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Title

**Sustainable private sector solid waste collection &
transportation. The case of Kwesimintsim, STMA, Ghana**

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Summary

The collection, transportation and disposal of waste are important for both public health, aesthetic and environmental reasons. Waste is anything discarded by an individual, household or organization. In Ghana the responsibility of waste collection and disposal lies under the local government's purview. The formation of waste management department in STMA in 1994 saw the responsibility of waste collection being transferred from national to district level. Waste collection services at that time were purely of communal container type of services, but due to lack of logistics the Assembly could not sustain it. The outcome was accumulation of refuse and spill over in the communities. The private sector was therefore invited to augment the operations of the waste management department to improve the quality of services and enhance its sustainability in the metropolis. Door-to door services started in 2002 by ABC Co. Ltd. and on pilot basis by WMD in some selected areas in the Metropolis,

The study therefore focused specifically on the sustainable private sector solid waste collection and transportation services in STMA. The first part was used to describe the situation that led to participation of the private sector while the second part was basically used to review various concepts in relation to sustainable solid waste collection based on the ISWM Model taking into consideration the three key stakeholders, the Government, the private sector and the service users.

The review of literature centred on the sustainable solid waste management based on the integrated solid waste management which is currently widely used model in this regard. It explains sustainability in solid waste collection from technical, social, economic, financial, institutional, and environmental perspective, As a model designed to achieve sustainability in the waste sector, it is characterized by three broad dimensions, notably; stakeholders, system element and sustainability aspects. The basic principles of the ISMW are: environmental effectiveness, economic efficiency and social equity and acceptability. Other aspect introduced in the study to complete ISWM Model is the management model which describes the various government mechanisms put in place to enhance sustainable PS in service delivery; these are the policies, institutions, financial mechanism, and technology.

The research type was explanatory and exploratory using single case study embedded. An embedded case study research methodology provides a means of integrating both quantitative and qualitative methods into a single research study. Data collection methods encompass primary and secondary methods as well as observation; it is therefore both qualitative and quantitative. The research population comprises the Metropolitan Assembly, the service providers, the service users. In-depth interviews were conducted with the STMA officials, the service providers and the waste workers. Closed-ended questionnaire were also used to sample the service users. The findings were analyzed qualitatively and quantitatively using Atlas ti and Statistical Package for Social Sciences (SPSS) software.

The study reveal that there are currently two systems of solid waste collection in STMA notably; the door-to door waste collection system organized in areas with clear layout and access road and communal container services being organized in areas with poor access road. The findings are that the current system is not sustainable in the sense that some of the service providers are not able to recover cost of operations as a result of high operational and maintenance cost. The Assembly does not also provide subsidy to assist the private companies. Fees are fixed without involvement of all key stakeholders, most especially the service users contrary to the ISWM Model which sought to incorporate all stakeholders to

achieve sustainability in solid waste collection. It is not sustainable because of weak complaint mechanism, weak performance mechanism, and political interference in applying the appropriate sanctions which is also contrary to the government model of ISWM. Recommendations provided includes fixing realistic fees, public education, and introduction of universal tax to support the PS, tax rebate for service providers, prompt prosecution of defaulters without political interference. Installation of performance and complaint mechanisms and capacity building of staff of EHD and waste management department.

Keywords

Sustainability, privatized solid waste collection services, Sekondi Takoradi Metropolitan Assembly, Private sector participation, integrated solid waste management

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Foreword

I have in the past 20 years observed with keen interest waste management practices in our communities and efforts being made by Government to deal with it. Many countries most especially in the developing world are currently grappling with every resource at their disposal to overcome problems emanating from bad waste practices. They do so by ensuring that waste are not dumped indiscriminately or dumped into public drains and to ensure that clandestine dumps are not created in our communities in order to prevent health risk or hazard from befalling our communities. Documentary sources available in the study area gave an outline about the advent of the private sector in the waste stream as a result of Government inability to deal with the ever growing waste generation in the system due to rapid urbanization and bad waste practices coupled with lack of resources or funds. The advent of the PS in this regard in 2001 saw the Metropolitan Assembly winning the best cleanest city award in Ghana in 2003 with the researcher among the winning team. This success story initially in the waste collection arena portray to the entire society that the participation of the private sector in waste collection after all has many advantages.

Not long ago after this success story, the city started experiencing overwhelming waste accumulation resulting in dump hills in our communities. Social thinkers began to unravel the mystery behind this decline in waste collection in the city. Available reports point to the fact that such factors as withdrawal of various support by the central Government for waste management activities, Government inability to pay the private company promptly and regularly culminated in the decline in waste collection in the city.

The inhabitants were furious to see that an effort by Government to prevent outbreak of infectious diseases in the city as a result of these clandestine dumps is proving futile since waste evacuated to the final disposal site resurfaced again within two weeks after its evacuation.

With this available information, I began to ask myself that what can be done at all by government to sustain the successes chalked over the years with regard to waste collection in the city. How can we avert the situation of uncollected waste in our system? What can be done to ensure that clandestine dumps once cleared do not come back again?

From that time onwards, I decided to focus my attention on any future study or research on sustainability of the system rather than looking at waste management in totality since it is my fervent hope that it will serve as a useful guide for Government to adopt and formulate the best management policy and regulatory framework to promote sustainable solid waste collection in our cities.

Abbreviations

STMA	Sekondi Takoradi Metropolitan Assembly
WMD	Waste Management Department
EHD	Environmental Health Department
PS	Private Sector
SWM	Solid waste management
MLGRD	Ministry of local Government and Rural Development
WB	World Bank
UESP	Urban Environmental Sanitation Project
MSW	Municipal Solid Waste
ISWM	Integrated Solid Waste Management
PSP	Private sector Participation
SAP	Structural Adjustment Programme
GNP	Gross National Product
NGO	Non-Governmental Organization
REHO	Regional Environmental Health Officer
SW	Solid Waste
PSWCT	Privatized Solid Waste collection and Transport
MMDA's	Metropolitan Municipal and District Assemblies
UN-HABITAT	United Nations Human Settlements Programme
UNEP	United Nations Environment Programme
USAID	The United States Agency for International Development

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Chapter 1: Introduction

This study aims at exploring the sustainable private sector solid waste collection and transportation services in Kwesimintsim in the Sekondi-Takoradi Metropolitan Assembly, Ghana. The focus of this chapter is on the background to the study, statement of the problem, research objective, research questions, overall research questions, specific research questions, significant of the study, Scope and limitations and thesis structure.

1.1 Background

Municipal solid waste management is regarded as one of the most important service a city provides in low-income countries as well as many middle-income countries. MSW constitute the largest single budget item for many cities around the globe and one of the largest employers (World Bank, 2012). Solid waste is usually a service that falls under local government's purview. Municipal solid waste managers are therefore charged with an arduous task to get the waste out from underfoot and do so in the most economically, socially, and environmentally optimal manner possible (World Bank, 2012) The storage, collection processing, transport and disposal of waste is important for both public health, aesthetic, as well as environmental reasons. Waste is regarded anything discarded by an individual, household or establishment. waste is composed of a complex mixture of different substances, only some of which are intrinsically hazardous to health (Rushton, 2003) Increasing population, sound economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries (Minghua, et al., 2009)

The study area the twin city of Sekondi Takoradi as the third largest city in Ghana, migration due to the recent oil find, and rapid population growth overwhelms the capacity of city authorities to meet collection target due to huge financial cost involved. As a result, the uncollected waste, which is mostly a mixture of animal excreta as well as human excrement, develops into clandestine dumps, which contributes to flooding and serves as a breeding place of insects, vermin, and rodents culminating in the spread of diseases. SWM is a service for which Municipal or local governments are usually responsible. However, due to inadequate capacity and lack of funds in the public sector, in many developing countries the private sector has stepped in to fill the gap in service provision (Kassim, 2009) Private sector participation involves the transfer of some part of household or establishment waste management services provided for by the public sector to the private sector (Ezebilo, 2012) Privatization of municipal services most often come as a consequence of numerous reasons which in some cases is provoked by the onset of poor service delivery by public sector entities. (Fobil et al., 2008) mentioned that in many of the sub-Sahara African cities, widespread internal dissatisfaction by residents and lack of confidence in the service delivery by the local government authorities, provided impetus for public sector organizations to either completely relinquish or share the role of municipal services delivery to PS groups, often credited with high performance.

Private sector participation, in this context is offered as a panacea to break apart government monopoly, promote efficiency through competition, and provide citizens with greater choice in a market context (Warner, 2008). Privatized service delivery was thus introduced in Ghana alongside many other public sector reforms such as the Structural Adjustment Program (SAP) and Economic Recovery Program (ERP) with the ultimate view to salvage the systemic down-turn in performance of public institutions. There is strong consensus among social

thinkers that private sector could be the solution to most of the inefficiency bedeviling public institutions. The major debate in the PS feature is that substantive amount of the collection, transportation, and disposal of solid waste have currently shifted away from the control of local government authorities to the increased involvement of the private sector (Fobil et al., 2008)

1.2 Problem Statement

Before 1995, the Sekondi Takoradi Metropolitan Assembly of Ghana was responsible for service provision in the Metropolis. Through the UESP/WB Urban I Project, the Assembly started outsourcing the solid waste Management in 2001. Through a new government policy 80% of solid waste service delivery was in 2002 outsourced to various private companies while the Metro Waste Management Department's coverage was reduced to 20%. (MLGRD, 2010)

Despite the privatization of SWM, Sekondi-Takoradi continue to witness waste accumulation, the central Government for that matter the Ministry of Local Government each year spent billions of Ghana Cedis to ensure that uncollected waste which has turned into 'dump hills' or 'spill overs' in the city are cleared through vigorous exercises known as 'Refuse Evacuation'. In the first quarter of 2012, the Government sent a signal to all municipal assemblies that it will no longer fund waste management activities. Based on the Local government directive, the Assembly introduced a polluter pay system and re-zoned Sekondi-Takoradi from two (2) to four (4) zones with the aim of introducing new companies by extending coverage areas and to collect the needed funds in order to enhance sustainable service delivery in STMA. This move has still not materialized. Four private companies are currently working in the metropolis. Despite this laudable move, sanitary conditions in the city continue to deteriorate. As a result stakeholders, opinion leaders, households and the larger community continue to critically express their discontent with the quality of waste services provision mostly through public gathering and through local radio stations. This has triggered lots of debates across the length and breadth of the metropolis. So far, no major study has been conducted to explore the sustainability of private sector participation in service delivery in Sekondi Takoradi Metropolitan Assembly. Hence the reason to focus this research on the sustainability of solid waste service provision in the area by the private sector. It is important therefore, for this study to examine the sustainability and management models for private sector participation in solid waste collection and transportation in the city and to come up with appropriate recommendations to enhance the sustainable service delivery in the metropolis.

1.3 Research Objectives

The main objective of the research is to explore the sustainability of solid waste collection and transport services in STMA

1.4 Main research question:

To examine whether the solid waste services presently delivered by the private sector in STMA are sustainable and how can the level of sustainability be explained?

1.4.1 Specific research questions are:

1. How is the current solid waste collection and transport system organized in STMA?
2. How sustainable is the current private sector service delivery in STMA?
3. Which government mechanisms have been put in place to enhance sustainable private sector service delivery in STMA?
4. What needs to be done to increase sustainable solid waste service delivery by the private sector in STMA?

1.5 Significance of the Study

This study is relevant in the sense that it will serve as a useful material for future research in this particular field. It will also serve as a reference material for policy makers, government and non-governmental institutions, and other stakeholders who are interested in supporting future waste management activities in the area. The study will also provide a critical and analytical perspective for understanding the sustainability of effective management models for effective and efficient private sector participation in municipal solid waste collection and transportation. This is important in the sense that policy makers will come to understand how various government mechanisms when installed will help enhance sustainability of service delivery. Finally, recommendations have been provided to complement government's efforts to help address and improve the sanitary conditions in the Sekondi Takoradi Metropolitan Assembly to making it a truly clean oil city.

1.6 Scope and Limitations

The study focused on the sustainable and management models for private sector participation in Solid waste collection and transportation in Sekondi Takoradi at household and community levels. In this case institutional challenges, perceived public attitudes toward waste disposal and government mechanism put in place to ensure sustainable solid waste delivery services were appropriately dealt with from the three dimensions of integrated solid waste Management notably, Stakeholders, the system element and the sustainability aspects. With regard to the stakeholders, the study was limited to the Metro authorities, the service providers or the formal sector and service users (that is, households and commercial entities). The system element was also limited to collection and transportation of waste to the final disposal site while the sustainability aspects focused on the social equity and acceptability, environmental effectiveness and economic efficiency and Stimulating Government Models.

1.7 Thesis Structure

The study was divided into **six chapters**.

The first chapter introduced the background as well as the problem statement, the research objectives, the research questions, the significant of the study and scope and limitation.

The second chapter focused on the state of the art theories and concepts of the study and theoretical framework where appropriate literatures were reviewed with regard to management models in solid waste management.

Chapter three was devoted to research design and methods with revised research questions, research objectives, approaches, techniques, operationalization of variables and indicators. The sample size and selection, validity and reliability, data collection methods and data analysis were included in this chapter.

Chapter Four focused on SWM in STMA. It started with the background on SWM in Ghana and the legal framework for Solid Waste Management. It then highlights the historical background to private sector involvement in SWM, as well as the institutional arrangements of the current system of solid waste collection in STMA.

Chapter five was used to present the findings of the research study based on the research question for the respondents.

Chapter Six focused on the conclusions and recommendations which answer the research question linking it with a reflection on the literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter the concepts related to sustainability of PS participation in solid waste collection based on the management models of the ISWM will be reviewed. The state of the art of the existing knowledge relating to this study will also be reviewed with the aim of creating a better insight into sustainable solid waste collection which will assist and guide this research study. It will look into the scope and nature of solid waste management model in general context from different perspectives

2.2 What is solid waste?

Waste creation is as a results of human activities, when these wastes are not properly handled, stored, collected and properly disposed of, it can pose an enormous risk to the environment and becomes detrimental to public health (Zurbrügg, 2002). Solid wastes are all the wastes arising from human and animal activities that are normally solid and are discarded or regarded as useless or unwanted. The term solid waste as used in this text is an inclusive, encompassing the heterogeneous mass of throwaways from predominantly urban community as well as the more homogeneous accumulation of agricultural, industrial, and mineral wastes (Tadesse, 2004, p.2)

With continuous economic development and an increase in living standards, the demand for goods and services is increasing quickly, resulting in an increase in per capita generation of solid waste. Increasing population, sound economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste (MSW) generation rate in low income countries (Minghua et al., 2009)

The challenges of solid waste management cannot be overemphasized .Despite the significant efforts in the last decades, the majority of municipalities in the developing countries cannot manage the growing volume of waste produced in their cities. This inability to manage urban solid waste consists of failures in the following areas: Inadequate services, Inadequate financing, Inadequate environmental controls and Poor institutional structure (Klundert and Anschutz, 1999)

In another report Lack of money for purchasing new equipment and vehicles is commonly argued as a major problem coupled with restrict operational expenditure such as salaries, fuel and maintenance. Also the Inability to provide full Coverage coupled with the use of unsuitable and unreliable waste vehicles most often leads to littering and illegal dumping as population keeps increasing thereby increasing huge strain on waste collection services, and often housing areas with difficult access or areas that have been recently developed receive no service. (UN-HABITAT, 2011)

Based on this it can explicitly be seen here that surging solid waste problems in developing countries is as the result of rapid urbanization, coupled with economic development and changing lifestyles which enormously contribute towards solid waste problems in low income countries.

