

**DECENTRALIZATION AND SOLID WASTE MANAGEMENT- A  
COMPARATIVE STUDY OF BEREKUM AND DORMAA MUNICIPALITIES**

**By**

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## DECLARATION

I hereby declare that this thesis is my own work towards the MSc. and that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree by the university or any other university, except where due acknowledgment has been made in the context.

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## ABSTRACT

Waste management remains a major challenge for any society, since all natural processes generate waste. However; it often competes with more pressing economic and social issues such as fiscal and trade matters, unemployment and poverty, education and health, and crime and security. Even within the domain of environmental sustainability, the management of waste has had to play second fiddle to fundamental challenges such as land and coastal degradation, biodiversity loss, and climate change. This has resulted in a total failure on the part of government to provide effective Solid Waste Management (SWM) for the people. The government of Ghana in trying to solve the menace of waste has decentralized waste management to promote accountability, as well as to introduce competition and cost consciousness into the public sector and develop a new role for the state in enabling and regulating. The thesis is a comparative study on the decentralized solid waste management in Berekum and Dormaa Municipalities. Specifically, the study analysed the evolving involvement of the private sector in SWM, the service quality of the companies in the two municipalities and the influence of private sector capacity and local government regulations on private sector. In order to establish the magnitude and causes of performance problems and possible policy interventions to these problems, the following questions were addressed in this study: Has decentralized SWM evolved to ensure sustainable service delivery? What is the service quality of decentralized SWM systems? What factors explain the differences in service quality of the decentralized

SWM? A survey of 312 households was conducted in the 2 municipalities. Households' perceptions about the existing service quality were rated on a scale from one to five and scores calculated. Household data were analysed to determine the extent of involvement of the residents and quality of service and residents' satisfaction. The implications of the study for performance improvement, regulatory policy, and sustainable service delivery have been explored. The conclusions drawn from the study were that there was a significant difference in service quality within the municipalities and not between the municipalities. There were no mechanisms for full cost recovery to include majority of the residents who patronize communal collection service, there were weak regulatory practices and non-adherence to contractual obligations. In the light of these problems enumerated above, the research study recommended the adherence to formal rules, use of appropriate cost recovery mechanism for low income group, and restructuring of institutional arrangements to ensure bottom-up approach to user involvement, enforcement of legislation and capacity building.

## **DEDICATION**

I dedicate this thesis to my wife Helena and our lovely children, Bridget Kyere Peprah Julia Nshira Kyere Peprah and Zenith Effah Kyere Peprah to inspire them to greater heights with the help of the Almighty God.

# KNUST



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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the study**

The past two and half decades have seen a tremendous shift in government policies toward decentralization among the developing countries, typically as a component of a comprehensive process of political, economic and technical reform (Litvack et al., 1998). This course of action has been inspired by new efforts of democratization and process of 'modernization' of the state. These initiatives by the state combined to foster accountability, introduce cost consciousness and competition into the public sector and develop a new role for the state in enabling and regulating rather than taking the place of the private sector activities (Bosset & Beauvais, 2002).

The role of decentralization for improving Solid Waste Management (SWM) is highly relevant to the African context. SWM has become an important part of the urban environment and planning of the urban infrastructure to safeguard a safe and healthy human environment while considering the promotion of viable economic growth has become an inevitable variable. Continuous urbanization of the developing countries at a very high rate has created serious problems of waste disposal as a result of uncontrolled and unmonitored urbanization (ISWA & UNEP, 2002).

The problem of waste continues to increase at the global, regional and local levels. A World Bank study (2012) reported that, there will be 70% upsurge in urban solid waste globally with a projected rise in the amount of waste, from 1.3 billion tonnes to 2.2 billion tonnes per year from 2012 to 2025, which will lead to a rise in the annual global costs of global waste from \$205 billion to \$375 billion within the same 13years span with developing countries facing the greatest challenges. In Africa, the poor state of solid waste management in urban areas is not only an environmental problem but also a major social handicap, it is expected in Kenya that the amount of solid waste generated will increase from 2,000 tonnes per day to 10,171 tonnes per day by 2025 (Hoornweg & Bhada-Tata, 2012). The problem is further aggravated by the lack of financial as well human resources trained in SWM practices in the sphere of collection, transportation, processing and final disposal. Whereas aspects like recycle, reuse and recovery of the solid waste is disorganized in most cases. In this scenario, the responsible persons or agencies concerned with the public health and environment protection face the crisis of ineffective SWM.

Due to rapid urbanization, Ghana's major agglomerations have been growing quickly but have lacked a concurrent expansion in SWM. In view of this Ghana has attempted to decentralize his SWM service delivery. These policies have often become embroiled in party politics, with less emphasis on efficient SWM delivery. In isolated cases where services have been decentralized, there has been inadequate policy direction and limited resource transfers to the lower levels of governance. Consequently, effective decentralized solid waste management has not been forthcoming.

Given that there is inadequate policy on decentralisation of solid waste management and the attendant consequences highlighted above, the study seeks to ascertain the various parameters that govern effective decentralized Solid waste management. The subsequent sections under this chapter described the research problem, and objectives. The remaining chapters describes the justification and the organization of the study.

## **1.2 Problem Statement**

The Solid Waste Subsector has been bedevilled with ineffectiveness. For the past two decades, a number of reform programmes, principally decentralization has been designed to ensure efficiency and better service delivery. Despite the above, there still exist challenges such as asymmetrical waste collection, waste overflow from bins, inadequate storage containers, and disposal of waste in unauthorized space are common in the Berekum and Dormaa municipalities. These challenges in due course lead to public health hazards, aesthetic nuisance, and environmental pollution. Because of the above challenges the uncollected solid waste by the public sector or its agent is very so often dispose of into drains, rivers and surrounding areas, or it is locally burnt or buried. These routine practices lead to considerable unpleasantness which eventually poses serious health risk to the population. These problems worsen, in the long run, not only the quality of life of the poorer communities but also the welfare of the population at large. The public health implications have been fazing, accounting for about 4.9% of GDP (MLGRD, 2010). Data from the Ghana Health Service indicate that six (6) out of the top ten (10) diseases in Ghana are linked to poor environmental sanitation, with malaria, diarrhoea and typhoid fever jointly constituting 70%-85% of out-patient cases at health facilities (MLGRD, 2010). Berekum and Dormaa Municipalities are no exception they are united by such undesirable environmental problem.

These causes for these waste challenges are not far-fetched. The first among them is rapid urbanization. Berekum and Dormaa Municipalities are urbanizing and as they do the



problem of waste management is also escalating. The unregulated urban growth and development in these areas has led to a situation where solid waste management infrastructure lags behind the growth in population. The uncontrolled and unplanned urbanization poses great problems to sanitation and solid waste management for the assemblies to deal with. The high level of urbanization implies high quantities of solid waste generated. Local authorities in Berekum and Dormaa have difficulties in keeping pace with solid waste facilities development and in meeting the growing demand for solid waste services due to financial constraints.

In addition, preliminary studies reveal that there is low cost recovery for solid waste service coupled with limited funds from central government. The low cost recovery is also attributed to lack of involvement of households in the decision making process for payment of SWM services. In view of this there are poor access roads and streets in some portions of the municipalities which make it difficult to collect waste in such neighborhoods. The needed solid waste infrastructure and equipment are inadequate due to limited funds or budgetary allocations from central government to the local government. Moreover, the political will and priority related to solid waste service and social prestige of waste workers are still very low, although these Municipalities increasingly acknowledge solid waste problems as immediate and serious. The lack of priority, political will, and public sector commitment limit rapid and sustainable improvements in the SWM sector in Berekum and Dormaa.

Furthermore, the weak enforcement of by-laws for solid waste management also contribute to the lax attitude of the people towards indiscriminate disposal of waste at unauthorized places, waste littering, and free riding. The enforcement of regulation by government officials appears to be weak and this may be due to lack of capacity, lack of resources, political will, and problems with the institutional setup. Finally, the lack of adequate infrastructure, coupled with low human resource capacity for solid waste collection, in these municipalities contribute in no small way the problems confronting these municipalities. The capacity of the public and private sector may not be adequate for SWM. Effective SWM require system analysis and optimization of operations. The inability to do this usually leads to inefficient use of time and resources, and which eventually leads low productivity and poor service quality (Zurbrugg, 1999; CointreauLevine and Coad, 2000).

### **1.3 Research questions**

To ascertain the magnitude and causes of the inefficiencies in SWM and provide possible interventions to these problems the following questions were addressed in this study:

- i. Has decentralized SWM evolved to ensure sustainable service delivery?
- ii. What is the service quality of decentralized SWM systems? iii. What factors explain the level of performance?

### **1.4 Objectives**

The general objective of the study was to examine the decentralization process of Ghana and its effects on SWM in the medium size towns of Berekum and Dormaa Brong Ahafo Region. The specific objectives were to;

- i. Examine the evolving practices of decentralized solid waste collection for sustainable service delivery;
- ii. Analyse the service quality of decentralized urban SWM institutions; and
- iii. Examine the factors which explain the differences in service quality of the decentralized SWM of the two municipalities. iv. Give policy recommendations to address the inefficiency and quality issues of the solid waste management within the municipalities.

### **1.5 Scope of study**

The study would be carried out in the Berekum and the Dormaa municipalities. The solid waste management system of the two municipalities would be studied. The location, size, and population characteristics, would be discussed. The socio-economic characteristics of the study area would be based on primary and secondary sources of data that the researcher will gather during the study. More importantly, the study is focused on the evolving involvement of the private sector, household and the enabling role of the local governments in providing quality waste service.

### **1.6 Justification of the study**

Ghana is witnessing a rapid increase in urban population with about 51% of its total population residing in urban areas (Ghana Statistical Service, 2012). This represents a 30.4 percent increase over the 2000 figures, implying that the country is gradually becoming urbanized. It is estimated that by 2015, nearly 60 % of Ghanaians will be living in urban areas or settlements with more

than 5,000 populations (Farveque-Vitkovic et al., 2008). A direct implication is that, there will be a major shift in the distribution of the population as well as the expansion of the urban boundaries. In addition to population growth, Ghana has also experienced impressive economic transformation over the last two decades, in terms of economic growth and poverty reduction, with average growth rates of 4.7% annually (Kolavalli, et al., 2011). As Ghana develops, its cities will experience change and will be transformed in terms of layout and human activities with implications on SWM. The rapid economic growth has improved the standards of living of the urban dwellers thus enabling them to change their pattern of consumption of goods. This has been creating a higher per capita waste generation rendering the existing SWM system ineffective and hence has put on the risk of massive failure.

Despite the seriousness of the problem all over Ghana, studies in SWM are focused on major centers such as Accra, Tema, Kumasi and Takoradi. This study therefore brings to light the SMW in Municipalities of Berekum and Dormaa where very little on SWM has been studied. The study will therefore serve as a reference point for the municipalities and the waste management department, and other agencies as concerns solid waste management. The study tries to relate decentralization and effective SWM and also provide a clear understanding of the nature of the problem and the remedying strategies that can be adapted to solve the problem. Finally the study by way of comparison of the SWM in the selected municipalities would provide a more appropriate framework for SWM planning in municipalities in Ghana.

### **1.7 Limitations**

The first limitation of the study is the sample size involved in the study. Only 312 households and 20 key informants in Berekum and Dormaa municipalities were used for the study, this figure relatively is not large enough to generalize the results for the other administrative district and municipal assemblies in the Region and other regions of Ghana. Favorably, the 2 municipalities selected out of 27 district and municipal Assemblies in the Brong-Ahafo Region share similar environmental characteristics with the other Municipal and District Assemblies and more importantly only one company exclusively provide waste services in all the Municipal and District Assemblies in the Region with exception of Tekyiman. In view of this, these municipalities are seen to be more representative and therefore results from the study can be generalized for the Region.



Moreover, respondent fatigue due to lack of implementation of outcomes of such researches which have been conducted in the past was also expressed. Some officials did not view the importance of this study and as such were not prepared to grant audience.

Finally, funding for this research work was a major challenge which limited the studies to only Berekum and Dormaa Municipal Assemblies. The financial difficulties such as money for communication travel and transportation and printing were other limitations of the study.

### **1.8 Organization of the Study**

The study is organized into five chapters. Chapter one focuses on the introduction which includes background to the study, research problem, the objectives, research questions, justification and organization of the study. This is followed by chapter two which reviewed extensive and related empirical literature on the overview of solids waste management, institutional structure for SWM, Ghana is perspectives on the community involvement in waste management decision process, waste collection, and disposal and cost recovery mechanism in solid waste management. Chapter three explains the methodology used including model specification, data sources and measurement and estimation techniques. Chapter four discusses empirical results. The summary, conclusions, recommendations as well as the limitation of the study and direction for future research are presented in chapter five.

## **CHAPTER TWO DECENTRALIZATION AND SOLID WASTE MANAGEMENT**

### **2.1 Introduction**

The generation of Solid Waste (SW) is inevitable. Inappropriate waste management was the cause of the outbreak of diseases like the plague and cholera. In the 18th century, this killed about 380,000 people in Hamburg (Bilitewski, et al 1994). Since then, management of solid waste has been of great concern to municipal authorities worldwide.

Cities in developing Countries have frequently been unable to keep up with the provision of basic services (World Bank, 2000). About 40% of the solid waste generated in developing Countries goes uncollected, piling up on streets and in drains, contributing to flooding and the spread of disease. In addition, domestic and industrial effluents are often released into waterways with little or no treatment (World Bank, 2000). This call for a change in the way



we manage our waste especially in the lower middle income countries which Ghana is no exception.

## **2.2 Evolution of the Solid Waste Management**

The Concept of SWM is always related to urban history. The human race was typically nomadic at the later part of the Stone Age, mostly term as the Neolithic period (circa 10,000 B.C.). As nomads, their waste decomposed by organic means. However, as people began to congregate in communities, village's towns and cities, the volumes of waste increased due to the increase in population. The ever growing municipalities necessitated the establishment of appropriate waste management systems to effectively handle solid waste. This basically ended the natural cycle of SWM.

Solid waste has been a major challenge for municipal authorities for about six thousand years now (Bilitewski et al 1997 cited in Dorvil 2007). According to Wittmaier, et. al., 2003 nearly 25 million people constituting about 30% of the population in Europe died from untreated waste related diseases from 1347 to 1352. Domestic waste was simply thrown into the streets. Up until 1950, some French cities such as Marseilles continued to evacuate solid waste and faecal sludge through the windows instead of being brought to the pavement every day at dawn (Silguy, 1996; p.20 as cited in Dorvil, 2007).

The First Regulations for effective waste management started in Athens (320 B.C.). Hippocrates a renowned Greek scholar (circa 400 B.C.) and the Arab Avicenna (Ibn Sina, 1,000 A.D.), were the very first individuals to identify contaminated water as the source of the various epidemics that bedevilled Europe. (Tchobanoglous, et al., cited in Bilitewski, et.al., 1994). All the same, the Athenian waste system had numerous limitations; for instance, disposing of large quantity of waste was a major challenge to overcome. Also the SWM in the city was limited to state-sponsored events (Savas, 1977, p. 13 cited in Dorvil, 2007).

The nineteenth century marks the beginning of the modern concepts of solid waste collection and disposal. Various scientists such as Lindle, Robert and Ignaz, 1993 made path breaking strides to elucidating the relationship between SWM and hygiene (Encyclopædia Britannica, 1994-1999 cited in Dorvil, 2007). European city Authorities introduced effective solid waste management with organized street sweeping. In England, the Sanitary Act of 1845, and especially the Public Health Act of 1875, had a radical effect on the general level of

sanitation, notably in working-class urban areas; they included provisions for the creation of —united districts for —specified sanitary purposes.

The search for scientific solutions for SWM became more resolute in the twentieth century, for the fact that, the volumes of waste were escalating and more importantly the components of the waste generated were not only organic, there were greater portions of inorganic material, which needed sophisticated methods of disposal. The steadfastness of the scientist and engineers paid off in 1920 when the first waste grinding machine was invented and later the compactor trucks in the 30s. In order to minimize environmental problems with dumpsites and especially to protect water resources, two Englishmen, Call and Dawed, introduced the concept of sanitary land filling which was first experimented within the city of Bradford in 1930 (Silguy, et.al., 1996). The first incinerator was manufactured in 1876 and 1893 in London and Germany respectively. On top of these, comprehensive management mechanisms were introduced into the waste management sector. Again effective methods were employed to schedule crews for work, vehicles operation planning which includes route planning and operation scheduling for vehicles, and to situate enough disposal facilities at all designated sites. Beside, major technological advances were taking place to salvage and recycle waste (Savas, 1997 p.22 cited in Dorvil, 2007).

### **2.3 Solid Waste Definitions**

There is still no single scientific definition of solid waste. The concept of solid waste (SW) was not used in its current meaning until the twentieth century (Savas, 1977 cited in Dorvil, 2007). The concept of waste is relative in two main respects. Firstly, something becomes waste when it loses its primary function for the user; hence, one person's waste output is often someone else's raw material input. Secondly, the notion of waste is also relative to the technological state of the art and to the location of its generation (Pongrácz, 2002. p. 70). Waste is therefore a very dynamic concept and must be looked at within these two contexts.

Wastes that are solid are termed to as —refuse (Pfeffer, 1992). Waste has been defined differently by many Authors with different meaning. One definition is that waste is —unwanted' by the first user. It is therefore anything that is no longer —unwanted' dependant on the time and the prevailing circumstances. Solid waste today is increasingly defined as —natural resources out of place or as —new materials for technologies not yet found. (Dorvil, 2007) Many governments now regard waste as a useful source of income and as such policies have been geared toward this potential by both the government and the public

sector to harnessing this potential. The recycling subsector, for example, is an essential industry generating revenues and jobs for a larger number of people in the world today.

## 2.4 Solid Waste Management

### 2.4.1 Definition

Waste Watchers (2004) defined solid waste management as everything that must be done to handle all the solid waste produced in a community, including collecting, transporting, processing and disposal of waste. Similar to this, is the one put forward by Tchobanoglous et al., (1993) to them, SWM involves the collection, treatment and disposal of non-hazardous waste.

