Emmanuel Oduro Antwi

COLLECTION OF MUNICIPAL
SOLID WASTE IN GHANA

A Case of Public-Private- Partnership in AMA

School of Technology

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The collection of municipal solid waste has been a critical issue in Ghana especially the Accra Metropolitan Assembly. Issues relating to piles of solid waste in communities, streets, open spaces, lorry terminals, markets, homes and other public places were rampant and could not be managed by the AMA. The failure by the local authorities to efficiently implement policies relating to the waste collection resulted in Public-Private-Partnership approach.

The study therefore focused on the collection of municipal solid waste in Accra Metropolitan Assembly since the inception of the PPP initiative and examining how it has contributed to the waste collection stream. The mode of operation, performance level, the challenges on the initiative among others. The theoretical framework and the main tools for data methods were obtained through primary and secondary sources, interviews and others.

The performances of six service providers in their respective service zones were analyzed based on the information available through the tools and the Key Performance Indicators which were derived from the Fee and Performance-Based Solid Waste Collection Service Franchise Agreement signed between AMA and service providers.

Out of six (6) service providers, only one, Jekora Ventures had a performance score of 80.6%. The other service providers in the remaining seven 7 service zones performed below 65%. Of the estimated 264,188 households, only 50,002 has been registered to represent 22.70% and a total of 44,084 bins have been distributed representing 20.90%. With all the analysis available, the clear indication is that, the general performance is unsatisfactory and that their performances are on a downward stream, which is contrary to what the PPP motive was for.

Keywords Municipal solid waste collection, public-private-partnership
CONTENTS

ABSTRACT

1. INTRODUCTION .................................................................................................................. 1

1.1 Background to the study ................................................................................................. 1

1.2 Statement of Research Problem ...................................................................................... 5

1.3 Research Objectives ....................................................................................................... 7

1.4 Research Methodology ................................................................................................... 7

1.4.1 The Research Design ................................................................................................. 8

1.4.2 Data Collection Method ............................................................................................. 8

1.4.3 Research Quality ......................................................................................................... 9

1.5 Limitation of the Study ................................................................................................ 9

1.6 The Study Area and the History of Accra Metropolitan Assembly ......................... 10

1.7 Organization of the Study ............................................................................................ 11

2. CONCEPTUAL FRAMEWORK OF SOLID WASTE COLLECTION AND MODALITIES OF PUBLIC-PRIVATE-PARTNERSHIP ................................................................. 13

2.1 Solid Waste Collection .................................................................................................. 13

2.2 Forms of Solid Waste Collection .................................................................................. 14

2.2.1 House-to-House Pick-up ......................................................................................... 14

2.2.2 Curbside Pick-up ..................................................................................................... 14

2.2.3 Community Bins or Communal Central Containers ............................................ 15

2.2.4 Self-delivery .............................................................................................................. 15

2.2.5 Contracted or Delegated Service .......................................................................... 15

2.3 Classification of Waste .................................................................................................. 16

2.4 Short Historical Trend on Solid Waste Collection (SWC) in Ghana ....................... 18
3.8 Discussion of the Outcome of the Performance Assessment .................................. 59
3.9 Informal Sector of Solid Waste Collection in AMA ............................................. 60
3.10 The Challenges Hindering the Public-Private-Partnership concept in AMA ........ 64
  3.10.1 Political Interference ......................................................................................... 64
  3.10.2 Lack of Political Will and Commitment ........................................................... 64
  3.10.3 Poor infrastructure and Institutional Planning ................................................. 65
  3.10.4 Lack of Enforcement ....................................................................................... 65
  3.10.5 Financial Problem ......................................................................................... 66
  3.10.6 Poor Attitude and Cultural Lifestyle of the People ....................................... 66
  3.10.7 Inadequate Logistics and Frequent Breakdown ............................................. 67
4. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS ............... 68
  4.1 Overview and Summary of Findings .................................................................... 68
  4.2 Conclusions ......................................................................................................... 70
  4.3 Recommendations .............................................................................................. 71
REFERENCES ............................................................................................................ 73
APPENDIX .................................................................................................................. 76
LIST OF FIGURES AND TABLES

Figure 1. Projected Waste Generation by regions (millions of tonnes/years) .......... 2
Figure 2. Waste Collection rates by income level (Percent)................................... 3
Figure 3. Map of Accra Metropolitan Assembly and Greater Accra Region .......... 10
Figure 4. Greater Accra .......................................................................................... 23
Figure 5. Ashanti Region ....................................................................................... 23
Figure 6. Central Region ....................................................................................... 23
Figure 7. Western Region ..................................................................................... 24
Figure 8. Upper West ............................................................................................ 24
Figure 9 Northern Region .................................................................................... 24
Figure 10. Eastern Region ................................................................................... 24
Figure 11. National Average Solid Waste Composition ........................................ 25
Figure 12. Diagram for Waste Management Institutions in Ghana ..................... 32
Figure 13. House-to-House mode ...................................................................... 37
Figure 14. Curbside Mode of Collection .............................................................. 38
Figure 15. Communal Container Collection ......................................................... 39
Figure 16. Registration and Distribution of storage bin chart ............................. 46
Figure 17. Informal Sector Waste Collectors ....................................................... 62
Figure 18. Informal self-delivery site .................................................................. 63

Table 1. Sources and types of municipal solid waste ............................................ 17
Table 2. Examples of Material classification of waste type ................................... 18
Table 3. Classification of waste based on physical state of waste substance .......... 18
Table 4. Average National Daily Waste Generation per Capita by Waste Type........22
Table 5. Average Daily Solid Waste Generation per Capita by Area........................22
Table 6. Average Waste Generation in Regional Capitals.................................22
Table 7. Solid Waste Collection and Management in ESPA 2010.......................33
Table 8. Registration of Clients and Supply of Storage Bins............................45
Table 9. Actual Performance of Service Providers.........................................57
Table 10. Performance and Evaluation marks based on the Performance..........59
Table 11. Daily Collection (tons) of MSW in AMA......................................63

**ABBREVIATIONS**

AMA          Accra Metropolitan Assembly
WMD          Waste Management Department
PPP          Public-Private-Partnership
ESP          Environmental Sanitation Project
UESP         Urban Environmental and Sanitation Project
MSW          Municipal Solid Waste
MMDA’s       Metropolitan, Municipal, Districts Assemblies
UESP         Urban Environmental and Sanitation Project
NSD          National Sanitation Day
MLGRD        Ministry of Local Government & Rural Development
CCW          City and Country Waste
MSWC         Municipal Solid Waste Collection
LI            Legislation Instrument
EPA          Environmental Protection Agency
ISP          Informal Service Providers
CCCM         Communal container Collection Mode
HHCM         House-to-House Collection Mod
ESPA  Environmental Sanitation Policy Amendment
1. INTRODUCTION

1.1 Background to the study

Many cities and towns globally are confronted with the crisis of solid waste collection due to population growth and developmental expansions. Large quantities of solid waste are being generated daily especially in the urban areas due to the rapid urbanization, more predominantly the developing world. The continuous economic growth and industrialization coupled with population growth and socio-economic activities have increased the volume to an unbelievable point which has caught most authorities unprepared. ‘’As the say goes, more population equal more trash’’ /1/. Waste is created out of our habits of life and it would continue to occur since human race and activities continue to grow. It is produced at each point of production and development in human endeavor and the logistics, proper planning and appropriate technology for effective and efficient management have been at bay especially for the middle- and lower-income countries in the world. /2/

Urbanization, population growth and economic development bring about waste generation and the urban centers of these countries generate tremendous amount of waste from households, schools, markets centers, open space, industrial areas, business premises, medical facilities and others /3/ & /4/. In 2016, solid waste generated globally by cities was estimated around 2.01 billion tonnes amounting to a 0.74kg per person per day /5/. With the forecast of the rapid population growth, industrialization and urbanization, annual solid waste generation could increase between 40 to 70% percent from 2016 level to 3.40 billion tonnes in 2050 if the trend should continue /5/. The illustration below gives the projected waste generations by regions in a graph form from 2016 up to 2030 and then to 2050. /6/
Waste management has become a global issue and very challenging especially for developing countries. The main problem related to this is the collection issues within the cities and its environs. Middle income and lower income countries produce huge amounts of waste and out of that between one-third and one-half of the waste remain uncollected. According to the World Bank, the collection of waste by middle income countries cost between 50-80% percent of their total municipal budget, the lower income countries collection rate cost 80-90% of their total budget while in developed countries the cost on waste collection is between 5-10% percent of the total budget. Now, from the cost profile, it is believed that the middle and lower countries spent a lot of municipal budget on waste management, but they do not achieve the objective. The illustration below gives the percentage rates on waste collection by income level in a graph form.

Figure 1. Projected Waste Generation by regions (millions of tonnes/years) /6/
Figure 2: Waste Collection rates by income level (Percent) /6/

Waste products can be of a good benefit to a country if proper measures are laid down to utilize it. Likewise, it can also create an epidemic to human lives if the needed attention is not given to it. Most of the health and environmental problems in the world especially the developing nations are attributed to improper waste management and inaccessible improved sanitation especially in sub-Saharan African countries and cities /7/. Throughout the history waste management has always presented enormous challenges to municipal authorities in countries of developing world with inefficient in the system /8/. Furthermore, the problem constitutes an even greater menace especially in the rapidly expanding cities of developing countries such as (sub-Saharan) Africa mainly due to pressures of uncontrolled urbanization, dwindling space for landfills and public health risk is even more pronounced where health and sanitation infrastructure is very fragile and largely dysfunctional /9/. It results due to the poor waste collection system laid down to curb the situation and inefficient considerable political commitment, insufficient budgetary allocations and dedicated workforce which are as a result of bad governance structures in sub-Saharan Africa.
Several studies and research have shown that Africa is not new to urbanization. However, the current rate of uncontrolled and unplanned urbanization in developing countries have given rise to huge piles of waste and overflowing waste containers in urban centres, particularly near markets and squatter settlements which have exceeded the capacity of city authorities to do effective and efficient work due to lack of funds, lack of logistics and inappropriate technology with average collection between 44 to 46% percent. /10/

Ghana, as one of the developing nation is a typical example of such challenges, where waste collection is often characterized by inadequate financial and logistical arrangements, lack of political commitment, inappropriate technology, poor service coverage, operational inefficiencies, lack of skilled manpower, lack of enforcement of sanitation laws and regulations, and poor cultural attitudes towards waste collection, handling and many more /11/. The situation keeps on accumulating by the lackadaisical attitude of various government institutions who hardly recognize environmental sanitation such as ‘waste collection’ as issues of priority to national interest compared to other competing interests on the national agenda. Without realizing that, a strong economy is the reflection of good health of citizens. Metropolitan, Municipal and District authorities are institutions responsible for waste collection with the Ministry of Local Government and Rural Development in Ghana as their head together with the Ministry of Sanitation. But they operate in resource constrained environments and are unable to deliver effective and efficient sanitation services as they continue to struggle to implement the measures required to deal with the ever-growing problem of waste in the cities of Ghana /12/. Large quantities of solid waste are being generated daily in the cities of Ghana due to the high urbanization rate which consequently has exerted pressure on the waste collection system because of resources constrain and weak institutional policies and capacity to match the growing urban population. In Greater Accra Region, current generation is in excess of 3100 tonnes of waste daily /13/ and out of this AMA generates excess of 1,463 tonnes /14/. The National Environmental Sanitation Strategy Plan made it 20% for the metropolis while 80% percent for the service providers under a PPP arrangement but the participation has been heavily
controlled by foreign donors and the World Bank instructions and now local firms have
to take over, their management and adoption of strategies have been recommended by
overseas consultant from countries with very different economic and social condition
and completely different waste characteristics as many other developing countries are
experiencing it /15/. The metropolis has faced a big challenge when it comes to waste
collection due to poverty and ignorance of some Ghanaians and the various
governments. In countries where citizens must struggle for everything to survive,
waste collection and environmental cleanliness will not be too much concern to them.
The average Ghanaian struggles for the basic needs on daily basis and therefore thinks
less about what happens in the environment. It is evident that filthy environments are
common sights mostly in developing countries with stench from heaps of waste and
choked drains in low income areas and Ghana, to be precise AMA is no exception with
poor collection rate.

1.2 Statement of Research Problem

Over the years, waste collection has become a major problem in the Accra Metropolitan
Assembly (AMA). The huge rural urban drifting has contributed a lot to this challenge
making solid waste management a big stone to turn over by the city authorities. The
city is the biggest and largest in Ghana and adjudged as one of the filthy cities in West
Africa since it has been experiencing deplorable solid waste collection which has
resulted in environmental sanitation problems. It is a simple formula: more people
equal more trash /1/. The Accra Metropolitan Assembly has experienced population
explosion for the past decades resulting in huge solid waste generation, which is not a
new phenomenon in a developing country so far as human race continues to grow and
desire in people to move from rural areas to cities to look for greener pastures, likewise
more waste to be produced.

Solid waste is classified as a third pollution after air pollution and water pollution due
to the increase in population and industrialization. Managing it, is also one of the
costliest urban services absorbing revenues in developing municipalities such as the
AMA. Up until the 1990s, solid waste collection was exclusively a responsibility of the Waste Management Department (WMD) established in 1985. Before 1995, 60% percent of solid waste was collected by WMD /4/, leaving 40% percent uncollected due to financial constrained, lack of government commitment, poor supervision, bad attitude of citizens and others, which made collection of waste in this metropolis a tough task for local authorities. A survey by central government in 2017 shows that, excess of 3,100 tons of waste is generated daily in Greater Accra Region /13/ and out of that the Accra Metropolitan Assembly (AMA) generates excess of 1,463 tonnes daily /14/ as mentioned earlier. In terms of quantity generated, it is huge, and it comprises those from homes, business premises, industries, commercial, open space, markets centers, the streets and others.