2.3.1 Sustainable Solid waste Management (SSWM)

MSW according to (Annepu, 2012) is defined as any “waste generated by households, or commercial establishment or by institutional activities which is not hazardous”. SWM system encompasses the generation of waste, storage, collection, transportation, processing and end up at the final disposal site (Annepu, 2012) Other definitions also looked at SMW as activities pertaining to the control of generation, storage, collection, transfer, treatment or recycling and processing and disposal of solid waste in accordance with the best principles of public health, economics, engineering, conservation, aesthetic, and other environmental considerations (Uriate, 2008) In agreement with other writers regarding municipal solid waste principles (Vaccari and Giardina., 2006, p.1) articulated their views based on three steps: Collection of waste, treatment/recycle/reuse of waste and disposal of waste

Base on the arguments advanced so far sustainable solid waste management is thus seen as a process that moves in a cyclical direction as against the linear process capable of managing today’s waste to save future generations. (Vaccari and Giardina 2006) outlines the principles of sustainable solid waste management as:

- minimization of waste generation and hazardousness;
- maximization of recycling, or waste reuse
- Safe and environmentally correct collection and disposal of waste.

Ensuring public health and safety is the main reason for the existence of municipal solid waste management. (Imran et al., 2008, p.4) mentioned that the concept of sustainable development concerns three aspects: environmental, social, and economic. The ultimate aim of sustainable development is to improve the quality and wellbeing of human life living within the limits of our ecological means. They argue that it is safe to say that sustainable waste management means: Management of waste that would not in any other way pose any particular ecological damage. The immediate focus of environmental concerns should be geared towards any foreseeable implication for generations yet unborn. Secondly it should be geared towards meeting human health and wellbeing which can maintain society’s cohesion for a long term. Economically, it should be able to incorporate external cost for the management of waste including social and pollution prevention cost. (Imran et al., 2008, p.4)

(Gertsakis, 2003) cited in (Imran et al., 2008) suggested that effective sustainability can only be achieved when there is significant increases in the efficiency of resource utilization (referred to as ‘eco-efficiency’). Based on this, (Imran et al., 2008) suggested that the concept of waste management hierarchy composed of the 3Rs forms the vital ingredients as far as sustainability in waste services are concerned. Other writers had the opinion that the traditional *Waste Management Hierarchy* needs to be expanded. More specifically, expand the elements that have been for decades lumped together into the category of “waste avoidance” or “waste prevention”. The result of that expansion leads to a hierarchy that deserves a different name which is proposed here be termed the *Sustainability Hierarchy* as its hierarchical priority is sustainability of resources (Perket, 2010). Other development experts were of the opinion that, the concept promotes waste avoidance instead of depending on recycling and disposal in the waste management hierarchy. The shortened version of the hierarchy, ‘*reduce reuse recycle*’ is frequently used in community education campaigns, and has become a well-recognised slogan for waste reduction and resource recovery (Gertsakis, 2003). Christensen (2010,) argues that waste hierarchy is a strong approach which to him is very easy to communicate and quantify if the purpose is to avoid landfilling, but lamented that two aspects are not well addressed by the waste hierarchy. According to him one aspect is that waste minimization and cleaner technology is a very difficult issue for local and

regional bodies because they do not have the mandate and power to address this. The second aspect he argued is that, as energy prices shoot up and the Kyoto protocol forces many countries to reduce their fossil fuel, energy recovery from solid waste may be as beneficial as material recovery and thereby question the rigid prioritization of material recovery over energy recovery. He was of the opinion that one example of waste minimization is by the ‘Zero waste approach’ (Christensen, 2010.) . This assertion was strengthened by (McDougall et al., 2001) cited in (Marshall and Farahbakhsh, 2013,) that, unlike the hierarchy, ISWM does not define the ‘best’ system, as there is no universal best system.” No ISWM system design will achieve environmental or economic sustainability because this is a total quality objective that can never be reached, since it will always be possible to reduce environmental impacts further, but it will lead to continual improvements” (McDougall et al.,2001,p.19) cited in (Marshall and Farahbakhsh, 2013,) On the contrary the hierarchy concept or principles which will lead us to ISWM approach is difficult to oppose because it echoes approaches that are widespread in human health and medicine, (i.e. prevention is better than cure). Most would agree that it is more effective to avoid problems from the outset, than to invest in reactive solutions once the problem has presented. (Gertsakis, 2003)

2.3.2 Integrated Sustainable Waste Management

ISWM from the socio-economic and environmental dimension refers to a waste management system that best suits a given location, mostly in an urban area (Klundert and Anschutz, 2001). The basic aspects that have to be taken into consideration when creating an ISWM system are: collection, segregation, transportation, recycling, treatment and disposal, which means that the ISWM concept involves the entire life-cycle process that spans from generation to disposal of various waste streams (ISWM-TINOS, 2011,p.3). (Klundert and Anschutz, 2001) argue that the concept of ISWM not only takes technical or financial-economic sustainability into account as is conventionally done, but it also includes socio-cultural, environmental, institutional and political aspects that influence in general the sustainability of waste management.” Sustainable according to (Klundert and Anschutz,1999) is: appropriate to the local conditions in which it operates, from a technical, social, economic, financial, institutional, and environmental perspective, and is capable to be resilient over time without declining in the resources it needs. Secondly they also argued that integrated is a system that uses a range of inter-related collection and treatment options, at different habitat scales (household, neighbourhood, and city) and also involves all stakeholders, governmental or non-governmental agencies, formal or informal, profit or non-profit oriented. Sustainable and integrated are, in a sense, two sides of the same coin.

ISWM recognises three important dimensions in waste management which should be carefully considered in helping make the solid waste system sustainable:

- **stakeholders**, they need to be considered in shaping the system and make it sustainable because they have strong influence to achieve desired sustainability or objectives
- **Waste system elements**. These are the technical components which cannot be ignored in the waste management system
- **Sustainability aspects** as part of the dimensions will enable determine how to achieve the required objectives of waste system. (Klundert and Anschutz, 2001)

Schall (1992) cited in (Imran, et al., 2008,) in agreement with argument above, mentioned that the premise of the overall basis for ISWM to achieve sustainable waste management is by employing the waste management hierarchy.

2.3.3 The ISWM concept

The premise of Integrated solid waste management has four (4) basic principles: these are the three (3) E's:-Equity, Effectiveness, Efficiency and sustainability:

Equity: means that all citizens should have an access to a convenient waste collection system based on public health concerns.

Effectiveness: the application of waste management model will gradually lead to safe removal of all waste in the municipalities

Efficiency: the management of all waste collection is done by maximization of benefits, minimization of costs which will leads to optimal use of resources, which is considered on equity, effectiveness and sustainability.

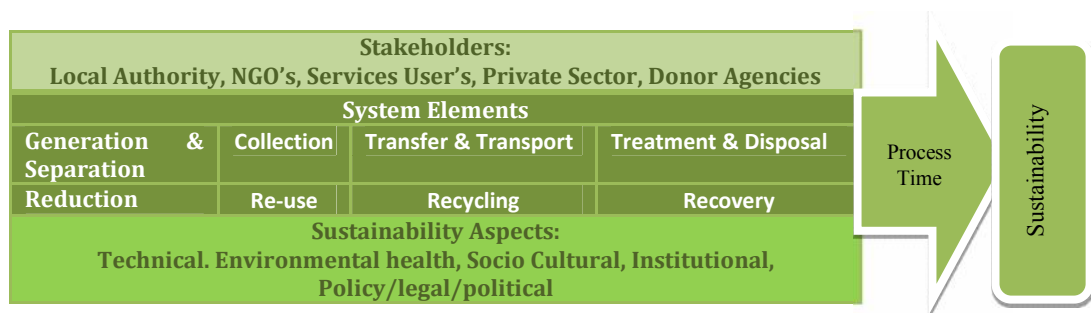
Sustainability: a solid waste collection system which is convenient to local conditions and from variety of perspectives is realistic. It is capable of maintaining itself over given period of time. (Klundert and Anschutz, 2001) this assertion was reinforced by (Scheinberg, A., 2008) that “Sustainable system in ISWM is robust and can continue without collapsing. Sustainability is considered to include operational, financial, social, institutional, political, legal and environmental aspects”.

2.3.4 Dimensions of Integrated Sustainable Waste Management

Integrated solid waste management has three dimensional components that should be taken into consideration when assessing and planning and formulating a waste management strategy. These are: the involvement of various stakeholders in waste management, waste system elements and the aspects of ISWM (Klundert, and Anschutz, 2001) the three dimensions are visualized in the diagram below with other systems and habitat scales, and six different aspects of integrated sustainable waste management;

The benefits ISWM concept in relation to this study is that: it will equip decision or policy makers with a broad set of ideas about managing enormous waste collection problems in their municipalities because it is very useful in planning and formulating waste system strategies. Also it is useful if waste collection is to be privatized. It is also useful at improving collection, transportation and final disposal systems. When all these are done, it minimizes the risk of health hazards, less water and soil pollution and better waste system performance.

Figure 2.1: The three dimensions of ISWM



Source: Developed by the Author Based on ISWM Model

2.3.5 Stakeholders

ISWM incorporate variously, the stakeholders in waste management, since cementing some level of collaboration between various stakeholders over a considerable period of time will

yield positive outcome (Klundert, and Anschutz, 2001). Stakeholders, the first of the ISWM dimensions and listed in the box in the upper third of the ISWM diagram shown in Figure 2.2 are people or organizations with a stake, or interest, in waste management. For household waste management to be more sustainable it requires the involvement of all interest groups or stakeholders (Ahmed and Ali, 2004); (Baud, 2003), namely government, private sector and residents.

2.3.6 Solid Waste Systems Elements

The system element refers to the technical aspect of sustainable waste management. Part of the purpose of using the ISWM framework is to show that these technical components are part of the overall picture, not all of it. In Figure 2.2, the upper row indicate removal and safe disposal of wastes, while the boxes below indicate waste reduction and recovery (Scheinberg, 2008)

2.3.6 Aspects of integrated sustainable waste management

To assess an existing solid waste system, the concept of ISWM categorized six (6) aspects which give metropolitan as well as municipalities some tools to study the available priorities and to design appropriate strategies to achieve desired outputs (Klundert and Anschutz, 2001)

An existing solid waste system should be assessed on ISWM dimensions described below:

- **Environmentally**, the focus is on the impacts of waste management on air, land, and water and the need to control pollution and other environmental health issues.
- **Politically** it seeks to determine the jurisdiction or legal and regulatory framework which addresses the conditions in which the waste system exists.
- **Institutionally**, actors such as the private sector involved in institutional planning is considered as very vital in activities pertaining to institutional and organisational dimensions in the waste management systems.
- **Socio-culturally**, there is vast influence of culture on waste generation form households and commercial establishments irrespective of age, sex, and ethnicity background
- **Financially**, waste system streams is planned on budgeting and cost accounting from the local, regional, national and international economic dimensions and are connected to issues like cost recovery and cost reduction in relation to the effects of environmental services on privatisation and economic activities.
- **Technically, the** implementation as well as the maintenance of the waste elements depending on the type of equipment and facilities being used and how they are designed; should be consistent with how the city is regularly cleaned. (Klundert and Anschutz, 2001)

2.4 Private Sector Participation in Solid Waste Management

Privatisation of essential public services has been the mantra of many governments the world over since late 1980s. Solid waste management is no exception, and various forms of private sector participation (PSP) have been tried in the Solid waste management (SWM). The roots of private sector participation (PSP) in urban governance can be traced to the 1990s when local governments across Europe, faced with the challenge of decentralisation accompanied by financial cutbacks from the centre used the partnership approach for infrastructure functions and services, including contracting out their duties to the private sector in the **Sustainable private sector solid waste collection & transportation. The case of Kwesimintsim, STMA, Ghana** 9

provision of services (Elander 2002) cited in (Srinivasan,2006) .Kousadikar and Singh (2013) view privatization as an essentially one of the most effective tool for restructuring and reforming the public sector enterprises running without significant aim and mission as private sector is perceived to be fundamentally more self-motivated, prolific and reliable for superior quality of products and services. (Plummer, 2002) distinguishes PSP from privatization. She sees PSP as the involvement of the private sector in some form, at some stage in the delivery of services. It is a general term used to cover a wide range of private sector involvement including large and small scale, international and local, and the formal and informal private to privatization as the transfer of some aspects of service delivery to the private sector.

2.4.1 Private sector participation in Africa

The PS concepts became the preferred mode of service delivery following the introduction of the SAP in the 1980s (Batley, 1996). Largely championed by the World Bank, adjustment was part of a neo-liberal offensive that advocated a minimalist state and viewed the private sector as more efficient (Stein, 2000) cited in (Onyanta, 2012,). The idea of privatisation is now widely accepted, especially since it continues to be promoted by international agencies and donors as the most effective vehicle for service delivery, but in many cases this remains however to be seen (Onyanta, 2012)

SWC is one of the functions that have been the purview of most Local Government in large numbers of developing countries (Van Dijk, 2006). Public sector in service delivery has been failing in low income countries most especially in Africa for a long time (Van Dijk, 2006) cited in (Van Dijk and Oduro-Kwarteng, 2007). The expectation was that decentralization and private sector participation in public services in the area of waste collection would bring vast improvement in service delivery (Van Dijk, and Oduro-Kwarteng, 2007)

Box 2.1: Private sector Involvement in solid waste collection in Conakry, Guinea

in some neighbourhoods in Conakry only 10% of solid waste in 1995 was being collected. It was been carried out by individuals with carts or tractors providing a pre-collection service for a fee and conveying the wastes to the city's communal container sites. The city lacks the capacity to maintain its own trucks because of inadequate funds; therefore emptying communal containers by the municipality was inadequate and irregular. Residents became dissatisfied and were unwilling to pay service provision to the private sector. Various small enterprises in 1998 were therefore considered for an award in franchise zones for waste collection, and the neighbourhoods were encourage to patronize these franchisees for their waste to be collected and pay the user fees to the municipality for improve services. Willingness-to-pay survey however, showed that for an average monthly fee , households are now paying about US\$3 for waste collection, and the city has now become a significant place to live.