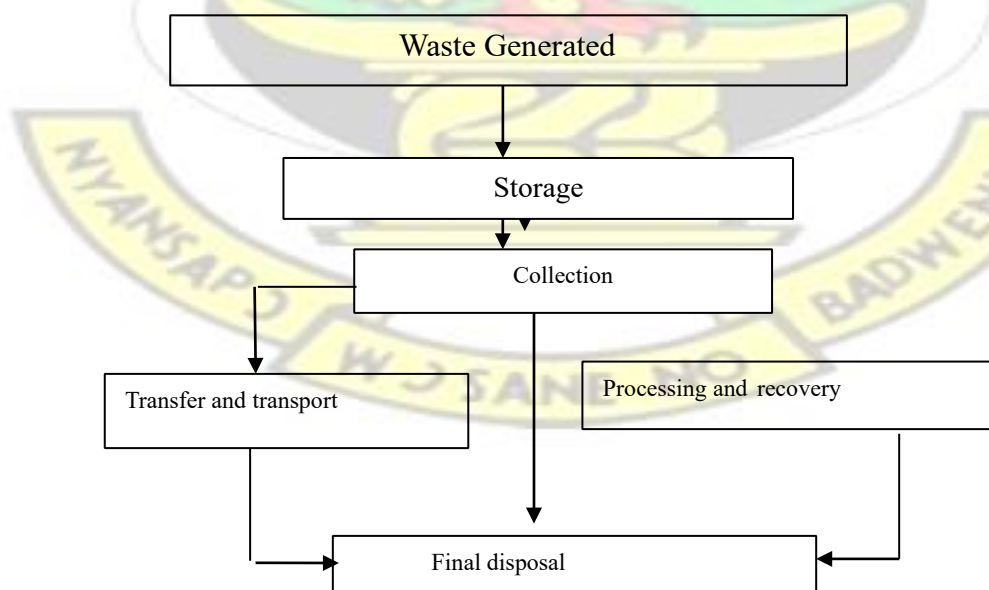
### 2.4.2 Elements of solid waste

Tchobanoglous et al, (1993) further categorized the activities of solid waste management into six elements. These six element are illustrated in figure 2.1

As shown figure 2.1, the key elements in solid waste management include: waste generation, storage, collection, transfer and transport, processing and recovery and final disposal. This implies that when waste is generated it is initially stored in either dustbins or skips. It is then collected and finally disposed of in landfill. Also, when waste is collected it can be transferred from small collection equipment like the tricycle to a bigger truck for final disposal.

Alternatively, waste collected can be processed and recovered for materials to be reused.

These elements are further elaborated below.





## **Figure 2.1: Stages in solid waste management**

(Author's Construct, 2014 based on Tchobanoglous et al., (1993) ideas (zone).

### **2.5 Waste Generation**

Waste generation is the most important aspect to look at in order to have effective SWM system. The generation of waste varies considerably between countries based on the culture, public awareness and management (Hazra and Goel, 2009; Wagner and Arnold, 2008; Magrinho et al., 2006). Waste generation comprise those activities in which materials are identified as no longer of any value by the owners/users and either thrown away or gathered for disposal (Momoh and Oladebeye, 2010 cited by Puopiel, 2010). Generally, developed countries generate more waste than developing countries (Kathiravale and Mohd Yunus, 2008). Countries in Asian and African region produce waste in the range of 0.21-0.37 tons/capita/ year, while European countries generate higher amount of waste with 0.38-0.64 tons/capita/ year (Intergovernmental Panel on Climate Change [IPCC], 2006). The waste generated by a population is a function of consumption patterns and thus of socioeconomic characteristics and the interest in, and willingness to pay for, collection services (Schübeler et al., 1996, p.35).

### **2.6 Solid Waste Disposal**

Disposal is broadly defined to include the collection, storage, treatment or processing, utilization, or final disposal of waste. It involves the process of getting rid of the waste materials that people generate (Mantell, 1972). Information on waste generation is important to determine the most suitable waste disposal options. The main purpose in implementing best practice for solid waste management is to prevent pollution. Pollution is a threat to human and other living organism (Morra et al., 2009; Liu & Morton, 1998). It may also damage the ecosystem and disrupt the natural cycle and climate on earth (Raga et al., 2001).

There are many disposal options available to suit the nature of waste and a country's preference and interest. Economics and environmental aspects of waste disposal option are always the main issue in choosing the right technology (Aye and Widjaya, 2006; Daskalopoulos et al., 1997). Most developed countries, are on their way to eliminate landfilling while some other countries still have problems with open dumping (Fauziah and Agamuthu, 2007; Shekdar, 2009; Bai and Sutanto, 2002). Despite the development of many waste disposal option, landfills remain the most prominent system applied worldwide



(Shekdar, 2009; Hamer, 2003). Although a lot of improvement had been possible in the landfilling system and the regulation on the type of waste that can be treated at landfill is stringent, most of landfills operated remain primitive (Hamer, 2003).

Ayomoh et al., (2008) had listed few problems related to improper landfill operation including, health deterioration, accidents, flood occurrences, pollution of surface and underground waters, unpleasant odor, pest infestation and gas explosion. Although the impacts from landfills are known, impacts from other alternative remain unanswered thus subject to critics (Hamer, 2003). Incineration has been the choice for developed country as they have sufficient financial input and are looking into energy recovery from waste (Papageorgiou et al., 2009; Kleiss & Imura, 2006). Small country such as Singapore adopts incineration as their waste disposal option due to scarcity of land (Bai & Sutant, 2002). Even that, incineration is also associated with some other risks. This includes the generation of carcinogenic and toxic compound. It will also produce end products which need further treatment where it is highly toxic, collectively known as dioxin (Hamer, 2003).

Some reported that the impacts from incineration are overemphasized and the advancing technology had highly reduced the environmental impacts (Hamer, 2003). However, many of the countries prefer waste minimization compared to waste treatment such as landfill or incineration (Bai & Sutanto, 2002; Boyle, 2000). Technology is advancing every day and chemical recycling of plastic wastes has also been made possible in these developed countries (Al-Salem et al., 2009).

Regardless of the technology chosen, each has its advantages and disadvantages. The information on each disposal option needs to be clarified to determine the suitable option for each particular country. Few tools had been used in the environmental evaluation including in determining best waste disposal option. For example, Life Cycle Assessment determined that the most economically feasible option for traditional market waste management in Indonesia is composting at a centralized plant, while biogas production option has the lowest environmental impact (Aye & Widjaya, 2006). Other tools used to determine best waste disposal option includes multiple criteria analysis (MCA) and CostBenefit Analysis (CBA) (Chung and Poon, 1996). SW Plan software particularly to calculate capital and management cost is also available to determine the best integrated technology in waste management (Fauziah & Agamuthu, 2007).

## **2.7 Solid Waste Management System in Ghana**

### **2.7.1 Evolving Practices of Solid Waste Management in Ghana**

Before 1985, incinerators were the technology used for handling waste in the urban centres of Ghana. This could not be sustained due to the lack of funds as a result of economic hardship in early 1980 and technical knowhow. In view of this by 1985 solid waste were dumped on all available locations (Oduro-Kwateng, 2010). Thereafter a special department called the Waste Management Department (WMD) was set up in the urban centres in 1985 to manage the waste in Ghana with financial and technical assistance from the German Agency for Technical Co-operation (GTZ).

The first house-to-house collection started in Accra using Animal drawn carts (donkeys) in the high income residential areas. Waste collected was dumped into central containers. Using only 15 donkeys and 10 staff the carriage could collect 3 to 4 trips daily which covered 75 to 100 houses (Oduro-Kwateng, 2010). The GTZ project helped to improve the deteriorated waste management in Ghana. However their exit saw more deterioration in level of service quality and service coverage due to the fact that the public provision alone could not handle the growing urbanization of the towns and cities. This however calls for further decentralization to include the private initiative in Solid Waste Management.

The waste companies provided house-to-house and communal services. The communal service was mostly provided in the lower middle income areas using central containers. Residents who patronize this kind of service disposed of their waste by taking it to a central containers site. These containers are lifted full of waste and disposed of at designated disposal sites (Oduro-Kwateng, 2010).

Private Sector Initiative (PSI) started in Accra and Tema in the early 1990s and later extended to Kumasi in the mid-1990. Afterwards this initiative was extended to Takoradi and Tamale in 2000 and 2002 respectively. The year 2004 to 2007 saw the inclusion of more private companies in to waste business all over Ghana. The companies in Accra and Tema increased to 18 and 6 respectively by 2006. As a result, contracts were open up for competition. The first competitive bidding for solid wastes took place in Kumasi in 2007 and later in Accra in year 2008 (Oduro- Kwateng, 2010).

## **2.8 Solid Waste generation in Ghana**

All natural process generates waste. This makes waste generation an inevitable factor in human life. To this effect there is the need to build sustainable and effective collection and disposal system. This requires knowledge of the volumes, density and the location of the waste (Oteng-Ababio, 2010). The rapid population growth in Ghana has resulted in increase in waste generated in the country. The amount of solid waste generated per day in Accra was 750-800 tonnes in 1994 (Asomani-Boateng, 2007); 1,800 tons per day in 2004 (Anomanyo, 2004); 2000 tons per day in 2007 this figure increased to 2,200 in 2010 (Oteng-Ababio, 2010)

In Ghana the rich community generates about 3 to 5 times more waste than waste from the poor (Blight and Mbande 1998). The waste density is higher in low income areas (0.50 per kilo liter) due to the greater portion of organic and inert (sand and dust) matter followed by middle income 0.24 kilos per liter and at 0.2 kilo per kilo liter for waste from highincome areas. Boadi and Knitunen (2003) puts the daily estimated waste generation rate at 0.40, 0.68 and 0.62 kilograms per day in low, middle and high income areas respectively.

So far, there has not been any comprehensive research on per capita waste generation in Ghana as a whole. The prevailing figures are crude estimates given by different authorities. The MLGRD, for example, gives the average daily waste generation as 0.51kg per person whilst the Water Research Institute (WRI) puts it at 0.41kg (WRI, 2000). Admittedly, the two points of view have implications for policy. Using these figures and the official as well as unofficial population of Accra for 2000, (i.e. 1.65 and 3 million, respectively), for example, in calculating daily waste generation, different figures are generated (i.e., between 841.5 and 1,530 tonnes based on MLGRD figures, and between 676.5 and 1,230 tonnes using the WRI figures). The variation in figures just a year is too great for any meaningful evaluation and proper planning.

## **2.9 Solid waste disposal in Ghana**

Solid waste disposal is one of the issues of concern in many developing countries. Currently, land filling is the only method used for solid waste disposal in Ghana the majority of landfills in Ghana are open dumps even though these are strongly discouraged in the national sanitation policy. The methods for solid waste disposal in Ghana are: uncontrolled dumping of refuse controlled dumping, sanitary land filling, composting, and incineration (Danso-Mnu, 2011).



Open refuse dumps are most commonly located at the perimeter of major urban centres in open lots, wetland areas, or next to surface water sources. Open dumps are generally sited based on considerations of access to collection vehicles rather than hydrological or public health considerations. In rural areas and small towns, there are often no vehicles for collection hence uncontrolled dumping occurs within the built up areas with all its attendant health hazards and negative environmental impact (Mensah, et al., 2005 cited by Danso-Menu). Problems from landfills in Ghana include odour, insufficient covering material, flies and other vermin infestations and smoke from open fires. The increasing amount of waste received by these landfill make it necessary to find other disposal option since constructing new landfills may be difficult due to the scarcity of land, increase of land price and demand for a better disposal system.

## **2.10 Factors Explaining Companies Performance**

Much literature on companies' efficiency in many parts of the world attributes the improved efficiency in Solid waste management regulation and working flexibility which includes, the degree of political interference, scale of operation, clear performance measures, accountability and the market competitiveness, This study seek to review these factors under two broad heading of internal factors (capacity of the company) and External factors (Regulations).

### **2.10.1 Capacity of the company**

#### **▪ Scale of operation**

The size of a firm is most often conceived of as the scale of operations. The staff strength, waste collection vehicle and the number of people who patronize the service constitute the size of the company. There is an on-going debate on the effect of a company's size on its performance. Truly, size does affect performance but very little scientific evidence shows a positive correlation between performance and size. In most research work the effect of a firm has not been the focus of the studies but rather more often than not used as the control variable. Few people however, have clearly illustrated the relationship size of a firm on performance with convincing evidence. Generally, scholars who assert that, large companies are more flexible and more likely to perform better tend to base their argument on the amount of resources available to the organisation.



A large organization has more complex decision making needs and some decision making responsibilities are likely to be devolved or decentralized. Organizations have growth as one of their goals (Daft 2003). Small organizations can behave informally while larger organizations tend to become more formalized. The owner of a small organization may directly control most things, but large organizations require more complex and indirect control mechanisms.

Large organizations can have more specialized staff, units, and jobs. Hence, a divisional structure is not appropriate for a small organization but may be for a large organization. According to Boyne (2003) the benefits of economics of scale and scope enjoyed by large companies could be compared to the advantages of flexibility enjoyed by the small organisations. To this effect, Jack Welch, Chairman of General Electric, called for a big company/small company hybrid that combines a large corporation's resources and reach with a small company's simplicity and flexibility (Edwinah et al, 2013).

- *Skills and Capability for Operations Management*

The internal capacity such as work force and the equipment holding capacity of an organization affects the organization's efficiency and effectiveness (Lusthaus et al., 2002). more resources lead to better results according to the public service improvement theory. However the resources must be effectively managed in order to deliver optimum benefits to ensure productive efficiency.

To effectively manage the resources, the public choice theorist calls for governments to effectively budget for these resources to ensure allocative efficiency, to properly meet the demand of the people. As good as this preposition may sound; it has been very difficult for governments to plan along this line of action. The reality is that governments' responsibilities have increased as result of the increase in population and high demand for more infrastructures. In view of this, the public budgets have expanded beyond revenue. This makes it difficult if not impossible for governments to meet its core responsibilities. There is therefore the need to engage the private sector to participate in public service provision with their extra resources (fiscal and real) and expertise to offer prudent management solutions to improved public service quality.

Fiscal capacity facilitate the acquisition of other resources, this however enhances service performance quality (Boyne, 2003). The managerial task is very demanding and essential for success. The need to improve quality of service requires special managerial efforts, skills

and capabilities. The private firms with strong financial capacity attract the best talent with higher salaries to get the required positive results (Nachum et al., 1996).

### 2.10.2 Regulation of Service Provision

Regulation is the government activity that is intended to affect directly the behaviours of private sector agents in order to align them with the 'public interest' (Chang, 1997). The private sector performance is greatly influenced by the variations in regulation and reality on the field of work in relation to the capacity of the organization and the good governance at the Municipal stage. Bringing individual firms on board to participate in the provision of waste services requires a very well organized sector controls. According to Van Dijk (2006), regulation is a focused control protocols, carried out by government institutions over the operations of the private companies. The basic reason for government regulation is to rectify the flaws of the market namely, externalities and monopoly power. Regulations are necessary to ensure that customers are not charged higher fees by companies for services rendered, as a result of their (private companies') ineptitude. However, firms are provided with incentives to achieve productive efficiency through government controls.

- *Public Service Regulatory theory*

Regulatory protocols are required in a contract for private sector participation and involvement in providing waste services. Agent (Regulatory) capture and the public interest regulation are the two main regulatory theories. Public service sectors, sometimes also referred Public regulation on the other hand is a mechanism to evaluate business and customer interests to ensure fairness in the face of market failure (Teske, 2004). The public interest' regulation seeks to protect the public interest. When there is regulatory failure the resultant effect is Regulatory capture (Franceys and Gerlash, 2008).

Regulatory capture occurs when special interests group appoint policymakers or political bodies to further their own end. This rests on the claim that particularistic interests see governmental regulation as a protective shield and that on the whole the state meets their demands. Proponents of regulatory capture see government regulations as the willing extension for rent-seeking business. They see any idea of 'good regulation' as futile, or to quote William Niskanen: 'Good regulation is no regulation.' Therefore, politicians are to be held up by private interests, to prevent them from capturing self-serving bureaucrats. Though regulation devised to correct negative externalities on environmental protection,

food safety, drug regulation and consumer protection, this view is mostly diverted without difficulty to serve particularistic interests (Stigler 1971; Posner 1974; Peltzman 1976).

The on-going debate on regulation is centered on whether regulation actually serves the public interest or whether regulation benefits interest groups and as a result interfere the market and weakens efficiency. It is argued that public interest protection is the basis for the different forms of regulation – regulation of the market conduct and market regulation. However, others argue that regulation does not protect the public interest but only the interest of groups who capture the regulation (Hantke-Domas, 2003). Etzioni (2009) contend that regulatory capture is quite extensive and therefore call for more attention to be placed on how to make regulation stronger and more capture proof rather than debating whether more or less regulation is needed.

- *Competition and Economies of Scale Arguments*

Competition is a key factor for differences in costs under public and private production. Competition is mechanism that motivates companies to keep costs down. Proponents of market competition postulate that competition at all levels promote efficiency, innovation and promptness to customer. It further suggests the rivalry among numerous agents supplying for various segment of the market. Both public and economic choice theories postulate a positive correlation between competition and service performance.

Bel and Warner in 2008 contend that the significance of competition for waste management has been overemphasised. Scientific data suggest that competition for the market is not sufficient to safeguard cost savings over time. Waste collection is characterized by weak competition or collusion, because of the concentration in the market (Bel and Warner, 2008). To them, the weak competition between firms undermines potential cost savings for waste collection. They further argue that competition for the market has always been expected which is yet to be typical. The public and private debate continues to put much emphasis on ownership and competition. But to Bel and Warner (2008), the primary attention should be given to the contract specification, regulations of incentives, and economies of scale and market structure.

## **2.11 Institutional Structure for SWM in Ghana**

Institutions are mandated to carry out government policies. Effective solid waste therefore calls for a competent and responsible institutions as well as sound managerial system. This



requires a collective responsibility at national, regional and district level. In Ghana the Ministry of Local Government and Rural Development (MLGRD) is the institution responsible for waste management services at the national level. This institution formulates waste and sanitation policies and also provides oversight role to the assemblies and gives subsidies for the provision of SWM services. The Ministry supervises the activities of local Assemblies and passes order as required by law to the various Waste Management Departments of the local Assemblies who are directly responsible for effective solid waste management.

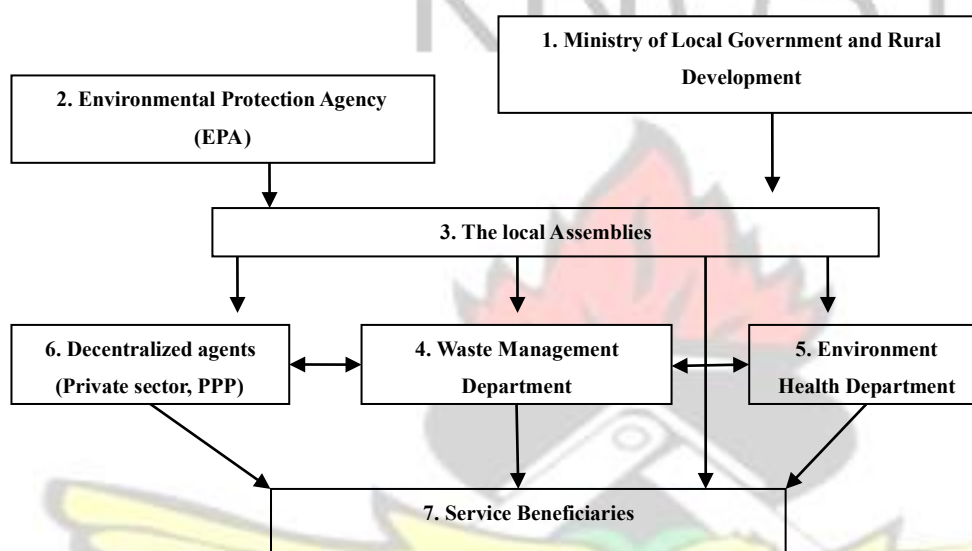
As part of the decentralization process in Ghana in 1988 the waste management functions became a sole responsibility of the Assemblies (Adarkwa, 2005). About 90% of the Assemblies budget is supported by the Central Government to carry out their obligations in the locality through the various departments. The WMD is responsible for all the waste collection, disposal and monitoring of all the activities of companies engaged by the Assemblies.