The sudden rise in generation since 1990’s outstripped the capacity of the local authorities and the owing to the challenges faced by the metropolis in managing the collection gave opportunity to Public-Private Partnership initiatives. After the PPP, collection increased to 88% percent in 1999, which was a good promising on waste management in the metropolis. But there was a swift shift towards the collection after some years and nobody could figure out the cause of it which made waste collection a major challenge in the metropolis. Cases of flooding and numerous diseases had been caused /16/ and is still causing whenever it rains due to the choked open drainage systems by these uncollected wastes and open organic waste piles outside streets and market areas, where food are sold for consumption. The intense trading activities by the people on the city streets has led to the congestion of streets and drainage ways and consequently created filth with inadequate logistics and inappropriate technologies for the city council and actors to deal with it. This has also resulted in bad culture of littering; people litter with serious impunity, heaping of waste and overflowing of containers and bins with waste in the Metropolis most especially in the low class residential, commercial and marketplaces are eye sore. The recent production of polythene bags for packing and water plastic has seriously worsened the situation in this study area where excess of 300 tonnes of plastic is produced per day. As in 2009, the Assembly fiscal annual expenditure summary, a total of GH¢6,670,000.00 or
US$4,380,00 ($1.00 = GH¢1.5) is needed to pay waste contractors under PPP and maintain equipment and others. Unfortunately, despite the increase in expenditure up to date due to currency depreciation, money spent on waste collection continue to fall due to capital mobilisation by the authorities. /17/

The irregular collection of waste and inadequate resources by the metropolis made way for Public-Private-Partnership initiative in the 1990’s. Through the PPP, the Metropolis has engaged the services of seven (7) service providers for efficiency and quality service delivery. Therefore, this study focuses on the collection of solid waste in Ghana; a case of Public-Private-Partnership performance assessment in the AMA. Owing to the challenges the AMA are facing, coupled with the service providers, what extent has solid waste collection in the AMA improved since the introduction of PPP concept.

1.3 Research Objectives

The purpose of the thesis is to examine how PPP initiative has contributed to the waste collection in the Accra Metropolitan Assembly, how the wastes were managed before the PPP and after, and how they could be best managed. That is;

- To describe the solid waste situation in Accra Metropolitan Assembly before and after Public-Private-Partnership
- To identify the mode of solid waste collection by the PPP companies
- To assess their performance level whether it is helping the collection coverage or not.
- To assess the challenges hindering the collection of solid waste in the metropolis
- To make recommendations for efficient and effective solid waste collection in the Metropolis.

1.4 Research Methodology

The research methodology presents the research design, data collection and analysis, research quality among others, which elaborates on the study structure and information on data collection methods for the thesis. The study is an explanatory research which
is focused on determining the relevant figures in the waste collection and its performance. It is poised on deriving detailed information on the waste collection data of Ghana to be precisely Accra Metropolitan Assembly and analyzing the best solution and procedures to it. The information from the study will give a clear picture of the trend of waste collection situation of the city currently and provide a basic level information on how things should be done to improve the situation. Information on waste collection from institutions, such as AMA/WMD was derived and some studies, which have been done by other students on similar projects in other cities, including AMA were referenced and the data available on the internet and academia for enlightenment were used.

1.4.1 The Research Design
The strategy of the research data collection was both primary and secondary. Interviews, phone calls and videos were made to some of the institutions sure as; Accra Metropolitan Assembly (Waste Management Department), Ministry of Local Government and Rural Development, the Ghana statistical board website, World Bank Reports on waste collection in developing countries among others. Information has been obtained from the various waste collection companies and other previous studies done by others on similar topics including other sources. Information gathered from the sources were compared and assessed to ensure its validities since some were old, few years old and current, but the trend was the same. Waste collection figures are recent figures, which makes the research a purposeful for future references.

1.4.2 Data Collection Method
Information was gathered from literature review, phone and video conversations, interviews with few operational directors and workers at various waste service providers especially Jekora Ventures Limited whom I have a personal relationship with and others. Accra Metropolitans Assembly with the help of Metropolitan Public Health Department, at Waste Management Department and some colleagues played a vital
role for my data gathering to attain current and accurate figures. This helped me to check the secondary data method to get the best out of it.

1.4.3 Research Quality
The research quality is characterized by the extent in which the collection information strategies and analysis method will yield steady findings. The participant error, participant bias, observer error and observant bias are major risks to research quality and its authenticity. The authenticity of the data is accurate and if any error turn up, it must be from their own study, which cannot be verified by this study since most of the interaction was done with experienced staff at both waste management companies and WMD and their responds were based on facts and documentations made from their activities over a period. The objectives of this study required more personal interview with residents, however, time and location factors did not make that possible enough. As mentioned earlier, several studies have been done within Grater Accra Region and AMA and the outcomes of these studies are often similar, that is, it is noted that the situation is throughout. The information gathered is very close to the reality and can be used for planning any policy.

1.5 Limitation of the Study
As usual, the study of this nature must have its limitations. The information accumulated for this study depended more on secondary data and literature review. Waste collection data was derived from open sources and partial information gathered from AMA/WMD and the Service Providers. A study of this nature surely demands an on-field survey across the city by the researcher for interviews, suggestions, and thought by residents, service providers, institutions, NGO’s, AMA/WMD to give progressively information. But, due to cost, constrained time period, and the lack of getting information from these actors, the study was conducted based on analyzing data from various sources to give the best outcome and also the writer’s experiences on what he had seen, felt and participate on how solid waste collection is managed in the
city for decades now. But be that as it may, the information or data gathered is enough to settle on attainability.

Some key participants felt reluctant to give vital information and documents to support the findings especially from AMA/WMD as well as some service providers when contacted. These in a way made quite difficult to get some findings and also prolong the study, know some budgetary, performance data and contract issues concerning waste collection in the assemble which in some way affected the study findings.

1.6 The Study Area and the History of Accra Metropolitan Assembly

Figure 3. Map of Accra Metropolitan Assembly and Greater Accra Region /18/

Historically Colonial Government seat was transfer from Cape Coast to Accra in 1877 when the Town Council which was set up in 1859 under the ordinance, was rescinded in January 1861. In 1898, the Accra Town Council was officially established under the Town Council Ordinance of 1894 after the introduction of native authorities by the colonial government in 1878. The native authorities were local governments units, made up of traditional rulers who served as central figures in local governments and were only given powers to pass by-laws. In 1943, it was formally established again under the Accra Town Council Ordinance. It has gone through several changes in terms of size, name, number of sub-metros and its administration works from the colonial
time to independence to revolution time and then to this constitutional rule era. On March 18, 1989 Accra was declared a metropolis thus, the Accra Metropolitan Authority was established by the Provisional National Defense Council (PNDC) Law 207, which has been replaced by the Local Government Act, 1993 (Act 462), when Ghana accepted in 1993 to practice constitutional rule. It derived its legal basis from Local Government Act 1993, (Act 462), which currently has been amended as Local Government Act, 2016 (ACT 936), under legislative instrument (L.I) 2034. The Metropolis is one of the two hundred and fifty-four (254) Metropolitan, Municipal and District Assemblies (MMDA’s) in Ghana and among the twenty-six (26) MMDAs in the Greater Accra Region. The office of the assembly is located at the District business center, which serves both the regional and national capital city of the country. Accra was declared a city on 28 June 1964, which paved way for Accra City Council to be established then.

Geographically, the Accra Metropolitan Assembly covers an area of 60km². The south boundary is the Gulf of Guinea, stretching from Gbegbeyese to La. It shares boundary with the Ledzokuku Assembly on the east. On the northern side, it is boarded by both Ga East and Ga West and by the west by the Ga South District. Currently, AMA is made up of the General Assembly and six sub-metropolitan District, which are subordinate bodies of the Assembly, performing functions assigned to them by the Assembly. Within the six Sub-Metropolitan Councils, there are Town Councils and the metropolis has the fastest urban migration and the population as of 2010 census stood at 1,665,086. With the population growth rate of 3.1%, the population was estimated around 2,036,889 million with female constitute 52 percent and male 48 percent but based on the current or newly created sub-metros the population is estimated around 1,083,180. /19/

1.7 Organization of the Study

The study consists of four chapters. The Chapter 1 gives the background of the study. It has also, to some extent, analyzed the problem in the Accra Metropolis with its relevance information. The objectives and the research methodology approach for the
thesis discussing research process and data collection method and others such as the research design, research quality, and others with the historical study area of the work. Chapter 2 touches on in-depth literature review on solid waste and its collection, methods, types and processes of solid waste, waste composition, collection of the waste and how PPP arrangement came into being with other relevant information. Chapter 3 presents data and analysis for the needed result whiles Chapter 4 focuses on the summary of the work findings, conclusions, and recommendations for the studies.
2. Conceptual Framework of Solid Waste Collection and Modalities of Public-Private-Partnership

This part explains the review of related literature, as well as the structure of the study. The review is presented in three sections. The first part discusses some basic concepts related to solid waste collection, waste classifications and management, waste sorting, its composition and others, a short historical trend of solid waste collection in Ghana while the second part focuses on the Public-Private-Partnership in solid waste collection. Its inception and its relevance on waste collection as well as the challenges confronting the efficient operations of the sector were reviewed. The third part consists of the policies and framework guiding solid waste collection and its management in Ghana and many vital information for clear understanding of the work.

2.1 Solid Waste Collection

Typically, the statement ‘Managing Waste’ is attributed to only recycling (treatment) with an appropriate technology by people and even expects when waste management is being talk about. Assuredly, recycling (treatment) is one of the most decisive in solid waste management chain, but it is not the chain that requires the greatest attention or expenditure, and not also the chain that has the greatest impact on the urban environment. For both criteria, it is the collection, that is the most important chain to be considered since recycling with an appropriate technology can be achieved if a proper and better waste collection system is in place. The impact uncollected waste can have on human lives is incomparable to other chains under waste management; therefore, it needs serious attention and pragmatic approach to deal with it especially in the developing world. /15/

Again, according to Manus Coffey & Adrian Coad, UN-HABITAT (2010) and World Bank Group, waste collection is the collection of solid waste from point of production (residential, shops, business premises, industrial, commercial, institutional, markets etc.) to the point of treatment or disposal. This includes the initial sweeping, gathering
and storage of the waste, the loading, unloading and transfer of these waste, and all stages of transporting the waste until it reaches its destination. It is collected in several ways through house-to-house approach, curbside pick-up system, community bins approach, self-delivered and contracted or delegated service.

2.2 Forms of Solid Waste Collection

Waste collection is a part of waste management process and very crucial aspect in maintaining public health around the world. The collection rate varies widely by region and income level to the extent that cities can also differ greatly. According to World Bank Group, the collection rate ranges from 41% in low-income countries to 98% in high-income countries. The collection process is done in several ways, but the more recognized ones are described below from the World Bank 2012, which talks about the global review of solid waste management by Daniel Hoornweg and Perinaz Bhada-Tata

2.2.1 House-to-House Pick-up: This approach is where waste collectors go to individual houses to collect garbage. This method is mostly found in developing countries in some middle and low-income areas. The waste collectors are not recognized by the municipality as their partners in waste collections but rather individuals who have taken upon themselves to engage in the activities. They work with small pushcarts and others to convey the waste and the users normally pay them their services fee as soon as the waste is collected. Nevertheless, this approach is also being practices by other developed world depending on the area and the collection plan.

2.2.2 Curbside Pick-up

This approach is where the users leave their garbage outside their homes according to a garbage pick-up schedule set with local authorities. This approach is done in different ways based on the country or the city. In the developing countries, this collection system is done in high-class and some middle-class residencies. When the day or time for pick-up is due, the waste bin is pushed from the houses to the roadside, where the collectors will empty the bin by their trucks or by the workers. In the developed
countries, this approach is very common, and the users normally do not push their waste bins outside but there is a place designated for refuse dump, be it private houses or residential apartments purposely for waste, which all the residents use. The collectors normally pick the waste from these points. Nevertheless, there are other residencies where the bins are pushed outside for the collector to empty them.

2.2.3 Community Bins or Communal Central Containers
Under the community bin arrangement, there is a designated fixed point or center in the locality or neighborhood, where users bring their refuse. The municipality is normally in charge of making sure that the refuse is picked up according to a set scheduled with their WMD workers or a contracted service provider. This approach is being practiced more in the developing countries where the service is normally offered to low-and poor-income settlements.

2.2.4 Self-delivery
Self-delivery refers to those who does the collection themselves. Under this, the generators of waste deliver the garbage or the waste directly to a dumping site which is either an authorized or unauthorized area. This activity is very common in developing countries.

2.2.5 Contracted or Delegated Service
The collection of solid waste is a responsibility of every municipality to make sure the collection is done in a more efficient and effective manner. So, under this arrangement, businesses and municipalities with sometime municipal facilities arrange collection schedules and charges with customers and bring private firms onboard by giving them license as private operators to do the collection on behalf of the municipality or the business firm. The operators maybe giving a designate collection area to encourage work efficiency. All the above arrangements can fall under this service depending on what the municipality will agree with the operators in the collection style and what the customers think it will be best suite them.
2.3. Classification of Waste

Waste is in different forms and therefore is classified in a wide range of varieties. Before waste is appropriately classified, its sources and properties must be known. For a proper waste management system, waste can be classified into types including their sources, physical state, material composition and the level of risk associated with the waste substances. Knowing the classification provides basis for the development of proper waste management practice in Table 1.