Source: (Plummer, 2002)

2.4.2 The rationale for PSP in Solid Waste Management

Plummer (2002) argues that majority of municipalities especially in low income countries have failed to deliver services efficiently. The rationale behind private sector participation in municipal services she explained, is based in the belief that the PS has an inherent financial, economic and managerial capacity as such is in better position to deliver the required services. Other proponents were of the view that the rationale in involving the private sector stems from the fact that the private sector:

- Generally enjoys more freedom from political interference so that it can optimize its work force and to concentrate its resources in service delivery

- Management have more flexibility to hire qualified staff to pay staff according to their performance and furthermore
- Is less restricted by bureaucracy in obtaining spare parts for repairs, and that it can lease equipment when it is needed and subcontracts to meet peaks in demand (Cointreau-Levine and Coad, 2000)

From the perspectives of the (World Bank, 2012) private sector improves efficiency and lowers costs by introducing commercial principles such as limited and well-focused performance objectives, financial and managerial autonomy, a hard budget constraint, and clear accountability to both customers and providers of capital. (Coad, 2005,) argues that some of the reasons are that the public sector has failed to provide a good service due to unreliable local government operations coupled with bad management as well as ineffective supervision of the workforce, and lengthy or ineffective disciplinary procedures. Politics he said is a factor which often leads to the employment of excessive numbers of personnel and the appointment of untrained executives.

2.4.3 Barriers to private sector participation in sustainable waste management

(Agyepong, 2011) argues that the challenges that face private sector participation in sustainable waste management in most developing countries fall under: ***regulatory framework, lack of finance, and political interference;***

Finance: Inadequate government financial support and delayed payment of government subsidies makes it difficult to go to financiers and secure long term funding to meet the capital and operational requirements in solid waste management

Politics: Also, Governments and political office seekers and holders used the provision of better waste management services for their campaigns.

Regulatory framework: A major barrier to private sector participation in the sector has to do with the regulatory framework characterized by lack of directives on promotion, regulation, procedures and roles of the major stakeholders identified in the public private partnerships.

(Agyepong, 2011)

In other words, some clients do not support the idea of engaging the services of these private firms to dispose waste because they believe that waste collection should be free since the government collects tax from their wages. Furthermore, Fees chargeable by private firms on waste collection seems to be too small to meet the running cost of service delivery. Additionally, there are also cases of defaulters who refuse to pay up to date. Debt recovery creates a problem and some clients discontinue the use of the services of the private firms because of accumulated debt owned the private firms operating in their neighbourhood (Alakinde, 2012). Another major challenge is that, most part of Sub-Saharan Africa is characterized by poor laid structures which lacks access routes which makes garbage removal and lifting rather difficult through motorized waste lifting system and this leads to accumulation of solid wastes in many residential areas in the city. Also, inappropriate fleet and equipment resulting in maintenance problems which were exacerbated by lack of a standardized policy on their operations becomes a major hindrance in service delivery (Fobil, Armah, et al., 2008). Coad (2005) argues that inadequate preparation, Vague contracts, Delayed payments, Contract terms are some of the challenges facing the private sector participation in service delivery.

The arguments advanced so far point to the fact that, barriers to PS participation in sustainable SWM is characterized by lack of finance, low fee charges, poor access routes, vague contracts, delayed payments, political interference, inadequate or lack of regulatory framework.

2.4.4 Types of private sector arrangements

There are four basic models for PSP Arrangements:

- a) **Contracting** refers to a type of arrangement whereby the municipality selects a private sector company and defines the work that is to be carried out and. In this arrangement it is the client that pays the contractor. Contracts in solid waste collection are often for a much longer period.
- b) **Franchising** refers to a type of arrangement where a franchisee notably the PS is awarded an exclusive right to provide various services in a specific area for a specified period. The franchisee is solely responsible for collecting revenue from the service users.
- c) **Open competition** refers to an arrangements where qualified or licensed service providers compete with one other to provide a service to households or commercial entities
- d) **Concession** is usually awarded to the selected PS to build and operate a large facility such landfills or recycling plants and transfer the ownership to a public body (UN-HABITAT, 2010)

2.4.5 Advantages of PSP

Many proponents of the PS concepts have advanced several arguments in favour of PSP. Some of the advantages are:

- Private companies have access to loans needed to acquire suitable equipment thereby minimising high cost of operation.
- Most PS organisations specialise in a number of services and therefore have significant expertise in those fields;
- Private companies are free from external interferences; they are also motivated by profit and are better able to run effectively than the public sector.(UN-HABITAT, 2010)

Other school of thought are of the view that PS can bring on board innovation, access to finance, knowledge of technologies, managerial efficiency and entrepreneurial spirit can be combined with the social responsibility, environmental awareness and local knowledge of the public sector in an effort to solve urban problems (Plummer, 2002)

2.4.6 Disadvantages of PSP

However, Green (2003), enumerated four critical points to debunk the assertion advanced by the proponents of PSP. The four thematic areas are: capacity building, community participation, finance and institutional reform.

Undermining capacity: activities of some PS often impede the capacity of governments to take services back into their care when a contract comes to an end or fail.

Poor people are often regarded as beneficiaries rather than participants: community participation is most often lacking in private sector programmes. Rather than contributing to community development, Poor people are mainly regarded as beneficiaries. The main focus is

on awarding contracts to the PS for service provision. In many instances, the PS does not consult the urban or the rural communities where it for projects in their area.

Inflexible finances: to maintain sustainable service delivery over time, capital cost as well as cost recovery is necessary in this regard. However, this basic principle when applied denies poor people access to services.

Huysman et al.,(2004.) Argues that privatization can have serious disadvantages or repercussions for employment and labour conditions of public waste workers. (Rees, 2008, p.4) argues that though the PS is widely perceived to be the solution to the failure of the public sector, however, there are no guarantees that it will actually yield the desired performance improvements. Privatisation had little to do to improve sector performance if governments are unwilling to tackle such underlying problems as over-manning, uneconomic pricing policies, financing the provision of public and merit goods, and restricting over-intrusive political intervention. (Coad, 2005) on his part mentioned disadvantages in private sector service delivery, including: Conditions of employment, Loss of control, Corruption, Lack of political leadership, lack of flexibility, clash of cultures and lack of capacity.

Other arguments against PS in solid waste which are harder to avoid including:

- The public sector losing most of its expertise
- The risk of a monopoly situation developing, so that there is no alternative to the particular service provider,
- Corruption (bribes paid to inspectors and officials to overlook shortcomings and associated penalties) (UN-HABITAT, 2010)

Based on the above discussion for and against PS, it can be seen that though PS has several advantages which includes innovation, access to finance, knowledge of technologies, and managerial efficiency notwithstanding it is also characterized by various limitations such as bribery and corruption, risk of monopoly, loss of expertise in the public sector and lack of flexibility.

2.4.7 Measuring the PS Performance in Solid Waste service delivery

The urban solid waste management in developing countries is faced with challenges of sustainability. A sustainable solid waste collection and management system encompasses a system that is environmentally, financially, and socially appropriate and acceptable, and meets the criteria of sustainable development (Oduro-Kwarteng, 2011). The three important interrelated aspects (environmental, financial, and social) of sustainability when met ensure that solid waste does not cause environmental pollution and public health hazards and does benefit all citizens (Baud et al., 2004; Baud, 2003) cited in (Oduro-Kwarteng, 2011)

Environmental/Health Effectiveness:

The principle of ISWM which basically link with the research states that Environmental effectiveness contributes to sustainable waste service delivery. Effectiveness for waste management in general means that all waste is removed, as planned and all recoverable materials are recovered (Klundert and Anschutz, 2001)

Cleanliness of service Areas/Level of satisfaction

With regard to cleanliness (Obirih-Opareh, 2002) argues that appreciation of the cleanliness of service areas is normally lower around the communal container sites as compared to

house-to-house collection system. Irregular lifting of communal containers often incites people to dump indiscriminately causing environmental conditions. He also explained that dissatisfaction about frequency of collection is prevalent in mostly low income countries, this means that interrogation of satisfaction of service user with regard to quality, frequency and distance is highly irregular leading to pilling up of refuse or 'spill over' at communal container sites.

Frequency of collection

The frequency of waste collection in terms of the number of times in a week or a month that waste is collected serves as a fundamental parameter as far as waste collection system is concerned (UN-HABITAT, 2010). With regard to the Container systems, where the complete skip is removed daily, or at most every two days, help prevent the build-up of the above nuisances and spillvoer (Coffey, 2005). Baud (2003, p.840) argues that the officially stipulated frequency of waste collection in most developing countries is once a day and some areas two (2) or three (3) days for the communal container service and once a week for house-to-house collection. (UN-HABITAT, 2010)

Types of Equipment

The collection vehicles and equipment are important factors to consider for the sustainability of the private organizations. Adequate vehicles and equipment will ensure the provision of good service in specified areas. If the private sector has enough equipment and vehicles it could improve and extend the service or spread its tentacles to cover large area for service delivery (Kassim, 2009). More importantly to ensure environmental effectiveness in solid waste collection require the use of appropriate equipment as well as better means of vehicles. Various types of transport are used in solid waste service delivery including wheel barrows which are often used to carry waste for short distances. The second means of transport comprises animals-drawn carts. Carts drawn by bullocks, horses or donkeys can pull much larger than the first group and are very useful in areas where there is absence of access routes. Currently various types of equipment for the collection and transportation of solid waste has been introduced. High technology equipment like skip loaders, roll-on-roll-off vehicles (open types) and compaction trucks (closed type) are widely being used. Some of the equipment might however, not ensure environmental effectiveness (Obirih-Opareh, 2002)

In sharp contrast, (ILO, 2002, p.25) argues that most of the equipment used to collect and transport solid waste in low income countries in many cases, are poorly designed, or is inappropriate, being imported from the West where the nature of waste is different. This often leads to frequent breakdown of service vehicles. Imported spare parts are normally required for the maintenance of these waste collection equipment which are very expensive and often leads to long layoff periods. (Baud, 2003) argues that frequent breakdown of service vehicle is due to the fact that most local contractors use aged, dilapidated vehicles. Moreover, most of these trucks are often open therefore contribute heavily to air pollution and littering.

Back-up vehicle

More importantly, to ensure sustainable service delivery it is expected that, any solid waste management system must include back-up vehicles to allow better and adequate servicing of trucks when equipment are down and service times which often most the PS lacks, otherwise even a simple breakdown such as a puncture can stop the whole system. Back up trucks are very essential to allow for proper servicing of trucks during breakdowns (Coffey, 2005)

Equipment Breakdowns

Many PS who provide solid waste service delivery in most municipalities suffer from frequent equipment breakdowns. In many instances about 60 per cent of the waste trucks even more remain unserviceable. In a study in Tanzania it came to light that, a small repair could take up to one week, and large repairs could take up to a month to complete depending on the availability of spare parts. It is common to see a waste truck been out of service for months awaiting funds to purchase spare parts which may to be imported from foreign a country (UN-HABITAT, 2010)

Equipment maintenance

Some of the most contributing factors to poor solid waste collection performance in most developing countries are attributed to lack of maintenance and the use of inappropriate equipment (UN-HABITAT, 2010). Coffey (2005) argues that preventive maintenance is an essential part of the operation of any SW collection system and will pay for itself many times over. A full preventive maintenance system which includes daily checks by the driver, weekly checks by a mechanic and monthly servicing is the minimum that is required for any new SW collection and transport system.

Covering of waste en route to final disposal site

Environmental cleanliness also entails the avoidance of littering in any form but a study conducted in Hyderabad and Accra shows that most private service providers most often do not cover their open containers en route to the final disposal site and no sanctions is ever applied by the authorities. Littering in this case is a common problem during transport resulting from inappropriate packing and not using top covers or tarpaulin (Baud, 2003)

Methods of disposal

Ensuring environmental effectiveness also requires safe disposal of solid waste. In most developed countries, methods of disposal are mainly through sanitary landfills, incineration, composting and recycling where most of these facilities are designed and operated to meet environmental standard. However, in most developing countries uncollected urban solid waste found their way into open dumps which tend to cause serious environmental degradation and health hazards (World Bank,1999:3) cited in (Obirih-Opareh, 2002). Shekdar (2009) mentioned that prevailing method of open dumping is a major source of environmental pollution in most low income countries. This is due to the fact that it is difficult to identify new sites for disposal due to public opposition, high cost of land and lack of appropriate land area. Attempts to adopt sanitary landfilling techniques have been unsuccessful, probably because of inappropriate designs and poor operational management.

Economic Efficiency:

On the perspective of (Klundert and Anschutz, 2001) economic efficiency is seen here as the management of all waste through optimization of benefits, and minimization of costs. It also entails resource optimization which is considered on equity, effectiveness and sustainability.

Cost recovery

Kassim (2009) mentioned that cost recovery is part of the overall design of each private sector organization. He argues that sustainability and further development of the private

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sector depends mainly on the recovery of the running costs, and in the case of Dar es Salaam this comes mainly from the service recipients. Solid waste collection user charges from the households are now commonly practised in many developing countries but a study conducted in Tanzania indicates that collection of fees from the households is not sufficient for cost recovery. Among the reasons for this includes, Lack of public awareness regarding the importance of service provision and the enforcement of the regulations and byelaws. On the other hand (Oduro-Kwarteng, 2011) was also of the view that financial sustainability ensures that there is more sustainable cost recovery approach than over reliance on government subsidy financing. Full or partial cost recovery through user charges based on ability-to-pay help reduce the financial burden on the government. (Choguill, 1996) cited in (Kassim, 2009) argues that the basic element of any sustainability criteria is that the cost of service must be recovered from the users.