Figure 2.2 is an illustration of the interactions among the various stakeholders in the institutional arrangements for solid waste management. This structure offers the possibility for broad participation by stakeholders in implementation and feedback through service beneficiaries. Each of the main elements is now discussed briefly:

(1) The Ministry of Local Government and Rural Development formulates solid waste policies for the Assembly to implement and provides funds to the assembly for solid waste management activities, (2) Environmental Protection Agency (EPA) this organization is in charge of Supervision and monitoring of activities of service providers. They set the standards for operation at the national level for the entire service provider to comply with, (3) The local Assemblies, they supervise and monitor the activities of service providers, rendering of services to service beneficiaries or private companies, release of funds to private companies for services rendered, (4) The Waste Management Department (WMD), which is responsible for the liquid and solid waste collection and disposal, public cleansing, education of the public on waste management and supervision of activities of private contractor's engaged by the Assemblies. Supervision and monitoring of activities of service providers rendering of services to service beneficiaries by the Assembly release of funds to private companies for services rendered, (5) the health inspectors of Environmental Health Department (EHD) are expected to regulate and monitor the quality of service delivery and



sanitary conditions, and sanction possible offenders, (6) Decentralized agents (Private sector, PPP) Payment of charges to the Assembly by private companies Submission of reports on activities of private companies and access to data from Assembly Rendering of services to service beneficiaries by the Assembly or private companies and (7) Service Beneficiaries Payment of user charges to private companies by service beneficiaries Complaints about service quality by beneficiaries



**Figure 2.2: Relationships and roles of stakeholders in the Institutional Arrangements for solid waste collection**

(Source: Authors' construct 2014)

## 2.12 Legal and Policy Frameworks for SWM

### 2.12.1 Legal and Regulatory Frameworks for effective solid waste management

The policy environment which regulates waste management in Ghana is primarily reflective of legislation enacted at the national level and decisions made in pertinent case law. The Central Government bestows local authority status, onto any town or city in accordance with Act 462 which come to replace the previous act enacted in 1988 (OduroKwaten, 2010). In spite of this the Government continue to exercise controls over the Metropolitan, Municipal, and District Assemblies (MMDAs). This is seen in the appointment of chief executives by the Central Government to run MMDAs, and the approval of the Assemblies proposals to harness new sources for revenue or increase existing levy, budgets and by-laws by the Minister in charge Local Government (OduroKwaten, 2010).

The Central Government usually gives directives that affect the Assemblies. The most important is the fact that, a considerable amount of the Assemblies revenue is a direct disbursement from the Central Government. This makes it very difficult for the assemblies to be free from government interference. However, the MMDAs have a constitutional mandate under the 1993 (Act 462) to effectively handle sanitation issue which includes solid-waste management and therefore needed to operate independently to benefit the people. This responsibility is far-fetched due to lack of independence.

The 1960 (Act 29) of the Criminal Code of Ghana, state in no uncertain terms that whoever places or permits to be placed, any refuse, or rubbish, or any offensive or otherwise unpleasant material, on any yard, street, enclosure, or open space, except for the reason that such a place has been designated by the Assembly for such intent and purpose commits an offence. The law requires individuals to take full responsibility for the streets, drains and space closer to their premises (Oduro-Kwaten, 2011).

The law in Ghana mandate the Assemblies as owners of all the waste generated in municipalities and as a result has the mandate to collect, recycles and discard solid waste. The National Building Regulations, The 1996 (LI 1630) which is the national building regulation stipulates that a building for residential, commercial, industrial, civic or cultural use shall have a facility for refuse disposal, a standardized dustbin and other receptacles approved by the Assembly in which all the waste generated shall be stored pending final collection by the trucks to final disposal site (Oduro-Kwaten, 2011).

## **2.13 Policy Framework for SWM in Ghana**

### **2.13.1 Policies on Solid Waste Service Provision Ghana**

Policy is the broad vision for a sector, reflecting its directions, priorities and development goals at various levels including the local, regional, national and international (Brugere et al., 2010). A very comprehensive definition comes from WEDC (2003). To them \_policy is a blue print of action, methods, rules and allocation procedures that offer the foundation for programmes and services.

SWM in Ghana is greatly influenced by the Environmental Sanitation Policy of 2008. This policy is an update of the 1999 policy with the view to meet the prevailing development objectives and address the aspirations of the principal actors in the sector after eight years of slow implementation with very little impact (MLGRD, 2008). With reference to

environmental sanitation, the policy requires the Assemblies to control environmental sanitation and check pollution in all forms (Oduro-Kwateng, 2010). The policies tend to reflect prevailing ideas on solid waste management and give an overall evaluation of the prevailing circumstance in the country. It further ensured private sector participation and the provision of 80% of SWM in all the assemblies (Oduro-Kwateng, 2010).

#### 2.13.2 Formal rules for Regulating Decentralization

The Ministry of Local Government is mandated to regulate the waste business. The regulation works to promote competition via legal restrictions and regulatory rules and controls concerning market entry and exit, the capacities of companies operating in the waste market, user charges and the service standards. The local assemblies are mandated to outsource solid waste collection to decentralized agents service by contracts and also embark on frequent monitoring and evaluation of the service quality provided by the companies and sanction any insubordination according to the dictate of the contract.

The policies and regulations and the contractual agreement that connect the assemblies with the companies are important factors that contribute to effective solid waste collection, treatment and disposal. These regulations include the Local Government Act, National Procurement Act, Local Governments By-law, Environmental Sanitation Policy, and other state conventions that provide rules for solid waste management. The Procurement Act (2003) requires the Assemblies Tender Boards to use competitive bidding to select companies. (Oduro-Kwaten, 2010)

#### 2.13.3 Decentralization and Public Service Delivery in Ghana

Decentralization policy in Ghana first and foremost sought to devolve central administration authority to the district level. It was also meant to fuse governmental agencies in any region, district or locality in to one administrative unit. (Kumi-Kyereme, 2013; p. 241) currently two different types of decentralization are implemented (Adarkwa, 2005). First is devolution. It is the transfer of authority for decision making, finance and management to autonomous units of local government. In a truly devolved independent system, local government have clear and legally recognized boundaries over which they exercise authority and within which they perform public function. This gives the local government in the authority to raise funds for local development through taxes, rates and the other heads of the IGF s for which they are held accountable (Rondinelli, Supporting Rural Development



1998). Powers and functions once devolved are not easily taken back, since this will often require a constitutional amendment of major political and administrative responsibilities from central government to local government (Ahwoi, 2010).

The second is Deconcentration also known as administrative or sectoral decentralization, takes place when the central government transfers power, authority and responsibility or the discretion to plan, decide, manage from a central point to local authorities who are upwardly accountable to the central government (Ribot, 2002). It is considered as the weakest type of decentralization. It is a system of field administration through which functions are transferred to the field staff to make routine decisions. In this case, deconcentrated offices can be opened at the national, regional, district and sub-district levels where central supervisory authority is paramount (Ahwoi, 2010). Faculty of inter institutional or inter-sectoral coordination or integration. In this type of decentralization, the decentralized agencies remain dependent on the central government thereby stifling local initiative.

They serve to cut through —red tapel and the highly structured procedures characteristic of centralized administrative systems. The administrative and practical deconcentration of the planning and provision of public service such as; education, health, agriculture, water and sanitation, from Ministries, Departments and Agencies (MDAs) So many government agency such as the community water and sanitation agency and all the commissions are under this form decentralization.

Ghana's effort to consolidate the MMDAs and to create Sub-Metropolitan Assemblies within the Municipal Assemblies has been ineffective due to the weakness that lies in the implementation of the decentralization policy. (Oduro-Kwateng, 2010). The element accounting for the weakness of the reform is the decentralization policy failure to inspire the public via the local governments level, to streamline government machinery and ameliorate the Assemblies to take up the challenge for development at the local level to make public administration more efficient and effective.

In addition is the ineffective restructuring to properly allocate resources and to reassign the functions and responsibilities from the national, regional and district level. (OduroKwateng, 2010) The resources given to the assemblies from the central government are woefully insufficient for any meaningful activities to be performed at the assembly level. For instance the WMDs is not autonomous financially in view of this they always rely on the politicized local government. The challeges in the resource allocation from the central government is



attributed to the administrative and technical deconcentration due the lack of personnel, funds and logistics this impedes proper planning and rendering specific services. (Oduro-Kwateng, 2010)

Ghana has witness major institutional changes through decentralization. The district assemblies have become the fulcrum of which planning and development revolve, however the tremendous interference of government in spending decisions in a highly centralized fashion has weaken the Assemblies. The local assemblies have little power to plane for development. They have avenues to improve revenue generations however revenue generation has always been a major challenge due to lack of capacity, corruption and politics.

For all intent and purposes the literature has shown there is an increasing role of the private sector in solid waste collection service. In Ghana this has been the case for the past two decades. Waste management have changed from local government provision to private sector provision. The private sector involvement has evolved from company entry into waste collection business with or without subsidy and contract through to arrangements between public sector and private companies with contracts and cost recovery arrangements.

The review further shows that there are policy and legislative instruments for local service delivery including private sector involvement in solid waste management. The policy, legal and regulatory aspects of solid waste management are the external environment within which the private organisations operate. This together with the scale of operation, internal flexibility and responsiveness to users, account for service quality differences in waste management.

## **2.14 Conceptual framework**

Solid waste management is a vital public service to ensure a sustainable and focused development to improve the quality of lives in the urban areas. This call for appropriate mechanisms suitable for the local conditions from an environment, social and fiscal perspectives, and at the same time being more capable to be sustain over long period of time without reducing the resources it needs (van de Klundert and Anchutz, 2001). This forms the basis of the conceptual framework of the study.

The conceptual framework of the study focuses on four key variables, namely: Evolving practice of SWM, Households' involvement for service sustainability, Private company

capacity and lastly, Regulatory mechanisms and control for solid waste management in relation to service quality. Figure 2.3 illustrates the conceptual framework of the study. The first component is the evolving practice of SWM. This seeks to explore the evolving practice of the private sector involvement in SWM. Dimensions such as the modalities of public-private arrangements that exist in practice in the two municipalities from 2004 to 2014 (number of companies, nature of contract, companies' cost recovery arrangements— user charges and subsidies), The service coverage level, customer education, Implementation of national policies over the last decades (2004-2014), and implications of current practices for policy and regulation at local and national stage were used to probe the evolving involvement of the PSI in study area

The next component focuses on the household involvement in SWM for sustainability. The analysis of the household involvement examines the extent of household participation and involvement in the waste business. Proper collaboration between public institutions and the private companies enormously contribute to the success of service provision. For this reason the analysis covers awareness and eagerness of the household to pay for collection service, monitor service quality, report complaints and waste minimization.

The third component concerned with is the analysis of private sector capacity. This is intended to throw more light on the factors influencing performance so that improvement solutions can be tailored towards the existing drawbacks to effectively implemented and monitored. Variables for analysis include the resource holding capacity, the work force capabilities and skills.

The fourth component covers the elements of regulation, such as

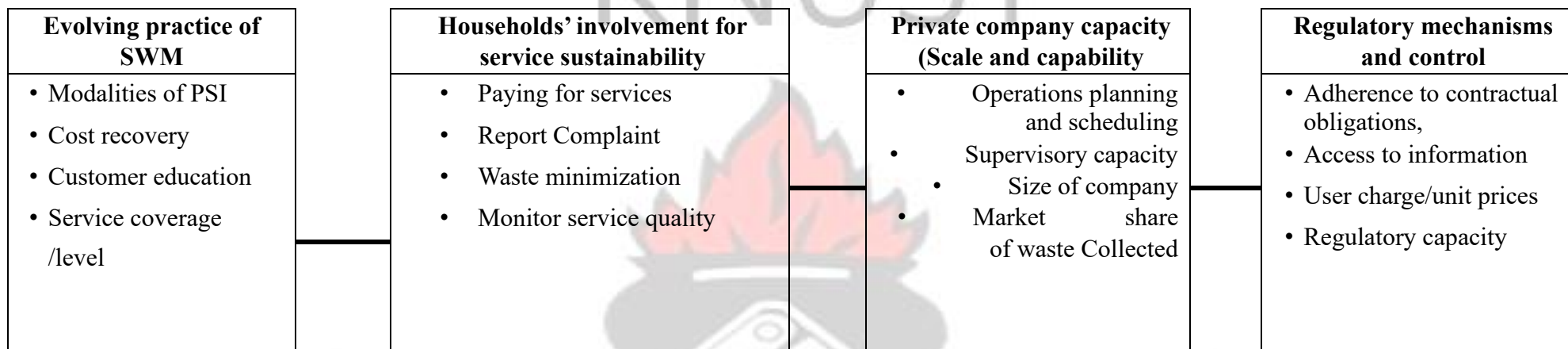
- Regulation by contract
- Mechanism for SWM regulation
- Commitment to contractual obligation
- Enforcement of legislation
- Autonomy of Municipal Assemblies to regulate SWM

Fifth covers service quality, it focuses on the effective means of producing or being capable of producing results. It stresses on the power to produce an effect. The service quality

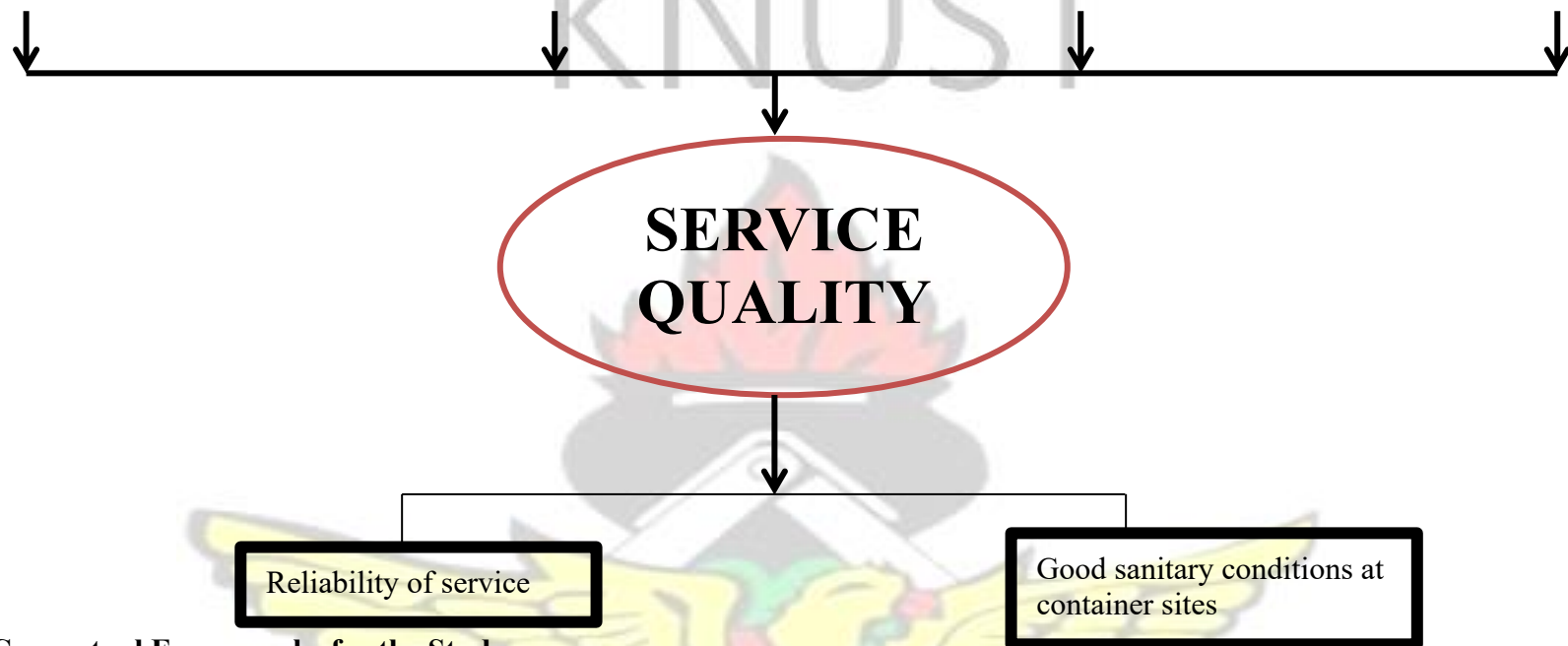
examines the issue of collection reliability of service – regular waste collection and Good sanitary conditions at the container sites.

The framework seeks to examine the key issues 1 to 4 to identify the drivers for service quality (5) which ensures sustainable solid waste management. The identification of drivers for sustainability is intended to provide feedback for changes in policy and legal frameworks.









**Figure 2.3: Conceptual Frameworks for the Study**

Source: Authors' construct 2014

## **CHAPTER THREE METHODOLOGY**

### **3.1 Introduction**

This chapter provides the methodology for the study. It throws more light on the research design and its aptness, the operationalization of variables, the sampling techniques and sample size determination, the method of data collection as well as the method of data analysis finally; the last section summarizes the methodology for the study.

### **3.2 Study Setting**

As shown in figure 3.1, the two municipalities (Berekum and Dormaa) are located in the Brong-Ahafo Region of Ghana. These municipalities were selected based on their rapid expansion and urbanization according to the 2010 Population and Housing Census (Ghana Statistical Service, 2012). The location and size and population characteristics were considered under this section.

#### **3.2.1 Area of Coverage of the Berekum Municipal**

The total land size of the municipality is 1,635km<sup>2</sup> with 578.63km<sup>2</sup> covered by forest reserves. This area forms about 0.7% of the entire Ghana land area of 233,588 km<sup>2</sup>. The Berekum Municipality lies between latitudes 6°27'N and 7° 00'N and longitude 2°52'W and shares common boundaries with Sunyani in the North West, Dormaa East on the NorthEast, Jaman District in South-West and Tain District in South East (NDPC, 2012).

#### **3.2.2 Demographic Characteristics**

According to the 2010 Population Census of Ghana, the population of the municipality stood at 129,628 (Ghana Statistical Service, 2012). This figure represents a percentage change of 39% over the 2000 figure of 93,235. The annual average growth rate of 2.2, the population of the municipality is estimated to approximately 144,528 by 2015 and a doubling in 31 year. This growth rate compares favourably with both the regional and national rates of 2.3% and 2.5 % respectively. The female form about 53% and the remaining 46% constitutes male population. The total land area of the municipality is 1,635sq km. This gives a population density of 79.2 persons per sq km as compared to that of the region which stands at 46 persons per kilometre square. It is important to note that the municipality is very densely populated due to the fact that a large area is taken up by

forest and farmlands. As a result, the population of the municipality is concentrated in the capital Berekum; there are four main religions groups in the Municipality. They are Christians which is the most predominant sector with 95% followed by Moslems 2.7 %, traditional 1.4 % and others being 0.9%.