Table 1. Classification of waste

<table>
<thead>
<tr>
<th>Criteria for classification</th>
<th>Example of waste type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state of waste material</td>
<td>Liquid, solid, gaseous, radioactive</td>
</tr>
<tr>
<td>Material composition of waste</td>
<td>Organic food, paper, plastic, glass, metal, textile waste</td>
</tr>
<tr>
<td>Level of risk</td>
<td>Hazardous, non-hazardous</td>
</tr>
<tr>
<td>Sources or premise of generation</td>
<td>Residential, commercial, industrial, shops, agriculture, business centers, offices</td>
</tr>
</tbody>
</table>

Furthermore, waste can be classified based on the source-classification, which is based on the fact that waste emanates from different sectors of society, such as residential, commercial, and industrial waste. An example of the source classification was provided by the World Bank in 1999 in the study in Asia which identified the sources of waste as a residential, commercial, industrial, municipal services, construction and demolition, processing and agricultural sources. Table 2 describes the sources, types of waste it generates, and the types of solid waste involved.
Table 1. Sources and types of municipal solid waste /20/

<table>
<thead>
<tr>
<th>Sources</th>
<th>Types of waste generate</th>
<th>Types of solid waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Single and multiple family dwelling</td>
<td>Food waste, papers, cardboard, plastic, textiles, yard wastes, leather, wood, glass, metals ashes, special waste (e.g. bulky items, consumer electronics, white goods, batteries, oil, tires), household hazardous waste etc.</td>
</tr>
<tr>
<td>Commercial</td>
<td>Stores, hotels, restaurants, markets, office building</td>
<td>Food waste, papers, cardboard, plastic, wood, glass, metals ashes, special wastes, hazardous waste etc</td>
</tr>
<tr>
<td>Institutional</td>
<td>Schools, government centers, hospitals, prisons etc</td>
<td>Paper, cardboard, plastic, glass, metals, food wastes, wood, ashes, special wastes, hazardous waste etc</td>
</tr>
<tr>
<td>Municipal sources</td>
<td>Street cleanings, landscaping, parks, beaches, recreational centers</td>
<td>Street sweepings, landscape and tree trimmings, general waste from parks, beaches and other recreational centers</td>
</tr>
<tr>
<td>Construction and demolition</td>
<td>New construction sites, road repair, renovation sites, demolition of buildings</td>
<td>Wood waste, steel waste, concrete waste and dirt waste</td>
</tr>
<tr>
<td>Process (manufacturing)</td>
<td>Heavy and light manufacturing refineries, chemical plants, power plant, mineral extraction and processing</td>
<td>Industrial process waste, scrap materials, slay, off specification products, tailings</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Crops, orchards, vineyards, dairy, feedlots, farms</td>
<td>Spoilt food waste, agriculture waste, hazardous waste</td>
</tr>
</tbody>
</table>

Waste classification by their sources is a useful way of determining the relative contributions of the different sectors of society to the waste stream, for planning the collection and disposal. /20/

An example of waste classification based on material composition was conducted by the survey County, UK in 2002/2003 and outcome of the analysis of household waste streams identified nine main types of material: paper/card, plastic film, dense plastic, textiles, miscellaneous combustibles, glass, ferrous metals, garden waste and food waste. /20/ (Table 3)
### Table 2. Examples of Material classification of waste type /20/

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Newspapers, cardboards, office wastepaper, Magazine, Glossy</td>
</tr>
<tr>
<td>Plastic</td>
<td>Bottles, expanded polystyrene, film plastic, other rigid plastics</td>
</tr>
<tr>
<td>Glass</td>
<td>Clear glass, green glass, amber glass, non-recyclable glass</td>
</tr>
<tr>
<td>Metals</td>
<td>Steel cans, aluminum can, other ferrous, other aluminum</td>
</tr>
<tr>
<td>Organic</td>
<td>Yard waste grass, food, paper, wood, textiles, diapers, other organics</td>
</tr>
<tr>
<td>Inorganic</td>
<td>Electronics, carpets, drywall, other construction and demolition, and others</td>
</tr>
</tbody>
</table>

On the physical state of waste substances, Baabereyir (2009) explained that the materials in the waste stream can also be categorized into liquid, gaseous, solid and radioactive wastes /21/. Below is an example of these types in Table 4.

### Table 3. Classification of waste based on physical state of waste substance /21/

<table>
<thead>
<tr>
<th>Waste types</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid waste</td>
<td>Sewage sludge, wastewater from bath house and kitchen</td>
</tr>
<tr>
<td>Gaseous</td>
<td>Factory smoke, vehicle exhaust smoke, fumes from burning waste dump</td>
</tr>
<tr>
<td>Solid</td>
<td>Food waste, paper, plastic, metal, debris</td>
</tr>
<tr>
<td>Radioactive</td>
<td>Radiation, uranium, plutonium, excess energy.</td>
</tr>
</tbody>
</table>

### 2.4 Short Historical Trend on Solid Waste Collection (SWC) in Ghana.

Before 1980, waste collection was done by using donkey drawn carts in big cities, such as Accra, Kumasi and others where businesses were intensive. Households were collecting their waste and dumping in designated space, others burning it and others doing indiscriminately dumping. There were individual waste collectors who moved from house-to-house especially in high-income areas to collect waste and go dump it for a service fee. Aside these, the Public Health Board which was established under the new ordinance were given a responsibility mainly to ensure hygienic living conditions
within areas by moving from house to house, compound to compound to check if the places are clean. The enforcement of the law was their mandate and to ensure that every premises were diligently checked and those who flawed the laws were appropriately sanctions, punished and fined to serve as a deterrent. In small towns and villages chiefs were given the power to make sure citizens kept the environment clean by collecting their waste and dumping it in a designated area and some burning it.

The population started growing and the demand on the central government by its local authorities in the provision of basic services and welfare to the people including solid waste collection became a problem, as the government was the sole service provider. It all started when the general economy began to downturn. Ghana’s economic fortunes started declining; the economy started stagnating, general tax revenue dwindled and by that, the policy of tax-based sanitation services could not be supported. With the economy literally on the verge of bankruptcy, environmental sanitation services collapsed with the local government agencies suffering from lack of central-government transfer of funds and provision of machinery and equipment to support solid waste collection. /22/

Aside this, urbanization was an issue, with massive high rate of urbanization increasing solid waste generation and the mechanism laid down for waste collection becoming less available. As a result, existing waste collection points (including communal containers and household bins) became engulfed with refuse overpowering the capacity of the authorities.

By the 1980s, the state of environmental sanitation services had dipped to a point that needed radical reforms to put it back on track. The first major radical reforms towards improved solid waste collection service in Ghana was to open a department within metropolitans, municipalities and districts assemblies to oversee waste collection services since the responsibilities of these institutions are too much for them to focus. In 1985 Waste Management Department (WMD) was set up in all urban centers to manage solid waste collection and its matters. Through this, Accra started with the implementation of the Accra Waste Management Project from 1985 to 1994 with a
support from the German Technical Cooperation, GTZ, which was later extended to Kumasi and other cities. The approach opened a way for re-tooling of the waste management department of the assemblies with the introduction of trucks, skips and communal containers. This initiative first introduced house-to-house collection in high-income areas and communal container collection in low-income areas where residents come to dump their waste. With this establishment in 1985, the percentage of waste collection in the country was improved in various cities. During this time, an informal sector was also ongoing by individuals and groups and their main area of concentration was the inaccessible communities, which were difficult to reach by the waste trucks. This informal sector mean of transport were carts drawn by horses, donkeys, bicycles, truck pushers and others for the collection of waste as a livelihood. The center could not hold after the exit of the GTZ due to serious rapid urbanization. This called for decentralization by the stakeholders through the World Bank and other donor partners since the public sector was failing. This led to the introduction of Public-Private-Partnership in 1995. Since then, waste collection has become a public private management responsibility and is gradually getting grounds in the developing world.

2.5 Solid Waste Sorting in Ghana

Waste sorting is a process by which solid waste is separated into different elements through manual at the households and collected through house-to-house, curbside collection and communal container by the generators. Nevertheless, an automatic recovery facility can be built for the process, but it is an expensive option and most developed countries put in effort to get the individual waste generators to separate their own waste before collection. The possible method is the allocation of different waste bins with their assigned type of waste to be collect marked on them. In solid waste collection, waste sorting is an important process for safe disposal of the materials or goods. Sorted waste becomes more easier for collection as it makes planning on trash easier to be conveyed knowing the type of waste one is going for.

Most developing countries are facing challenges in waste collection and one of it root cause is the sorting of waste. Cities in Ghana, such as; Accra, Kumasi, Secondi-
Takoradi, Cape Coast, Tema, Tamale and others are faced with terrible issues of waste collection system due to inability to get their municipal solid waste sorted. The situation is even worse at the marketplaces where plastics, organic, hazardous and many others are collected and dump in a central container. Studies have revealed that, lack of public education and sensitization and ignorance among the average Ghanaian is the situation. Waste sorting can be attitudinal and socio-cultural challenge and the developed countries with a high rate of literacy even find difficulties in dealing with the situation since individual differences and ignorance is everywhere around the world and play a major role in waste sorting. The developed countries give different types of waste bins to their citizens for waste sorting and those living in apartments at a particular area have different types at a designated place with illustrations while in the developing world especially Ghana it is the contrary. It is difficult for a household to get one waste bin, and those who have one, use it for another purpose. The adoption of waste sorting will enable and facilitate waste collection thereby reducing environmental pollution, flooding and other epidemic diseases. However, this requires the authority’s determination by bringing a strategic plan to involve all stakeholders to participate in consensus for the plan to materialized. There must be a long-term plan towards education and awareness creation among the people in the developing world especially Ghana to start emulating waste sorting for better living.

2.6 Waste Generation and Composition Data in Ghana

In Ghana waste generation and composition depend on the community and the economic lifestyle of the inhabitants in an area. The classification of settlement hierarchy of high-income, middle-income and low-income areas play a major role in waste generation and composition. The per capita daily waste generation in Ghana is determined by finding the average of the regional data. Table 5 illustrates the national per capita waste generation by some classified waste components. /24/
Table 4. Average National Daily Waste Generation per Capita by Waste Type /24/

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Generation per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradable waste (organic &amp; papers)</td>
<td>0.318 kg</td>
</tr>
<tr>
<td>Non-biodegradable (metals, glass, textile,</td>
<td>0.096 kg</td>
</tr>
<tr>
<td>leather, rubbers)</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous waste</td>
<td>0.55 kg</td>
</tr>
</tbody>
</table>

Waste generation quantities per individual differ in metropolitan areas, municipal areas and districts in Ghana. It has been observed that the lifestyle of inhabitants in the metropolis and high trade activities account for the high waste generation per capita. This is followed by the municipalities and the districts. Table 6 and Table 7 show the average waste generation per capita by Area and some regional capitals.

Table 5. Average Daily Solid Waste Generation per Capita by Area. /24/

<table>
<thead>
<tr>
<th>Area</th>
<th>Generation per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>0.72 kg</td>
</tr>
<tr>
<td>Municipal</td>
<td>0.40 kg</td>
</tr>
<tr>
<td>District</td>
<td>0.28 kg</td>
</tr>
<tr>
<td>National</td>
<td>0.47 kg</td>
</tr>
</tbody>
</table>

Table 6. Average Waste Generation in Regional Capitals /24/

<table>
<thead>
<tr>
<th>Regional capital</th>
<th>High income area (daily)</th>
<th>Middle income area</th>
<th>Low income area</th>
<th>Average generation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accra</td>
<td>0.86</td>
<td>0.73</td>
<td>0.74</td>
<td>0.74</td>
<td>0.27</td>
</tr>
<tr>
<td>Kumasi</td>
<td>0.63</td>
<td>0.73</td>
<td>0.75</td>
<td>0.75</td>
<td>0.32</td>
</tr>
<tr>
<td>Ho</td>
<td>0.34</td>
<td>0.33</td>
<td>0.31</td>
<td>0.31</td>
<td>0.64</td>
</tr>
<tr>
<td>Koforidua</td>
<td>0.80</td>
<td>0.54</td>
<td>0.61</td>
<td>0.61</td>
<td>0.41</td>
</tr>
<tr>
<td>Sunyani</td>
<td>0.52</td>
<td>0.49</td>
<td>0.49</td>
<td>0.49</td>
<td>0.70</td>
</tr>
<tr>
<td>Tamale</td>
<td>0.38</td>
<td>0.27</td>
<td>0.33</td>
<td>0.33</td>
<td>0.22</td>
</tr>
<tr>
<td>Cape Cost</td>
<td>0.74</td>
<td>0.69</td>
<td>0.67</td>
<td>0.67</td>
<td>0.37</td>
</tr>
<tr>
<td>Bolgaratanga</td>
<td>0.31</td>
<td>0.20</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
</tr>
<tr>
<td>Wa</td>
<td>0.30</td>
<td>0.23</td>
<td>0.25</td>
<td>0.25</td>
<td>0.75</td>
</tr>
<tr>
<td>Takoradi</td>
<td>0.76</td>
<td>0.68</td>
<td>0.70</td>
<td>0.70</td>
<td>0.73</td>
</tr>
</tbody>
</table>
2.6.1 Regional Solid waste composition

Solid waste composition in Ghana varies with each particular area, regions, cities, towns and villages. However, in all situation organic waste appears to be the dominant form of waste followed by plastic waste. The average composition of organic waste is estimated at around 61%, which is relatively high. Figures 3-9 give the waste composition of seven regions.

<table>
<thead>
<tr>
<th>Average</th>
<th>0.56</th>
<th>0.49</th>
<th>0.51</th>
<th>0.51</th>
<th>0.47</th>
</tr>
</thead>
</table>

**Figure 4. Greater Accra /24/**

**Figure 5. Ashanti Region /24/**

**Figure 6. Central Region /24/**

**Figure 7. Western Region /24/**
2.6.2. National Solid Waste Composition

In the analysis it has been revealed that the waste constituent which is dominant in the waste samples collected for various studies is organic waste. These data collected from the regions analyzed to obtain the actual municipal solid waste composition for entire country. The data will be relevant in planning waste collection as its percentage varies by region and areas and this imply that waste characteristics differs from country to country, region to region, area to area and many more. Figure 10 shows the national average solid waste composition.
2.7 Inception of Public-Private-Partnership (PPP)

PPP has been part of the world economy since the inception of human activities from the ancient Greece in the pre 20th century. It is the part of the world business economy that is run by governments (public sector) in conjunction with individuals and groups of people for profit and efficient and quality service delivery where the government oversees and monitors the performance of how work is going based on the legal agreement. To some extent, it is not controlled directly by governments but rather lay down regulations and procedures for their businesses and activities to flow. PPP roles back to the 1790s in the United State where private sectors were engaged by governments in highway, rail, building development and many others.

