can help control the spate of illegal dumping. Illegal disposal of solid waste at the communal sites go on because there are no control systems in place allowing residents access to it at any time. Reducing these leakages through strict control to access can be beneficial. In view of this, it can be prudent to leave the management of communal sites to waste contractors to operate for it to become profitable. This will enable the Assembly spend less on these sites and use the money on improving monitoring and providing litter bins in all public places. A private waste company operating for profits can help reduce all loses but the caution for them is not to increase prices beyond the limits of residents since this can also have a dire repercussion on waste management.

Public awareness is important in improving solid waste management and may help change attitudes. This could be done through the mass media with assistance from journalists. Religious leaders can also play vital part in promoting cleanliness campaigns through their sermons in church and the mosque.

There could also be competitions to award the cleanness neighbourhood every month. This can steer up residents and households to take the issue of sanitation seriously and become watchdogs to prevent illegal dumping in their neighbourhood. This should be done in tandem with regular collection of solid waste materials from households and at the communal container sites.

Involvement of key actors such as households and waste contractors in solid waste decision making is key to improving solid waste management. This helps in building trust and cooperation with the Local Government actors and once key actors feel involved in the decision making process they help carry out such decisions and protect the interest of the community. Solid waste management requires the active co-operation and participation of the

large majority of residents. Consultation with all key actors should be part of the planning process in solid waste management.

The problems of solid waste in the municipality is a joint creation of the key actors themselves and goes a long way to sum up the assumptions in actor-oriented approach that the differential patterns that arise are the joint creation of the actors themselves (Long 2001) and the solution also lies in the cooperation between all the key actors in decision making towards a lasting solution in view of the fact that conflicts and dilemmas between actors and the power relations also play affect solid waste management.

7.5 AVENUE FOR FURTHER STUDIES

This study has been instrumental in exploring solid waste management and makes room for further studies. The following could be explored by researchers in the field.

- Research on the social interactions between actors in solid waste that encourages or prevents illegal disposal of waste.
- The activities of the ‘kaya borla’ group of new actors in solid waste management. The dilemmas, the conflicts, and interactions between legal entities such as private waste collecting companies and illegal group of actors providing solid waste services and the impact on solid waste management.
- The spate of illegal disposal of solid waste, the deep rooted causes, and the impact on human health and livelihoods of residents.

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APPENDICES

Appendix I

This research is designed to assess solid waste management in the Ledzokuku Krowor Municipal Assembly. It is for academic purposes only and your response will be highly treated with confidentiality. Participation in this survey is purely voluntary.

Survey Questionnaires for households in the Municipality.

Section A. Background Information

1. Sex
    - Female
    - Male
2. Educational Level
    - No education
    - Junior High School
    - Senior High School
    - Tertiary
    - Others
3. Occupation
   ……

4. Number of household ……..

Section B. Responses to Solid Waste strategies by households

1. How do you store solid waste for disposal?
    - In a refuse bin provided by the Municipal Assembly
    - In a refuse bin provided by the household
    - Others
2. How do you dispose of solid waste?
    - House-to-House collection
    - It is sent to the communal container site
    - Others……
3. Do you patronise the services of any waste collecting company?
    - Yes
    - No

If you answered 'Yes', proceed to the next section (C). If you answered 'No', proceed to section D

Section C. Solid waste services by private waste contractors

4. How often does the waste company collect solid waste from your household?

- Once a week
- Once a month
- Once every two weeks
- Others……

5. What is the fee system of the solid waste collecting company?
    - Pay per bin
    - Pay every month
    - Pay per weight
    - Pay per week
6. How do you consider the fee charged for the disposal of solid waste?
    - Very high
    - High
    - Moderate
    - Low
    - Very low
7. Please rate your level of satisfaction with services of your waste collecting company?
    - Very satisfied
    - Satisfied
    - Dissatisfied
    - Very dissatisfied
8. Please give reasons for your choice of answer in question 7 above?

……

9. Do you enjoy regular service from the waste company?
    - Always
    - Yes, most of the time
    - Not often
    - Others…….
10. If you answered ‘Not often’, does it pose any danger to your household?

- Yes
- No

11. Please specify the kind of danger it poses to your household, if you answered ‘yes’ to question 10 above.

……..

Section D. Recycling of Waste materials

12. Do you store some of the solid waste to re-use later?
    - Always
    - Not always
    - Not at all
    - Others……..

13. If you store solid waste to re-use, please state what you use it for.

…….

14. Do you sometimes store solid waste for sale to scavengers?
    - Always
    - Not always
    - Not at all
    - Others

Section E

15. What are the three most important challenges to waste management of concern to your household? Please state.

…….

Appendix II

Interview Guide for Waste management Department of LEKMA

Section A. Actors in Solid waste management

1. Who are the actors in solid waste management in this Municipality and what are their roles?
2. What is the responsibility of the Municipal assembly in solid waste management?