### **3.3. Dormaa Municipality**

Dormaa Ahenkro is the Municipal Capital. It lies between latitude 7° and 7° 30'N and longitude 3° and 3°30'N. It covers a land area of 912km<sup>2</sup>. The municipality shares boundaries with the Jaman South District to the south east, Dormaa East to the north east, Sunyani Municipality to the East. Dormaa west to the south and North-West to La Cote d'Ivoire (NDPC, 2012).

#### **3.3.1 Population characteristics**

According to the 2010 housing population census the total population of Dormaa municipality was 159789 with an annual growth rate of 2.4 per cent per annum. The total population consists of 51% females and 49% for males. The dominance of females over males is a reflection of a nationwide trend. With a land size of km<sup>2</sup>, 912km<sup>2</sup>, the municipal population density stands at 175persons /km<sup>2</sup>. The implication is that, the pressure on land and other existing socio-economic facilities is going to be high. This can be attributed to the fact that the municipality has much arable land with about 45% of the total land area made up of forest reserves hence uninhabited.

The people in the district are mostly Christians accounting for about 84%.with the Moslems forming about 10%, Traditionalists taking about 2% and others 4%. Despite the religion diversity, there is religion tolerance in the district. This healthy co-existence augurs well for peace and stability within the Municipality which are essential ingredients for development. In all two Private companies provide solid waste services in the two municipalities, one in Berekum and the other in Dormaa.

# KNUST





# KNUST

MAP OF STUDY AREA

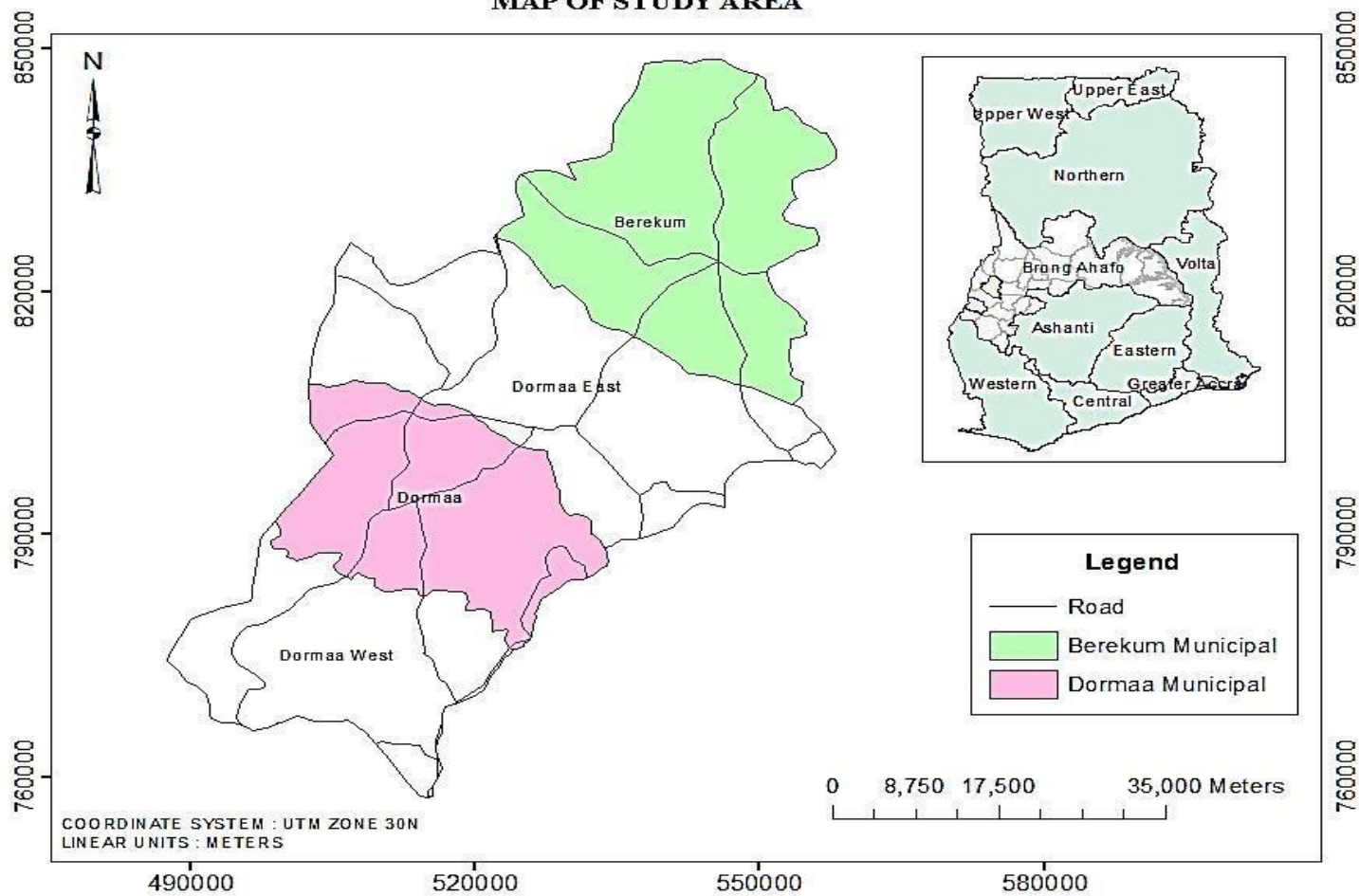


Figure 3.1: Map of Study Area

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### **3.4 Research design**

The study employed purely qualitative research approach in the collection and analysis of data. Qualitative approach is mainly descriptive and involves the collection and analysis of data that is concerned with meanings, attitudes and beliefs, rather than quantitative method that results in numerical counts from which statistical inferences can be drawn (Ogier, 2002). Due to the complex nature of the issues regarding solid waste management the case study approach was used to get the relevant information for the study in the two municipalities. According to Yin (1983), a case study is an empirical study that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly drawn.

### **3.5 Operationalization of variables**

Table 3.1 represents the operationalization of variables and indicators for assessing Service Quality and elements influencing the outputs of the waste companies as well as the definitions of concepts and indicators to be assessed.

#### **3.5.1 Private companies and Households' involvement**

Private sector and households' involvement refers to the evolving practice of involving private sector and households in service provision for better service quality and increase coverage. The dimensions for assessment include cost recovery, paying for services, customer orientation, and waste minimization.

#### **3.5.2 Service quality**

Service quality is defined as the level of outcome achieved, for instance, the level of satisfaction that customers experience with services, the number of waste pickups made, the amount of revenue collected from customers, and the number of customers that are served. In this study, quality of service is used as a measure for effective solid waste management. The measures of quality of service used in this study are reliability of service and environmental cleanliness.

The operationalization of the variables for measuring the internal and external factors influencing solid waste management includes company capability, scale of operation and regulatory arrangements.

### 3.5.3 Company capability

Service operations are intended to ensure that customers are served and the service objectives are met. Company capability in this study implies the capacity for vehicle operations planning, operations supervision, and maintenance management, and quality of operation management employees.

The operations planning capacities involves the ability of the operations manager to plan waste collection and establish rational vehicle routes, route plans and vehicle logs for the service operations. The maintenance management capability is the ability of the technical personnel to plan in-house maintenance, prepare maintenance schedule to prevent equipment breakdown and long downtime duration. The operations supervision involves the ability of technical personnel to monitor collection of services and emergencies.

### 3.5.4 Scale of operation

This refers to the physical capacity of the companies. It is measured using the number of company vehicles (as proxy for company size), market share of waste collected and the vehicle conditions.

### 3.5.5 Regulatory mechanisms and contract arrangement

The regulatory mechanisms refer to the mechanisms for accessing information, controlling user charges and quality of service rendered. In this study, the contractual relation is defined as any contract and cooperative arrangement between private enterprise and the government (local and central), in which there are arrangements for mutual benefit, and each party adheres to obligations.



**Table 3.1: operationalization of variables**

Variables	Definition	How variables are measured
Private companies and Households_involvement	This refers to the evolving processes of involving private companies and households in service delivery for sustainable service delivery for residents	<ul style="list-style-type: none"> <li>Evolving practices of SWM <ul style="list-style-type: none"> <li>-trends in SWM</li> <li>-modes of disposal</li> </ul> </li> <li>Households involvement in SWM <ul style="list-style-type: none"> <li>-house hold perception on cost recovery</li> <li>-household eagerness to pay for service charge</li> <li>-household involvement in waste recycling and minimization practices -</li> <li>household involvement in service quality monitoring</li> </ul> </li> </ul>
Quality of service	Quality of service is defined as the extent to which the objectives of the service are met in practice. It is a measure of effectiveness.	Service Quality /Customer satisfaction <ul style="list-style-type: none"> <li>Reliability of service – regular waste collection.</li> <li>Sanitary conditions and waste overflow at container site</li> </ul>
<b>Operationalization of internal and external factors explaining performance</b>		
Company capability	Service operations are intended to ensure that customers are served and the service objectives are met.	<ul style="list-style-type: none"> <li>Operations planning and scheduling –</li> <li>Route/rational vehicle routes, vehicle logs, pick-up scheduling,</li> <li>Operations supervision – ability of technical personnel,</li> <li>Vehicles maintenance capacity/ schedule – In house maintenance, maintenance schedule available</li> </ul>
Scale of operations	This refers to the physical capacity of the company	<ul style="list-style-type: none"> <li>Number of company vehicles,</li> <li>Market share of waste collected – ratio of quantity of waste collected by a company to the total waste collected in the municipality</li> </ul>
Regulatory arrangements	This refers to the mechanisms for accessing information, controlling user charges and quality of service rendered, and roles and obligations in partnership	<ul style="list-style-type: none"> <li>Regulation by contract mechanism. <ul style="list-style-type: none"> <li>– duration and competition for contract, and contract renewal.</li> </ul> </li> <li>Regulation of access to information.</li> <li>Regulation of user charges – setting of charges, frequency of tariff review.</li> <li>Contractual obligations – adherence to conditions of contract.</li> <li>Regulatory capacity and autonomy.</li> </ul>

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Source: Author's Construct, 2014

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### **3.6 Sources of Data**

Data for this study were collected from both primary and secondary sources.

#### **3.6.1 Secondary Data**

The secondary sources of data were collected from available sources made for purposes in line or related to the study such as from text books, internet access, documents from the district assembly and other relevant publications. The other secondary source of data involved review of literature from documentary sources such as waste management journals, magazines, periodicals and relevant materials from the internet.

#### **3.6.2 Primary Data**

Preliminary field investigation, questionnaires survey and face- to-face interviews were used to collect primary data. These are further discussed in the sub-sections below.

#### **3.6.3 Preliminary Field Investigation**

The field observation involved scouting through the study area to assess the following.

- Communal waste containers.
- Dustbins in the selected areas of study in the municipalities.
- Dump sites.
- Informal contacts with Municipal Assembly, WMD and The Waste management companies.

### **3.7 Questionnaire Survey**

A convenient household survey was undertaken in the two Municipalities. Respondents' perceptions about the existing service quality (reliability, clean customer satisfaction, sanitary condition and waste overflow etc.) were rated on an ordinal scale from 1 to 5, with 1 being —strongly disagree and 5 —strongly agree. Scores were calculated using the ratings to determine the quality of service for each respondent and company.

### **3.8 Target Population**

The target population for the questionnaire was the number of Households in the study area.

#### **3.8.1 Sample Frame and Sample Size Determination.**

A total number of 48157 and 36315 households were obtained from the 2010 Population and Housing Census (Ghana Statistical Service, 2012) for the study areas Berekum and Dormaa Municipalities. This represented the sample frame of the questionnaire survey for the study areas. Furthermore, the mathematical approach was used to find out the sample size for the survey. Below is the formula.

Formula:  $n = \frac{N}{1+N(\alpha)^2}$  Where **n**=sample size, **N**= sample frame and **α** represented the margin of error which is **0.08** with confidence level of **92%**.

Calculating the sample size for Berekum Municipality by placing 48157 and 0.08 into the formula

$$n = \frac{48157}{1+48157(0.08)^2} = 156 \text{ to the nearest whole number}$$

Sample size for Berekum = 156

### Calculating the sample size for Dormaa Municipality

Formula:  $n = \frac{N}{1+N(\alpha)^2}$  Where **n**=sample size, **N**=sample frame (**36315**) and **α** represented the margin of error which is **0.08** with confidence level of **92%**. By substituting 36315 and 0.08 into the formula

$$n = \frac{36315}{1+36315(0.08)^2} = 156 \text{ to the nearest whole number}$$

Sample size for Dormaa is = 156

Therefore, the total sample size for the survey was three hundred and eleven (312) for the two study areas. This was to ensure that the sampled mean was closer to the population mean and minimize errors.

### 3.9 Sampling Techniques

The following sampling techniques were used to select the respondents for the study. These were: cluster, purposive and , convenient sampling.. Firstly, the study area was zoned into two clusters namely: Berekum municipality and Dormaa, municipality. Secondly, purposive sampling was used to select twelve (12) areas from the two municipalities for the survey.

**Table 3.2. Purposive Sampling of the 2 municipality**

Local councils	Selected areas	Total
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Berekum Municipal	Awerempe Estate Nyame Bekyere Kyiri twedea zongo Amangoase Atonotia	6
Dormaa Municipal	Kumidaa street Asikafo Amantem Ahenbrono Atoase Ahantrase New Dormaa	6

Source: Fieldwork, 2014

The sample size of 312 was divided among the 12 selected communities. This was distributed among the respective study communities. This means that in exception of New Dormaa area, 26 households were interviewed in all other selected communities (see Table 3.3).

**Table 3.3. The sample size for the selected communities**

Municipalities	Selected communities	Respondents per community	Respondents per Municipality
Berekum Municipal	Awerempe Estate	26	156
	Nyame Bekyere	26	
	Kyiri twedea	26	
	zongo	26	
	Amangoase	26	
	Atonotia	26	
Dormaa Municipal	Kumidaa street	26	156
	Asikafo Amantem	26	
	Ahenbrono	26	
	Atoase	26	
	Ahantrase	26	
	New Dormaa	25	
Total		312	312

Source: Fieldwork, 2014

### 3.10 Face-to-face Interview

Face-to-face interviews were used to collect data from the following key stakeholders as far as solid waste management is concerned in the study area.

#### 3.10.1 Informant Interview

Interview with the local directors of waste management and managers of private companies in waste management in the study area was conducted to get more information more on the contract arrangements, trust and cooperation in the contract relations, regulations, company\_s capacity, and the performance of the companies. These included

- i. Assemblymen in the selected areas
- ii. Berekum and Dormaa Municipal Assembly (municipal Director, Municipal Budget Officer and planning officer)
- iii. Waste Management Department of the two municipalities and
- iv. Private Waste Company

### 3.10.2 Pre-Testing of Survey Instruments

Having designed the various survey instruments there was the need to pre-test them to ascertain their appropriateness or otherwise so as to correct anomalies. This provided the opportunity to test the appropriateness or otherwise of the questionnaires. To this end the Kyirikwede community of the Berekum municipality and the Atoase community of Dormaa were selected. The choice of these two areas was based on the fact that they have active business environments which can be conveniently generalized for the two municipalities. The pre-test exercise was quite successful.

### 3.11 Data Processing and Analysis

The study gathered both qualitative and quantitative data from the secondary and primary sources. The data collection instruments were administered through household interviews and key informant interviews using interview guides and questionnaires. The Statistical Package for Social Science (SPSS, version 20) was used to analyse the quantitative data. This was done using descriptive statistics such as the measures of central tendency and dispersion, frequency/percentage distribution tables and relevant statistical diagrams to represent the quantitative data. The qualitative data was analysed by means of content analysis. This included the views and expressions made by the units of enquiry in the course of interview. A cross-case analysis procedure was further used to analyse the interview data. In this approach, responses to a common question from all interviewees in each category are analysed together.

### **3.12 Validity**

Validity is defined as the degree to which a measuring instrument measures what it is designed to measure (Neuman, 2006:45). A research design is said to be valid, authentic, credible and trustworthy, if it enables the researcher to elicit the correct responses from the sampled subjects, otherwise, it is faulty design and may lead to misleading findings. In determining the validity of the survey questionnaires, the Researcher presented the drafts to two experts in the field of waste management to assess the questions for face and content validity. Furthermore a pre-test was done. Based on their comments and suggestions the questionnaires were fine tuned to achieve the purpose of the study.

### **3.13 Ethical Consideration**

Neuman (2006) prints out that ethics in research is a set of principles that reveal what is or is not legitimate to do in research practice. Sarantakos (2005) suggests that in order for a research to be ethical, the study should provide adequate information on the type of questions being asked, the degree of sensitivity and the consequences of the questions. The study should provide concern for the welfare of the respondents by paying particular attention to safety, personnel embarrassment and physical and mental health. The study should also provide informed consent. Lastly, the study has the responsibility to recognize the responder's right to privacy, anonymity and that all information about them remain confidential (Sarantakos, 2005).

To ensure all these ethical standards are met as discussed above and as required by regulations, the research carried out presented an intellectual honesty and the findings of the research were not falsified. Acknowledgements were given to the articles and documents used in preparations of this study and properly identified in the reference section. Information gathered from survey participants was treated with utmost privacy and was used for the purpose of this research only as was stated on the questionnaire.

### **3.14 Conclusion**

This chapter described the research design and the operationalization of variables. The explanatory factors of performance and performance variables were defined. The chapter explained the study settings and the research methodology for data collection and analysis. The study was conducted in the two medium size cities in the Brong/Ahafo region of

Ghana. These cities were chosen for the study because of their rapid urbanization and expansion. Qualitative and quantitative data were collected from two public organizations and two private companies. Secondary data on companies in the two cities were used for assessment of company productivity.

A survey of 312 Households was conducted in the two municipalities. Households' perceptions about the existing service quality were rated on a scale from one to five and scores calculated.





## **CHAPTER FOUR**

### **DATA ANALYSES AND DISCUSSION**

#### **4.1 Introduction**

Berekum and Dormaa Benefited from the GTZ initiatives in 1980s after the end of the project like other cities, waste management become a major problem. The government took it upon itself to provide waste management services in these two municipalities among others. Which were then districts with small population. Waste management from that time became the business of government. This was run by the WMD. The WMD could not provide effective services. Heaps of wastes were found in most dumping sites due to lack of logistics and funds. With this in 2006 private companies were awarded the contract to be in charge of waste management in these two municipalities to bring private expertise, private funds and the introduction of commercial principles in SWM in these municipalities. The involvement of the private sector has received some misfiling with majority saying there has been an improvement.