However, as population grew the responsibilities of governments began to grow as various countries were expanding. The public debt started accumulating during macro economy and became a concern, which triggered and arose the change and mode of procurement. Another factor that triggered Public-Private Partnership was the budget constraint and debt crisis where most governments could not provide basic amenities and effective public sector for its citizens. Therefore, alternatives were suggested and
a process to adopt PPP by governments were finalized to provide, finance and maintain the public services delivery.

Initially, it was about engaging to execute projects and pay by the public sector without no commitment from the other. The paradigm began to change where various governments began to encourage investment from both sides. In developed nations PPP has been characterized primarily in the public sector. Continents where public ownership of firms are common, such as Europe, North America and even Asia, PPP has mainly taken the form of contracting out services previously delivered by the government.

All over the world, in recent decades, the PPP approach to the public sector services is a policy that is been implemented for the betterment of the world economy especially in the developing world where solely government asserts are not properly taking care of by the public workers and the institutions. /25/

2.7.1 PPP Approach in Solid Waste Collection

The PPP approach in solid waste collection gives better results. The combination has a high tendency of efficient and quality service delivery through proper and strict supervision, therefore making them competent in delivery good services. It reduces oversized responsibilities of authorities and helps infrastructure and social amenities to be met, because any initiative which cannot be implemented by authorities, through PPP it can be met. Developed countries have led the way and PPP is getting ground in solid waste collection sector in the developing world because of the lackadaisical attitude of the public workers, their incompetent and financial constraints in providing effective solid waste services to the people.

PPP brings qualities, such as, innovation, dynamism, efficiency, economic rationality, technical knowhow, and to some extend freedom from bureaucratic hurdles and political independence. These are qualities, which make it more favorable to 100% public sector service delivery. Studies shows that, PPP in solid waste collection in developing countries is due to the governmental failures, the debt, and over-size issues
on the part of the public sector, which sometimes come with corruption at the local level. Another motive is to share responsibilities for better service delivery. Monies disbursed or given by donors to various institutions and agencies who oversee waste collection are not managed properly specifically low- and middle-income countries. Public budgets by most developing countries depend on some percentage of financial aid who sees no improvement time by time, therefore, imposing the concept of Public-Private Partnership to obtain efficiency and proper used of their capital.

The World Bank Group is the leading institution in the preparation and support of PPP programmes, especially in waste collection sector, providing advice, techniques, technical support, planned and structure, and loans to cover costs associated with this initiative. In reality, the developed powers introduced the principles of PPP in solid waste collection sector and it certainly cannot be refused since most of the funds for local government social intervention projects come from external aid and other developed donor countries and organizations. The oversize and poor performance by the public sector and its precedent has led to that and as far as the donor aid flows, Solid Waste Collection and Public-Private Partnership is here to stay.

2.7.2 Advantages of Public-Private-Partnership
PPP initiative has proven to be the social and economic growth for the past decades especially in the developed world. The motive of individuals or groups in any venture is to make profit while what the government or public sector is looking for is a good service delivery to people, which in all bring efficiency at large. Again, one of the most general advantages is management flexibility. It is argued that, the government makes poor economic managers because of political pressure rather than sound economic decisions and business sense. To take a critical and urgent decision for the betterment of the firm must seek approval from the sector minister or from the government, which makes decisions delay in the day-to-day management of the firm. Privatizing increases flexibility whereby gives state officials the needed space to meet other programs.
The flexibility helps them to hire qualified staff, to pay staff according to their performance, fire personnel for non-performance and provide workers with the necessary resources for them to perform well. The governments especially in developing countries at times seem reluctant of taking hard decisions, especially when they affect their political chances, such as, layoffs and pay cuts, which attract negative publicity, but PPP reduces government political interference in the day-to-day management of the firm and the agreement.

PPP opens avenues for job creation and increases government tax revenue for national development. It also helps in the decentralization of waste collection management to increase efficiency for the betterment of the citizens. People are trained to acquire various knowledge on waste management, workers are send abroad for training and to learn new things on waste to help improve the sector and many other opportunities available in this approach. /26/

### 2.7.3 Disadvantages of Public-Private-Partnership in Solid Waste Collection

The role of public institutions in every country is to offer services to the citizens in order to improve their living conditions and achieve its social goals. Public Private Partnership in waste collection is not solely owned by the private entity because the public sector or the state agency has monitoring and some managerial decisions and roles to play base on the agreement. A study shows that especially in the developing world, the public sector generates weaker performance, at times not innovative and not flexible enough, too slow and overregulated, which might affect the managerial performance of the private entity to achieve its goals.

PPP is for the public sector to achieve its social intervention projects by using the skills, experience and the capital intensity of the private sector. Even though the approach in some public services in the developed world has proved to be the best way to enhance effectiveness and efficiency, it also comes with its own challenges, such as natural monopoly, high cost of executing business, since their core motive is profit making not social intervention. Moreover, it should not be ideological consideration based on
politics to public service but rather on economic and performance merits. In the developing countries, especially Ghana, the main reason solid waste collection must adopt PPP should be economic reasons and poor attitude towards government works but it seems it has been coupled with politics. The budgets for most governments in African countries are constraint and as such do not have the commitment in funding solid waste effectively, which has hindered PPP agenda since money is the key and various governments have decided to subsidise the charges for their political gains. /26/

2.7.4. Forms of Public-Private-Partnership in Solid Waste Collection
Public-Private Partnership come with different types of agreements which includes: Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), Build-Own-Operate-Transfer (BOOT), Design-Build (DB), Design-Build-Finance (DBF), Design-Build-Finance-Operate (DBFO), Design-Build-Finance-Maintenance (DBFM), Design-Build-Finance-Maintenance-Operate (DBFMO). For waste management practice, PPP has its different forms of contract. According to Cointreau-Levine and Coad (2000), waste collection comes with different forms, such as Contracting out, Open competition, Franchise and Concession or Leasing.

- Contracting out
A contract is a formal writing or spoken agreement between two entities, that is intended to be enforceable by law in this case a country and a service provider for specified services to be provided at a certain price for a certain length of time. According to Cointreau-Levine and Coad, (2000) contracting out in Public-Private Partnership is when the government gives a finite term contract to a private company to deliver solid waste collection services. This contract under normal practice may or may not be given in a competitive bidding process. More often companies that win this contract are paid for service delivery by the government under the proposed terms of the contract.
• **Open Competition**

In open competition, under the public private partnership, the government allows qualified companies to freely compete among themselves in the solid waste management service. In this procedure, companies privately negotiate with the individual households and make arrangement for the collection. In this agreement, no company holds the zonal monopoly, therefore, everybody in the firm can compete within the zone. /27/

• **Franchising**

This agreement is where the owner sells or gives the right or responsibility to an entity to do a business or perform a task. Cointreau-Levine and Coad (2000) also defines franchise as the situation whereby the government awards a finite-term zonal monopoly (franchise) to two or more service providers for the delivery of solid waste collection service. In franchising there is ownership of right, which is clearly outlined in the franchise agreement, whereby the responsibility for billing and collections typically though not always, falls on the franchise. It comes with a legal binding contract through competitive qualification process which includes negotiations.

• **Concession or Leasing**

Cointreau-Levine and Coad, (2000) explains concession as the process whereby the government grants a service provider to set up a facility that utilizes the government-owned resources-refuse in response to demand.

Concession agreement is a negotiated contract between a company and government that gives the company the right to operate in a specific business in the government jurisdictions, subject to certain conditions. Competition must be noted as the key element of concession regulatory framework for performance target.
2.8 Solid Waste Collection Policies Framework in Ghana

Ghana implemented the environmental sanitation policy (ESP) in 1999 due to sanitation challenges confronted in the various cities and towns. Before that, Environmental Protection Agency EPA was established in 1994 by the support of Ministry of Science and Environment to implement environmental policies, including waste under the Agency Act 490 and Environmental Assessment Regulation LI 1652, which seek to outline and give standard prescribed procedures on how waste should be controlled. The main emphasis is on the environmental assessment procedure policy, which lays down how solid waste must be dealt with in accordance with the procedure and other regulatory agencies in the sanitation sector. However, the policy failed to address relevant issues and did not affect the sector much, hence, there was a need to adjust. Policies, such as the millennium development goal, the growth and poverty reduction strategy, the World Bank policies on waste and the new partnership for African development surfaced after the formation of the ESP /26/. These global and regional agendas had their own notions on development and services delivery. As a result, there was a need for relevant alterations to be made on policies implemented previously to ensure that they survive the changing dimensions. The government was solely responsible for solid waste collection and its management; however, policies and system have been replaced to include local government and metropolitan, municipal, district, communities, foreign support and NGO’s for better and broad consultations.

In 2010, the Ministry of Local Government and Rural Development in collaborations with various waste management actors, such as, ministries, departments and agencies, metropolitan, municipal, and district assemblies, NGO’s and CBO’s with EPA, who has regulatory powers in the waste management sector, established the new environmental sanitation policy. This time, the government saw the need to involve various stakeholders in the formulation of the policy.

The Ministry of Local Government and Rural Development played a major and a significant role in the management of the solid waste stream since all the agencies and institutions within MMDA’s are under it. MLGRD is in charge of decentralization of
Metropolitan, Municipal and District Assemblies (MMDA’s) and these MMDAs are responsible for waste collection through their Waste Management Departments (WMDs) in every area, which is under their supervision and jurisdiction through the new policy. Below is an illustration of the waste management institutions in Ghana 2017 and the Table for the sanitation amendment policy 2010.

**Figure 12.** Diagram for Waste Management Institutions in Ghana /28/
### Table 7. Solid Waste Collection and Management in Environmental Sanitation
#### Policy Amendment 2010 /29/

<table>
<thead>
<tr>
<th>Particular areas of Policy</th>
<th>Policy directives and decision makings</th>
</tr>
</thead>
</table>
| Collection of solid waste and its management by Waste Management Department | ✓ All solid wastes generated in urban areas are regularly collected and dispose in adequately controlled landfills or by other environmentally acceptable means from Waste Management Department (WMD)  
✓ At least 20% of the solid waste collection is done by the individual assemblies and 80% perform by the Public-Private-Partnership arrangement. |
| Private sector involvement in solid waste collection (PPP arrangement) | ✓ Private sector must be involved in the provision of waste collection service and WMD should be the supervision to the private sector  
✓ Suburbs should be zoned into service areas and private companies to be giving monopoly in a zone with population less than 15,000.  
✓ Private sector shall operate within the policies, regulations and supervisory and licensing arrangements set out by the public sector.  
✓ Full cost recovery where possible |
| Environmental monitoring and public health education             | ✓ Educate the people on environmental, sanitation issues.  
✓ Monitoring environmental health standard and sanitary regulations |
| Legislations by law enforcement and regulations                  | ✓ By-laws are to be enforced by the Environmental Health and Management department of various assemblies  
✓ Promulgate and enforcement of the by-laws on sanitation together with national laws  
✓ Strictly observing and enforcing environmental health standards and sanitary regulations. |
3. PRESENTATION AND ANALYSIS

3.1 Waste Generation in Accra Metropolitan Assembly

Waste generation is a nation-wide issue, and AMA is the predominant due to rapid urbanization and the intense business centers. The metropolis is described as one of the fastest growing cities in sub-Saharan, which generates excess of 1,463 tonnes of waste per day. The generation per person is estimated around 0.72kg per day making the metropolis one of the highest solid waste generators in Africa. AMA waste generation is estimated to have increased in triple fold in the last two decades. The factors affecting this include the rapid population growth, high increase in urbanization, and change in lifestyle. A research shows that the increase in the use of plastic bags and sachet water in Ghana, predominantly in AMA, has contributed immensely to the solid waste generation. The city population is projected to double in the next decade, which in turn shall double the current waste generation of the city if proper strategies are not laid down for the collection management of these waste. Solid waste is generated in its largest folds in the main business zones of the city including markets, public transport stations and low-income communities. Street hawkers, which are very predominant at the central business city, also generate a very considerable amount of waste. It is very worrisome when buyers from this street hawkers throw the plastic bags or paper for wrapping the content on the street instead of dumping them in the central container bins or if there is none, they will keep it till they get home or find a designated place to dump. Moreover, street hawkers are also not exceptional as they also do the same during their activities.

3.2 Evolution of Solid Waste Collection in AMA

The history of waste handling in the societies and communities has evolved in a pattern. Citizens still think that it is a responsibility of only the government or public institutions due to the legal framework guiding sanitation policies which does not strictly enforce. This trend has had a negative impact from generation to generation
concerning how serious solid waste management is being consider in the developmental agenda of the country and the environment people live especially in AMA.