Employment

In Hyderabad, a study by Post et al., (2003) reveal that PS participation has indeed created additional employment opportunities in the sector (a couple of hundred extra jobs throughout the city); Despite this job creation, frequently of collection remain inadequate, with up to two thirds of the waste generated in urban areas still remains uncollected, and most neighbourhoods in the cities receiving no waste collection services. (UN-HABITAT, 2010). Coffey (2005) argues that the availability of human resource plays an important role for sustainability and development of the private sectors, since people are needed to work in that sector. Most of the solid waste collection activities are manual and that they need people to work for them,

Willingness to pay

Willingness to pay, combined with ability to manage, are often seen as good measures to assess the feasibility of privatized solid waste collection. A service is considered affordable when service users perceive it as valuable (USAID, 2009) Post et al., (2003) argue that in the door-to-door waste collection system, the willingness of residents to pay their dues depends on whether they receive value for money. Willingness to pay for the service can be used to determine what type of service provision should be provided in a sustainable manner if households should pay for all solid waste collection services (UN-HABITAT, 2010)

Health & safety conditions

Although protective clothing such as hand gloves, nose mask and wellington boots are supposed to be provided but most sanitary labourers do not use it (Obirih-Opareh, 2002). Post et al., (2003) agreed with the assertion that employees in the PS are usually not reimbursed for medical expenses. Public sector workers and their families enjoy full medical care better than employees in private sector and in most cases these are non-existent. Employees in the private sector are usually not reimbursed for hospital and medical expenses. There is also total absence of Medical check-ups (Obirih-Opareh, 2002)

Social equity and acceptability:

Klundert and Anschutz (2001) argue that social equity and acceptability in sustainable solid waste collection ensure that citizens have access to the requisite waste collection system for public health concerns. (Oduro-Kwarteng, 2011) sided with the proponents that, social sustainability of solid waste collection concerns provide services to all strata of society, regardless of income. Formal solid waste collection and necessary institutional arrangements ensure total service coverage where everybody is served. (Visvanathan et al., 2004) cited in (Joseph, 2006) argues that Solid waste management (SWM) is an area of universal concern

for both the developed and developing world. This approach of burying waste in the ground, covering it up and forgetting it is not sustainable.

Labour Conditions/wages

According to (ILO, 2002, p.26) "Labour is often used without regard to their health and safety". (Post, et al., 2003) argues that Labour conditions for all those working in solid waste collection are not attractive. Furthermore, they have to work in insanitary and unhygienic conditions and for low wages. Although protective clothing such as gloves, boots is supposed to be provided, in actual fact sanitary workers seldom wear it. Fringe benefits for government workers which include allowances for housing, transportation, social security benefits, risk and hazards, holidays and weekend allowances are often not paid (Obirih-Opareh, 2002) and besides they do not also have explicit employment contracts and are most often troubled by irregularity of payment. Moreover, these workers are not properly organised since they do not belong to any union and as such they have weak bargaining chip in their employment (Post et al., 2003)

Awareness creation

Awareness creation and attitudes towards waste can have a significant impact on a whole solid waste collection system. The overall activity in waste collection services notably, storage, collection, transportation, user fees and coupled with lack of cooperation on the part of the public in helping select an appropriate site for a sanitary facility depend heavily on creating awareness and the level of participation by the general populace. These are the determinants of the success or otherwise the malfunctioning of a solid waste management system (Zurbrügg, 2002). Bhuiyan (2010) argues that the role or responsibility of central as well as urban government is to initiate effective motivational campaigns to increase awareness of the people on privatized solid waste issues.

Attitudes/Types of storage facility

When it comes to dumping of waste some citizens are mindful of their conducts and always endeavour to dump their refuse inside an appropriate container at a specific location, however, others flout the rules and regulation and see the street as a place for dumping their waste, even as they do that, they ensure their houses are kept clean UN-HABITAT (2010). In most developing countries also, all sort of storage containers such as metal bucket, sacks and metal boxes are used. This is attributed to the attitude of residence to use the appropriate waste storage facilities. Though cheaper and affordable as they are, they can lead to filth and serve as breeding places of flies. Ideally waste should be stored in sturdy container of sufficient capacity which is easy to empty and clean and should have a tight fitting lid. With regard to communal containers, they are usually open thus given access to rats, flies and other domestic animals which creates unhygienic and aesthetic conditions (Obirih-Opareh, 2002)

Stimulating Government Mechanism

Kassim (2009) mentioned that for the sustainability of private sector there is the need for government to develop mechanisms which guarantee a long term service and efficient performance. There is the need for a favourable working condition, and secondly, the private sector itself must show commitment in the service. The success of the privatized solid waste collection and its sustainability is justified by the arrangement which offers the correct incentives, sufficient flexibility in management and the need to compete in a market.

To argue further, the private sector needs the appropriate financial and human resources and technological knowhow. However, unflinching support is needed from the government and

other institutions to this sector. Good governance is also identified as a fundamental importance; as the public sector responsible for the system should actively play a major role and work hand in hand with their partners, the private sector. The environmental standards, legislation and contractual obligation should also be enforced and upheld (Kassim, 2009)

Policy & Regulatory framework

Joseph et al., (2007) argues that regulatory framework should ensure that the PS is protected against risks such as environmental damage, currency adjustments, inflation and political changes. There are often weak regulatory practices and non-adherence to contractual obligations, resulting in no incentives for full cost recovery and better service quality. The regulatory practices which affect service quality are non-competitive bidding and unsigned contracts. This normally results in prolonged period before upward review of collection fees and service charges, delay of subsidy payment, and no interest paid on monies delayed. The delay of subsidy payment (for more than a year) to the private companies does not provide for private sector investment in new vehicles and does not enhance better service delivery (Oduro-Kwarteng, 2011)

Institutions and legislation

Institutional issues include the current and in-tended legislation and the extent to which it is enforced. For legislation to be effective it needs the support of the general populace or the service user's, being regarded as influential stakeholders. Environmental health officers and others involved in enforcing the law should be adequately motivated by the conviction that environmental issues are vital for sustainable service delivery and in the public interest. Appropriate Penalties should be administered in a way by a judiciary and should be stringent enough to enforce compliance which is convinced of the need to penalise defaulters of service fee or user charges (UN-HABITAT, 2010)

Complain Mechanism

Formidable, well designed and effective complaints systems help cement relationships between those in authorities and the public and immaculately, provide useful monitoring information regarding solid waste collection services. If the local government department would set up a system of providing feedback on complaints, citizens who have absolutely lost interest in the system will become constant users of the services (UN-HABITAT, 2010) In actual fact, official monitoring in waste collection services is exceptionally weak due to bad logistics, understaffing, low remuneration and corruption (Post, et al., 2003)

Appropriate technology

Lack of appropriate or modern technology, is often seen as limiting the possibility of reusing and recycling most of the municipal waste (UNEP, 2009) it is therefore important that various handling equipment like vehicles for collection and transportation, and machinery for waste treatment processing and disposal equipment has to be appropriately designed in accordance with the waste characteristics. Sanitary landfilling technology should be much more widely adopted so that available landfill space can be utilized for longer periods so that reclamation can become more cost-effective (Shekdar, 2009)

Financial Mechanism

With regard to taxes, user fees or charges and penalties Joseph et al., (2007) mentioned that possible sources of funding for waste management operations are municipal funds and Taxes or User fees or charges (i.e. flat or graded rate). The government must have the resources and

capabilities to monitor service levels and enforce penalties for flouting the rules of engagement. (Ezebilo, 2011) argue that in order to sustain private sector participation in MSW collection and transport, there is a need to provide the sector with incentives (e.g. rewards). For example, introduction of user fees for privatized solid waste service delivery, i.e. urban residents should pay for privatized solid waste collection. Before introducing user fees or charges, it will be important to examine whether urban residents would be willing to pay for privatized solid waste services.

Capacity Building

Insufficient capacity has been identified as a fundamental impediment to sound privatized solid waste collection and transport systems in much of the developing world. Operating an effective, efficient, environmentally and sustainable sound municipal solid waste collection and transport systems requires building administrative capacity for government and private sector players and technical capacity for designing, operating, maintaining, and monitoring each part of the process (USAID., 2009)

Often those people working in privatized solid waste collection and transport; private sector companies, NGOs, and government entities, lack the technical and financial knowledge to operate efficiently. Training that builds human resource and institutional capacity at appropriate levels is essential. Capacity building for everyone from local government officials to the private sector will prove effective in extending and sustaining these programs (USAID, 2009)

2.5 The Management Model of Integrated Solid Waste Management

The management Model uses such mechanism as Polices, regulations and laws, institutions, financial mechanisms, technology and infrastructure, and the role of various stakeholders to achieve environmental effectiveness, economic efficiency and social equity and acceptability

2.5.1 The role of Government in SPS participation in Solid Waste Management

Local municipal governments have a role in the set-up and operation of waste management systems. Most urban authorities in both industrialized and developing countries receive their powers and obligations from a central government authority, with allocation of powers and responsibilities to protect the rights of the citizens, to provide services, and to serve the common good (Gidman et al., 1995) cited in (Klundert and Lardinois, 1995) On the other hand, they have to implement laws and regulations in order to fulfil their statutory obligations. On the other hand, a failure to provide a public service can result in those in power risking the wrath of their constituents (Klundert and Lardinois, 1995). Among the role of Government PS participation is to ensure that monitoring mechanisms are put in place to ensure effective, efficient and sustainable service delivery. Government are also to ensure that the private contractor is paid on time to sustain it in business. Government role is also to ensure that the tendering process is transparent and devoid of any malpractices and that the bidding is competitive enough to ensure that the right calibre of contractor is selected.

2.5.2 The principles for successful private sector participation

(Cointreau-Levine and Coad, 2000) outlined three vital ingredients for successful private sector participation, that is, Competition, Accountability and Transparency:

Competition: stimulation of competition between different private companies should be the norm, and moreover between the public sectors and the private service providers. Competition provides the criteria for assessing the performance of various companies in service provision. Furthermore it also serves as a reminder that those who fail to perform according to set standard risk losing to others who are ready to occupy their place.

Accountability is key to service delivery improvements. However accountability as a central theme of the debates on service delivery however, only surfaced after the World Development Report of 2004 which identified failures in service delivery squarely as failures in accountability relationships (World Bank 2004).cited in (Joshi, 2010) .He argued that There are four elements to this accountability relationship: setting standards, getting information about actions, making judgements about appropriateness and sanctioning unsatisfactory performance this will lead to service delivery performance((Joshi, 2010)

Transparency and accountability initiatives lead to greater empowerment of poor people, greater awareness of rights by users and greater engagement in service delivery through the practice of citizenship (Joshi, 2010, p.5). He mentioned for example, citizen report cards and community score cards which are based on the assumption that providers care about their rankings either because of their reputation or potential loss of users. Community monitoring he argued implies more of a watchdog role that can pitch community members in an adversarial relationship vis-à-vis providers. Public Expenditure Tracking Surveys (PETS) are largely meant to expose blocks in fund flows and expose corruption and improve provider behaviour due to fear of exposure. He suggested that their impacts vary on the three dimensions they have the potentials to sustainable service delivery (Joshi, 2010,) According to (Joshi, 2010,) “The overall evidence suggests that transparency and accountability initiatives score higher on *effectiveness* (in that they are often well implemented and reach first order goals, complaint mechanisms are used, or corruption is exposed) than on *impact* (in improving responsiveness of providers, or improving services themselves)”

2.5.3 The Management Mechanisms for ensuring sustainable PSP

According to (UNEP, 2009) “One major concepts of ISWM is based on its management which includes policies, rules and regulations, institutions, financial mechanisms, technology and infrastructure, and role of various stakeholders to achieve social equity, environmental effectiveness and economic efficiency in the solid waste service delivery”:

Policies: There are varieties of polices out there. Policies are often used as regulatory instruments before they are implemented. It is, also known as command and control, which specify the standards or limits to be followed and the latter, also known as market-based instruments, provide incentives and disincentives. National and local policies may have multiple perspectives and they may help to improve SW service delivery with respect to local and national conditions. (UNEP, 2009)

Institutions: solid waste collection in most municipalities hitherto has been the purview of municipal or local governments. However, the ever rapid increase of municipal solid waste has led for the involvement of the private sector in solid waste management service provision. This development transition has led to the establishments of strong regulatory institutions to ensure effective and efficient services by the PS. (UNEP, 2009)

Financial Mechanisms: SWM being a local issue, in many countries all the financial activities like its annual budget, subsidies from national government, and international cooperation were taken care by the local governments. To deal with the issue of public health and various environmental concerns, many governments across the globe adopts financial mechanisms as enumerated below to deal with the issue of Solid waste management effectively and efficiently:(UNEP, 2009)

User charges: user charges are introduced in many countries as a means of generating revenue to fund waste collection activities .A typical example in this aspect is the polluter's pay principle normally imposed to motivate generators of waste to reduce waste generation.

Penalty, fine and levy: This is where defaulters of service delivery are prosecuted for failing to pay for service provision and the amount is used in support waste management activities.

Environmental Fund: In some developing countries environmental levy are imposed on the citizenry to raise funds to support environmental or sanitation services

International Cooperation: through international cooperation many countries, most especially the developing world are supported through grants and loans to support developmental projects including funding waste management projects.(UNEP, 2009)

Technology

An environmentally sound technology is requires in Solid waste collection in municipalities. The technology should range from communal containers for primary collection to the use of incinerators for hazardous waste disposal. Some of these technological interventions for Solid waste collection are as follows:

Transfer stations: This is a site where waste is temporary stored for sorting before it is transferred to the final disposal site or for recycling and treatment. Its construction helps to avoid such effects as offensive odour, breeding of vectors, flies, rodents and mosquitoes and other animals.