This chapter presents the data analysed along with the discussion of the results in relation to the objectives of the study with relevant literature.

#### **4.2 Evolving practices of Decentralized SWM in Berekum and Dormaa Municipality**

As one of the objectives of the study, this section looked at how the practice of decentralization in governance has also been translated into the management of solid waste in these study local authorities (Berekum and Dormaa). This section presents data analysed on evolving trends of SWM and modes of waste disposal in the two Municipalities and household's involvement in solid SWM.

##### **4.2. Evolving Trend of decentralized SWM**

Result gathered from the study according to the two municipal waste director, indicates that, coverage of service in these two municipalities as a result of GTZ assistance in the 1980s were not available it is believe that coverage were very high. This is seen in the numerous waste dumping site which became known as —bolal in the old communities of these two municipalities. As these municipalities expanded the waste departments did not build new site for waste. With this, the coverage continued to fall from the 1990s of about 75% to 50% by the year 2006 according to the municipal waste Directors of Berekum and Dormaa. The falloff called for the involvement of the Private companies. Checks by the study revealed

that the private companies formally started in Berekum and Dormaa in 2006. These municipalities were not group into zones. One company provided SWM services in the municipalities, there was no competitive bidding, and one company was given the contract to provide house to house and community collection service. This revelations confirms what Oduro-Kwarteng (2010) indicated of the evolution of decentralized SWM in the country.

### 4.3 Modes of waste disposal in Berekum and Dormaa Municipality

**Table 4.1 Modes of waste disposal in Berekum and Dormaa Municipality**

	Do you pay for collection service						
Berekum	Yes	No	Total	Dormaa	Yes	No	Total
Door to door	41	0	41		31	0	31
Communal collection	0	97	97		0	98	98
An open dump	0	18	18		0	27	27
Total	27	91	156		23	85	155

Field Survey, 2014

Basically results from the data analysed on waste disposal in the Berekum Municipality confirmed that three ways of waste collection exist in Berekum including House-to-house collection, communal collection and open dump site. From the survey, majority of the respondents 62% disposed of their waste into communal containers. This is followed by 29% of the respondents who indicated that, their waste was collected directly from their houses (which are mostly found in the new residential areas). A total of 16% indicated that they emptied their waste into open dam sites.

Similar responses were observed in the Dormaa Municipality as the results from the data analysed indicate these modes of waste disposal. From the survey, a larger percentage of the respondents 63% indicated that waste was disposed of into communal containers. While 20% of the respondent said that waste was collected directly from their house, 17% also indicated that they emptied their waste into open dam sites.

In the Berekum Municipality, the data analysed shows that the House-to-house service of refuse disposal is primarily practiced in the new residential areas including Nyamenae and Awerempe-Estate. Similar results showed the same trend as residential areas such as Kumidaa Street and Asikafo Amantem were found to be practising house-to-house waste collection in the Dormaa Municipality. These modes of waste collection were verified with key stakeholders (the Assemblymen, WMD and Private waste company).The introduction

of this service in the municipalities reflect urban form of solid waste management as such areas compose of settlements which house middle to high income earners who are in the position to pay for such service. As Oduro-Kwarteng (2010) asserted in the formal introduction of this service in the urbanized areas in the two major cities in Ghana (Accra and Kumasi), other towns and cities have grabbed this concept to enhance service delivery as far as SWM is concerned.

All the respondents from these residential areas where house-to-house waste collection service takes place in the Berekum Municipality are required to pay a monthly charge of ₵15 per 120 liter dustbin. In the Dormaa Municipality, service beneficiaries pay an amount of ₵10 per 120 liter dustbin. The results show that service beneficiaries in the

Dormaa Municipality slightly pay lower price than amount paid in the Berekum Municipality. According to the Assemblymen this charge was exorbitant and as a result accounted for the lack of patronage in the Municipality. Secondly, there was lack of patronage because the companies did not regularly and routinely collect waste in these areas. In view of this some people turned to burning as a means of dealing with their waste.

Communal collection was mainly carried out in the old town residential areas of Kyiritwede Zongo and Amangoase for Berekum and Atoase, Ahantrase Ahenbrono for Dormaa Municipal. This mode of waste collection does not require any monthly fee or pay as you dump charges. Residents go to a central container and dispose of their waste. The next mode of collection is the open dump site collection this is seen in the suburbs; Communities who dispose of their waste at the open dump site, are emerging communities that the Assembly together with private companies have failed to supply with containers. In view of this, the people throw their waste in open dump pit this is seen in some part of Atonotia, and the light industrial area of Berekum municipal and in New Dormaa for Dormaa Municipal. This findings supported studies by (Danso- Manu, 2011) who asserted that open refuse dumps are most commonly located at the perimeter of major urban centres in open lots, and are generally sited based on considerations of access to collection vehicles.

#### **4.4 Households involvement in solid SWM in Berekum and Dormaa Municipality**

This section looks at the extent to which the various households in the two municipalities participate in waste management services in relation to the mechanism for cost recovery, the



eagerness-to-pay for service charge, eagerness to separate waste at source and monitoring of service quality.

#### 4.4.1 Households' Perception on recovering waste cost

Table 4.2 presents the household's views on the assessment on who ought to bear the cost of waste collection in the municipality. The study shows that, a total 72 respondents participated in the household survey. About 41 residents representing 57% respondents came from Berekum municipality, whereas 31 residents representing 43% respondents came from Dormaa municipality. Further analysis shows that, 10 of the residents representing 58% of the respondents from the Berekum municipality perceived the generator only to pay for waste services while 7 of the residents representing 42% respondents from Dormaa Municipality also perceived that the generator only should be made to pay for waste services. On the centrally, 18 residents representing 45 % of the respondents from Berekum municipality said they wanted both the Generator and the Assembly to pay for waste services. Likewise, 24 resident representing 55% of the respondent in Dormaa municipality shared the same view that both the generator and the assembly pay for waste services. Moreover, the result shows that, 13 residents from the two municipalities representing 18% of the respondents opted for the Assembly only to pay for the waste services. It was further realized that, all the respondents who wanted the Assembly only to pay for waste services were from the Berekum Municipality. No house to house service respondent from Dormaa wanted the Assembly only to incur the coast of waste.

Regarding communal collection, the results shows a total of 195 residents representing 63% of all the respondents in the two municipalities participated in the household survey. Out of this, 97 residents representing 49% of the respondents came from Berekum municipality, whereas 98 residents representing 51% of the respondents came from Dormaa municipality. Further analysis shows that, in Berekum about 70% of the respondents call for the Generator only to pay for cost incurred on waste. On the other hand, 39 residents representing 53% of the respondents perceived both the Generator and the Assembly to pay for waste cost. Again it came out that, 57 residents representing 42% of the respondents perceived Assembly only to pay for waste. Very few segment of the sampled population patronize the open dump disposal. With this, a total of 8 residents representing 57% of the respondents under the open dump disposal services, think the Generator and the Assembly should pay for waste services whereas 13 residents representing 45% of the respondents wonted only the



assembly to pay for waste services. All the residents wanted the assembly to be actively involved in waste management, none of the resident indicated that they wanted the generator only to pay for waste services.

**Table 4.2 Opinion on who ought to bear the cost of waste collection services**

	Berekum		Dormaa		Total
	N	%	N	%	N
<b>House-to –House</b>	<b>41</b>	<b>57</b>	<b>31</b>	43	72
Generator only	10	58	7	42	17
Generator & Assembly	18	42	24	57	42
Assembly only	13	100	0	0	13
<b>Communal Collection</b>	<b>97</b>	<b>49</b>	<b>98</b>	51	195
Generator only	7	70	3	30	10
Generator & Assembly	34	39	53	61	87
Assembly only	56	57	42	43	98
<b>Open Dump</b>	<b>18</b>	<b>43</b>	<b>27</b>	<b>57</b>	45
Generator only	0	0	2	100	2
Generator & Assembly	8	57	6	43	14
Assembly only	13	45	16	55	29

Source: Field Survey, 2014

In Dormaa a total of 98 residences accounting for 51% of the respondents were used for the analysis. A total of 30% of the respondents perceived that the Generator only should pay for waste services whereas 53 households representing 61% of the respondents wanted the Assembly and the Generator to pay for waste services. A total of 42 resident's representing 43 % also wanted the assembly only to pay for waste services. In relation to Open dump site, all the residents who said generator only should incur the cost of waste came from Dormaa. The result further shows that, 6 residents representing 43% of the respondents call for the generator and the Assembly to incur the cost of waste management. Interestingly a total of 16 households representing 55% of the respondents on the other hand, call for the Assembly only to pay for waste management cost.

In view of the above, it is quite obvious that the companies need to be more responsible for results and to be more responsive to their client. Also much attention must be given to household involvement to make sure the households are well informed about the fiscal problem confronting the Municipalities and the necessity to pay for service improvement. Communal collection service are been rendered free of charge for the past years, this has resulted in a serious financial constrain for the Assembly thereby making the operation of the WMD ineffective. This process must be improved to make the households pay for the

service; to provide mass education and strengthen the capacity of the WMD to monitor the activities of the private sector to improve quality of service and respond to their customers to actualized the full cost recovery policy.

#### 4.4.2 Eagerness to pay for service charge

To further ascertain the household involvement in solid waste management, the resident's eagerness to pay more for waste services was assessed. Table 4.3 indicate the results of the eagerness-to-pay service charges. To better the house-to-house service, the respondents were ask on their willingness to-pay more. The result shows that, in the Berekum municipality 9 resident representing 60% of the respondents compared to 6 residents representing 40% from Dormaa Municipality were eager to pay more for waste services. On the other hand, 21 residents representing a total of 55% respondents from the Berekum municipality were eager to pay current user fees, whereas 8 residents representing 43% of the respondents responded same in Dormaa municipal. Centrally to the above, 11 residents representing 57% of the respondents in Berekum said they were eager to pay less than the current user fees. A total of 8 households in Dormaa representing 43% of the respondents were also ready to pay less than the current fees.

In relation to communal collection, the result further shows that, all the residents in the municipality did not pay user fees. However, more households in Berekum, totalling 76 residents representing 54% of respondents confirmed their eagerness to pay for waste services compared to a total of 63 households representing 47% of the respondents in the Dormaa municipality. In the same way, household who patronize open dump site services do not pay for waste services but some of them were eager to pay for the waste services. A total of 12 households representing 55% of the respondents in the Berekum municipality were willing to pay more for waste services under open damp whereas 10 residents resenting 45% said same from Dormaa municipal.

**Table 4.3 Respondents' eagerness -to-pay user charges**

Households eagerness to pay for services	Berekum	%	Dormaa	%	Total
<b>House-to-House collection</b>	<b>41</b>		<b>31</b>		<b>72</b>
Eagerness to Pay more	9	60	6	40	15
Eagerness to Pay current user fees	21	55	17	45	38
Eagerness to pay less than the current user fees	11	57	8	43	19
<b>Communal collection</b>	<b>97</b>		<b>98</b>		<b>195</b>

Pay Tariffs at time of survey	0		0		0
Eagerness to pay for the service	76	54	63	46	139
<b>Open Dump</b>	<b>18</b>		<b>27</b>		<b>45</b>
Pay Tariff at time of survey	0		0		0
Eagerness to pay for the service	12	55	10	45	22

Source: Field Survey, 2014

The result further indicated that, all the respondents were ready to pay any considerable tariff for the service if the service would be improved along frequent and routine waste collection of two times a week. It was again realized that the respondents wanted the tariffs to be charged on waste volumes and rate with which waste is being picked up.

Regarding communal service, it came out from the study that all the respondents did not pay for services. However over 70% of respondents who utilize the communal waste services were eager to pay for the tariff under one condition that service improves. In Berekum 76 residence representing 78% of the communal collection respondents were ready to pay for the waste services. In the same way 64% of the communal collection respondents from Dormaa also confirmed their eagerness to pay for waste services. The implication is that more effort should be geared towards educating the public and for that matter the customers to come to terms with the need to pay for services to recover cost to ensure better service quality. Moreover, the companies ought to be more responsive to complains of the customers so as to improve service quality.

It was further realised that, the more residents patronize house-to-house services, the more the rate of cost recovery. The continue increase of house to house services corresponded with the rate of cost recovery in the study area. The Assemblies are therefore required to augment the development of the house-to-house waste collection in the municipalities since the upsurge in the house-to-house collection coverage decreases the communal collection and as result generate more revenue to recover cost. This in effect will reduce the financial burden on the Assemblies. The proper waste management can only be a reality only when cost recovery policies are vigorously pursued.

#### 4.3.3 Involvement of households' in Waste Minimization

In the solid waste management hierarchy, waste minimization has been placed at the top. It consists of two basic operations: source reduction and recycling (Hopper et al, 1993). Source



reduction is most desirable to avoid waste generation, while recycling is useful to conserve resources and to prevent materials from entering the waste stream (Bai and Sutanto, 2002).

**Table 4.4 Respondents ready to out organic waste for separate collection**

	House to House			Communal Collection			Open Dump			Total	
	Yes %	No %	Undecided %	Yes %	No %	Undecided %	Yes %	No %	Undecided %	Yes %	No %
<b>Berekum</b>	59	37	4	50	33	17	46	34	20	50	34
<b>Dormaa</b>	52	43	5	52	42	6	56	30	14	49	40

Source: Field Survey, 2014

Table 4.4 shows residents' readiness to separate and recycle their waste at the house (source) for collection. The result indicates the majority of 59% and 52% of sample who patronize house to house service in Berekum and Dormaa respectively were ready to separate their waste at the source given the necessary incentives. Regarding communal collection majority 50% and 52% of the respondents from Berekum and Dormaa in the same way confirmed their readiness to separate waste at source. Again more residents 46% and 56% who patronize open the dump collection also confirmed their readiness to source separate waste. They pointed the increase in collection rate to two times a week, the free provision of plastic bags with variety of colours, and to be provided with free bins by the companies or the assembly for separate collection as the incentives needed for effective waste separation. Over 40% accepted to purchase their own receptacles for storing organic waste. Whereas 33% called the enforcement of by-laws to ensure everybody separate their waste.

The respondents acknowledged their awareness on waste reuse, recycling, as well as composting. Majority indicated that they use food waste to feed livestock, salvage used plastics and cans, and sachet rubbers for the informal buyers or scavengers. Moreover some continue to engage in the burning waste. Small number of them uses organic waste as manure for vegetable garden. Notwithstanding, the resident's awareness on reuse and recycling of waste in the municipalities more and more reusable and recyclable materials continue to be seen in the streets, drains and streams. It came out that the existing collection system does not ensure recycling. Varied wastes are sent to the dumping grounds with very little or no recycling by scavengers.

#### 4.3.4 Households' involvement in service quality monitoring



**Table 4.5 Awareness of waste container overflow before container is lifted**

	House-to-house			Communal collection		
City	Num	Yes%	No	Num	Yes	No
Berekum	41	28 (39%)	13 (18%)	97	69 (36%)	28 (14%)
Dormaa	31	26 (36%)	5 (7%)	98	61 (31%)	37 (19%)
Total	72	54	18	195	130	65
Total %	100	75	25	100	67	33

Field Survey, 2014

Table 4.5 presents the result on service quality monitoring using the awareness of waste container overflows before container is lifted as an indicator for household involvement in SWM. A total of 75% of the respondents under the House-to house service and 67% under the Communal collection service confirmed the overflows of waste receptacles before picked up for final disposal.in Berekum a total of 28 residents representing 39% of the respondents confirmed waste overflow before container was lifted. Whereas 69 residents representing 36% of the respondents. There was dissatisfaction for all the service rendered by the companies in the two municipalities, in that, the trucks for waste collection comes on rare occasions, consequently the receptacles for these services continue to overflow without respite, which in effect create a lot environmental problems.

Those who were not satisfied on the service quality of the house to house collection said, waste always spill over from bins and this makes their houses aesthetically unpleasant. Again they said, the companies do not have waste implement such as rakes or shovels and brooms on account of this they leave spill over waste all over their houses which makes the place untidy. This to them has been reported the formal channel for service monitoring at the premises of the companies. However there has not been any response from the companies to rectify these problems.

#### **4.4 Service Quality of Waste Management in Berekum and Dormaa Municipality**

The quality of SWM was assessed by asking the respondents to indicate service satisfaction by responding either satisfied or not satisfied with the quality of service on a five-point scale from very poor to very good in terms of two service quality attributes (reliability of collection and sanitary conditions at bin/container location). The following section presents service quality results obtained from residents survey conducted in the two municipalities

and discusses the similarities as well as the differences in service quality among the companies and municipalities.

#### 4.4.1 Quality of the SWM Service in Berekum Municipality

To rate the quality SWM of the service providers effectively, all the communities served by the company were selected for the survey. Table 4.6 presents the results of residents' ratings of the service quality attributes in Berekum. The study shows considerable disparities in terms of quality in the existing SWM system as practiced in the municipality. A total of 65% of the respondents who patronize house-to-house collection service rated the reliability of service and sanitary condition and waste overflow as fair and good. Areas such as Estate, Nyamebekyere and Osofokyere which have larger number of high and medium income households' fall in this category of the respondents rated the quality of service of the company in their vicinity as good.

The level of service quality could be attributed to the perceived quality of service by the people, given they pay for waste services that recover full cost and therefore expect the service to be devoid of waste overflow from bins located in front of their house.

**Table 4.6 Customers' rating the quality of SWM in Berekum Municipality**

Modes of disposal	Number	Sanitary condition and waste spill-over (%)		Reliability of waste collection (%)	
		Good%	Poor %	Good%	Poor %
House-to-house	41	65	25	54	46
Communal collection	97	27	73	24	76
Open dump	18				
	156				

Source: Field Survey, 2014

The service reliability and sanitary conditions of communal collection in the low income areas of Atonotia Kyirikwede Amangoase were largely rated as poor by residents.

Surprisingly, a total 76% of the respondents for communal collection rated the service as poor. This is because the waste overflow from communal containers unto the ground was widespread. The people in these areas confirmed that collection is irregular and the containers' sites are not desirably maintained by the company and the Assembly.

#### 4.4.2 Quality of SWM services in Dormaa Municipality

The survey in the Dormaa Municipality shows similar result, there were also considerable disparities in terms of quality in the existing SWM system as practiced in the municipality. About 71% of the respondents who patronize house-to-house collection service rated the sanitary condition and waste spill over as good. In addition 59% said the reliability of waste collection was also good. Areas such as Kumidaa Street and Asikafo Amantem which have larger number of high and medium income households‘ fall in this category of the respondents rated the quality of service of the company in their vicinity as good.