Since the independence, waste has been managed by the central government through its local authorities like AMA, until they realized that their capacity cannot cope with the generation due to many responsibilities, which led to the establishment of the Waste Management Department in 1985. It was founded by the (AMA) UNDP in conjunction with German Agency for Technical Cooperation (GTZ) with the aim of managing solid waste in the metropolis when there was a need to prioritize waste collection due to the generation rate. The cooperation with the GTZ did a good job to improve the collection rate and even extended the services to other cities. The service was later stopped, and the full responsibility came back to the WMD. They could not cope, when the cash flow was not enough to support their work from the central government. With this situation, the political leaders and decision-makers decided to choose a path to accept Public-Private- Partnership to help to increase the collection efficiency and coverage areas. In the early 1990s, there was a policy shift towards public private partnership in the metropolis. The World Bank in collaboration with the Ghana Government established the Urban Environmental and Sanitation Project (UESP) between 1995 to 1999 to be implemented. Under the project, the World Bank provided the funds as well as technical assistance for the collection. /22/

In 1995, AMA opened the way for PPP to help to curb the failures of the public sector. In practice their main agenda was to avoid responsibility for raising huge sums of revenue for sanitation purposes since the local authority budget was not enough, as well as abide by donor’s recommendations which to some extend was a must. Since 1995 to 2000, PPP has been the forefront in the solid waste collection in the metropolis with the agreement of private service providers collecting 80% of the solid waste while AMA/WMD is to collect 20% of the waste generated. This 20% are within the central Business District, open spaces and the ceremonial roads as part of its 20 percent in-house capacity as stated in the Environmental Sanitation Policy 2010.
3.3 The Private Sector Involvement in Solid Waste Collection in AMA

The public private partnership officially started getting momentum in the 1990’s. The PPP approach brought private sector involvement, and development partners supported the drive for private sector to involve in solid waste collection through capacity building and loans for equipment when the needs arose due to government failures. Since its inception, it has evolved from using low technology of vehicles to a more sophisticated machines and equipment of compact trucks and skips, street machine sweeping skilled expertise, proper supervision and others to improve the sanitation problems in the Metropolis. Currently the private companies are operating on a franchise contract with no subsidy in the high income and some middle-income areas for house-to-house and curbside service while communal service, which is rendered in low-income areas are subsidized, including the markets places where the full cost is on AMA. It started with house to house in high-income residential areas and some middle-income areas including markets by an international private company called City and Country Waste (CCW), a Canadian-Ghanaian joint venture on franchised basis. The collection of solid waste improved tremendously, whereby the company was able to provide services twice a day by even covering densely populated areas. But their service fees were high for residents and AMA. Their charges were too much for the residents in low-income areas, which resulted in the abrogation of the services. AMA then contracted a local firm called J. Stanley-Owusu company limited, the first local waste collection company in AMA to take charge of the waste collection in the central hub of the city and other suburbs. In 2003, Jekora Ventures limited also came into the scene and was given a letter contract by AMA to provide cleaning services at the Odornaa main lorry park and other centers and this company expanded to solid waste collection in 2004 as a solid waste contractor responsible for a number of container sites in Accra. After these two local companies came Metropolitan waste & Allied services, Zoomlion domestic service in 2006, which is now the giant in waste collection management in Ghana, Tropical waste, Meskworld limited and others.
3.4 Collection mode under PPP Arrangement in AMA

Currently, the service providers practice three mode of waste collection. The House to House (HH), Curbside and the Communal Container Collection (CCC).

3.4.1 House-to-House Collection Mode

Under the house-to-house approach, each house owner, office building, business, and street vending kiosk may register with the waste private company contracted in that zone to pick up waste. Upon registration, AMA in collaboration with the waste company will provide them with waste bins to store the waste before picking. The service of house-to-house collection is normally done in middle-income communities. The waste companies come with their compactible waste trucks with workers of five to six and will enter each house registered to pick the waste to the truck to be emptied. Below is a picture illustration of the house-to-house mode.

![House-to-House mode](image)

**Formal sector**

**Figure 13.** House-to-House mode

3.4.2 Curbside Collection Mode

Curbside collection mode is similar to the house-to-house approach but with this, the waste bins are placed at a vantage point for pick up. That is, bins are normally placed in front of the house which is close to the street for pickup. For these areas the settlements are well planned with accessible good road for the waste truck to service
every registered household within the community. This approach is practiced in high-income communities within the metropolis. Figure 14 is an illustration of curbside mode collection.

![Curbside Mode of Collection](image)

**Figure 14.** Curbside Mode of Collection

### 3.4.3 Communal Container Collection

The Communal container collection is commonly practiced in low-income settlements with high density population. It is an approach adopted by the AMA in areas where road accessibility is limited to households and the households cannot afford the service price from the private waste collection contractors. The mode is of two forms; pay-as-you-dump, which is done in the community but not always and free dumping mode, which is done at the public places, such as markets areas, street hawking, educational institutions, hospitals, public business centers and others. There are a lot of collection centers in the metropolis where people discharge their waste especially for the pay-as-you-dump at the designated locations and collection trucks pick the solid waste at frequent intervals. Figure 15 gives a picture of communal central container with one full of waste and other empty as illustration. One showing pilage of waste is one of the service providers in AMA called Zoomlion Domestic Waste.
3.5 Payment for Solid Waste Collection Before and After PPP.

The private sector engagement in MSWC is based on three modes, the House-to-House (HH), curbside and the Communal Central Container (CCC). High-income and some parts of middle-income resident practice both HH and curbside mode whereby residents pay their service delivery to the companies every month. In the middle-income areas, the companies have personnel who go to each household under their zone and have subscribed to their services for the service fees. The high-income settlement pays through arrangement they make with these service providers through Bank or Mobile money transfers. The amount charged sometime depends on the size of the bin, which implies the amount of waste one generates. The waste bins come with different sizes, such as, 240-L bin with a charge of US$20.00 for four times in a month for high-income residents, while middle- and some low-income dwellers pay US$12.00 and The fees are subsidized by the government in both middle and low-income US$4.00 respectively. areas.

The CCC mode payment is different based on the settlement. This mode is more for slum and low low-income residents, marketplaces, lorry parks and open spaces. The marketplaces, the lorry parks and open space are service free, and the government or
AMA is responsible for paying the service fees to the companies since they pay tax for working in those areas. The low-income settlement come with two approach, some communities do not pay at all for the services and other communities pay sometime for the conveying of the waste and the payment is done when residents take their waste to the container site which is little as US$0.50 and below. This is a very small amount and AMA is fully responsible for the service. Before PPP, the metropolis was fully in charge of the service fee which was costing a lot and draining the coffers of the local government budget. Even with PPP they still contribute based on what has been planned through subsidy approach.

3.6 Solid Waste Situation in AMA after PPP Arrangement

The general waste collection situation and performance of the companies are unsatisfactory and has not yielded the needed result which it was intended for. One will only argue that it is better because the population and waste generation has tremendously increased for the past years and if WMD were to be in charge things would have gotten out of hands to handle the situation. The initiative has really improved the sanitation situation in the high-income and some part of middle-income settlement according to the statistics available but concerning low urban areas, marketplaces and some parts of slum areas, waste collection is on a slow pace. The PPP initiative has brought a lot of innovation, skilled personnel, machines, and equipment, to mention a few, into the collection stream but the bottlenecks in their operations has crippled their efficiency. More to the point, a study conducted show that technology and strategies implemented in the collection stream of AMA is too complicated and too expensive for the metropolis. According to Kwaku Oduro-Appiah et al, (2018), whatever the real reason for the PPP policy was, it did not arise from an observable interest in what the private sector had to offer and so it is not surprising that the PPP arrangement is failing. They argued that, instead of decision makers to build on what will work and delve into local solutions, they tend to accept and choose donor financed and technology- and capital-intensive management plans on solid waste collection in the developed worlds as a direction for better service. The metropolis
accumulated arrears of GH 6,000,000 or US$4,000,000.00 (US$1.00 = GH1.5) from PPP inception up to 2009 on waste collection under PPP since most of the services were free. But one main agenda for PPP was to shift the service cost to the polluter. Rather than taking a political risk decision, mere choices were taken without no policy directions. A city with most people living in low income and highly populated poor settlement needs serious planning on waste collection strategy. After two (2) decades of the PPP arrangement, the expected improvement has not been achieved and their efficiency is dwindling where coverage had dropped from 70% to 60% in 2013. This dropped again from 60% to 55% in 2015 and in 2016 to 2018 another drops in percentage points from 55% to 46%. While AMA cannot do much since part of their inefficiency is due to them. Aside that, their failures come with a lot of factors which are internal and external. The approach which is helping the city and increasing the collection rate has been the informal sector called Bola people within the metropolis who have increased the collection coverage to 47% in 2018. The debt incurred by the metropolis to the private solid waste contractors from 2001 to 2007 was huge since it was a free service in most parts of the suburbs and resulted in the rethinking of the PPP approach. There was a reform which brought the polluter pay principles whereby the cost of solid waste collection in some parts of AMA must be the system users’ responsibility.

The World Bank Second Urban Environmental Sanitation project brought this idea in 2008 where it was fully implemented in 2011. This initiative paved way for performance-based strategy of solid waste collection which includes:

- To offer the private sector the opportunity to bid competitively to participate in a five-year franchise agreement with no more paper letter contracts
- To increase collection coverage and,
- To assign the responsibility of the collection service fees to the franchise-holders.
With these, the authorities act on the behalf of the public as a regulator and monitor of their activities, which includes:

- To set user charges
- To enforce obligatory and,
- To have the right to abrogate contracts for non-performance

Upon all these, waste collection and sanitation problem in AMA is not yielding good results and the reality is, achieving efficiency and good work done is not about allowing the private service providers to be the forefront in the PPP arrangement but it is all about efficient management that requires considerable political commitment, sufficient budgetary allocation, a dedicated workforce with appropriate technology in place as well as understanding the geographical area coupled with waste characteristics and the attitude and life style of the people to ascertain a concrete and formidable plan and strategies.

3.7 The Performance Assessment Level of Service Providers under PPP in AMA

In 2016, twelve (12) solid waste collection service providers were assigned on franchised basis to collect solid waste and corresponding revenue from premises in fifteen (15) service zones for 5 years. The creation of new municipal assemblies from AMA reduced the number of service providers to six, due to the reduction of service zones to eight. The performances of the service providers in their respective zones are evaluated by indicators derived from the Fee and Performance Based Solid Waste Collection Service Franchise Agreement signed between AMA and service providers which includes; innovations, coverage, equipment holdings, health and safety among others. From the study, the general performance level of the service providers for the period was unsatisfactory. Out of six (6) service providers, only one, Jekora Ventures performed satisfactorily in one service zone with a score of 80.6%. The other service providers in the remaining seven (7) service zones performed unsatisfactorily with scores below 65% which signifies poor service delivery.
Of the estimated 264,188 households, only 50,002 has been registered representing 22.70% and a total of 44,084 bins has been distributed representing 20.90% on assumption that distribution was on the basis of one bin per household which should not be so. Waste generation in the Accra Metropolitan Assembly is currently in excess of 1,463 ton/day based on the six (6) sub-metros with an estimated generation rate of 0.72kg per person per day.

The indicators used to assess the companies based on performance evaluation were derived from the Fee and Performance Based Solid Waste Collection Service Franchise Agreement between respective service providers and Accra Metropolitan Assembly (AMA). Key articles under ‘’Obligations of SERVICE PROVIDERS’’ used for assessment are but not limited to the following:

- Register all premises in the service zone and maintain a register of all premises receiving the service
- Supply ‘Standard solid waste bins (plastic or metallic)
- Frequency of service
- Maintenance of designated sanitary site
- Provision of PPEs at all times
- Submission of monthly report
- Collaboration with relevant departments to ensure clean environment
- Service coverage
- Innovation (collection of market waste)
- Innovation (recycling, integration of informal collectors etc)
- Innovative activities to promote recycling

Key Performance Indicators (KPI) derived from the Franchise Agreement between the Accra Metropolitan Assembly and the Service Providers were divided into two.

1. **The Capacity Performance**, which is based on registration of households and supply of storage bins. Weighted (30 marks). It was also divided into two sections to obtain the marks. That is:
• Calculation of households registered (weighted 15 marks).

\[
\frac{\text{No. of households registered}}{\text{Estimated households in service area}} \times 100 = \text{Answer} \times \text{weighted marks (15%)} \text{ and }
\]

• Calculation of bins distributed (weighted 15 marks)

\[
\frac{\text{No. of refuse bin supplied}}{\text{Estimated households service area}} \times 100 = \text{Answer} \times \text{weighted marks (15%)}.
\]

The Table 9 below gives a detail on the capacity performance on the service providers on the registration of households and supply of storage bins in the metropolis based on the key performance indication.

In the table, target percentage is 80 and the figures were derived based on this calculation.

• Target percentage (80) = Estimated households \( \times \frac{80}{100} \)

Percentage of registered households were obtained through;

• Percentage of registered household = \( \frac{\text{No. of households registered}}{\text{Estimated households in service area}} \times 100 \)

Again, weight percentage was calculated based on;

• Weight (15%) = \( \frac{\text{No. of households registered}}{\text{Estimated households in service area}} \times 100 = \text{Answer} \times 15\% \)

The calculation for percentage of households supplied with bins were,

• % of households supplied with bins = \( \frac{\text{No. of refuse bin supplied}}{\text{Est. households in service area (Target percentage)}} \times 100 \)

Furthermore, weight percentage for household supplied with bin were calculated on,

• Weight (15%) = \( \frac{\text{No. of refuse bin supplied}}{\text{Est. households in service area (Target percentage)}} \times 100 \times \text{Answer} \times 15\% \)
**Table 8. Registration of Clients and Supply of Storage Bins**

<table>
<thead>
<tr>
<th>Sub Metro/Contractor</th>
<th>Est. Population 2018</th>
<th>Est. Households 2018</th>
<th>Target (80%)</th>
<th>Reg. Households</th>
<th>% of Registered Households</th>
<th>Weight (15%)</th>
<th>Bins Supplied</th>
<th>% of Households Supplied with Bins</th>
<th>Weight (15%)</th>
<th>Total Score (30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Stanley Owusu &amp; Co. Ltd Okaikoi South</td>
<td>148,896</td>
<td>36,316</td>
<td>29,053</td>
<td>4,472</td>
<td>15.39</td>
<td>2.3</td>
<td>8,561</td>
<td>29.47</td>
<td>4.4</td>
<td>6.73</td>
</tr>
<tr>
<td>Metropolitan Waste and Allied Services Ablekuma South</td>
<td>79,942</td>
<td>19,498</td>
<td>15,598</td>
<td>1,021</td>
<td>6.55</td>
<td>1.0</td>
<td>990</td>
<td>6.35</td>
<td>1.0</td>
<td>1.93</td>
</tr>
<tr>
<td>Zoomlion Domestic Services Ltd Ablekuma Central</td>
<td>199,491</td>
<td>48,656</td>
<td>38,925</td>
<td>8,310</td>
<td>21.35</td>
<td>3.2</td>
<td>8,489</td>
<td>21.81</td>
<td>3.3</td>
<td>6.47</td>
</tr>
<tr>
<td>Metropolitan Waste and Allied Services Ablekuma Central</td>
<td>113,437</td>
<td>27,667</td>
<td>22,134</td>
<td>721</td>
<td>3.26</td>
<td>0.5</td>
<td>734</td>
<td>3.32</td>
<td>0.5</td>
<td>0.99</td>
</tr>
<tr>
<td>Meskworld Co. Ltd. Asheidu Ketke 1</td>
<td>83,812</td>
<td>20,442</td>
<td>16,354</td>
<td>844</td>
<td>5.16</td>
<td>0.8</td>
<td>2,466</td>
<td>15.08</td>
<td>2.3</td>
<td>3.04</td>
</tr>
<tr>
<td>Tropical Waste. Asheidu Ketke 2</td>
<td>134,596</td>
<td>32,828</td>
<td>26,262</td>
<td>339</td>
<td>1.29</td>
<td>0.2</td>
<td>236</td>
<td>0.90</td>
<td>0.1</td>
<td>0.33</td>
</tr>
<tr>
<td>Zoomlion Domestic Services Ltd Ayawaso Central</td>
<td>174,102</td>
<td>42,463</td>
<td>33,970</td>
<td>9,920</td>
<td>29.20</td>
<td>4.4</td>
<td>10,005</td>
<td>29.45</td>
<td>4.4</td>
<td>8.80</td>
</tr>
<tr>
<td>Jekora Ventures Osu Klottey</td>
<td>148,904</td>
<td>36,318</td>
<td>29,054</td>
<td>24,375</td>
<td>83.89</td>
<td>12.6</td>
<td>12,603</td>
<td>43.38</td>
<td>6.5</td>
<td>19.09</td>
</tr>
</tbody>
</table>
Figure 16 is an illustration of a graph showing the registration and distribution of storage bins chart by the various service providers with their respective zones.