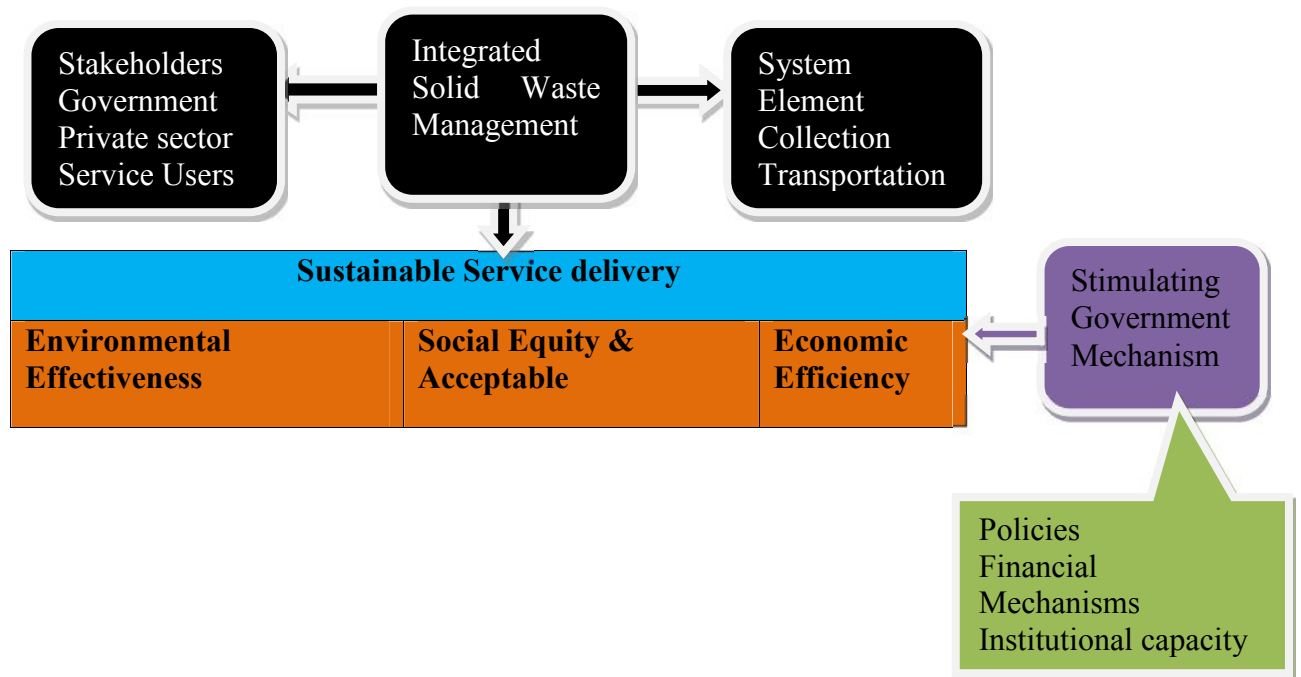
Treatment: It includes separation of different types of waste; hence, the use of sophisticated technology in waste separation for recovery and recycling as well as equipment for shredding and treatment of disposable of waste

Final Disposal: sanitary landfill is now commonly used technology across the world; despite its introduction, environmentally unfriendly methods which includes open-burning and open-dumping are still being practiced in most low income countries.

Recycling and Recovery: This involves activities pertaining to recycling of reusable materials like plastics or polythene bags and glass products, paper and iron for industrial production as well as turning waste into energy (UNEP, 2009,)

The argument advanced so far on the government mechanisms point to the fact that for sustainability to be achieved in service delivery such mechanism as polices, regulations and laws, institutions, financial mechanisms, technology and infrastructure, and the role of various stakeholders when implemented would help achieve environmental effectiveness, economic efficiency and social equity and acceptability in sustainable privatized solid waste collection. In other words the discussion on the government models advocated for the establishment of strong institutions which would serve as a super structure to enhance service provision, without these institutions, user's and providers alike are bound to flout the rules of engagement which could lead to negative outcomes.

Figure 2.2: Conceptual framework for sustainable private sector waste collection and transport



Source: Developed by the Author based on the ISWM Model, 2001

2.5.4 The conceptual framework

The Conceptual framework above has been designed based on the ISWM Model. It integrates the three dimensions which are the stakeholders made up of the Government, the service provider and service users link with the system elements made up of solid waste collection and transport to create the platform for successful sustainable service delivery in order to promote environmental effectiveness, economic efficiency and social equity and acceptability which are stimulated by Government mechanism made up of policies, institutional capacity, financial mechanism and standard and regulation, technology stimulate the four main variables to achieve sustainable PS service delivery in waste collection and transportation.

Summary

The issue of waste management has a global linkage as its consequences leads to various environmental concerns. Various models had for several years been propounded to deal with sustainable private sector participation in solid waste management. The integrated solid waste management is currently widely used model in this regard. It operates, from a technical, social, economic, financial, institutional, and environmental perspective, As a model designed to achieve sustainability in the waste sector, it is characterized by three broad dimensions, notably; stakeholders, system element and sustainability aspects. The basic principles of the ISMW is : environmental effectiveness, economic efficiency and social equity .Other aspect to complete ISWM is the management model which describes various government mechanisms put in place to ensure sustainable PS in service delivery, These are the policies, institutions, financial mechanism, and technology. All these models or concepts are linked together to ensure sustainable PS in service delivery.

CHAPTER THREE

Research Design and Methods

3.1 Introduction

This chapter explained the research methodology used in this study. It highlights the revised research questions, the research type and strategy, research population and sampling methods, data collection and analysis and variables and indicators related to the research questions as well as the issue of reliability and validity.

3.1.1 Revised Research Question(s)

To achieve the objective of the study, the following research questions were addressed:

3.1.2 Specific research questions are:

1. How is the current solid waste collection and transport system organized in STMA?
2. How sustainable is the current private sector service delivery in STMA?
3. Which government mechanisms have been put in place to enhance sustainable private sector service delivery in STMA?
4. What needs to be done to increase sustainable solid waste service delivery by the private sector in STMA?

3.2 Research type, approach, strategy

The research type was explanatory and exploratory using single case study embedded. An embedded case study research methodology provides a means of integrating both quantitative and qualitative methods into a single research study (Scholz and Tietje, 2002). To explore the viewpoints of metro authorities, service providers and service users in connection with the sustainability of privatised solid waste collection and transportation services in STMA, a case study was used. A combination of qualitative and quantitative methods both of which were complementary was used in this research to achieve better results and to collect data on the variables: environmental effectiveness, economic efficiency, social equity and acceptability and stimulating government mechanisms.

Table 3.1: Operationalization: variables, indicators

Variables	Indicators	Data Sources	Type of Analysis Variables
Solid Waste Collection & transportation	Existence of PS participation	In depth interview with STMA Officials	Qualitative
Research Question 2	How sustainable is the current private sector service delivery in STMA?		

<p>Social Equity/acceptability</p> <p>Sub-Variables'</p> <p>Labour conditions</p> <p>Health & Safety Conditions</p> <p>Level of satisfaction</p> <p>Cultural</p>	<p>Wages paid/overtime paid /holiday allowances/</p> <p>Capacity building/On the job training skills</p> <p>payment of social security/pension Scheme benefits to workers</p> <p>Reimbursement of medical expenses, Frequency of Medical check-ups and preventive vaccination</p> <p>Protective gear, wellington boots, hand gloves, nose mask</p> <p>Willingness to pay</p> <p>Affordability of user fees</p> <p>Willingness to participate in waste separation at source.</p>	<p>In depth interview with service provider</p> <p>Administering Questionnaire-Service users</p>	<p>Qualitative</p> <p>Quantitative</p>
<p>Environmental Effectiveness</p> <p>Sub-Variables'</p> <p>Cleanliness of the service area</p> <p>Types/No of disposal equipment</p>	<p>Number of households and establishments served per day</p> <p>frequency of collection for-communal containers/door-to-door</p> <p>Number of trips (loads) made daily per vehicle.</p> <p>Equipment breakdown frequency and duration per vehicle</p> <p>Open/closed truck/compaction</p> <p>Number of vehicles in service/waste</p> <p>Covering of truck en route to final disposal site</p>	<p>In depth interview with service provider</p> <p>In depth interview with service provider</p>	<p>Qualitative</p> <p>Qualitative</p>

Methods of disposal	Type of storage bins used by households Open dump/ clandestine dumping or Sanitary landfill	In depth interview with service provider	Qualitative
Segregation & recovery of recyclables	Existence of waste segregation and recycling	In depth interview with STMA Officials	Qualitative
Economic Efficiency Sub Variables			
Employment	No. of Jobs Created	In depth interview with service provider	Qualitative
Cost recovery	Ability of PS to recover Cost Regular payment of user fees		
Research Question 3	Which government mechanisms have been put in place to enhance sustainable private sector service delivery in STMA?		
Stimulating Government mechanisms Sub-Variables Financial Mechanisms	User charges, Subsidies Support, Penalty, fine and levy		Qualitative
Technology	Existence of waste treatment facility, Final disposal Method, Existence of recycling and recovery of material Existence of transferee stations	In depth interview with STMA Officials	
Policies	Existence of bye laws, Environmental laws, citizens score card, sanction/Penalties		
Institutional Capacity	Proper tender procedures, Sufficient contract periods for cost recovery. Monitoring mechanism, Complaints hotlines, Existence of capacity building programmes	In depth interview with STMA Officials	Qualitative
Stakeholder Participation	Level of Participation performance/monitoring		
Research Question 4	What needs to be done to enhance sustainable solid waste service delivery by the private sector in STMA?		

Solid Waste Collection & Transport measures	Implementation of Financial & Institutional arrangements	In depth interview with STMA Officials	Qualitative
	Effective monitoring & control		
	Effective complaints mechanism		

Source: developed by the Author based different sources and experiences on the job

3.3 Sample size and selection

The research population comprises the Metropolitan Assembly, the service providers, the service users and other stakeholders in solid waste management in STMA. To ensure representation of the study population 78 respondents were sampled through purposive and simple random sample. Two (2) from the top officials of STMA. Two (2) from officials of Waste Management Department, The regional Environmental health officer (1) one Environmental Health Department one (1), two (2) from the service providers, eight (8) from the private waste collectors and 60 service users in the zone.

Table 3.2: Data Collection strategy

Category of respondents	Sample Size	Sampling Technique	Data Type	Research Instruments
STMA Staff	2	Purposive	Primary/ Secondary	In-depth Interview
WMD Staff	2	Purposive	Primary/ Secondary	In-depth Interview
EHD Staff	1	Purposive	Primary/ Secondary	In-depth Interview
REHO	1			
Service Providers	2	Purposive	Primary/ Secondary	In-depth Interview
Private Sector Workers	8	Purposive	Primary	In-depth Interview
Households	60	Simple random Sampling	Primary	Questionnaire/Observation
Total	62			

Source: Author, 2013

3.4 Validity and reliability

Validity: The validity of the research was ensured by using triangulation that is by combining different methodological approaches through designing appropriate questions for questionnaire and interviews.

Reliability: To ensure reliability of data an elaborate research detail plan was used. Database of all collected data was tightly kept before processing with the SPSS. Pre-testing of the research instruments was done to ensure that vague, leading and ambiguous questions were eliminated.

3.5 Data collection methods

Data collection encompassed both primary and secondary sources. Data was gathered through in-depth interviews from purposively selected officials of the waste management and private

institutions involve in service delivery in the metropolitan Assembly as well as service users comprising households in the service zone. The officials were purposively selected because they had in-depth knowledge about SW problems in the study area and as such their views are very relevant regarding the study concerned. Purposive sampling enable the researcher to decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard 2002, Lewis & Sheppard 2006) cited in (Tongco, 2007).Data collection from service users was done through simple random sampling; this is because sub-groups were studied in greater detail due to its heterogeneous nature and also, it gives precise information inside the sub-populations about the variables under study (Barreiro, 2001)

The **primary sources** include;

Questionnaires: closed-ended as well as open ended questionnaires were used to collect data from the households on the sustainability of the privatised solid waste collection service delivery in STMA. Their candid opinions were sought on the improvement of the service.

Interviews: were used to gather an in-depth information from STMA, WMD ,EHD,REHO staff as well as service providers who are directly involved in privatized SWM and their supervisors as well as the waste collectors.

Observation: In order to confirm the responses from interviews and questionnaire in order to generate a triangulated data set, observation was used to document the conditions and practices of PSWC in STMA

Secondary data: was gathered from the review of different books, periodicals, journal articles, internet, newspapers, magazines, reports/research reports, internal records of organizations on privatised solid waste collection service delivery.

3.6 Data analysis methods

Data analysis deals with a critical examination of data in order to understand its parts and its relationship and to discover its trends. Combination of Qualitative and quantitative techniques were used in the Data analysis for the research With regard to qualitative analysis, data coding was done using Atlas.ti software. The coding was done in a neutral and objective manner. Once all the data were coded, they were further analyzed and interpreted to arrive at recommendations and conclusions. The researcher employed the use of the software programme or package ‘Statistical Package for Social Sciences (SPSS) software to analyse quantitative data. Coding was done in numeric form and tested statistically using the software. It was also used to create simple graphs and tabulating frequencies

Summary

The chapter discusses the research design and methods. The research type and strategy was explanatory and exploratory using single case study embedded, research population and sampling methods comprises the Metropolitan Assembly, the service providers, the service users and other stakeholders in STMA. Both qualitative and qualitative as well as observation methods were used to gather the data. ‘Statistical Package for Social Sciences (SPSS) software and Atlas ti software were the software’s used to analyzed both quantitative and qualitative data.

CHAPTER FOUR

Local context

4.1 Introduction

This Chapter presents an insight of the state of current Privatized Solid Waste collection and transportation in the study area (STMA). It commenced with an overview of SWM in Ghana and the institutional provision for PSWCT. The focus was then shifted to the background of SWM in STMA, the private sector participation in STMA, the institutional arrangement for PS involvement and how the current system of solid waste collection is organized in STMA.

4.2 Background on Privatized Solid waste Management in Ghana

In Ghana, solid waste collection and transportation has been characterized through various strategies and methods of collection under different political regimes. Privatization of waste collection and transportation commenced in Ghana in the early 1990s when the German Government supported the Accra Metropolitan Assembly to collect waste from commercial and residential entities in the capital city by means of local private companies. Door-to-door waste collection took place around this time in the capital city of Ghana. Overall responsibility of SWM in Ghana at the national level lies with the Ministry of Local Government and Rural Development which has the oversight responsibilities and supervises the decentralized Metropolitan, Municipal and District Assemblies (MMDAs). However the Environmental Protection Agency (EPA) plays a key role in this regard since it is vested with regulatory authority under the auspices of the Ministry of Environment, Science and technology (Mariwah, 2012)

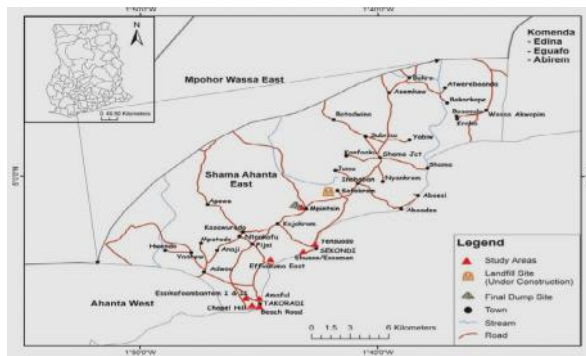
The Metropolitan, Municipal and District Assemblies are the sole agencies responsible for the collection and final disposal of solid waste through their Waste Management Departments (WMDs) as well as their Environmental Health Management and Sanitation Departments. The policy framework guiding the management of hazardous, solid and radioactive waste includes¹. All these Acts, Rules and Regulations emanate from the National Environmental Action Plan.