**Table 4.7 Customers’ rating of quality of SWM in Dormaa Municipality**

Modes of disposal	Number	Sanitary condition and waste spill-over (%)		Reliability of waste collection (%)	
		Good%	Poor %	Good%	Poor %
House-to-house	31	71	29	59	41
Communal collection	98	43	67	36	74
Open dump	27				
	155				

Source: Field Survey, 2014

The service reliability and sanitary conditions of communal collection in the low income areas of Atoase, Ahantrase and Ahenbrono were generally rated as poor by residents. Interestingly, about 67% and 74% in these areas rated the sanitary condition and Reliability of waste collection respectively as poor. To them, the rate of waste overflow, from communal containers unto the ground at the container sites were high. The households confirm that collection is irregular and the containers \_sites are not cleaned by the company.

Comparatively, more of the residents in Dormaa Municipality rated the service quality for the house to house as good than those from Berekum Municipality. Approximately 71% and 59% of the residents from Dormaa Municipality rated the sanitary condition at the container site and the reliability of waste collection respectively as good whereas 65% and 54% also rated the sanitary condition at the container site and the reliability of waste collection respectively in Berekum Municipality. Similar, results came out regarding communal collection. A total of 43% and 36% rated the sanitary condition at the container site and the reliability of waste collection respectively as good from the Dormaa Municipality whereas 27% and 24 also rated the sanitary condition at the container site and the reliability of waste collection respectively in Berekum Municipality.



#### **4.5. Factors That Explains the Differences in Performance in the two municipalities**

The ability for companies to attain maximum output hinges on its internal operations management (capacity) and External (regulation). This section focuses on the influence of capacity and regulation of companies in the study area .First the capacity of companies which includes the Scale of operation and the capability of the company were assessed. Secondly the regulatory mechanism and commitment to contract obligations were analysed to find out the influence on performance of the companies.

##### **4.5.1 The influence of internal factors (capacity) on performance of companies**

In this study the scale of operation and capability of companies to perform operations management tasks is considered as the company's capacity.

##### ***Scale of operation***

This deals with the physical capacity of the company. This was measured using the number of dust bins and vehicles available, the market share of the company. In terms of logistics, the two private companies lack most of the important waste collection machinery needed for the work (Table 4.8). For instance, none of the companies has any of the following; health vans, and fork lift truck. Whilst the company in Berekum has only one compacter and requires 2 to work with, the company in Dormaa has none instead a van is use to collect waste from door to door. Though, the companies do not have the required numbers of vehicles as shown in the table (Table 4.8). According to the waste mangers in the companies they have the capacity to pick all the waste in their various jurisdictions. This was denied by the Heads of WMD in the two municipalities. To them the vehicles are over stretched and they are older and have reduced the capacity of the company to handle waste collection.

Again the study revealed that the skips were woefully inadequate. Interviews with the companies and the Assembly Members in the study area revealed that the greatest problem confronting waste management was inadequate communal skip containers. The table below shows the available skip containers in the two municipalities and the number required for effective waste management. This table goes further to explain why 10% to 30% of the households dispose-off their domestic waste indiscriminately. The informal interviews conducted disclosed that most residents would prefer to dispose their waste properly, as most lament the nuisance caused by the polythene menace. Obviously, this could be contained by disposing into skip container.



**Table 4.8 Equipment holding capacity of the companies in Berekum and Dormaa Municipality**

<b>Equipment holding capacity of the companies in Berekum and Dormaa</b>				
	Berekum		Dormaa	
Equipment	Number available	Number required	Number available	Number required
Skips	18	52	24	50
Grader	1	1	1	1
Skiploader	2	3	2	3
Compactor	1	1	-	1
Roll on/roll off truck		1		1
Bola taxi	—	2	1	3
Obofo tricycle	25	25	25	25

Source: Field Survey, 2014

### ***Companies Capability for effective Solid waste Management***

The Vehicle Operations Planning Capability Operations Supervision Capability Vehicle Maintenance Capability were used to assess the companies capabilities

#### ***Vehicle Operations Planning Capability***

Vehicle operations capability involves route planning to situate collection vehicles and labour to collection routes such that collection efficiency is maximized. It further involved all the processes of ensuring that vehicle use the plan to minimize either the distance that it covers or the time taken to complete the collection assignment.

The study shows that, all the companies within the two municipalities confirmed that route planed for vehicles were prepared for drivers to ply by an in house expertise and that vehicles utilize specific roads for solid waste collection. Again the companies further confirm that, waste pick-up schedules were prepared and strictly followed. However they were quick to admit that when there is a breakdown of vehicle waste pick up delay for few days. With this notwithstanding waste pick-up schedules were strictly adhered to. The pick-up schedules are necessary to ensure that waste is picked-up as planned in the terms of the contract to avoid inconvenience such as spill over and odour nuisance at the collection points. The also had vehicle log books for recording times and mileage.

All the companies further confirmed that, drivers did not use their own discretion about scheduling and routing. The task for selecting vehicle routes were assigned to the supervisors of the companies which help them to control and manage the waste collection ahead of time to ensures that full loads are optimized.

Observations made during the study shows that, the use of route plans, log books and waste pick-up (tour) schedules in no doubt, helped the operations of the waste companies. Ensuing analysis of log book data by supervisors reveals that significant improvements were made in terms of reliability and how work is carried out. The implication here is that, the companies avoid waste of fuel and time which contributes to increase in the daily output of the vehicles.

### ***Operations Supervision Capability***

Supervision involves watching over an activity being carried out by somebody and ensuring that it is performed correctly. The result shows that, vehicle operations supervision within the two municipalities starts with the allocation of vehicles to the supervisors. The supervisors assess the records of the vehicle log books to effectively monitor waste collection to know the daily number of trips and tonnage of waste for meaningful analysis. All the companies said top management was capable of managing the operations of their vehicle. The managers' qualifications ranged from BSc to MSc. The productivity and utilization of the waste collection vehicles is dependent on the extent to which operations are supervised. The top management was capable of managing the vehicle operations.

### ***Vehicle Maintenance Capability***

Maintenance is the task or work done regularly to keep a machine building or a piece of equipment in good condition, it is therefore necessary for vehicles to undergo regular checks for repairs. This prevents total breakdowns, extra cost and low productivity.

The two companies in two municipalities admitted they have a comprehensive maintenance schedules and that, every vehicle goes through a routine check and servicing every month. Further results show that, the companies have in-house mechanics workshop and personals with varied technical know-how for vehicles maintenance. However they have to resort to external mechanic or facility for major repairs because the in house workshop does not have proper garaging facilities for major vehicle maintenance which takes four days or a week. This more often than not reduces productivity.

#### **4.5.2 Regulating Solid Waste Management in the Two Municipalities**

In Ghana, the government employs the public interest regulations to regulate solid waste which try to protect the public interest. Private company's involvement in solid waste needs

institutions with technical knowhow for contract groundwork, implementation, monitoring and evaluation as well as means for managing the lapses that arises from the contract.

Performance monitoring is an important factor that ensures contracts work effectively, this gives a clear picture on whether the waste company is meeting its obligations or not. In 2006 the local Assemblies in the Berekum and Dormaa Municipalities were allowed to outsource SWM via competitive bidding to ensure transparently. By this the Assemblies no longer engaged in the direct provision of waste service but rather became a regulator for the provision of this service. In this section we shall be looking at how the assemblies carry out their this regulation mandate and how these regulation which is external to the companies affects the operation of the company by looking at regulation by contract, the mechanisms for regulating solid waste, commitment to the contractual obligations, enforcement of legislation and sanctions and total independent of the municipal Assemblies to regulate SWM

### ***Regulation by Contract***

The key issues assessed here includes the scope of services under contracts, competitive bidding, contract duration and renewal. Result from the interview with the key informant revealed that, the companies have contract with the two Municipalities with the same contract scope for waste management. This involves communal and house-to-house collection. Largely the contracts service area including both communal and house-to-house collection consist of: (a) solid waste pick up from house-to-house; (b) solid waste pick up from skip containers to be placed at sanitary sites obtained and certified by the Local Assembly; (c) solid waste pick up from industries and (d) solid waste pick up from commercial facilities. All the waste collected under this scope was to be conveyed and disposed at a sites designated and approved by the Assembly.

However this contract did not go through any complete bidding. To them, there were some forms of political meddling in the award of waste contracts. This lies in the fact that, the Municipal Chief Executive, who is government appointee, signs the contract without passing through the proper tendering process at the local level where all interested parties were to be given the chance to compete for the same contract, and the involvement of the waste management department at any level, a department responsible for monitoring the activities of the waste companies. For this reason there is a strong perception among all the



key informants that the waste contracts were given to their cronies of the MCE and the incumbent companies with strong connections from the central government.

The results further revealed that, the contract renewal in the two municipalities' did not go through any competitive bidding. But the incumbent companies continue to working even though their contracts had expired. This process of bidding where the opportunity was given to only the incumbent for renewal without open competitive tendering to other companies offers opportunity for corruption and dishonesty. The above shows clear case of regulatory capture with rent-seeking behaviour of the politicians.

## **Mechanisms for Solid Waste Management Regulating**

### ***Regulation of Access to Information***

To monitor the quality of service effectively, the companies are mandated to furnish the Local Assembly with information on monthly basis. This comprises of performance targets, vehicle tour schedule, proceeds and expenditure from house-to-house collection and tonnage of waste disposed of.

The key informants revealed that the performance targets as well as the formal rules and regulation for private waste companies were obviously elucidated in the contract signed. In addition, they affirmed that, the company cooperate with the Municipalities and provide information on tonnage on waste collected. This information is kept and used as the basis for paying the companies.

With reference to house-to-house service, the companies further admitted that they (companies) provide the municipalities with information on revenues from the house-to-house services. In contrast, the staffs of the WMD were of the view that actual revenue from house to house collection is not properly accounted for in the reported to the Assemblies. Further result from them pointed out that detailed document on claims and revenue collected always lack behind time and the revenue figures usually, were far below expectation. There was a clear evident of information asymmetry with the reports on cost and revenue in all the two municipalities. The information asymmetry in the report of the companies did not arguer well for the Assembly to have a firm grip on cost and revenue to make any meaningful plan for effective cost recovery mechanism.



## **Regulation of Waste collection charges and User fees**

The Result revealed that, the Assembly alone set up the service charge for the communal as well as house-to-house service. They further pointed out that the tariff for house-to-house services devoid of any central government support are fixed by the individual companies and submitted to the Municipal Assemblies for approval, to arrive on the unit price that will protect the resident from high prices from the companies as their main motive is to make profit. The Assembly specify an indicative levy for house-to-house collection to be collected monthly and a unit price per emptying the skips for communal collection service as specified in the contract document. The final levies and the unit prices are susceptible to changes using the price escalation formula in the contract after the award of contract.

## **Waste collection charges and fee (unit price) and cost recovery**

The companies providing the house-to-house collection takes approved service fees from their client on monthly basis in both Berekum and Dormaa. The house-to-house collection fees for waste management were ₵12 Berekum and ₵10 for Dormaa those who patronize the communal services do not pay for user charges. However the cost for lifting a tonne of waste keep increasing with time as result this has become a burden on the assembly.

The user charges were not regularly reviewed this has resulted in to big cash flow problems for the companies due to the continuous increase in exchange rate of the cedi, inflation and fuel prices. The user charges need to be reviewed by the Assembly and published the new fees in national gazette as by-law for it to be legally binding on residents, this according to many is cumbersome and requires political will on the part of the leaders central government and municipalities. Clearly there is a look warm attitude from the Municipal Authorities to implement full cost recovery through charging of all households in the two municipalities.

## **Commitment to the Contractual Obligations**

The contract was signed between two parties that is the Principal and the agent. It is when these two parties adhere to their regulation as stated in the contract that service provision will be effective. In the light of this, the study seeks to assess adherence of assemblies and the companies to the obligation of the contract.

### **The Assemblies' adherence to the obligations of the contract**

The indicators used for this assessment were promulgation of by-laws, education the public and paying the companies strictly by the terms of the contract. The result from the key informant reveals that, the Assemblies hardly conduct public education. There was only 2 and 4 count for Berekum and Dormaa respectively. This has adversely affected the resident's attitude towards waste management. The residents continue to litter indiscriminately.

In relation to the Assembly commitment to buy laws it come out clear that the two assemblies had bye laws fully gazetted to keep the companies and the residents within the confines of best practices so far as SWM is concerned. However, the by-laws were not strictly enforced. Subsequent result shows that the Assembly finds it difficult to fulfil the terms of payment as stated in the contract. Payment of services provided by the companies delays beyond the stipulated time. More so, there had not been any occasion where interest had been paid on delayed beyond the 3 months as stated in the contract.

The difficulties and holdups identified in the Assemblies commitment to its contractual obligations are basically lack of financial resources. The key informant from the waste management department said they keep on changing their schedule for educating the masses on waste year in year out all because of the lack of funds. According to the companies, the cost recovery mechanism is inadequate. With this the assembly funds it difficult to generate enough revenue to pay the companies, there was also weak mechanism in place to deal with residents who refuse to pay for the waste collection services rendered. The Assembly delays so much with the payment of monies and this in effect affects service quality. It can be concluded that Assemblies' non-adherence to contract obligations did influence service quality and productivity of companies.

### **Company's Obligations as specified in the contract**

Indicators used includes; company achieves daily collection target in the contract, company's company cover waste containers during transporting, company collection crew use protective clothing ,company keeps container site free of litters and clean. The directors of both the private companies and the WMD interviewed said the companies were able to achieve their daily targets of about 80%.coverage as stipulated in the contract they also confirmed together with other key informant and from the resident in the household survey that the collection crew have protective clothing and use them their activities, However very few about 10% refuse to wear theirs in most cases. The few workers who do not in most

cases use the protective clothing started with the informal sector and believed they are responsive to the waste collection without protective clothing and therefore insusceptible to any form of infection that may result from waste handling.

Regarding the companies obligation to keeping the container sites clean especially with the communal collection. 25 out of over 100 container sites were kept clean and tidy while the others had litters all over. Large heaps of waste remains at these container sites after solid waste has been moved to the disposal sites. In relation to this is the companies' obligation to repair and maintain communal waste skips. The key informant said the company barely does this function it is only the assemblies that squeeze some funds out of pressure from the residents for few repairs works on these containers.

### **Enforcement of Legislation and Sanctions**

The municipal Assembly has the sole responsibility to enforce legislations and sanctions on the provision of public services. The Assembly uses By-laws as well as terms and condition in the contract as the basic mechanism to management solid waste collection services in their area of jurisdiction. It was realized from the companies point of view that, the by-laws were enforced. In addition they were also of the view that the monitoring of compliance was done effectively, more so, to them, the sanctions for noncompliance to the by-laws were punitive enough and finally they said the environmental health standards and sanitation were strictly observed and enforced. However, the household survey shows on the other hand shows a different picture. It indicated that very little have been done to enforce by-laws.

It was realized that, the Assemblies find it very difficult to sanction offenders due to the frequency at which these by-laws are flouted. The residents show lax attitude toward effective waste management. There are inadequate waste containers, low frequency of waste collection especially with the communal collection, long distance to central containers. Relating to this is the lack of environmental sanitation courts in these areas this hinders the enforcement of solid waste and sanitation regulation.

The fines for non-compliance are the same in the two municipalities and are subject to review and may be changed by the Assembly after the service provider has been informed of such changes. The fine ranges from ₦100 - ₦200. The municipalities so far have not been able to apply any sanction to the companies though evident from the household survey shows the companies fail enormously in waste pick up and the cleaning up of the container



sites. They are unable to apply the stipulated sanctions in the contract. This study is consistent with the finding of Oduro- Kwateng that there is lack of sanctions. According to Oduro- Kwateng (2010) case studies of 5 cities showed that many of the contracts had credible threats of sanctions that required sanction, but non-complying companies were not penalized.

### **Autonomy of the Municipalities Assemblies to Regulate SWM**

The autonomy of the Assemblies to regulate the private sector activities was assessed using regulatory capacity, financial autonomy and the managerial autonomy of the assembly.

Regarding regulatory capacity of the assembly, the result shows that the two municipalities (Berekum and Dormaa) were very responsive to the EPA and the head ministry; they also provided adequate accountability to these institutions. Again the assemblies were independent in regulating the company's services however the Resources and capacity of Assembly to monitor service quality and non-compliance of service delivery was not adequate. The two municipalities did not have sanitary landfills. In view of this, open disposal sites were designated by the Assemblies for use. This makes waste management at the disposal sites a more arduous task particularly during the wet seasons. The obvious is that, waste vehicles most often get trapped in the mud. In Berekum for instance, the grader that push the waste and pave the way for vehicles to pass through at the dump site, on several counts did not work on the account of breakdowns, delay/no payment for work done, and delay in supply of fuel. This adversely affect the operation of the grader at the dump site which further aggravates the solid waste collection in the communities. It becomes difficult for trucks to use the disposal site as driving through the piled up waste at the dump site becomes impossible. The resultant effect is piles of refuse all over the communities. This raised concern by the people, the media and local FM radio stations.

In relation to Financial Autonomy of the Assemblies, It was realised that, the assemblies had adequate independence to set the price waste services at the household level or for the price per tonne for communal service contract however they lacked the financial independence for waste management budget.

It came out that, the financial constraint faced by the Assemblies has resulted in to irregular payment of services rendered by these companies. The lack of logistics for monitoring has affected the work of the WMDs. The companies affirmed that the Assemblies are challenged



with both personal and financial constraints. The financial constraint faced by the Assemblies has resulted in to irregular payment of services rendered by these companies. The major source for paying the companies is the Common fund from the central government. This fund had been in arrears for two 2 quarterly trenches as at the time this study was being conducted, and for that matter everything was at a standstill at the local assembly level. This does not provide the financial incentive for the companies to go the extra mile to provide the needed service.

Regarding service fees adjustment it came out that, the adjustment service fee to reflect price hicks usually takes two years. Again, according to the companies, it takes a long time (over a year) before part of delayed payment is made without interest. Despite the fact that the contracts stipulate that, in the event of delayed payment beyond three months interest should be paid to the company. This makes it difficult for the Control Instruments to be effectively implemented.

## **CHAPTER FIVE**

### **SUMMARY OF KEY FINDINGS, RECOMMENDATIONS AND CONCLUSION**

#### **5.1 Introduction**

There are gaps in the existing literature on the understanding of the solid waste management in Sub Saharan Africa and the elements which influence performance and participation of private firms in SWM. This research addresses these problems by focusing on the Berekum and Dormaa municipalities in Ghana. It is very necessary to be wellinformed with factors responsible for why certain companies provide quality service than others. When these factors are well understood it would assist the private companies improves and sustains the service quality.

The evolving SWM practices, the quality of service, and the factors that influence the private sector performance for effective SWM were the main objective of the research and their implications for solid waste collection in the medium towns. The data for analysis was obtained from staff of the two Assemblies, interview of 2 private companies and a survey of 312 households within the municipalities.

## 5.2 Key findings

This section presents the following key findings of the study arising from analysis and discussion of the study.

Firstly, the study revealed that there were no significant disparities in service quality among the two municipalities. But more difference do exists among different communities due to the difference in the methods of waste collection. In that, the service quality of house-to-house collection practiced at well-organized residential areas was higher than that of communal collection at old town lower income residential areas.