Section B. Strategies for managing solid waste

3. What is the strategy for solid waste management in this municipality?

4. Do you have any contractual agreement with any waste collecting company?

5. What are the responsibilities of these companies in solid waste management in this area?

6. What is the amount of waste generated and collected daily in this area? What is the composition of solid waste generated?

Section C. Outcome of the strategy

7. In all, would you say your strategy for managing solid waste has been successful?

8. How has these strategies impacted on the municipality as a whole? Has it reduce filth in the municipality? Has it created more environmental problems?

Section D. Challenges to the strategy

9. What have been the challenges to this strategy?

10. What do you think are the inefficiencies within the solid waste management strategy for the assembly? Can we link the current outcome of strategies for managing solid waste to the challenges?

11. What is the way forward?

Appendix III

Interview Guide to Waste Contractors

1. In the management of solid waste in this Municipal Assembly, who do you consider as actors in solid waste management? What can you say about the roles of these actors you specified?
2. What is the strategy for collecting solid waste in this Municipality? What are your roles in this strategy?
3. Talking about capacity, do you think you have the capacity to deal with the amount of solid waste generated within your area of jurisdiction?
4. In the households, what types of waste are acceptable for disposal?
5. How do you dispose of the solid waste you collect from the various locations within the Municipality?
6. Are you able to collect solid waste in all the vicinities assigned to you on a regular basis? What are some of the reasons for the irregular collection of solid waste in the neighbourhoods assigned to you? Out of the amount of solid waste generated daily, how much are you able to collect?
7. Can you say that the partnership between your company and the Municipal Assembly has been successful in effectively managing solid waste here?
8. What are some of the challenges you face that prevents you from effectively delivering solid waste services in this municipality?
9. Can you say the outcome of solid waste management strategies are a result of these challenges? Can you explain why?

Appendix IV

Interview Guide for Supervisors at the communal container sites

1. Can you please identify the types of waste materials brought here? What are some of the waste not allowed here?
2. Do you collect fees? How are the fees charged?
3. Is the container large enough to serve this vicinity? How often does the container get filled?
4. Can you explain the mechanism for disposing solid waste collected here?

   How regular is the container emptied? What account for the irregularity in empting the container?
5. When the container is full and it's not emptied, where do the people who patronise this service dispose their solid waste materials?
6. What are some of the challenges you face here when collecting solid waste?
7. What can you say generally about the health implication under these conditions to you and this community?
8. So far what are your impressions about solid waste management in this area?
9. Is the strategy adopted by the municipality in managing solid waste reducing filth? What about the health implications?
10. What in your view should be the right approach in solid waste management here?

Appendix V

Interview guide for scavengers

1. What are some of the materials you look out for? Where do you normally gather all these materials you are talking about?
2. These are solid waste materials from different homes, so how useful are they to you? Do you pay for them or you collect them for free?
3. Do you make a living out of this? How does it affect your life?
4. What happens to these materials after collection by you?
5. Do you dispose some of the solid waste materials you collect? Where do you dispose them? Why do you dispose them off?
6. What can you say about the effects of the solid waste materials you collect on your health? Can you share some personal experience here?
7. What are some of the challenges you face in collecting these materials from the various locations you visit?

Appendix VI

Interview Guide for the Environmental Protection Agency (E.P.A)

1. What can you say about solid waste management in this Municipality?
2. Generally, what is the role of EPA in solid waste management here?
3. Do you see solid waste management here as a problem? What do you think are the possible causes?
4. What are your views on how solid waste is collected and disposed? What are the environmental impacts of such practices on the municipality as a whole?
5. Are there legal requirements to put these practices in check? What has been your role in ensuring that these practices are sustainable?
6. What do you think should be the best strategy for managing solid waste in this Municipality?
7. Any plans for the future regarding solid waste management here?

Appendix VII

Basic Requirement a waste contractor must meet before admission to the Assembly to offer solid waste services

1.Registered Company Certificate
2.Evidence of SSNIT Registration of Staff
3.Evidence of Internal Revenue Service Certificate
4.Insurance Certificates of Equipment
5.Three (3) Compactors
6.Two (2) Multi Lift Trucks
7.Ten (10) Central Containers
8.Adequate supply of 240 Litre Bins to clients
9.One (1) 'Borla' Taxi
10.Protective Clothing
11.Hand Tools (comprising wheel barrows, rakes, & brooms)
12.Office Location & Contact Address

Source: A document from LEKMA provided during interview, Fieldwork, July2014

Appendix VIII

Informants for the study with a response rate of 78%.

Category of informant	Sample	Participated	Replacement
Municipal Assembly	1	1	0
Waste contractors	4	4	0
Communal supervisors	4	4	0
E.P.A	1	1	0
Scavengers	4	1	3
Total	14	11	3

Source: Author, Fieldwork July, 2014

Appendix IX

This section presents tables showing responses from household survey.