4.3 Background of Sekondi Takoradi

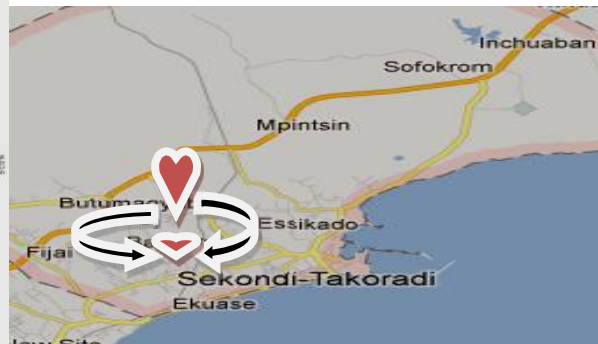
Sekondi-Takoradi is the administrative capital of the Western Region; it has a land area of 385 square kilometres and is strategically located in the South-Western part of Ghana, about 242 kilometres to the West of Accra, the capital city. It is also approximately 280 kilometres from the La Cote d'Ivoire border in the West. The metropolis has an equatorial type of climate which implies a dry and wet season (STMA, 2006)

¹ the Local Government Act (1994), Act 462, the Environmental Protection Agency Act (1994), Act 490, the Pesticides Control and Management Act (1996), Act 528, the Environmental Assessment Regulations 1999, (LI 1652) the Environmental Sanitation Policy of Ghana (1999), the Guidelines for the Development and Management of Landfills in Ghana, and the Guidelines for Bio-medical Waste (2000)

Map 4.1: Showing the study area



Map 4.2: Showing physical features of the study area



*Study Areas: Adopted from Mariwah, 2012
(Source Cartography Unit, UCC)*

Source: Map Data Google 2013

With temperatures as high as 22 degree Celsius. It has a mean annual rainfall of 2.350 millimetres, which is experienced heavily in May and June with the minor rains occurring between September and October. The climate offers opportunities for varying agricultural production. The City is strategically located considering its closeness to the sea with a sea port, airport and accessibility to major cities either by road, by air or by sea. Sekondi is the administrative head of the Sekondi-Takoradi Metropolitan Assembly and the Metropolis has been divided into four (4) Sub Metros namely:

Table 4.1: Sub-Metros in STMA

SUB-METRO	POPULATION
Sekondi Sub Metro	70,361
Takoradi Sub Metro	97,352
Essikado-Ketan Sub Metro	159,218
Effia-Kwesimintsim Sub Metro	232,617
TOTAL (STMA)	559,548

Source: Secondary Data, STMA, July, 2013

As of now only Sekondi Sub Metro and Takoradi Sub Metro are in operation, with Essikado/Ketan and Effia Kwesimintsim operating under Sekondi and Takoradi Sub-Metros respectively.

4.4 The Waste Management Department of Sekondi-Takoradi

The Local Government Act of 1993, Act 462 established and regulates the local government system in Ghana. Section 38 of this Act, provides for the establishment of 16 departments within a Metropolitan Assembly (MA) for the efficient discharge of its functions. The Waste Management Department (WMD) is one of the departments established by the Metropolitan Assembly to manage environmental sanitation services. STMA established its WMD in 1994. It is mandated to maintain a clean and healthy metropolis, through the provision and delivery of effective, efficient and affordable waste collection services and programmes, and environmentally friendly waste management systems in collaboration with the private sector and all relevant stakeholders. It also focuses on an efficient organization, working with dedicated partners and collaborators, and a responsible society for sustainable waste management.

Organizational Structure of WMD

The proposed structure of the WMD seeks to fit a functionally related structure into the local government structure for the Metropolitan Assembly and the Sub-Metropolitan District Councils. The structure of the WMD in terms of the local government structure therefore comprises the main Administrative Office and the Sub-Metropolitan Offices of the WMD. The main office of the WMD, is therefore located at the Metropolitan Assembly, and consists of the Head of WMD, One Deputy Head and six operational units namely the Solid Waste, Liquid Waste, Drains Maintenance unit, Plant & Equipment, Finance and Administration and Support services Unit.

Table 4.2: Staff strength of WMD

CATEGORY OF WORKERS		
Skilled Staff		
S/NO	GRADE	NUMBER
1	Assistant Chief Environmental Health Officer	1
2	Chief Environmental Health Officer	1
3	Principal Environmental Health Officers	2
4	Environmental Health Officer Grade 11	1
6	Assistant Chief Environmental Health Assistant	4
7	Senior Environmental Health Assistants	2
8	Technician Engineer (Mechanical)	1
9	Mechanics	30
10	Accounts Officer	1
11	Secretary	3
12	Drivers	8
TOTAL		54
Unskilled Workers		
S/NO	GRADE	NUMBER
1.	Malaria Control Officers	4
2.	Refuse Collectors (Door to Door)	13
3.	Sweepers and Drain (WMD)	168
4.	Security	2
5.	Sweepers (Zoomlion) Ghana Ltd	262
TOTAL		449

Source; Secondary Data WMD July, 2013

The main office of WMD is responsible for the overall planning and management of waste. All operational functions of the WMD are conducted directly from the Head Office with the Sub Metros providing mainly supervisory services & monitoring. Functional cleansing activities are also performed at the Sub Metro level with the head office providing planning and supervisory roles.

The main functions of the department are:

- To supervise the collection or ensure the hygienic, collection transportation and disposal of solid and liquid waste
- Supervise the desilting, cleansing and maintenance of public drains
- Supervise Street sweeping
- Supervise the picking of plastic waste along streets and public places
- Monitoring and supervision of private waste companies

- Supervision and management of the final disposal site/ Landfill- Sofokrom
- Ensure efficient management and maintenance of public toilets and urinals

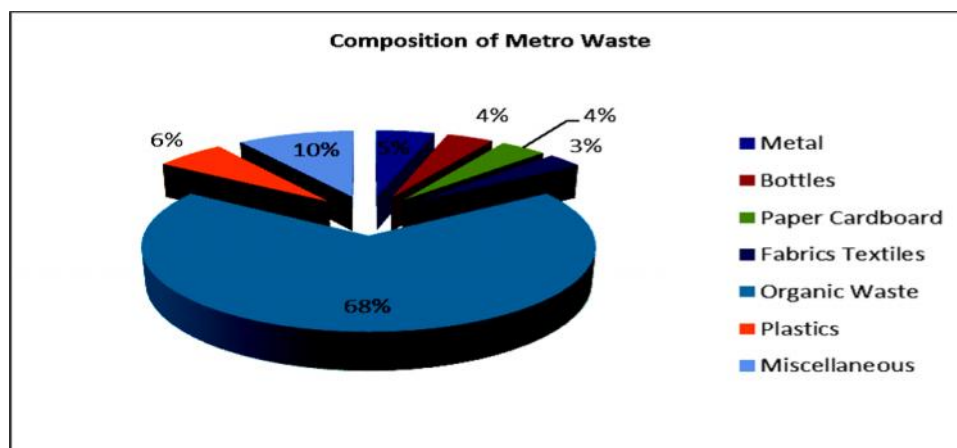
The Solid Waste Unit is responsible for the daily monitoring and supervising of the storage, collection, transportation, and hygienic disposal of all solid waste generated in the Metropolis. The unit also supervises and monitors the activities of private waste management companies as well as the department’s workers. The unit is required to perform the following supervisory and monitoring functions to ensure clean environment in the metropolis:

- Door to door services (Solid Waste collection)
- Communal refuse container lifting
- Street sweeping and maintenance of public open places
- Street liter bins collection
- Supervising of activities at final disposal site
- General clean up exercises
- Evacuation of Refuse Heaps

4.5 Composition of Metro Solid Waste

Waste compositions in STMA are characterized mainly of organic waste and of recyclables materials like papers or cardboard, rubber/polythene bags, metals, bottles and textiles. The data shown in chart 4.1 below reflects the constitution or otherwise the characterization of waste produced in the metropolis. This classification of the waste varies from Sub-Metro to Sub-Metro. However, it is important that this waste classification should be taken into consideration when formulating a strategic plan on waste management. From the table below, 68% of waste composition in STMA is made up of organic waste which indicates a high rate of mortification and hence a potential odour exasperation. The high constituent of vegetable connotation indicates a high rate of humidity which also makes the waste susceptible to composting. Introduction of waste recycling could make waste management efficient and will contribute to reduction in the volume of waste being sent to the sanitary landfill site.

Chart 4.1: Composition of Metro Waste



Source: Secondary data STMA, July, 2013

4.6 The System of waste collection

There are two main systems of solid waste collection and transportation in STMA, these are; Door-to-Door Services and Communal Container Services. The door-to-door services involved the collection of waste from house-to-house in STMA. While the communal container service encompasses the collection of waste from vantage points or communal Sustainable private sector solid waste collection & transportation. The case of Kwesimintsim, STMA, 31 Ghana

container sites in STMA. Door-to-door refuse collection services is carried out in STMA in areas where road network is accessible and favorable Income levels appreciable to afford user fee and education level is high. Waste collections in these areas are both frontage as well as backyard. This type of services is carried out in mainly high income areas. Frequency of collection is either once or twice weekly or in some cases negotiated. Storage facilities are usually provided by households but in some areas the private operators provide the users with storage bins and allow users to pay by installments. Vehicles used for this service are compaction trucks, Tipper Trucks or Tractors and tricycles. Crewmembers on each truck range from 2-6, including the driver or operator. To facilitate easy waste collection and efficiency, routing of vehicles is designed to:

- Reduce Collection time
- Reduce fuel consumption
- Reduce tiredness of workers
- Increase coverage

Communal container services: This type of service is carried out in areas where accessibility is poor or non-existence and is characterized by: Low income / high density, areas earmarked for the provision of sanitary facilities and Markets Centers. Frequency of collection is based on the generation rate of the area concerned. It is either daily, twice or thrice weekly, determined mostly by the service provider. Householders dump their waste into the communal containers which are lifted when it is full.

Pay as you dump: Formally provision of services at the communal container sites were free, users dump their waste at no cost, but with high cost of service delivery, the Assembly adopted this system and households pay between 10GHP and 50GHP as they dump. This system is practiced in mainly mix group areas where communal containers are placed. It is aimed at generating much needed revenue to support the operations of the private sector and support the developmental activities in communities where these containers are placed.

The management of the communal container was formally in the hands of Honorable Assembly members in whose electoral area the container is sited. Revenue from pay as you dump is to be shared as – 40% to the Assembly (WMD), 60% to the collector or the electoral area. Practically the sharing of the revenue is not being adhered to resulting in loss of revenue to the Assembly. It is worth noting that in some electoral areas, the Chief or the Unit Committee members have hijacked the revenue collection and do not account to anybody. Due to this poor situation the current arrangements for managing these containers is now under the direct control of the private companies collecting waste in the metropolis.

Final disposal site management

The engineered sanitary landfill and septage treatment facility which was started initially in 2000 by the Nordic Development Fund (NDF) and later under UESP/World Bank at a cost of GHC 2m is yet to be completed. This Contract was awarded to Messer's Nkwantabisa Engineers and should have been completed on the 30th June 2002, but unfortunately, work has not been completed as at 31st December 2003. The contractor abandoned the work in 2001 and was handed over to SAMCOTA Ltd. in 2009. The new contractor managed to complete the septage treatment plant for disposal of liquid waste and handed over to STMA in December, 2011, but there are still minor works to be done on the solid waste section and as such disposal of waste at the working face has not yet started. The landfill facility has an air space for 15 years operation whilst the septage treatment facility with proper maintenance

schedule would enjoy longer life span. Under the current phase, the project would develop cells one (1) for the first five years of the lifespan of the landfill, subsequent cells would have to be developed from other financial sources. The control tipping site was contracted to Rusaben Waste Management Gh. Limited between 2004 and 2012 but due to lack of resources and financial difficulties Rusaben withdrew its services and was subsequently handed over to the Takoradi Landfill Company Ltd a subsidiary of Zoomlion Gh.Ltd

Solid waste disposal at the Landfill site

Solid waste are still being dumped at the control tipping site of the landfill site characterize mainly by pushing and spreading and covering with literates, while the cells of the newly constructed sanitary engineering landfill are also getting ready for pioneering layer to be built. The control dump will finally be closed down and decommissioned, thus allowing solid waste to be received at the working face of the new landfill site.

Photograph 4.1: Pushing and covering at the final disposal site. Photograph 4.2



Photographed by researcher. Field work, July 30 2013

4.7 Private Sector Participation

Privatized solid waste collection and transportation in STMA came into full swing under the UESP/World Bank Urban I project between 1994 and 1998. The metropolis was then divided into two (2) operational zones and has currently been re-zoned into four (4). STMA is solely involved in monitoring and supervision of waste collection and transportation. The service providers are now those in charge of fee collection determined together with the Metropolitan assembly. The re-zoning took into consideration factors such as accessibility to facilitate door-to-door services and communal refuse container lifting for hard to reach areas. For purposes of easy identification it has been done on Sub-Metro basis. The aim of the re-zoning is to ensure effective and efficient refuse collection in the Metropolis. Furthermore, the re-zoning is to provide solid waste management services to generators in the zone, so as to minimize and avoid clandestine or unauthorised disposal of solid waste in the Metropolis. The established service goal is 100% of the Generators within the zone.

The sole contractor during that period was ABC Waste Management Ltd which started its waste collection services in August, 2001. The actual contract commenced in January 2002 after evaluation of competitive bids and consisted of the following mixed activities: door-to-door refuse collection, communal container services and street litter bin collection. The communal container services entails the collection of twenty (20) communal containers, while the door-to door services covers 2,343 households in Beach road, Chapel hill, Airport ridge, Windy ridge, Takoradi central and Essikafo Ambantem 1,2, and 3 ,while WMD also started door-to services on pilot basis in and around Sekondi in 2002. And in 2003 STMA won the best cleanest city in Ghana Other companies like Zoomlion and Rusaben waste

Company Ltd. were contracted between 2002 and 2004 respectively to augment the operations of ABC Waste Management Ltd. Currently, there are four (4) private waste management companies working in the Metropolis.