Secondly, the study revealed that more waste is now been collected than before, due to increasing role of the private sector in the waste business. Over 80% of waste generated in these municipalities are collected and send to a designated site for final disposal by the formal private sector. This is much better than the 2006 figure of about 50% waste collection.

In addition, the participation and involvement of households at any level of the SWM has been very slow principally due to the lack of funds and public education.

Moreover, a shift towards cost recovery through charging all households a fixed charge for house-to-house collection is in places. However there were no mechanisms for full cost recovery to include majority of the residents who patronize communal collection service. The assembly therefore face problems of financing bins, providing for other resources which resulted in to illegal dumping by some households.

Furthermore, the study revealed that there were weak regulatory practices and nonadherence to contractual obligations and these consequently provided no incentives for full cost recovery and better service quality. The weak regulatory practices such as no competitive bidding, prolonged periods before upward review of collection fees and service charges, no interest on monies delayed, and delay in payment of subsidy does not provide incentive mechanism for private sector growth and does not enhance better service delivery.

Again, the study revealed that there is a weak institutional capacity (inadequate personnel and logistics). The responsibility over solid waste collection and disposal is well beyond the capacity of waste management institutions; they could not collect the 20% waste as stated in the contract document, lack of personnel and logistics for monitoring and supervision. Though the involvement of the private companies in the management of solid waste capacity

has been strengthened, this is still deemed inadequate to meet required levels of urban solid waste collection. For example, they face difficulties in carrying out their waste management functions due to inadequate financial, technical and human resource capacity.

Finally, the study revealed that there is a lack of strict monitoring and enforcement of sanitation bye-laws in the Municipalities. The study found out that the by-laws were punitive enough but lacked strict enforcement which has contributed immensely to the indiscriminate dumping in the municipalities. It is common knowledge that human beings need to be monitored and sometimes punished, when necessary, before they respond positively to changes. As the issue of proper waste disposal has not been part of us from the scratch, proper education and strict enforcement should always be done.

### **5.3 Recommendation**

In order to address the problem of solid waste in Berekum and Dormaa it is strongly recommended that attempts must be made in a holistic manner. The problem of solid waste is not limited to one institution, one activity or limited to a specific time period. It is multidimensional and interventions to address the problem should be made as such.

In the short term, there is the urgent need for the central government to be made aware of the of problems associated with Solid Waste Management in the Berekum and Dormaa Municipalities so as to be able to plan and weigh the mitigation measures against budgetary allocations. This thesis in part will serve as an information tool to enable government to have an appreciation of the facts on decentralization and effective solid waste management in Berekum and Dormaa Municipalities.

Secondly, the present waste collection situation calls for routine and regular capacity building. Clearly defined standards and service quality were included in the contract for regulating the private sector activities to facilitate a well-managed SWM system. However, the parties to the contract were not abreast with these standards and terms of the waste contract. The study therefore recommends a capacity building for the entire stakeholders in waste management with much emphasis on the officials of Waste Department in the municipalities and the technical operations of the private sector companies.

Thirdly, there should be full cost recovery for waste services; this requires the ‘pay as you throw’ (PAYT) mechanism for communal collection to ensure financial sustainability and



better service quality. This mechanism even though it failed at initial stage in Accra 1995, it worked well in Kumasi. The success of PAYT rest on participation and creating of public awareness, household participation and involvement at all levels and enforcement of by-laws on indiscriminate dumping. The prevailing system were communal collection is free for resident is not sustainable.

Fourth, Assemblies should to be encouraged to be responsive to service delivery. The environmental health unit should be restructured to make it more responsive to the challenges of SWM. The environmental health personal can be attached to the companies to enforce bylaws on paying for service and prevention of indiscriminate dumping of waste. The establishment of recycle firms should be encouraged by the Assembly. They can start by going into partnership with the individual companies .This will encourage household segregation since they would then have economic incentives.

The coordination for waste management should be encouraged within the context of environmental education and stricter enforcement of sanitary bye-laws. Environmental education creates environmental awareness and makes people conscious of environmental issues. The enforcement of bye-laws is important in view of the fact that environmental awareness is not sufficient enough to ensure change in behaviour. Therefore, stricter law enforcement is needed to deter people from dumping indiscriminately.

#### **5.4 Conclusion**

The following objectives were set to be achieved in the study. The first objective was to examine the evolving practices of decentralized solid waste collection for sustainable service delivery; this looks at the inclusion of both the private sector and the household involvement in the solid waste management. The survey established that, the private companies formally started in Berekum and Dormaa in 2006. Basically, three modes of waste collection exist in the study area these are: House-to-house, communal dumpsites and open dump site. The household involvement has been very low in relation to cost recovery, eagerness-to-pay for service, eagerness to separate waste at source, and service quality monitoring. The second objective was to analyse the service quality of decentralized urban SWM in terms of two service quality attributes of reliability of collection and sanitary conditions at bin/container location in the two municipalities. There were no significant difference in service quality among the municipalities however; more difference do exists



among different communities due the difference in the modes of waste collection. Thirdly, the study examined the factors which influence SWM of the two municipalities. This focused on the influence of capacity and regulation of companies in the study area. The result indicated a weak capacity for both the WMD. Though the involvement of the private companies has strengthen the capacity in the solid waste management in these areas much more needs to be done in that, this still deemed inadequate to meet required levels of urban solid waste collection. the study intended assessing the capacity of waste management institutions particularly in terms of physical resources to effectively manage waste in the municipalities. The main equipment used for waste storage and collection were: dustbins, skips, obofo tricycle, skip loaders, compaction trucks and roll on/ roll off trucks. But this equipment was not enough to ensure effective waste collection and disposal. The assessment on regulation came out that, contract for the solid waste collection in these two municipalities did not go through any complete bidding. There were weak regulatory practices and non-adherence to contractual obligations and these consequently provided no incentives for full cost recovery.

To effectively manage the problems enumerated, the following measures are recommended.

1. There should be routine and regular capacity building for the waste management department and the private company personnels
2. there should be full cost recovery for waste services; this requires the 'pay as you throw' (PAYT) mechanism for communal collection
3. There is the need for formalizing waste minimization to divert greater quantity of waste from the disposal stream
4. stricter law enforcement is needed to deter people from dumping indiscriminately

If the above recommendations given are well taken and implemented, it will bring about effective solid waste management; to ensure a clean environment and curb any possible outbreak in Berekun and Dormaa municipalities.

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## APPENDICES

### QUESTIONNAIRE

#### RESIDENTS' SURVEY QUESTIONNAIRE

##### Household Characteristics

- 1.1 City ..... Locality/Suburb ..... 1.2
- Respondent Age-..... Sex: M/F.....
- 1.3 Is respondent household head? ☐ Yes ... ☐ no.....
- 1.4 Educational level of Respondent – a) None b) Basic c) Secondary/tech. d) Tertiary 1.5
- Occupation of the household head (s)
- (1) Unemployed (2) Trading (3) Government employee/Retired
- (4) Self-employed (5) Agriculture/farming (6) Others, specify.....
- 1.6 How many households/families are in the house? .....
- 1.7 How many are you in the house (population of all households)? .....

1.8 Do you rent the house? Yes..... No.....Rent per month..... **Public**

**Awareness and appreciation of waste collection service quality**

2 Where do you empty or dispose your waste?

- a. Door-to-door collection .....
- b. Communal collection (a skip container in the neighborhood).....
- c. An open dump (waste is collected regularly).....

2.2 Give name of service provider collecting your waste.....

2.3 Has the Assembly or the service provider informed or educated you about your responsibility and that of the service provider? Yes..... No.....

2.4 What have you been inform about? .....

2.5 Are you happy or satisfy about the quality of collection service? ☐ Yes ... ☐ no.....

2.6 Why are you satisfied (or not satisfied) about the quality of collection ser-vice?

.....

2.7 Does the waste in container overflows before container is collected? ☐ Yes ... ☐ no.....

2.8 Why does the bin/container overflows? .....

2.9 How often does the vehicle comes for collection?

a) every day, b) once a week c) twice a week d) thrice a week

2.10 How will you rate the quality of waste collection service in the city using these Scales

(1) very poor (2) poor (3) fair (4) good (5) very good

Quality of waste collection service (1) (2) (3) (4) (5)

a). Reliability of waste collection (timely collection) (b).

Sanitary conditions at bin/container site and spill-over of waste

c). Quick response to residents\_ complaints

c). Quick response to residents\_ complaints

(d). cleanliness of surroundings (rating of 5 for no littering)

f). Neatness of waste collection crew, wearing of protective clothing

(g). Neatness of waste collection vehicles

h). Behaviour/attitude of collection crew towards residents

2.11 How do you rate the effects/impacts of solid waste in your community?

Use these Scales (1) high negative effect (2) negative effect (3) no effect (4) positive effect (5) high positive effect

Effects/impacts of solid waste ( 1) high  
negative effect (2) negative effect (3)  
no effect (4) positive effect (5)  
high positive effect

(a). Impact of waste uncollected on human health,

(b). Impact of waste uncollected in the neighborhood on aesthetics

(b).Impact of offensive odour in the neighborhood on health, (d). Impact of choke drains with waste/breeding of mosquitoes 2.12 What should be done to prevent wastes being dumped in drains and other unauthorized places...

2.13 What illness in your house do you associate with the sanitation conditions in your area...?

2.14 Are you involved in service quality monitoring? ....

Waste reuse, recycle and waste minimization

2.15 What do you do with food waste you generate?

2.16 What do you do with plastic waste you generate?

2.17 What waste do you sell?

2.18 What waste do you give out as gifts?

2.19 How do you minimize waste being generated?

2.20 Would you like to separate your food waste and plastic waste at the house for collection? Yes...no.....

2.21 Why will you separate food waste and plastic waste (or NOT separate waste)?

2.22 Which of the following motivate you to sort and separate food and plastic wastes for collection? (tick one or more) ☐ Buy your own bins for storing food waste/plastics and pay a reduced user charge

☐ Those NOT separating food/plastic wastes should pay unreduced user charge

☐ You would like to be provided with free bins

☐ You would like waste to be collected frequently,

☐ You would like see clean environment and unchoked drains

☐ Others.....

Payment of user fees for solid waste collection



3.1 It cost Assembly more money for waste collection and disposal. Who should pay for waste collection?

☐Generators only ☐Generators and Assembly ☐Government and Assembly

3.2 Do you pay for the collection service? ☐Yes.....☐no.....

3.3 If yes, how much do you pay per month in Ghana cedis?

a) For communal collection, GH¢ .....b) For door-to-door collection, GH¢ ...

3.4 If yes, how do you rate the existing tariff? a) High b) Moderate, c) Low / affordable

3.5 Would you be willing to pay MORE for the collection service? ☐YES..... ☐NO.....

3.6 How much are you willing to pay per month in cedis per Household for solid waste collection?

a) For communal collection, GH¢ .....b) for door-to-door collection, GH¢ ... 3.7

How would you want to be charged for solid waste sorting and separation?

a. Pay fixed amount of charge for any amount of waste you generate, and bring for collection

b. Pay different amount of charge for different quantities of waste .....

3.8 What is your total household income per month? a.GH¢ <100 b.GH¢101-200  
c.GH¢201-400 d.GH¢>401

3.9 Who contributes to household income? .....

3.10 What is your monthly Expenses on:

a. Solid waste .....b. toilet..... c. water.....

d. Housing (rent).....e. Electricity.....

**DEPARTMENT OF PLANNING**

**FACULTY OF PLANNING AND LAND ECONOMY**

**Kwame Nkrumah University of Science and Technology, Kumasi**

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**Key informant Questionnaire General Information**

- 1.1 Date of interview.....
- 1.2 Name.....
- 1.3 City and Office Location.....Tel No.....
- 1.4 Sex of respondent (interviewee) ☐ Male ☐ Female
- 1.5 Designation or status in the assembly.....
- 1.6 Indicate your profession.....
- 1.7 Indicate level education ☐ Nil ☐ Basic ☐ Second cycle ☐ Tertiary

**Technical Operations**

- 2.1 What type of collection service does the waste management institutions renders? (tick)
- Only house-to-house service (curbside/door to door) .....
- Only communal collection service .....
- Both house-to-house service and communal collection services .....
- 2.2 Who provides the standard bins for house-to-house service collection.....?
- 2.3 How many communal containers are owned by the company.....?
- 2.4 How many communal containers are picked a day.....?
- 2.5 How many collection vehicles are in the municipality.....?
- 2.6 How many collection vehicles are on road.....?
- 2.7 How many vehicles are hired by companies.....?
- 2.8 Give the collection vehicles types owned by the company, theirs ages and number not on road

### 3 Cost Recovery and Financial Aspects

- 3.1 What is the total number of registered house-to-house users? .....
- 3.2 How is user fee charged for house-to-house service?  
☐ Fee per household ☐ fee per house ☐ fee per bin ☐ fee per volume of waste
- 3.3 Do you charge the same user fee for all house-to-house service users? ☐ yes ☐ no
- 3.5 What is the number of house-to-house users/beneficiaries who pay regularly? .....
- 3.6 How many months are defaulters of fee payment allowed to be in arrears?  
.....
- 3.7 What sanctions are applied to defaulters of house-to-house service fees payment? .....
- 3.8 What factors contribute to the defaulting of user fee payment for house-to-house service?  
.....
- 3.9 What is the total amount billed per month for house-to-house service.....  
.....
- 3.10 What is the actual total amount collected per month for house-to-house service.....
- 3.11 What is the cost per tonne of house-to-house waste collected and transported to the disposal site? .....
- 3.12 How many people are served by communal collection service? .....
- 3.13 Do you charge user fee for communal service users? ☐ yes ☐ no
- 3.14 If yes, indicate the amount being paid? .....
- 3.15 If no, why are communal service users not paying user fee? .....
- 3.16 What is the cost per tonne of communal waste collected and transported to the disposal site? .....
- 3.17 How are trucks purchases? (Source (s) of funds for purchasing of trucks? .....
- 3.18 What is (are) the source(s) for funds for working capital (for paying salaries, buying fuel and repairing vehicle)? .....
- 3.19 What is the return (annual profits) on your investments (in term of percentage of investment)? .....
- 3.20 How do you judge the return on your investments? .....
- 3.21 How do you judge the financial viability (or profitability) of the waste business? .....
- 3.22 How do you judge the cost recovery of the waste service? .....
- .....



## 5 Contract and Public-Private Partnership Arrangements

5.1 What type of contract(s) are you operating under ☐☐No contract ☐franchise contract?

☐Service contract ☐other, specify.....

5.2 How was the franchise contract procured? ☐☐No bidding ☐open competition bidding

☐other, specify.....

5.3 How is the franchise contract renewed?

☐☐Automatic renewal ☐competition bidding ☐other, specify.....

5.4 How was the communal service contract procured? ☐☐No bidding ☐open competition bidding ☐other, specify.....

5.5 How is the communal service contract renewed?

☐☐Automatic renewal ☐competition bidding ☐other, specify.....

5.6 How do you judge the transparency and level playing field of the contract processes in solid waste business?.....

5.7 Do you think or know of some political interference in awarding contracts to waste contractors .....

5.8 What is the duration of franchise contract? .....

5.9 Is the franchise contract duration enough to recover investment in vehicles?  
.....

5.10 What is the duration of communal service contract? .....

5.11 Is the communal service contract duration enough to recover investment in vehicles?  
.....

5.12 Is the house-to-house contract signed with ☐the Assembly ☐the residents?

5.13 Are the house-to-house service users registered with ☐the Assembly ☐the Company?

5.14 Does the contract have price adjustment formula and cost escalation indices which are tied to the rate of inflation, fuel, labour or consumer price index?.....  
.....

5.15 If there are no price adjustment factors, how are your operations affected?  
.....

5.16 Is the service area delineated into zones with well known boundaries? .....

5.17 Does your company operate in the zone alone...?

5.18 How do you judge the size of the service area to the capacity of Solid Waste Institutions?

In the municipality.....

5.19 What is your opinion about the Assembly's obligations under the contract?

*Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

Opinion about the Assembly's obligations under the contract	1	2	3	4	5
(a). Assembly provides designated and accessible landfill site					
(b). Assembly provides designated and accessible communal container sites					
(c). Assembly provides communal containers (23, 12 and 10m3)					
d). Assembly provides standard bins for house-to-house service					
(e). Assembly promulgates bye-law to assist contractor in the service					
(f). Assembly conducts public education regularly					
(g). Assembly pays contractor within 45 working days after date of claim					
(h). Assembly pays interest charges as stipulated in the contract if payment delayed beyond 3 months					

5.20 Is there any political interference in the day-to-day management and operations of vehicles? .....

5.21 Who sets the user fee for house-to-house services?

.....

5.22 What role do you play in setting user fee for house-to-house services?

.....

5.23 What role do you play in setting user fee for communal services? .....

.....

5.24 In case you do not participate in setting user fee, do you see the user fee set as reasonable?

.....

5.25 Are the house-to-house services subsidized by Government or Assembly

.....

5.26 Does the Assembly honour its obligation to pay for the service or subsidy on time?

.....

5.27 In the case of delay payment for communal services, how does this affect your operations?

.....

5.28 What is your opinion about honoring of company's obligations under the contract?  
Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree

opinion about honoring of company's obligations under the contract					
(a). Company provides trucks sufficient for solid waste collection					
(b). Company achieves daily collection target in the contract					
(c). Company disposes off waste at designated landfill					
d). Company uses professional and technical personnel re-					
(e). Company keeps complaints of residents/users					
(f). Company collection crew uses protective clothing					
(g). Company covers waste containers during transporting					
h). Company keeps vehicles in good appearance/sanitary condition and road worthy,					
(i). Company carries out regular repair and maintenance of containers					
(j). Company maintain container site free of litters and clean					

## 6 Regulatory (External) Factors Affecting Solid Waste Management

6.1 What performance targets are set in the service contracts? .....

6.2 How is the performance target in the service contract monitored by the Assembly?

.....

6.3 What kind of reports on operations do you submitted to the Assembly?

.....

6.4 What is the frequency of operations report submitted by your company to the Assembly?

.....

6.5 What factors outside your control affect service delivery? .....

6.6 How is the quality of service rendered by your the companies/institutions regulated?

.....