**Figure 16. Registration and Distribution of Storage Bin Chart**
2. **Actual Service Delivery Performance** (weighted 70 marks), which is based on key performance indication in the franchise agreement. In this section comes with criteria the service providers must meet in their line of service delivery to their various zones. Below are the obligations;

- **Innovation and Recycling** (maximum deduction is 10): Service providers must involve in waste reduction and recycling within their service zones and produce strategies for market and transport terminal sanitation as well as other specialized services.

- **Collaboration with WMD and MPHD** (maximum deduction is 10): Marks were deducted taking into consideration service providers collaboration with WMD and the MPHD within the respective service zones of contractors to improve services, support for public cleansing activities and cooperated social responsibility.

- **Submission of Monthly Reports** (maximum deduction is 5): This keeps track on the service providers monthly operations within their respective service zones.

- **Service Coverage** (maximum deduction 10): This captures the number of houses registered and clients serviced within the service area.

- **General Cleanliness/ Indiscriminate Dumping** (maximum deduction is 15): This marks takes into consideration contractors, who failed to act proactively to control indiscriminate dumping of waste in open spaces and drains within their, irregular service schedules (including communal containers) and general cleanliness of service zone.

- **Capacity of Contractors Equipment holding** (maximum deduction is 10): This gives a clear indication of the contractor’s equipment holding capacity and their ability to execute the assigned task respectively in the area of operation.

- **Health and Safety** (maximum deduction is 10): This helps to keep and monitor the safeguards measure put in place to prevent minor accidents that are likely to occur.
3.7.2 Performance Rating

The rating assessment aims at quantifying the performance of the contractors and the range of score used are agreed from both end for better outcome.

- Excellent performance — Performance ≥ 85%
- Satisfactory performance — 85% < Performance ≤ 75%
- Average performance — 75% < performance ≤ 65%
- Unsatisfactory performance — 65 < performance

From the analysis, it is noted that the pass mark AMA/WMD used to assess private service providers under PPP is very high (65%). However, one should imagine the impact of 25% (440 tons) uncollected refuse daily within the environment, let alone the cumulative effect over time. The impact could be huge, unbearable and eye sore to the environment.

3.7.3 Current Service Providers under PPP initiative in AMA

There were eleven companies contracted under the PPP arrangement to work within the metropolis. But after the creation of new administrations the sub-metros were reduced to six (6) with eight (8) zones instead of fifteen. This reduced the number of companies to six which are the following:

1. J. Stanley Owusu Company Limited (Okaikoi South Metro)
2. Metropolitan Waste and Allied Services (Ablekuma South and Central)
3. Zoomlion Domestic Waste Services (Ablekuma central and Ayawaso central)
4. Meskworld Co Limited (Ashiedu Keteke)
5. Tropical Waste Limited (Ashiedu Keteke)
6. Jekora Ventures Limited (Osu Klottey)

3.7.4 Analyzing the Actual Service Performance Criteria of Service Providers

- J. Stanley Owusu and Co Limited – Okaikoi south

1. Innovation and Recycling (maximum deduction is 10): No notable innovation has been seen in their operations of the company. The company is required per the Franchise Agreement with AMA to collect at least 12 tonnes of recyclable plastics
separately by the end of every year of the franchise which the service provider is not able to achieve that. Deductions 8.

2. **Collaboration with the WMD and MPHED** (maximum deduction is 10): There are some collaboration in the area of enforcement and public cleansing. The service supports the Okaikoi south sub metro with logistics during clean up exercises. The company has officially engaged a group of informal collectors to improve coverage. Deductions 3

3. **Submission of Monthly Reports** (maximum deduction is 5): The service provider does not submit monthly reports. Deductions 5

4. **Service Coverage** (maximum deduction is 10): Collection services within the Okaikoi south sub metro is not complete. Many households in the communities such as Bubiashie Aygbe Town, Bubiashie Presby Church area, Busanga Line, Kanaeshie No. 1 & 2, Avenor and Neoplan station are mostly serviced by informal waste collectors. Deduction 5.

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction is 15): As a result of the service provider not being able to cover up to 80% of the service zone and deploy credible strategies for specialize clients such as traders, markets and transport terminals, there is constant indiscriminate disposal of refuse at locations such as the Dr. Bussia Highway, Neoplan station and its environs, Vodafone and Avenor. Deduction 10

6. **Capacity of Contractors Equipment holding** (maximum deduction is 10): With the acquisition of more collection vehicles, the equipment holding of the company has improved. However, availability within the service zone is an issue. Deduction 3

7. **Health and Safety** (maximum deduction is 10): The company provides PPE for waste collector. However, PPEs provided are adequate and usage is not strictly enforced. Deduction 2
• Metropolitan Waste and Allied Services – Ablekuma South Sub Metro

1. **Innovation and Recycling** (maximum deduction is 10): There are no innovation in the operations of this company. The company is required per the Franchise Agreement with AMA to collect at least 12 tonnes of recyclable plastics separately by the end of the year of the franchise. Deductions 6

2. **Collaboration with the WMD and MPHD** (maximum deduction is 10): There is some collaborations with departments of AMA especially in the area of enforcement. Support for Ablekuma south in public cleansing activities such as clean up campaigns is inadequate. Deduction 5

3. **Submission of Monthly Reports** (maximum deduction is 5): The service provider does not submit monthly reports. Deduction 5

4. **Service Coverage** (maximum deduction is 10): Collection service coverage within the Ablekuma South Sub Metro is not complete. Many households in the communities such as Korle Gono, Mamprobi and Old Dansoman have not been registered for house to house collection. Deduction 5

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction is 15): Low service coverage constantly has created the chance for indiscriminate disposal of waste at the beaches and open places. Households that are quiet far from communal container sites and do not benefit from house to house services have no option than to dispose of waste indiscriminately. Deduction 10

6. **Capacity of Contactors Equipment holding** (maximum deduction is 10): The quantity of collection vehicles in this area is not adequate. Deduction 3

7. **Health and Safety** (maximum deduction is 10): The company provide adequate PPE for waste collection crew. However, usage was not strictly enforced. Deduction is 1

• Zoomlion Domestic Waste Services – Ablekuma Central Sub Metro

1. **Innovation and Recycling** (maximum deduction is 10): The service collaborate with Environmental 360, an NGO involved in collection of recyclable plastics to
collect plastics separately as required in the Franchise Agreement with the AMA. However, no tangible results were seen. Deductions 3

2. **Collaboration with the WMD and MPHD** (maximum deduction is 10): There are some collaboration in the area of enforcement and public cleansing. The service provider has been supporting the Ablekuma Central Sub Metro with logistics during clean up exercises, especially on National Sanitation Days. Deduction 1

3. **Submission of Monthly Reports** (maximum deduction is 10): The service provider submits report once in a while and it does not tally with what the agreement demand. Deductions 4

4. **General Cleanliness/Indiscriminate Dumping** (maximum deduction is 15): Indiscriminate dumping is notable in locations such as Sukura and Soko drains. The waste situation in this area is an evidence of indiscriminate dumping and low collection of waste. And this waste gets into drains and open spaces in communities. Deductions 5

5. **Capacity of Contractors Equipment holding** (maximum deduction is 10): The service provider has adequate collection equipment to carry out waste collection services within the service zone. Deduction 1

6. **Service Coverage** (maximum deduction is 10): Greater percentage of households are serviced either through house-to-house collection or communal container service. Coverage is not complete in communities like Sukura, Russia and Soko. Deductions 2

7. **Health and Safety** (maximum deduction is 10): The company provides adequate PPE for waste collection crew. However, usage is not strictly enforced. Deduction 1

- **Metropolitan Waste and Allied Service – Ablekuma Central**

1. **Innovation and Recycling** (maximum deduction is 10): No notable innovation is in the operations of the company. The company is required per the Franchise Agreement with AMA to collect at least 12 tonnes of recyclable plastics separately by the end of the year of the franchise. Deductions 6

2. **Collaboration with the WMD and MPHD** (maximum deduction is 10): There are some collaborations with departments of AMA especially in the area of
enforcement. Support for Ablekuma south in public cleansing activities such as clean up campaigns is inadequate. Deduction 5

3. **Submission of Monthly Reports** (maximum deduction 5): The service provider does not submit monthly reports. Deductions 5

4. **Service Coverage** (maximum deduction is 10): Collection service coverage within the Ablekuma central is not complete. Many households in the communities such as Mataheko, new Russia and its environs have not been registered for house to house refuse collection. Deductions 5

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction 15): Low service coverage and indiscriminate disposal of waste at unauthorized locations such as roadsides and medians. Typical locations were the First Light to Obetsebi Lamptey circle stretch of the Kaneshie Odorkor highway, Flamingo traffic light and the central Mosque area. Deduction 10.

6. **Capacity of Contactors Equipment holding** (maximum deduction is 10): The quantity of collection vehicles provide for collection are inadequate. Deductions 3

7. **Health and Safety** (maximum deduction is 10): The company provides adequate PPE for waste collection crew, and as usual, usage is not strictly enforced. Deduction 1

- **Zoomlion Domestic Services – Ayawaso Central Sub Metro**

  1. **Innovation and Recycling** (maximum deduction 10): The service collaborates with Environmental 360, an NGO involved in the collection of recyclable plastics to collect plastics separately as required in the Franchise Agreement with AMA. However, no tangible results are available or achieved with this initiative. Deductions 3

  2. **Collaboration with the WMD and MPHD** (maximum deduction 10): There is some collaboration in the area of enforcement and public cleansing. The service provider has been supporting the Ayawaso Central Sub-Metro with logistics during clean up exercises especially on NSD. Deduction 1.
3. **Submission of Monthly Reports** (maximum deduction 5): The submission of report by this service provider is once in a while. Deductions 4

4. **Service Coverage** (maximum deduction 10): Greater percentage of households is service either through house-to-house collection or communal container service. This area has more high-income residents, so the coverage area is good. But low-income communities like Alajo, part of Accra New Town and Parts of Kokomlemle coverage is still below and not complete. Deductions 3

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction 15): Evidence of indiscriminate dumping of waste into drains and open spaces in communities within the service zone. Notable locations are the Alajo Pentecost drain, Kpehe and Obasanjo way. Deductions 5

6. **Capacity of Contractors Equipment holding** (maximum deduction 10): The company has adequate collection equipment to carry out waste collection services within the service zone. Deduction 1

7. **Health and Safety** (maximum deduction 10): The company provides adequate PPE for waste collectors. However, usage is not strictly enforced. Deduction 1.

- **Meskworld Co Limited – Ashiedu Ketekе Sub Metro**

1. **Innovation and Recycling** (maximum deduction 10): No notable innovation is in the operations of the company. The Franchise Agreement they have with AMA required them to collect 12 tonnes of recyclable plastics separately in which there is not much effort to achieve that. Deductions 7

2. **Collaboration with the WMD and MPHД** (maximum deduction 10): There is very minimal collaboration with the Ashiedu Ketekе Sub Metro and relevant departments of the AMA. Deductions 7

3. **Submission of Monthly Reports** (maximum deduction 5): The service provider does not submit monthly reports. Deduction 5
4. **Service Coverage** (maximum deduction 10): Collection services within the Messrs. Meskword’s service zone within sub-metro was very low. The service was limited to Makola and its environs and some commercial clients. Deductions 7

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction 15): The area is constantly accumulated with refuse in the service zone due to low coverage and absence of strategy to service markets within. Deductions 11.

6. **Capacity of Contractors/Equipment holding** (maximum deduction 10): From the study, the service provider lacks adequate capacity to efficiently render services in the assigned service zone. Deduction 6

7. **Health and Safety** (maximum deduction 10): PPE for collection crew are woefully inadequate. Deductions 8.

- **Tropical Waste Limited – Ashiedu Ketek Sub Metro**

1. **Innovation and Recycling** (maximum deduction 10): Under the Franchise Agreement with AMA, the company is required to collect 12 tonnes of recyclable plastics separately but has not been achieved. There is no innovation in their collection strategy to increase their efficiency as required. Deductions 7

2. **Collaboration with the WMD and MPHID** (maximum deduction 10): There is some collaboration in the area of enforcement and public cleansing. The service provider does not provide any support to the Ashiedu Ketek sub metro whenever there is clean up exercises. Deductions 6

3. **Submission of Monthly Reports** (maximum deduction 5): The service provider does not submit monthly reports. Deductions 5.