These companies are;

- Vemark Environmental Services
- Zoomlion Ghana Ltd
- Cudjoe Construction (GH) Ltd.
- J.Stanley-Owusu & Co. Ltd

Zoomlion Gh.Ltd currently offers communal container services and door-to door waste collection in Zone 1 as well as street sweeping and drain cleansing and lifting of few communal containers in Zone 1, 2 and 3 respectively under special arrangement with STMA. The rest of the companies notably Vemark Environmental services, Cudjoe construction Ltd. and J.Stanley Owusu Company Ltd offer door-to-door and communal container services only and that their activities involve only waste collection, transportation, and disposal of solid waste in the metropolis. Apart from these companies there are other private institutions involved in the transportation of waste to the final disposal site namely; WAMCO, GHACEM, VRA, Police, Nyame yie and Zeal Environmental Technology. Currently Rusaben Waste Management Ltd is no longer operating in the Metropolis due to financial difficulties.

Table 4.3: Total tonnage and Percentage of waste disposal for the year 2012

COMPANY	TONNAGE	PERCENTAGE
ZOOMLION GH LTD	43240	37.5
VERMARK	14893	12.9
J.STANLEY OWUSU	15963	13.8
CUDJOE CONST.	5653	4.9
WAMCO	966	0.8
GHACEM	222	0.2
ZEAL E.TECH	7382	6.4
ZL (SDA)	431	0.4
STMA (WMD)	1312	1.1
OTHERS /EVACUATION	25351	22.0
TOTAL	115,413.16	100%

Secondary Data, STMA July, 2013

4.8 Type of Institutional arrangements

Zoomlion started operating in STMA in 2004. Its services encompasses door-to-door waste collection across zone one, two and three respectively. It also provides such services as communal container waste collection, tricycle waste collection services, drain cleansing, street sweeping cesspit emptier services, vector control and landscaping in all the sub-metros. The institutional arrangement with Zoomlion was mainly executed at the national level. This means that Zoomlion get paid for service provision directly from the central government based on terms of conditions in the contract signed at that level and therefore has no problem recovering cost of operations. However, other private companies get paid by the Metropolitan Assembly. Vemark started full operations in STMA in early 2011 when Rusaben waste company Ltd had written to the Assembly that it is pulling out from STMA due to financial difficulties as a result of irregular payment for service provision on the part of the Metropolitan Assembly.

Zoomlion Gh.Ltd derives its name with a Chinese company Zoomlion Heavy Industry Science & Technology Development Co., Ltd. founded in 1992. and has so many branches across the world and have many specialized units including Environmental Sanitation Machinery Company which provides wide range of services and specializes in developing, manufacturing as well as marketing environmental sanitation equipment. Currently, it produces different varieties of mechanical products including waste collection and transportation equipment, municipal maintenance equipment, waste compression equipment, sweeping machinery and landfill equipment. Zoomlion Gh.Ltd started with an agreement with Zoomlion china, where the Director of Zoomlion Gh. bought variety of waste equipment at affordable prices to establish the company in Ghana. It was therefore part of the contractual obligations to name the new company Zoomlion Gh.Ltd. They have also helped Zoomlion to assemble its own waste equipment locally, build a recycling plant and build its own waste management training school in Madina, a suburb of Accra. It is currently considering installing waste recycling plant in STMA. It has governmental backing and is involved in recruiting thousands of Ghanaians for programmes like: Sanitation guards projects where hundreds of Ghanaian youths are recruited to assist Environmental Health Officers in their routine duties. They are also involved in recruiting people for ECO brigade project, which is noted for clearing waste at the beaches across Ghana.

Formally the type of arrangement involved in the provision of service delivery in the metropolis was the contract type, where the service provider work for the Assembly and get paid depending on number of trips made at the end of each month. According to STMA officials that arrangement is no longer viable and has therefore been scrapped in favour of the franchise type of arrangement. This was as a result of Ministry of local Government's directives to various Metropolitan Assemblies that it is no longer in a position to bear the full cost of service provision in the Metropolis and as such metropolitan Assemblies should put in measures to enable full cost recovery by service providers.

4.9 Summary

Privatized solid waste collection and transportation in STMA came into full swing under the UESP/World Bank Urban I project between 1994 and 1998. The metropolis was then divided two (2) operational zones and has currently been re-zoned into four (4). There are four companies currently involved in waste collection and transportation. The companies are Zoomlion Ghana Ltd, Vermark Co.Ltd, and J.Stanley Owusu Co.Ltd., and Cudjoe Construction Co.Ltd. STMA is solely involved in monitoring and supervision of waste collection and transportation. The privatized solid waste system is organized around two (2) main systems notably: door-to-door and communal container services.

CHAPTER FIVE

Research Findings

5.1 Introduction

This Chapter presents the findings of the survey among various service users and of the interviews with waste workers and company owners. It focuses on the sustainability of the privatised solid waste collection services. The Metropolitan Assembly (STMA) is the main service regulator; the private sector is the service provider, the citizens comprising mainly the households in the study area as service users. The variables under consideration are social equity and acceptability, environmental effectiveness, economic efficiency and stimulating government mechanisms.

Recommendations on how the privatized solid waste services in STMA can be made more sustainable will be made at the end of the chapter. The findings will be compared between Zoomlion and Vermark Environmental Service because both companies provide waste collection services in the operational zone with Vermark providing the bulk of the services. The study will focus on one specific contractor (Vermark) in that specific location; however, when appropriate the second private contractor (Zoomlion) that was interviewed will be used as such to put the findings on the sustainable service provision in a broader prospective.

5.2 Measuring Social Equity and Acceptability

The indicators selected to measure the variables are wages paid, capacity building, medical check-ups, reimbursement of medical expenses, social security and pension benefits, use of gloves and protective clothing, willingness to pay, level of satisfaction and affordability of service provision. The National Environmental and Sanitation policy 1999 as described in chapter 4 provides credence as to how solid waste collection should be organized in the various metropolitan Assemblies who have waste management departments. The agreement ushering in the commencement of Private sector participation in solid waste collection in STMA clearly set standards by which the right of employees should be assured. An in-depth interview was therefore carried out with various operational managers of the waste management department, as well other STMA officials, and the operational manager of Vermark environmental services, the regional Manager of Zoomlion Gh.Ltd. as well as workers of the PS. A survey was also used to sample the households on the above mentioned indicators.

Wages paid

The study reveals that standards are set for working conditions for private sector workers involved in service delivery. These standards were clearly stated in the contract agreement with all service providers. According to STMA Officials in STMA, waste contractors are taken through the contract agreement before they commence operations. The agreements stipulates among other things that; “The Franchisee agrees to pay all persons, regardless of race, sex, creed, colour, religion, tribe, ethnic background, or nationality, the prevailing wage for the job classification and level of effort. The Franchisee shall comply with the applicable minimum wage regulation” (STMA, 2010, p.III-38)

All STMA officials interviewed indicated that they have cross-checked the above through documentary sources with all the companies operating in the metropolis. Their findings are that the operators pay their workers according to the current daily minimum wage set by the government at GH¢4.48 in 2012 and increase to GH¢5.24 (that is, an increase of 17%) in 2013 by the Ghana tripartite committee on wages and salaries.

Moreover, an in-depth interview with the company owners notably, Vermark Environmental Services and Zoomlion Gh.Ltd. attest to the fact that the service providers are strictly following the rules of the game spelt out in the agreement and that their employees are being paid according to the daily minimum wage. This assertion was cross-checked with the workers on both sides who also confirm that they are being paid according to the minimum wage set forth by the Government.

Payment of medical Expenses

Medical provision coupled with regular check-ups and preventive vaccination is an important aspect of service provision which ensures the well-being and health of the worker. Absence of these facilities does not motivate workers to give their best to promote sustainability of any waste collection system. According to the officials of both Zoomlion and Vermark, they have been paying the medical bills of their employees. However an interview with the workers proved contrary to this assertion. Workers of Zoomlion confirm that their company had insured them with a health insurance, while workers of Vermark mentioned that their company does not pay for their medical expenses. The study further reveals that, what is lacking for both companies is the provision of preventive vaccination.

“The company has given us given us a health insurance card, but we only go to hospital when we are sick. We don’t get time to go for medical check-ups because of the nature of the work; we come to work early and close late in the afternoon” (Personal communication with Zoomlion waste collector, July, 2013)

“The company had not insured us and as a result we pay our own medical expenses when we go for medical attention” (Personal communication with Vermark waste collector, July, 2013)

The use of protective gear

Section 24 of the Ghana labour law as enshrined in the constitution of Ghana lays down labour rights, which includes the rights to work under hygienic, satisfactory, safe and healthy conditions and to receive equal pay for equal work done (ILO, 2013). Therefore the use of protective clothing is paramount in waste collection and transport activities across the country and STMA is no exception. This is the most effective way of protecting the health of waste collectors from contracting fatal diseases. This was clearly spelt out in the contractual agreement with all the service providers currently operating in the metropolis: “The Franchisee shall provide protective shoes, nose hoses and gloves to all workers, for use at all times during the performance of Services under this Agreement. Sweepers and drain cleaners shall be provided with equipment which facilitates their work and limits their direct contact with waste materials.” (STMA, 2010, p.III-38)

The study reveals that Zoomlion provides its workers with hand gloves, nose mask, protective clothing and wellington boots while Vermark provide only nose mask and hand

gloves Personal observation during the field work on the truck to the final disposal site also confirms these findings. Workers of Vermark use the hand gloves and neglect the use of nose masks during their routine duties. The workers of Zoomlion on the other hand constantly use all the said items. The use of the nose mask is what is often not regular in its use with Zoomlion workers. The picture below attest to these findings with picture 5.1 and 5.2 showing Vermark workers working without protective gear as well as nose mask what is visible with them is hand gloves. While photograph 5.3 shows a Zoomlion worker in his full protective gear, hand gloves and nose mask

Wearing of hand gloves was absent at some point as evident in this picture

Photograph 5.1 Vermark workers with only hand gloves Photograph 5.2 Zoomlion worker in protective clothing photograph 5.3



Source: Photographed by researcher. Fieldwork 2013

“We have worked without these protective clothing’s for years now and nothing has happened to us. It is only when you think that something will happen to you that you normally contract a disease” (Personal communication with Vermark waste collector, July, 2013)

“The nose mask attracts heat and therefore, we don’t often use it. We only use it when we feel we are going to encounter serious offensive odour such as those at the final disposal site” (Personal communication with a Zoomlion waste collector, July, 2013)

Payment of Social Security

In Ghana, Social Security Act 279 of 1965 which was preceded by the Social Security Law (PNDC Law 247) in 1991 converted the Provident Fund Scheme to a Pension Scheme which requires the payment of social security contribution of employees by all employers’. Failure to do so attracts an appropriate sanction from the authorities. An interview with Zoomlion and Vermark indicates that they regularly pay their workers social security benefits in accordance with the labour law. An in-depth interview with the waste collectors and their supervisors also attest to the fact that their employers have been paying their social security contributions.

“Social security is very dear to us. We see it as our life, as such we resolved to take any necessary action by reporting to the appropriate authorities should our employers deny us of this all important contributions because of the many benefits attach to it most especially the pension benefits that goes with it” (Personal communication with Vermark waste collector, July, 2013)

Capacity building/on the job training skills

Waste collection is a delicate job. To achieve efficient and sustainable service delivery, will therefore require some form of on the job training skills for the collectors or the waste workers to enable them discharge their duties satisfactorily and as a result the agreement between STMA and the private sector for waste collection in the metropolis was clear on this, it states that: “The franchisee shall provide an adequate number of employees with adequate skill and training to conduct the Services under this Agreement as may reasonably be determined by the Assembly from time to time” (STMA, 2010, p.III-38)

The study reveal that both Vermark and Zoomlion provides their workers some form of on the job training before and during their duties as spelt out in the agreement.

Service user’s perspective on provision of waste collection services base on the indicators user fees, willingness to pay, affordability and level of satisfaction.

Table 5.2: Affordability of User fees-Vermark

Selected service user’s =60		
Affordability of user fees	Frequency	Percentage %
Yes	50	83.3
No	10	16.7
Total	60	100.0

Field study: July, 2013

In the table above, 83% of the respondents are of the opinion that the user fee is affordable, while the remaining 17% of the respondents point to the fact that the user fee is not affordable. This implies that most of the user’s finds the fee to be very moderate and may be willing to pay more for improved services. This expression of affordability has been explained variously by the service users that:

“Currently I am paying GH¢10 per month. If I am to pay about 50Gp daily, I will end up paying about GH¢15, GH¢5 higher than the GH¢10 I have been paying so far, therefore I find it to be affordable” (Personal communication with service user, July, 2013)

Table 5.3: User’s Willingness to pay -Vermark

Selected service user’s =60		
Willingness to pay	Frequency	Percentage%
Yes	39	65.0
No	21	35.0
Total	60	100.0

Field study: July, 2013

A follow-up question was asked to ascertain whether they are willing to pay more for improved services. 65% of the respondents indicated that they are willing to pay more for

improved services. While 35% of the respondents reject any idea of any increase in tariffs for improved services. This implies their level of satisfaction of service delivery.

Table 5.4: User’s level of satisfaction - Vermark

Selected service user’s =60		
Level of satisfaction	Frequency	Percentage %
Very satisfied	15	25.0
Reasonably satisfied	42	70.0
Not satisfied at all	3	5.0
Total	60	100.0

Field study: July, 2013

To examine whether the current provision of service in that zone is satisfactory to all. 25% of the respondents indicated that they are very satisfied with service provision in the area by the PS, 70% of the respondents thought it is reasonably satisfied while 5% expressed dissatisfaction of the current service provision. This satisfaction is attributed to the cleanliness of various sites they witness (As in Photograph.5.4 & 5.5 below)

Cleanliness of service areas

Photograph 5.4



Photograph 5.5



Photographed by the researcher. Fieldwork July, 2013

*“I am satisfied in the sense that in the past we hardly live without experiencing spillage at our container site. This is however not the case with this contractor. The place looks neat all the time ever since this contractor started operating in this area”
(Personal communication with service user, July, 2013)*

5.3 Environmental effectiveness

The variable environmental effectiveness was investigated with the help of the following indicators: types of equipment, Number of vehicles in service, Back-up vehicle, No of trips per company per day, frequent breakdown of equipment, equipment maintenance, existence of final disposal site, frequency of collection, existence of waste separation and recycling, type of storage facility used by households

Types of equipment

The research findings pertaining to environmental effectiveness reveal that types of equipment for service delivery in the Metropolis has been specified clearly in the contract agreement and are meant to be inspected before commencement of operations in STMA. This was clearly stated in clause 4.3c of the documents as follows: “The essential equipment to be made available, for the delivery of the service, by the successful Bidder in the Sub-Metro/Zones shall be: a) 2 No. Covered Refuse Collection Trucks of Capacity not less than

14m³ and of payloads of at least 10,000 kg b) 2 No. Trucks with Containers (Skip) hoist equipment of payloads not less than 4,000 kg” (STMA, 2010, p, 1-14)

The study further reveals that no inspection took place prior to commencement of service provision by the company as was stated in the contract document.