1. Storing of solid waste for reuse by households

Responses	Percent (N)
Always	3.7 (3)
Not always	52.4 (43)
Not at all	43.9 (36)
Total	100 (82)

Source: Author, Field Work July 2014

N=Number of Respondents

2 . Selling solid waste to scavenges.

Responses	Percent (N)
Always	2.4 (2)
Not always	45.1 (37)
Not at all	52.4 (43)
Total	100 (82)

Source: Author, Field Work July 2014

3. How often the company collect solid waste from household

Responses	Percent (N)
Once a week	47.5 (19)
Once a month	25 (10)
Once every two weeks	27.5 (11)
Total	100 (40)

Source: Author, Field Work July 2014

4. Responses regarding Fee system with private waste collectors

Responses	Percent (N)
Pay per Bin	10 (4)
Pay once a month	75 (30)
Pay per weight	7.5(3)
Pay per week	7.5 (3)
Total	100 (40)

Source: Author, Field Work July 2014

5. Thoughts of households on fees charged by waste collectors.

Responses	Percent (N)
High	20 (8)
Moderate	77.5 (31)
Low	2.5 (1)
Total	100 (40)

Source: Author, Field Work July 2014

6. Correlation between level of education and choice of disposal

Correlations

		Level of Education	Choice of disposal for household
Level of Education	Pearson Correlation	1	.435**
	Sig. (2-tailed)		.000
	N	82	82
Choice of disposal for household	Pearson Correlation	.435**	1
	Sig. (2-tailed)	.000	
	N	82	82

**. Correlation is significant at the 0.01 level (2-tailed).

7. Correlation between level of satisfaction and regularity of service

Correlations

		Regularity of service from waste company	Level of satisfaction with SW service
Regularity of service from waste company	Pearson Correlation	1	.758**
	Sig. (2-tailed)		.000
	N	40	40
Level of satisfaction with SW service	Pearson Correlation	.758**	1
	Sig. (2-tailed)	.000	
	N	40	40

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix X

Characteristics of Key Informants

Organisation	Position	Sex
Waste Management Department, LEKMA	Head	Female
Zoomlion Company Ltd	Operations Manager	Male
Asadu Royal	Field Supervisor	Male
Daben Cleansing	Public Relations Officer	Female
Rural Waste	Supervisor	Male
LEKMA CC site	Supervisor	Female
LEKMA CC site	Supervisor	Male
LEKMA CC site	Supervisor	Male
LEKMA CC site	Supervisor	Male

Source: Author, Field Work July 2014

Appendix XI

Informed Consent

My name is Raymond Acquah, a student of the Norwegian University of Science and Technology, Norway. I am a Master of Philosophy (MPhil) in Development Studies student.

I am undertaking a research which is aimed at assessing solid waste management in the Ledzokuku Krowor Municipal Assembly.

This study seek to identify the relevant actors in solid waste management in this municipality and also sought to understand the strategy used in managing solid waste.

It further seeks to understand the outcomes of strategies used in collecting and managing solid waste from the municipality. And to also assess the challenges faced by actors in managing solid waste.

The study will use survey questionnaires, interviews, and observation in collecting data. Data and information gathered with regards to this study is purely for academic purposes and will be treated with confidentiality. All identities of participants will be hidden.

I hereby seek your consent in participating in this study. As one of the respondents, your contribution will be very significant in drawing conclusions for the study. Participation is however voluntary and you can withdraw at any time you wish and can as well avoid answering any question you feel uncomfortable with.

Any clarification or question concerning this study can be addressed to racquah@hotmail.com or call me on +233264037895.

…… ……..

Raymond Acquah Date

Appendix XII

Waste thrown in the bush in the municipality

Indiscriminate disposal of solid waste at the communal container sites

Disposal of solid waste in drains

APPENDIX XIII

NTNU
Norwegian University of Science and Technology

Faculty of Social Science and Technology Management
Department of Geography

To whom it may concern

Our consultant: Anette Knutsen
Telephone no.: + 47 7359 79 48
E-mail: anette.knutsen@svt.ntnu.no

Dated: 16th May 2014 Our ref.: Your letter dated: Your ref.:

Letter of introduction

We hereby confirm that Raymond Acquah is a student on the programme *Master of Philosophy in Development Studies, specialising in Geography* at the Department of Geography, Norwegian University of Science and Technology.

He will undertake his fieldwork and data collection during June to August of 2014 in Accra, Ghana, on the topic:

"Towards Zero Waste: Assessing Solid Waste Management Practices in the Ledzokuku Krowor Muncipal Assembly of the Greater-Accra Region of Ghana."

We would be grateful for any assistance given to him during this process. This includes granting interviews, assisting him in making appointments, handing out materials and making information accessible to him.

Yours sincerely,

R. Lund

Ragnhild Lund
Academic leader/Professor

Anette Knutsen

Anette Knutsen
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