4. **Service Coverage** (maximum deduction 10): Many households in this service zone are not serve by the waste service provider. The service provider is normally not even visible in the service zone, creating avenues for junkies and other informal collectors to operate. Deductions 7

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction 15): Indiscriminate dumping of refuse is rampant in the zone with notable locations
being the Kojo Ababio Street, Mantse Agbonaa, Cadbury, London market drain and many others. Deductions 12

6. **Capacity of Contractors Equipment holding** (maximum deduction 10): The quantity of collection vehicles available for them is not adequate for the work. Deductions 3

7. **Health and Safety** (maximum deduction 10): The company provide adequate PPE for waste collection crew. However, usage was not strictly enforced, and the workers also see nothing wrong of not wearing their PPE. Deduction 1.

- **Jekora Ventures Limited – Osu Klottey Sub Metro**

1. **Innovation and Recycling** (maximum deduction 10): Jekora Ventures involved in a number of innovative with tangible results. Involvement in compost production, pilot waste segregation, incentives for cooperate clients who properly separate their waste among others. Deduction 0.5

2. **Collaboration with WMD and MPHD** (maximum deduction 10): The service provider collaborates with AMA and other stakeholders to introduce innovations to improve service efficiency. One of such collaboration is ‘Mayor’s Pilot Waste Segregation’ in basic schools in the Osu Klote sub Metro. Deduction 1.

3. **Submission of Monthly Reports** (maximum deductions 5): The company submits monthly reports to help them get feedbacks on areas they need to improve. Deduction 0.

4. **Service Coverage** (maximum deductions 10): There are communities within the zone that are not adequately service. Some of these communities are; Tudu, Abuja and Adabraka Freetown. Deductions 3.

5. **General Cleanliness/Indiscriminate Dumping** (maximum deduction 15): There are constant heaps of refuse at Tudu, Kojo Thompson Road, Kwame Nkrumah Avenue and Graphic Road due to inadequate service coverage. Deductions 3.

6. **Capacity of Contractors Equipment holding** (maximum deductions 10): The service provider has adequate resources to provide efficient services. However, back up for skip trucks are not adequate. Deduction 1.
7. **Health and Safety** (maximum deductions 10): The company provides adequate PPE for waste collectors but as usual the workers do not see the useful need of that and strictly enforced usage is not applied by their supervisors. Deduction 1

Below is Table 10, which explains the actual performance of the service providers when analyzed base on the key performance indicators (KPI) from the franchise agreement.

In the table, the total deduction marks were obtained by adding all the marks each service provider obtained in the analysis. Also, the ‘marks obtained’ column in the table were derived based on;

- Marks obtained = Total maximum deduction (70%) – Total deductions obtained by the service providers
Table 9. Actual Performance of Service Providers

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovation and Recycling</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>Collaboration with the WMD and MPHD</td>
<td>10</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Submission of Monthly Reports</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Service Coverage</td>
<td>10</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>General Cleanliness/ Indiscriminate Dumping</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>3</td>
<td>8</td>
<td>11</td>
<td>12</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Capacity of Contractors Equipment holding</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Health and Safety</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total Deduction</td>
<td>70</td>
<td>36</td>
<td>36</td>
<td>15</td>
<td>28</td>
<td>51</td>
<td>42</td>
<td>17</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>Marks Obtained</td>
<td><strong>34</strong></td>
<td><strong>34</strong></td>
<td><strong>55</strong></td>
<td><strong>42</strong></td>
<td><strong>19</strong></td>
<td><strong>28</strong></td>
<td><strong>53</strong></td>
<td><strong>61.5</strong></td>
<td></td>
</tr>
</tbody>
</table>
Again, below is table 11, which explains the performance appraisal of service providers under the Public-Private-Partnership and how the marks were derived. In the ‘’total marks (100%)’’ column, the calculations were based on:

- Total marks (100%) = Total score obtained from the capacity performance marks (30%) + Total score obtained from actual performance (70%).

**Table 9. Performance Appraisal of Solid Waste Contractors under Public Private Partnership in AMA**

<table>
<thead>
<tr>
<th>S/NO.</th>
<th>Sub Metro/Contractor</th>
<th>Registered Households</th>
<th>Marks (15%)</th>
<th>Bins Supplied</th>
<th>Marks (15%)</th>
<th>Total Deduction</th>
<th>Marks (70%)</th>
<th>Total Marks (100%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>J. Stanley Owusu &amp; Co. Ltd Okaikoi South</td>
<td>4,472</td>
<td>2.3</td>
<td>8561</td>
<td>4.4</td>
<td>36</td>
<td>34</td>
<td>40.7</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>2</td>
<td>Metropolitan Waste and Allied Services Ablekuma South</td>
<td>721</td>
<td>1</td>
<td>734</td>
<td>1.0</td>
<td>40</td>
<td>34</td>
<td>36.0</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>3</td>
<td>Zoomlion Domestic Services Ltd Ablekuma Central</td>
<td>8,310</td>
<td>3.2</td>
<td>8489</td>
<td>3.3</td>
<td>31</td>
<td>55</td>
<td>61.5</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>4</td>
<td>Metropolitan Waste and Allied Services Ablekuma Central</td>
<td>1021</td>
<td>0.5</td>
<td>990</td>
<td>0.5</td>
<td>27</td>
<td>42</td>
<td>43.0</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>5</td>
<td>Meskworld Co. Ltd. Asheidu Keteke 1</td>
<td>844</td>
<td>0.8</td>
<td>2466</td>
<td>2.3</td>
<td>39</td>
<td>19</td>
<td>22.1</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>6</td>
<td>Tropical Waste. Asheidu Keteke 2</td>
<td>339</td>
<td>0.2</td>
<td>236</td>
<td>0.1</td>
<td>33</td>
<td>28</td>
<td>28.3</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>7</td>
<td>Zoomlion Domestic Services Ltd Ayawaso Central</td>
<td>9,920</td>
<td>4.4</td>
<td>10005</td>
<td>4.4</td>
<td>24</td>
<td>53</td>
<td>61.8</td>
<td>Unsatisfactory performance.</td>
</tr>
<tr>
<td>8</td>
<td>Jekora Ventures Osu Klottey</td>
<td>24,375</td>
<td>12.6</td>
<td>12603</td>
<td>6.5</td>
<td>11</td>
<td>61.5</td>
<td>80.6</td>
<td>Satisfactory performance</td>
</tr>
</tbody>
</table>
3.8 Discussion of the Outcome of the Performance Assessment

From the data above, it is revealed that none of the service providers were able to secure marks above 85% for excellent performance which is the minimum mark for their services. However, one service provider, Jekora Ventures scored 80.6% and therefore performed satisfactorily. The remaining service providers in the seven service zones performed below average with the following scores.

Table 10. Performance and Evaluation marks based on the Performance

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoomlion Domestic (Ayawaso Central)</td>
<td>61.8%</td>
</tr>
<tr>
<td>Zoomlion Domestic (Ablekuma Central)</td>
<td>61.5%</td>
</tr>
<tr>
<td>Metropolitan and ALLIED (Ablekuma Central)</td>
<td>43%</td>
</tr>
<tr>
<td>Metropolitan and Allied (Ablekuma South)</td>
<td>40.7%</td>
</tr>
<tr>
<td>Stanley Owusu and Co Ltd (Okaikoi South)</td>
<td>36%</td>
</tr>
<tr>
<td>Tropical Waste (Ashiedu Keteye)</td>
<td>28.3%</td>
</tr>
<tr>
<td>Meskworld Ltd (Ashiedu Keteye)</td>
<td>22.1%</td>
</tr>
</tbody>
</table>

Undoubtedly, the PPP arrangement has not improved the collection rate based on the data above with almost all the service providers within the unsatisfactorily performance category. Though, the service performance quality of their work differs based on the assigned study zone due to number of factors, still there must be a better approach to increase their efficiency and way of work. I used to live in Osu Klottey sub-metro in both high-income, middle-income and low-income residential areas. The company in charge of my zone is Jekora Ventures, who does house-to-house, curbside pickup and central container collection. The work is very efficient and frequent in high- and middle-income areas with collection of every seven days (one-week pickup arrangement) with the users. But the low-income areas with central container collection receives irregular collection. Though the container will be lifted but the schedules days are unpredictable resulting in overflowing of waste all the time. The company has a modernized compact truck with different models and dedicated personal when it comes to solid waste collection and their service quality has improved over the years but much
needs to be done to ensure good delivery since a break up of air-borne diseases do not distinguish between the rich or poor. From the tables, everything clearly points out that the mandate given to them compared to their performance is low and even below average point, which in other words has not brought any good to the metropolis since adopted. The political interference in public work delivery in developing countries is too heavy to ignore and AMA is no exception. But the new law on the PPP arrangement with AMA makes them politically independent to some extent, which helps them to stay focused on their delivery. The franchise contracts are being signed for five years and is only abrogated when the performance of the company is always below the required assessment performance grade for a number of times. The analysis points out the poor performance clearly, but AMA is not capable of being strict on them since a part of the problem is from them due to the delay in payment of services offered resulting in low cash flow of the providers.

3.9 Informal Sector of Solid Waste Collection in AMA

The informal private sector within AMA are individuals and group of people who have come together to offer solid waste collection to some residents. They are not companies and do not have any formal contracts with AMA to carry out such business but rather do the collection on their own without any institution supervising and regulating them. Their main collection points are low-income areas and some middle-income settlements who cannot afford the high fees charge by the companies (formal) under the PPP initiative. This sector has been in existing for years even before PPP arrangement was introduced. It used to be individuals moving from house to house to collect waste, then moved to small trucks and carts pusher, then improved to manual tricycle, then lastly added motorized tricycle as technology keeps on improving. Their work keeps on increasing because the laws on waste collection by service providers under the PPP do not make it compulsory for every household to subscribe within their zonal settlement. It is the responsibility of the formal sector (Private companies) within it assigned zone to integrate these informal workers into their operations, which has not been easy and successful. Over the years, the informal sector has evolved since the
introduction of the formal sector and has improved waste collection in the metropolis but with low recognition from local authorities to integrate them for the betterment of their work, the people and the environment at large. Often, they do not pay taxes nor work in the formal financial sector of the city but offer their clients personalized services, simple technologies and affordable user charges which in most cases the PPP sector is lacking in the waste collection management.

The informal sector collects their fees directly from the user and their dependable and friendly services have paved way for the users to compare with the costly and unreliable PPP services for some groups of people. Their charges, simple technology, lean operations have given them upper edge on their PPP competitors in the low-income and some middle-income settlements, who sometime refuse to pay for their services. Nevertheless, their operations have lapses with their disposing of the collected waste. Some of the waste is sometime left to the street while they are moving from house to house and the final disposal is either heaps or semi-formal dumping sites, which is free rather than paying a fee to dispose at a designated dumping site. These collectors in AMA are contributing immensely to the city’s ability to meet the performance targets of waste collection at the time when the PPP service providers are failing due to some circumstances in their line of duties both internal and external.

The solid waste collection coverage in AMA is around 1,122 tons/day which is 76.7% out of the 100% rate of 1,463 tons generated per day. A rate below the benchmarking for waste aware average of 88% in lower-middle income cities. The PPP companies averagely is doing 46% due to the circumstances crippling their efficiency while the informal sector coverage taking care of the rest. The performance assessment was not satisfactorily, as shown above but their work has been supported by the informal sector to increase the collection rate. PPP is not achieving the intended purpose whiles the informal sector continues to increase its client based in the city since 2016 and has increased the overall collection coverage for the metropolis.

Their strategy is only house to house approach and they come with either push trucks or small tricycles to do business with people. They collect waste and charge them some
small amount and since they are not checked or under a regulatory body, they do things that is convenient to their work. Below are pictures of informal workers (Bola workers)

Figure 16. Informal Sector Waste Collectors

Daily collection (ton) of MSW in Accra Metropolitan Assembly (AMA) in 2018 for both the PPP service providers, waste management department and the informal sector were analyzed and the result is in Table 13, which gives out the figures for their percentage contribution towards the collection rate.
Table 11. Daily Collection (tons) of MSW in AMA

<table>
<thead>
<tr>
<th>Year</th>
<th>Companies under PPP (tons)</th>
<th>Informal Sector (tons)</th>
<th>Waste Management Department (WMD) (tons)</th>
<th>Total (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>673</td>
<td>439</td>
<td>10</td>
<td>1,122 out of 1,463</td>
</tr>
<tr>
<td>Percentage contribution (2018)</td>
<td>46%</td>
<td>30%</td>
<td>0.7%</td>
<td>Total contribution is within 76.7</td>
</tr>
</tbody>
</table>

Source: (AMA/WMD) and author field work

Self-delivery is also one mode under the informal sector where individuals and households after collecting waste, store it in their houses for some days or weeks depending on the size of their storage bins and then go to a designated area within their community for dumping. The places normally are not landfills but someone in charge to make sure people dump their refuse within the confined zone of the place. In some cases, the person in charge charges small fees, very small for taking care of the place. These are communities with no house-to-house collection mode, no communal container collection and others. The designated areas in the community are being controlled by burning some of the refuse when it dries up to control the place and to make way for more refuse in the community. Below is a figure 18 illustrating the informal self-delivery dumping site in AMA.