- 6.7 Is the Assembly able to monitor the service contracts? .....
- 6.8 What is the reason why the Assembly is able or not able to monitor the companies' service quality? .....
- 6.9 What is the Assembly doing to apply the full cost recovery policy? .....
- .....
- 6.10 What is the Assembly doing to enforce by-laws? .....
- 6.11 What is the Assembly doing to enforce national laws? .....
- 6.12 Is the Assembly financial independent, and does not request for funds from central government? .....
- 6.13 Why is the Assembly not capable or capable of paying companies regularly? .....
- .....
- 6.14 What is the effect of the following on the company\_s performance?  
*Use these Scales (1) high negative effect (2) negative effect (3) no effect (4) positive effect (5) high positive effect (.....on the performance of company)*

The effect of the following on the company_s performance	1	2	3	4	5
(a). Frequency of payments of service contract					
(b). Company_s compliance to regulation of service quality					
(c). Current level of user charges for house-to-house service					
(d). Current level of charge or price per tonne for service con-tract					
(e). Financial autonomy (level of budget) of the Assembly					
(f). Autonomy of the Assembly in decision making on the level of user charge					

- 6.15 How would you judge the implementation of sanitation policies by the Assembly? *Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

Judging the implementation of sanitation policies by the Assembly	1	2	3	4	5
(a). City Authority (Assembly) as legal entity has powers conferred on it by the Local Government Act 1993 (Act 462) to promulgate by- laws to govern and regulate sanitation.					

(b). All solid wastes generated in the city are regularly collected and disposed of in controlled landfills or by other environmentally acceptable means.					
(c). Waste Management Department (WMD) collects at most 20% of the waste collected in the city.					
(d). The involvement of the private sector in the waste collection services has improved solid waste management.					
(e). City is delineated into zones or service areas and each company operates in a specific zone.					
(f). Each private company has monopoly in a zone.					
(g). The private sector operates within the policies, regulations, supervisory and licensing arrangements set up by the Assembly					
(h). The policy on full cost recovery where possible (middle and high income areas) is not being pursued seriously.					
(h). The policy on full cost recovery where possible (middle and high income areas) is not being pursued seriously.					
i). The by-laws of the Assembly and national laws on environmental sanitation are not enforced					
(j). The fine for defaulting by-laws are not punitive (penalizing) enough					
(k). The monitoring of compliance to solid waste service standards and regulations set in the contracts are not done effectively.					
(l). The environmental health standards and sanitary regulations					

6.16 How do you rate the regulation of solid waste services by the Assembly?

*Use these Scales (1) very inadequate (2) inadequate (3) normal (4) adequate (5) very adequate*

Rating the regulation of solid waste services by the Assembly	1	2	3	4	5
n) Accountability of the Assembly to EPA and head Ministry					
o) Independence of the Assembly in regulating the company's services					
Resources and capacity of Assembly to monitor service quality and non compliance of service delivery					
Frequency of monitoring companies' compliance to service quality and standards					

6.17 How would you judge the level of autonomy of the Assembly?

*Use these Scales (1) very low (2) low (3) normal (4) high (5) high very*

Judging the level of autonomy of the Assembly	1	2	3	4	5
(a). Autonomy to set level of user charges					
(b). Autonomy to set level of price per tonne for service contract					
(c). Financial autonomy of the Assembly (level of budget for solid waste)					
(d). Autonomy of the Assembly to terminate contract of nonperforming company					
(e). Autonomy to enforce by-laws and prosecute free riders					
f). Autonomy to implement national sanitation policy					
g) Autonomy of the Assembly in decision making on the level of user charge					

Autonomy

18 How would you rate the adequacy or otherwise of the following financial issues? *Use these Scales (1) very inadequate (2) inadequate (3) normal (4) adequate (5) very adequate*

(a). Frequency of payments of service contract					
b). Current level of user charges for house-to-house service					
(c). Current level of charge or price per tonne for service contract					
(d). Financial autonomy (level of budget) of the Assembly					

Thank you.

## DEPARTMENT OF PLANNING

### FACULTY OF PLANNING AND LAND ECONOMY

**Kwame Nkrumah University of Science and Technology, Kumasi**

### Company Questionnaire

#### General Information

1.1 Date of interview.....

1.2 Company\_s name.....

1.3 City and Office Location.....Tel No.....

1.4 Sex of respondent (interviewee) ☐ Male ☐ Female

1.5 Designation or status in the company.....



1.6 Indicate your profession.....

1.7 Indicate level of terminal formal education ☐ Nil ☐ Basic ☐ Second cycle ☐ Tertiary

### Technical Operations

2.1 What type of collection service does the company renders? (tick)

☐ Only house -to-house service (curbside/door to door) .....

☐ Only communal collection service .....

☐ Both house -to-house service and communal collection services  
.....

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

2.3 How many communal containers are owned by the company.....?

2.4 How many communal containers are picked by the company.....?

2.5 How many collection vehicles are owned by the company.....?

2.6 How many collection vehicles are on road.....?

2.7 How many vehicles are hired by the company.....?

2.8 Give the collection vehicles types owned by the company, theirs ages and number not on road

Type of vehicles	Number	Ages of vehicles (years )	Number not on road
Compactor			
Side loader			
Skip truck			
Roll-on-truck			

2.9 Where do you repair your vehicles? ☐ In house vehicle workshop ☐ workshop elsewhere

2.10 If your company has no maintenance workshop, where do you maintain your vehicles?

.....

2.11 How many mechanics do you have for in-house repairs?

2.12 How many operations supervisors do you have?

2.13 What is the approximate distance between the service area and the disposal site?

.....

### Vehicle operations planning

2.14 How would you rate vehicle operations planning?

*Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

Vehicle route plan is prepared for drivers					
Drivers use vehicle route plan for drivers					
Divers have vehicle log book for recording miles and time					
Drivers use waste pick-up schedules indicating day and time					
Drivers use waste pick-up schedules indicating day and time					
f) Drives use their own discretion about which route to take					
Records in vehicle log books are analysed by supervisor/engineer					

Drivers follow specific routes for solid waste collection					
---	--	--	--	--	--

Who prepare vehicle route plan .....

Who prepare vehicle schedules (that is waste pick-up) .....

### Vehicle operations Supervision

2.15 Number of operations supervisors.....

2.16 Number of vehicles supervised by each supervisor .....

2.17 How would you rate vehicle operations supervision?

*Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

Rating vehicle operations supervision	1	2	3	4	5
a. Supervisor checks records in vehicle log books					
b. Supervisor monitors and follow-up waste collection					
c. Supervisor records the daily number of trips and tonnage of waste					
d. Management able to manage and analyse log records					
e. Frequency of waste pick-up are strictly followed					
f. A scheduled waste pick-up delayed, is picked up within 24 hours					
g. The drivers and collection crew put on protective clothing					
h. Waste spillover unto the ground at collection points is collected					
i. High moral of workers exist due to fair labour practices					

Vehicles Maintenance



2.18 Where do you repair your vehicles? 1. in-house workshop 2. elsewhere

2.19 Number of mechanics for in-house repairs.....

2.20 Number of vehicles per mechanic.....

2.21 Breakdown vehicle comes back on road within how many days? .....

2.22 How would you rate vehicle maintenance?

*Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

Rating vehicle maintenance	1	2	3	4	5
Vehicle maintenance schedules are prepared and followed					
Breakdowns occur despite planned maintenance					
Minor breakdowns are repaired within 24 hours					
vehicle breakdowns affect waste collection					

2.23 How is vehicle operations supervised? .....

2.24 What is your collection frequency per week for house-to-house service? .....

2.25 What is the number of collection crew including driver for each of the following:

a. Compactor vehicle .....

b. Skip vehicle, Roll-on Vehicle, Side loader

c. Tractor.....

2.26 What are the reasons for waste spillover at communal container locations?  
.....

2.27 How would you judge the cooperation of residents served by house-to-house  
service?  
.....

2.28 What complaints are often received from service beneficiaries?  
.....

2.29 What complaints about service beneficiaries are often received from collection  
crew?

.....

2.30 How are these complaints responded to? .....

*Vehicle and traffic conditions*

2.31 How would you rate the condition of road used for waste collection  
☐ Very poor ☐ poor ☐ fair ☐ good ☐ very good

2.32 How would you rate the nature of traffic conditions along collection routes?  
☐ Slow/low congestion ☐ moderate congestion ☐ high congestion

2.33 How do \_make \_and \_age \_of vehicles and the frequency of breakdown for the  
past year affect operations?  
.....

**3 Cost Recovery and Financial Aspects**

3.1 What is the total number of registered house-to-house users? .....

3.2 How is user fee charged for house-to-house service?  
☐ Fee per household ☐ fee per house ☐ fee per bin ☐ fee per volume of waste

3.3 Do you charge the same user fee for all house-to-house service users? ☐ yes ☐ no

3.4 If NO, indicate the amount and number of customers in the categories below?

No	Number of households registered in each class	Amount charged per household (¢)	Number of Households who pay regularly
Class 1			
Class2			
Class 3			
Class 4			

- 3.5 What is the number of house-to-house users/beneficiaries who pay regularly? .....
- 3.6 How many months are defaulters of fee payment allowed to be in arrears?  
.....
- 3.7 What sanctions are applied to defaulters of house-to-house service fees payment?  
.....
- 3.8 What factors contribute to the defaulting of user fee payment for house-to-house service?  
.....
- 3.9 What is the total amount billed per month for house-to-house service.....  
.....
- 3.10 What is the actual total amount collected per month for house-to-house service.....
- 3.11 What is the cost per tonne of house-to-house waste collected and transported to the disposal site? .....
- 3.12 How many people are served by communal collection service? .....
- 3.13 Do you charge user fee for communal service users? ☐ yes ☐ no
- 3.14 If yes, indicate the amount being paid? .....
- 3.15 If no, why are communal service users not paying user fee? .....
- 3.16 What is the cost per tonne of communal waste collected and transported to the disposal site? .....
- 3.17 How are trucks purchases? (Source (s) of funds for purchasing of trucks .....
- 3.18 What is (are) the source(s) for funds for working capital (for paying salaries, buying fuel and repairing vehicle)? .....
- 3.19 What is the return (annual profits) on your investments (in term of percentage of investment)? .....
- 3.20 How do you judge the return on your investments? .....
- 3.21 How do you judge the financial viability (or profitability) of the waste business? .....



3.22 How do you judge the cost recovery of the waste service? .....

.....

3.23 What were the total annual costs of the following items?

items	2010	2011	2012	2013
Fuel consumption cost				
Salaries and benefits				
Vehicle maintenance and servicing				
Depreciation of vehicles				
Withholding tax				
Rent of office space and utilities				
Insurance of collection vehicles				

#### 4 Company Characteristics and Human Resource Capacity

4.1

What is the type of company ☐not registered ☐limited liability by share ☐partnership  
☐Sole proprietor ☐Limited liability by guarantee (NGO)

4.2 When was the company registered? .....

4.3 When did the company commence solid waste services? .....

4.4 How do you classify the size of the company? ☐small scale ☐medium scale ☐large  
scale

4.5 How many management levels? .....

4.6 Give the order of management control and information flow (example:  
director→manager→supervisors/mechnics→collectioncrew/drivers/cleaners).....  
.....  
.....

4.7 How are the workers motivated? .....

4.8 Has the company sponsored any of the employees to undergo short training to enhance  
his/her performance? .....

4.9 If yes, what kind of training? .....

4.10 What kind of study leave do you have for the employees? .....

4.11 How many people work in the company? Fill the following table

Posts held	Number of staff	Number of staff	Highest qualification
Managing Directors ( <i>Part of ownership</i> )			
Managers/Administrator			
Engineers			
Operations supervisor			
Accountant			
Collection vehicle drivers			
Collection workers (loading of waste)			
Workshop staff (Mechanics)			
Other, specify			

## 5 Contract and Public-Private Partnership Arrangements

5.1 What type of contract(s) are you operating under ☐ ☐ No contract ☐ franchise contract?

☐ Service contract ☐ other, specify.....

5.2 How was the franchise contract procured? ☐ ☐ No bidding ☐ open competition bidding

☐ ☐ other, specify.....

5.3 How is the franchise contract renewed?

☐ ☐ Automatic renewal ☐ competition bidding ☐ ☐ other, specify.....

5.4 How was the communal service contract procured? ☐ ☐ No bidding ☐ open competition bidding ☐ ☐ other, specify.....

5.5 How is the communal service contract renewed?

☐ ☐ Automatic renewal ☐ competition bidding ☐ ☐ other, specify.....

5.6 How do you judge the transparency and level playing field of the contract processes in solid waste business?.....

5.7 Do you think or know of some political interference in awarding contracts to waste contractors .....

5.8 What is the duration of franchise contract? .....

5.9 Is the franchise contract duration enough to recover investment in vehicles?

.....

5.10 What is the duration of communal service contract? .....

5.11 Is the communal service contract duration enough to recover investment in vehicles?

.....

5.12 Is the house-to-house contract signed with ☐ the Assembly ☐ the residents? 5.13 Are the

house-to-house service users registered with ☐ the Assembly ☐ the Company?

5.14 Does the contract have price adjustment formula and cost escalation indices which are tied to the rate of inflation, fuel, labour or consumer price index?.....

5.15 If there are no price adjustment factors, how are your operations affected?

.....



5.16 Is the service area delineated into zones with well known boundaries? .....

5.17 Does your company operate in the zone alone? .....

5.18 How do you judge the size of the service area to the capacity of your company?

.....

5.19 What is your opinion about the Assembly's obligations under the contract?

*Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly*

Opinion about the Assembly's obligations under the contract					
(a). Assembly provides designated and accessible landfill site					
(b). Assembly provides designated and accessible communal container sites					
(c). Assembly provides communal containers (23, 12 and 10m3)					
(d). Assembly provides standard bins for house-to-house service					
(e). Assembly promulgates bye-law to assist contractor in the service					
(f). Assembly conducts public education regularly					
(g). Assembly pays contractor within 45 working days after date of claim					
(h). Assembly pays interest charges as stipulated in the contract if payment delayed beyond 3 months					

*agree*

5.20 Is there any political interference in the day-to-day management and operations of vehicles? .....

5.21 Who sets the user fee for house-to-house services? .....

5.22 What role do you play in setting user fee for house-to-house services?

.....

5.23 What role do you play in setting user fee for communal services? .....

.....

5.24 In case you do not participate in setting user fee, do you see the user fee set as reasonable? .....

5.25 Are the house-to-house services subsidized by Government or Assembly.....

5.26 Does the Assembly honour its obligation to pay for the service or subsidy on time?

.....

5.27 In the case of delay payment for communal services, how does this affect your operations?

.....

5.28 What is your opinion about honoring of company\_s obligations under the contract?

*Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree*

opinion about honoring of company_s obligations under the contract	1	2	3	4	5
(a). Company provides trucks sufficient for solid waste collection					
(b). Company achieves daily collection target in the contract					
(c). Company disposes off waste at designated landfill					
d). Company uses professional and technical personnel re-					
(e). Company keeps complaints of residents/users					
(f). Company collection crew uses protective clothing					
(g). Company covers waste containers during transporting					
h). Company keeps vehicles in good appearance/sanitary condition and road worthy,					
(i). Company carries out regular repair and maintenance of containers					
(j). Company maintain container site free of litters and clean					

## 6 Regulatory (External) Factors Affecting Solid Waste Management

- 6.1 What performance targets are set in the service con-tracts? .....
- 6.2 How is the performance target in the service contract monitored by the Assembly?  
.....
- 6.3 What kind of reports on operations do you submitted to the Assembly? .....
- 6.4 What is the frequency of operations report submitted by your company to the Assembly?  
.....
- 6.5 What factors outside your control affect your service? .....
- 6.6 How is the quality of service rendered by your company regulated? .....
- 6.7 Is the Assembly able to monitor the service contracts? .....
- 6.8 What is the reason why the Assembly is able or not able to monitor the companies  
\_service quality?  
.....
- 6.9 What is the Assembly doing to apply the full cost recovery policy? .....
- .....
- 6.10 What is the Assembly doing to enforce by-laws? .....
- 6.11 What is the Assembly doing to enforce national laws? .....
- 6.12 Is the Assembly financial independent, and does not request for funds from central  
government? .....
- 6.13 Why is the Assembly not capable or capable of paying your company regularly?  
.....
- 6.14 What is the effect of the following on the company\_s performance?

*Use these Scales (1) high negative effect (2) negative effect (3) no effect (4) positive effect*

(5) high positive effect (.....on the performance of company)

What is the effect of the following on the company's performance					
(a). Frequency of payments of service contract					
(b). Company's compliance to regulation of service quality					
(c). Current level of user charges for house-to-house service					
(d). Current level of charge or price per tonne for service contract					
(e). Financial autonomy (level of budget) of the Assembly					
(f). Autonomy of the Assembly in decision making on the level of user charge					

6.15 How would you judge the implementation of sanitation policies by the Assembly?

Use these Scales (1) strongly disagree (2) disagree (3) cannot tell (4) agree (5) strongly agree

Judging the implementation of sanitation policies by the Assembly					
(a). City Authority (Assembly) as legal entity has powers conferred on it by the Local Government Act 1993 (Act 462) to promulgate by-laws to govern and regulate sanitation.					
(b). All solid wastes generated in the city are regularly collected and disposed of in controlled landfills or by other environmentally acceptable means.					
(c). Waste Management Department (WMD) collects at most 20% of the waste collected in the city.					
(d). The involvement of the private sector in the waste collection services has improved solid waste management.					
(e). City is delineated into zones or service areas and each company operates in a specific zone.					
(f). Each private company has monopoly in a zone.					
(g). The private sector operates within the policies, regulations, supervisory and licensing arrangements set up by the Assembly					
(h). The policy on full cost recovery where possible (middle and high income areas) is not being pursued seriously.					
(h). The policy on full cost recovery where possible (middle and high income areas) is not being pursued seriously.					
i). The by-laws of the Assembly and national laws on environmental sanitation are not enforced					
(j). The fine for defaulting by-laws are not punitive (penalizing) enough					
(k). The monitoring of compliance to solid waste service standards and regulations set in the contracts are not done effectively.					
(l). The environmental health standards and sanitary regulations					

6.16 How do you rate the regulation of solid waste services by the Assembly?



Use these Scales (1) very inadequate (2) inadequate (3) normal (4) adequate (5) very adequate

Rating the regulation of solid waste services by the Assembly	1	2	3	4	5
n) Accountability of the Assembly to EPA and head Ministry					
o) Independence of the Assembly in regulating the company_s services					
Resources and capacity of Assembly to monitor service quality and non compliance of service delivery					
Frequency of monitoring companies_ compliance to service quality and standards					

6.17 How would you judge the level of autonomy of the Assembly?

Use these Scales (1) very low (2) low (3) normal (4) high (5) high very

Judging the level of autonomy of the Assembl	1	2	3	4	5
(a). Autonomy to set level of user charges					
(b). Autonomy to set level of price per tonne for service contract					
(c). Financial autonomy of the Assembly (level of budget for solid waste)					
(d). Autonomy of the Assembly to terminate contract of nonperforming company					
(e). Autonomy to enforce by-laws and prosecute free riders					
f). Autonomy to implement national sanitation policy					
g) Autonomy of the Assembly in decision making on the level of user charge					

18 How would you rate the adequacy or otherwise of the following financial issues?

Use these Scales (1) very inadequate (2) inadequate (3) normal (4) adequate (5) very adequate

(a). Frequency of payments of service contract					
b). Current level of user charges for house-to-house service					
(c). Current level of charge or price per tonne for service contract					
(d). Financial autonomy (level of budget) of the Assembly					