Figure 17. Informal self-delivery site
3.10 The Challenges Hinder the Public-Private-Partnership concept in AMA

The Public-Private-Partnership approach has not been achieving its maximum efficiency from the performance assessment data and in my interview and interaction with the service providers and the Waste Management Department about what has being the impediment, there was a sort of blame game. Companies pointing fingers at the AMA for non-payment of monies owned them and others while WMD also blaming Ministry of Local Government and Rural Development for not releasing the monies and the lackadaisical attitude of the service providers. In all both have points and some of the causes they attributed are presented below:

3.10.1 Political Interference

In Ghana the PPP arrangement in solid waste collection is always meshing with political influence. Everything that has to do with public delivery is politized. All the solid waste collection service providers in AMA are either members of the two main political parties in Ghana or the owners are from one of them and contracts are always linked with the party in power. The solid waste collection is always disrupted after every election. A new political party in power has to change the management heads of AMA for their members to take over the affirms of the institution. Providers who are not in line with the current administration may be removed, intimidated, sabotaged for their work, either performing well or not, or their payments are delayed for them to be inefficient and effective in their line of duties. Contacts are given to companies not based on merit but based on political colors which always results in poor performance delivery. Service providers and organizations, which are capable of handling waste collection in the metropolis, have to toe the line of political parties to be in business.

3.10.2 Lack of Political Will and Commitment

The prioritization of solid waste collection in our political dispensation is not enough to deal with this problem. In Ghana, the issue of solid waste collection is not of a high priority to various governments as compared to other social problems, such as poverty, unemployment, infrastructure, social interventions, economic and trade-related issue,
health and education to mention a few. But it is forgotten that most of these causes are as a result of sanitation issues. The country is good at enacting new laws and regulations in the sanitation sector, but its implementation and enforcing is a big problem for local governments. AMA data on budgetary allocation for waste collection is always on top with a claim that it consumes almost 80 to 90% percent of their budget, which in reality is not the case. The money is geared towards something else which they presume is important to them due to the promises the political party in power made when they were seeking for power in election campaign.

3.10.3 Poor infrastructure and Institutional Planning
Another challenge hindering the initiative is poor planning and unplanned structures within the metropolis. AMA according to the Ghana Statistical Service is made of 5 to 10 percent high-income residences, 19 to 25 middle-income residences and the rest are low-income residences, which are difficult for waste companies to get access to with their compact trucks and sophisticated machines. Good roads and layout are the key in waste, which is contrary in AMA. The Director of Ghana’s Environmental Protection Agency Cindy Badoe in an interview said that, the waste collection issue in AMA is as a result of poor planning by institutions mandated to do so. She explained that, Accra Metropolitan Assemble has shifted waste collection in certain areas of the city from providers in the metropolis due to some people parochial interest.

3.10.4 Lack of Enforcement
Another challenge is the lack of enforcement of sanitation by laws in the metropolis. People litter with impunity and go scot free. This habit has become norm for the people, and everybody sees it normal due to the lack of proper regulation by the authorities. Serious enforcement is needed to ensure that AMA moves towards a future with less waste in the streets and market centers including residence areas. The PPP approach does not force residents and households to register under the service within their zone, therefore making it not obligatory, and people take advantage to deal with their own waste. Service providers in charge are rather to convince the household to register, which is not yielding any result since there is no legal binding to it.
3.10.5 Financial Problem
According to WMD, one of the challenges the department is facing is not having enough funds for their work. Waste collection consumes much resources and because the department fall short on that, it is difficult for them to cover the whole metropolis. Waste collection is subsidized, and the cost are on government to provide the funds which do not come as expected. Payments to contractors always delay between 6 months to 1 year for two months work done, which affects their operations. An interaction with one of the operations Directors at Jekora Ventures, explained that, money is everything in this job and waste collection business cannot be done efficiently without money, so if the payment is coming on time, contractors will work well. They need money to pay salaries, buy spare parts, service broken down tracks, buy fuel and pay their loans at banks for them to be efficient and be in business. Without money, it will be difficult for them to cover all the areas assigned to them. Adding to it, the operational cost is very high, and they are paid very low rates where the money is also not on time. This financial constraint and the delay in payment to the contractors by the authorities has forced some of the contractors to adopt lackadaisical attitude towards their work, resulting in the increasing of waste in some parts of the metropolis.

3.10.6 Poor Attitude and Cultural Lifestyle of the People
The interviewed with Mr. Fiifi also landed at the mindset of the people within the metropolis. He said a survey was done by his department on both the contractors and the service receivers and he noted that some concern raised by contractors during the period were true. According to Mr. Kotey, the Director of Operations at WMD, the unwillingness on the part of households and shop owners to pay for service rendered results in a poor cash flow for the companies, which is also because of inadequate public education and sensitization. People refusing to pay for the service rendered makes the contractors’ work very challenging. Besides, poor attitude towards sanitation is unbelievable. People litter with impunity believing waste collectors will come and sweep it at the right time. The central city of this metropolis is a big business center for both formal and informal sector, people sell on the streets and they are choked with
business activities, resulting in huge accumulation of waste scattered everywhere on the street. The situation is an eye sore, as the people do not care to litter on the right way or find a CCC to throw their garbage in. People throw trash everywhere even when sanitation people are still sweeping, and the places are full of trash and dirty after few hours of sweeping. These wastes sometime find their way into drainage and gutters when it rains, causing serious flooding every year in the metropolis during raining season. Waste collectors seems to be illiterate workers and people exhibit attitude of disrespect towards them, which undermines their zeal to work effectively.

3.10.7 Inadequate Logistics and Frequent Breakdown
Waste collection is all about logistics, the movement of waste from one place to another will be effective if there are more simple vehicles and equipment to support the work. There is a need for a back-up of equipment and ready-to-fix spare parts for maintenance purpose, but it seems contractors are lacking them. The rapid population growth rate with the increase in waste generation in the metropolis is not matching the machines and equipment available for their work. At Communal Centers, there are sometimes no standby containers available to cater for the extra waste when the main one is full, and residents will be throwing their waste on and the result is the overflowing of the container, which at the end of the day will scatter all over the place. At times, when the collectors come to pick the container away there are no option but for them to throw their waste on the ground. Again, the container will be full for several days and they will not come for it and when asked the respond is, the skip truck assigned to the work is broken down and until it is fixed, there is no other option available. Some of the areas are also inaccessible; the roads are in a bad shape and because of that, the skip track is unable to pick it on scheduled dates.
4. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

4.1 Overview and Summary of Findings

The study seeks to examine how the introduction of the Public-Private-Partnership (PPP) concept has contributed to solid waste collection in the Accra Metropolitan Assembly since its inception. From the research perspective, the situation is the same and even getting worse. The AMA has witnessed massive population growth through natural and rural urban migration for the past decades, resulting in high generation of waste, which needed radical approach to deal with it. The waste management department of the metropolis established in 1985 failed in its assignment as it was able to collect just 55 to 60% percent of the total waste generated, hence leading to the Public-Private-Partnership approach in 1995. The department then privatized 80% percent of its waste collection to service providers under the sanitation policies and various contract agreement, which has evolved over the years to now a franchise competitive tendering bidding process. However, the PPP concept has not brought any significant improvement to the sector due to deficiencies in finances, human resources, lack of government commitment, poor sensitization and others. It has been heavily controlled by external factors (foreign concept) for decades and is not yielding any results.

Waste companies concentrate more on high income zones compared to low-income zones, who receive little or no service at all. When asked, the answer is, high-come residents pay their charges very well when they are served, even in some cases top it up for good work done as compared to some middle-income and low-income zones, who are unwilling to pay for the service rendered. In addition, there often are the delays of government subsidies for these zones. Because of these, residents of high-income and parts of middle-income receive regular house-to-house and curbside collection between three days and one week, which keeps their surroundings clean while low income and some middle-income zones receive irregular and unreliable services,
resulting in bins and communal central containers overflowing and indiscriminating collection and dumping.

According to the study, their work performance is not stable due to circumstances they may find themselves at a particular time, therefore making it difficult to assess them based on the assessment data program. Even though from the performance assessment data their work as of now is not impressive, there has been improvement in the collection stream in particular zones and much is needed to be done to improve it especially in the low-income and some middle-income settlements, which constitute almost 60 to 70% percent of the metropolis. The low rate of collection in the central business of the city is an eye sore, especially early in the morning and something must be done to clear the deficit on time.

One might argue that, the introduction of PPP has improved the sanitation situation in the metropolis despite the abysmal performance compared to the population growth rate now and the challenges hindering their success, which would not have been sustained by AMA/WMD to some extent if it was still in charge of the collection. In the franchised contract, Government in conjunction with the service providers in charge of various zones are supposed to provide waste bins to the households but when these bins are provided, some of the residents refuse to use them for the intended purposes. Rather, they are used for storing foods, cooking utensils and water, which does not help in the service delivery. The study shows that PPP create benefits, such as creation of job, payment of tax for national development, and the introduction of polluter pay principle, which is struggling to be fruitful due to lack of political commitment. The concept of tricycles both manual and motorized to reach inner slums areas for waste and the strategy for door-to-door approach with modern machines and equipment are gradually enhancing their work but needs support. The performance level, such as efficiency and quality of service under PPP approach, is of no doubt compared to full government driving in developing countries due to the expertise and the innovation. They bring onboard, workforce, economic independence, adequate machines and equipment and financial qualities but the approach must suit the
conditions of that particular zone. The study by Porter & Boakye-Yiadom showed that most of the technologies employed to clean up the city of AMA is either too complicated or is too expensive for a developing country such as Ghana.

Aside the benefits and the endless effort to achieve efficiency by the PPP companies, other major finding the study observed is that hindering their success has to do with the challenges confronting the companies under the PPP arrangement. The lack of public sensitization, irregular delay in payments of subsidize from AMA or government, which affects day-to-day running of the service providers, unwillingness of the part of households to pay for service rendered and to subscribe waste collection in their zones, lack of political will or commitment, poor attitude of the people towards waste, political interference and frequent breakdown of their vehicles are major issues in their operations. The unwillingness of the government to prioritize waste management and resources for the PPP companies accordingly by what is entails in the contract to interest more people, organizations, companies and others into the sector for the betterment and wellbeing of its citizens within the metropolis is something that needs prompt actions.

The informal sector is a crucial sector in developing countries when planning waste collection. The research shows that the local authorities do not pay the needed attention to their services and contribution towards waste management in the metropolis. Although, they are doing marvelously well, there is no legal recognition to their job and service. The responsibility has been only given to the PPP companies to integrate them within their zones to work under them with no legal backing therefore making it difficult to see the light of the day.

4.2 Conclusions
Municipal solid waste collection in AMA after introducing the PPP approach is in a bad state and the main challenges have been articulated. The study revealed that thousands of tons of waste are generated daily in AMA, yet the new approach is not solving the problem. The study revealed that the Public-Private-Partnership concept
has not improved the waste collection rate in the metropolis. Their performance keeps on getting worse and waste generation keeps on increasing in various zones. Although there has been some improvement in waste collection in its totality in the metropolis, the improvement has not been the effort of the PPP concept but rather local waste collectors (Bola people) who have taken it upon themselves to be waste collectors but do it indiscriminately and in an unhygienic manner. There are too many actors in the waste sector of this metropolis and a huge gap between the policies and the practices, which needs serious revolution, rethinking, restructuring and dynamism to the approach. Solid waste franchise agreement should be strict and enforce and AMA should be determined to fulfill it part of the bargain.

4.3 Recommendations

The study reveals that the informal sector is contributing very well to the collection stream though their practices are unprofessional, indiscriminate and unhygienic but when given the needed support and recognition will be a more efficient sector to help in the solid waste collection. Therefore, existing collection strategy must be revealed, and a new developmental action plan must be developed or emerged for their integration by the government or AMA.

Waste characteristics is very important in every waste collection planning. The characteristics within waste differ as there is a vast difference between an industrialized city and a developing city like AMA. The types of waste produced, as well as the generation rate and the composition of waste couple with one social lifestyle must be considered. From the waste composition, AMA produces the majority of the organic waste and in their geographical location of hot weather, this needs prompt measures and local strategies to solve the collection deficit and to acclaim international recognition and standard.

The local service providers must adopt simple local technologies in the area of equipment and vehicles. Local authorities must partner Kantanka automobile, Kumasi mangasee and Abosey-Okai manufacturers and the service providers to manufacture
simple and durable plastics tricycles to help in the collection stream, which can stand the conditions and the local road structure in the metropolis. The high percentage of organic waste constituent in the metropolis and the moisture and the texture content of the waste require simple durable plastic to the sophisticated ones from industrialized countries which is difficult to fix and also get spare parts when needed or there is a breakdown.

There must be a long-term plan towards education and awareness creation among the people, from the young to the old, informing them on the environmental and economic benefits of waste collection. In order to make a great impact on the youth, it will be necessary to involve waste management topics in the school curriculum of the younger pupils to teach them the importance of waste collection in their households and the need to subscribe to waste service providers in their community. Demonstrations should be made starting from the schools so that they can emulate that in their homes and public or go home to teach their parents on why important waste collection in a proper way helps the community and the country to grow both economically and socially.

The legislative arm of government must also prioritize waste collection to pass a law that will enforce any President to show political commitment in this sector. Polluter pay principle based on fee and performance-based policy that will include informal sector to legalize their work must be supported. AMA must pass a law to make it compulsory for every household to register under any waste collection in their zone and anyone who will go contrary to the instructions must be punished to serve as a deterrent to others. This action should not be politized for the betterment of the metropolis.

Sub-metros should be more involved in daily monitoring of operations of service providers in their respective jurisdictions and incentives for developing innovation solutions must be encouraged. Outdated bylaws and very expensive and time-consuming legal processes to enforce compliance must be revealed.
REFERENCES


AMA/WMD. 2018


Performance Audit Report of The Auditor General on Solid Waste Management by Accra Metropolitan Assembly (AMA)


# APPENDIX

Table 12. Number of Collection Machines available and Area in operation

<table>
<thead>
<tr>
<th>Sub Metro/Contractor</th>
<th>No. of Compactors Available</th>
<th>No. of Compactors Operational</th>
<th>No. of Skips Available</th>
<th>No. of Skips Operational</th>
<th>No. of Roll on Roll off Availabl e</th>
<th>No. Of Roll on Roll off Operational</th>
<th>Others</th>
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<td>4</td>
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<td>4</td>
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<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
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<tr>
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<td>2</td>
<td>0</td>
<td>0</td>
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<td>3</td>
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<tr>
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