However, an in-depth interview conducted with the contractors indicated that they have the following waste collection equipment for their routine operations;

Table 5.5: Overview of operational trucks of waste companies

Vermark Environmental Services		Zoomlion Gh.Ltd	
Compaction trucks	(3)	Compaction trucks 12tones	(2)
Skip Loader 14m ³	(2)	Skip Loader 14m ³	(4)
Roll-on Roll-off or Arm Roll	(2)	Roll-on Roll-off or Arm Roll	(3)

Source: Personal communication waste companies, July, 2013

Based on the information above, both companies point to the fact that the compaction trucks are the closed types and that the skip and the arm-roll trucks are of open types. In this case Vermark has three (3) closed type of trucks and four open types. Zoomlion has two (2) closed types and Seven (7) open types. The study further reveals that though most of the refuse trucks are imported, the spare parts are locally available. According to Zoomlion Gh. Ltd. most of their trucks and containers for waste collection are designed and assembled locally. In addition, Zoomlion have their own containers for collection of waste while that of Vermark are the property of the metropolitan Assembly. Implying that both companies have enough truck to provide quality as well as sustainable service provision in the area.

Number of vehicle in service

The total number of vehicle in use by Zoomlion Gh.Ltd for waste collection in STMA is nine (9), while the total number of vehicle being use by Vermark is Seven (7), this shows that both companies satisfy the number of trucks needed for service provision in STMA.

Back-up Vehicle

Sustainability of waste collection entails having enough equipment to allow smooth running of service delivery. The failure of many of the past companies in solid waste collection most especially in the metropolis has largely been attributed to several challenges which include the inability of many PS in the past to have back-up trucks to support their operational vehicles. When vehicles and equipment are down for maintenance or repair, the contractor should do well to provide a standby trucks or a back-up vehicle from the spares in its fleet or a comparable replacement through rental agreement; this is to avoid heap of refuse which characterizes operational areas most especially when waste trucks continuously experience frequent breakdowns. An in-depth interview and observation with Zoomlion and Vermark reveal that they both have standby truck or back-up trucks in case of any breakdown.

“It is stated in our contract agreement that we should have back-up trucks to our operational trucks which to our estimation believes the sustainability of our services in our zone hinges on efficient services with adequate resources and without it I don’t think we can survive in service delivery” (Personal communication with a Vermark operations manager, July, 2013)

No of trips per company per day/No of households served in a day

Formerly, contractors operating in STMA are paid based on the number of trips made in a day. With the introduction of the franchise system, companies are no longer paid on number of trips made per month. According to STMA officials and based on the rules of the game as embodied in the contract document each company is supposed to pay tipping fees to the metropolitan assembly according to the number of trips made. “The franchisee shall pay officially established tipping fees at officially designated disposal and transfer sites” (STMA, 2010, p.III-37)

Based on the interview with the private companies, the study reveal that Zoomlion Gh.Ltd makes averagely eleven (11) trips in a day while Vermark makes averagely twelve (12) trips a day. This difference is based on the fact that Vermark operates in relatively large area of the metropolis than Zoomlion. Also, whereas Zoomlion serve about 1,000 households, Vermark serve about 1,200 households 200 households more than that of Zoomlion.

Covering of trucks en route to final disposal

The study reveals that containment or covering of waste during transportation to the final disposal site is very vital when it comes to issues of environmental concerns. If waste trucks are uncovered there is probability of some being blown away by wind which in effect can result in air pollution and littering and can also cause an eye sore or unsightliness. The agreement clearly states that: “The franchisee shall cover and properly contain all Solid Waste loads with tarpaulins, nets or other means, as appropriate to the type of vehicle or equipment being used, during the haul of solid waste from the collection service area to the final disposal site” (STMA, 2010,p.IV-4)

An in-depth interview with the managers of both companies reveal that net is normally used to cover the waste during transportation to the final disposal site..

Nets being used by Zoomlion & Vermark to cover the waste

Photograph 5.6



Photograph 5.7



Photograph 5.8



Source: Photographed by researcher. Fieldwork July, 2013 through observation

“Woe be tied you if you do not cover the waste, the company’s name will be blacklisted at all places via the local FM station or the air waves within a minute which will dent the image of the company and attract the appropriate sanction from the regulator” (Personal communication with the Regional Manager, Zoomlion,July2013)

Frequent breakdown of equipment

In STMA, the law governing waste collection and disposal stipulates that all vehicles and

equipment for waste collection services in the metropolis should be in good repair, appearance and sanitary condition.

Spill over at No. 9 communal container site.

Photograph 5.9



Photograph 5.10



Photograph 5.11



Source: Photographed by researcher. Fieldwork July, 2013

The interview conducted with Vermark reveals that, they experience frequent equipment breakdown, which the manager attributes to condition of the road towards the final disposal site. Especially in the event of rainfall; the road he said to become very soggy and un-motorable.

“Though the main road leading to the disposal site is in good condition, the paths leading to the working face of the disposal site itself is appalling making work difficult especially when it rains this accounts for most of our frequent breakdowns leading to spill over at some sites” (Personal communication with the Operations Manager, Vermark, July 2013)

Equipment maintenance

Equipment maintenance is an essential aspect of any waste management system involving solid waste collection and transportation systems. If equipment is not maintained regularly as scheduled there is probability of frequent breakdowns which can lead to accumulation of waste in service areas. Improving equipment maintenance of trucks is in the end required to achieve sustainability of waste collection services.

Investigation reveals that Zoomlion has well equipped mechanical workshop for building containers and servicing their operational trucks and they follow a well-designed maintenance schedule for all of their equipment. Vermark does not have a mechanical workshop but they have their equipment repaired and maintained by private mechanics. They have a maintenance schedule for their operational trucks.

Existence of final disposal site

Existence of final disposal is paramount when it comes to environmental effectiveness since waste must be disposed of properly at a designated site to avoid environmental hazard and prevent spread of diseases. It is the responsibility of the metropolitan Assembly to provide such a facility for waste disposal in STMA. This is clearly outlined in the contract document for the provision of solid waste collection in STMA: “The Assembly shall provide and designate a safe and accessible disposal site(s) within travel distances of no greater than Twenty (20) kilometres from within the centroid of the service zone to the entrance of the site. The Assembly shall ensure that the disposal site is accessible by good roads even during seasons of rainy weather, or other weather which might otherwise adversely affect access. The Assembly shall ensure that paths leading to the working face of the disposal site shall be sufficiently compacted and surfaced to safely support franchisee’s vehicles and equipment.

The disposal site shall be approved and permitted under prevailing regulatory framework. (STMA, 2010, p.III-41)

The study reveals that although STMA has provided a designated dumping site, some of the conditions as enshrined in the contractual agreement remains outstanding. The inner roads of the disposal site has not been gravelled and is characterized by pot holes which makes work so tedious in the rainy season as the site becomes very soggy making it extremely difficult for the waste trucks to have easy access to dispose of their waste. Photograph 5.13 will attest to this fact.

As describe in chapter four (4) the method being used at the final disposal site is control tipping meaning pushing spreading and covering of waste with literates but now the metropolis could boost of a sanitary engineering landfill site. According to STMA officials Work on the remaining grey areas of the solid waste tipping section including the weighing bridge are yet to be completed. Though not fully completed, it has been contracted out and is being managed by Takoradi Landfill Company Ltd with STMA doing the supervision

The newly constructed landfill at Sofokrom in Sekondi Takoradi

Photograph 5.12

Photograph 5.13

Photograph 5.14



Source: Photographed by researcher. Fieldwork July, 2013

“Thanks to the World Bank we now have a sanitary engineered landfill site for so many years we were combing the wilderness looking for a permanent place to accommodate our waste” (Personal communication with the Presiding Member of STMA, July 2013)

Frequency of collection

Frequency of collection ensures cleanliness of the service areas. Inadequate frequency of collection could result in indiscriminate waste disposal which could lead to creation of dump hills in the communities. According to Zoomlion and Vermark they are able to cover all areas under their jurisdiction in a day according to their working schedule. The frequency for door-to-door areas is once a week while that of the communal container site ranges from one to three times in a week. They indicated that in some areas the communal containers are lifted once in a week. In some areas it is lifted either two times or three times in a week as to when the containers gets full. The lifting of communal containers varies from one area to another. An example they gave was an area like No.9 normally gets full in one and half days and had to be lifted three times in a week. Another area No.1 gets full seven days interval and had to be lifted once every week. An area like Chicago gets full in two and half days and had to be lifted every three days or else there will be spill over at the site.

Table 5.6: User’s perspective on frequency of collection-Vermark

Selected service user’s =60		
Frequency of collection	Frequency	Percentage%
Once a week	40	67.7
One to three times a week	20	33.3
Total	60	100.0

Field study: July, 2013

From the table above 67% respondents indicate that the frequency of their waste collection is once weekly, this is mainly a door-to-door area as explained by Vermark officials about rate of collection which is once weekly. While 33% of the respondents indicated that their waste is collected between two and three times in a week. This happens predominantly in areas with communal containers which also confirm what Vermark officials explained above.

Existence of waste separation and recycling

Existence of Waste separation and recycling forms an important aspect in the waste system. Recycling of waste can reduce the volume of waste going to the landfill site thereby reducing cost of transportation .The study reveals that STMA does not have the facilities for waste separation and recycling. What is currently occurring is only waste sorting and separation by the informal sector for plastics and metals and selling it for money mainly at the landfill site. The study further reveals that STMA plans having such a facility in the future in collaboration with other stakeholders like Zoomlion Gh.Ltd.

“What is taken place now is just small scale waste sorting out of waste for metal scraps and turning some of it into usable items” (Personal communication with the operations/landfill manager, WMD, July, 2013)

The informal sector sorting through the waste for recyclables

Photograph 5.15



Photograph 5.16



Source: Photographed by researcher. Fieldwork July,2013

Table 5.7: Users Perspective on waste separation before collection-Vermark

Selected service user’s =60		
Waste Separation	Frequency	Percentage %
Yes	0	0
No	60	100.0
Total	60	100.0

Field study: July, 2013

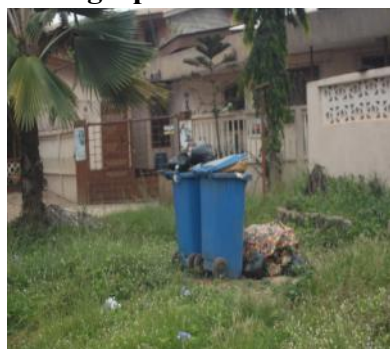
From the table above all respondents overwhelmingly indicates that they do not separate their waste before storage and collection by the service provider. Implying that no waste separation is currently going on in STMA.

Types of waste storage bins used by household

Waste storage bins play an important role when it comes to environmental effectiveness since it leads to cleanliness of the service area if the appropriate storage facilities are used. Proper storage bins would not lead to waste spillage in service areas, as well as offensive odour and access to rodents, vermin and other animals. It also makes waste collection and emptying it into compaction trucks much easier for waste collectors.

Types of waste storage containers used in the study area

Photograph 5.17



Photograph 5.18



Photograph 5.19



Source: Photographed by researcher. Fieldwork July, 2013

Table 5.8: User's perspective on type of waste storage facilities used in focus area

Selected service user's =60		
Storage facility	Frequency	Percentage %
Plastic container	48	80.0
Metal container	3	5.0
Basket	1	1.7
Plastic bags	8	13.3
Total	60	100.0

Field study: July, 2013

The table above reveals that 80% of the respondents indicate they use plastic container as waste storage facility, 5% of the respondents use metal containers while 2% indicates that they use a basket container for storing their waste. The remaining 13% mentioned that they use plastic bags. This shows that overwhelming majority of users in the zone use plastic containers for storing their waste, while the basket is seen as the least use for waste storage.

The provider of the container

The provision of waste storage receptacles is included in the agreement which allowed service providers to supply their customer's storage facility in their operational zones, even though it is clearly stated in the agreement; however, it is not binding on the contractors. The investigation reveal that Zoomlion Gh.Ltd supplies their service users with a 240 and 120 liters waste bins, while Vermark do not provide their service users with the appropriate

storage bin as such service users in that zone under Vermark responded overwhelmingly that they buy their own storage bins.

Table 5.9: User’s perspective on the provider of the container-Vermark

Selected service user’s =60		
Provider of storage facility	Frequency	Percentage %
Bought it myself	60	100.0
Provided by the private contractor	0	0
Provided by the Metro Assembly	0	0
Total	60	100.0

Field study: July, 2013

From the table above, 100% of the respondents mentioned that they bought the containers or the waste receptacles themselves. Meaning that Vermark does not provide waste storage facilities to its customers

5.4 Economic efficiency

Here the variable economic efficiency has been measured by the following indicators: regular payment of user fees, ability of the service provider to recover cost and employment generation

Regular payment of user fees

Regular payment of user fee is very crucial when it comes to the issue of cost recovery in waste collection and transportation in order to sustain the private sector in service delivery. Sustainability of privatized solid waste collection and transport depend immensely on the user’s ability to pay as well as prompt and regular payment. According to both Zoomlion and Vermark their users are paying regularly only some fraction of the users normally delays in payment mostly in door-to-door areas. According to them, they have not experienced default payment as yet.

“With regard to the communal container sites, the language there is ‘pay as you dump’. All users therefore pay before they are allowed to dump. There is no way you can avoid it, cash is collected instantly” (Personal communication with Operations manager, Vermark, July, 2013)

Table 5.10: User’s perspective on regular payment of user fee-Vermark

Selected service user’s =60		
Regular payment	Frequency	Percentage %
Yes	44	73.3
No	16	26.7
Total	60	100.0

Field study: July, 2013

73% of selected users indicate that they pay their user fees regularly while 27% of the respondents indicate that they do not pay regularly. This analysis indicates that majority of Sustainable private sector solid waste collection & transportation. The case of Kwesimintsim, STMA, 47 Ghana

the users pay their tariffs regularly which is good for the PS to achieve required sustainability in its operations since it will enable effective cost recovery.

“We pay as required of us only sometimes we may not have the money when the revenue collector comes, in such a case we usually ask him to come back at a later date for the money. Currently I do not owe the contractor a penny” (Personal communication with a user, July2013)

Ability of the Private Sector to recover cost

The Ghana environmental sanitation policy of 1999 (revised in 2010) clearly stipulates in respect of cost recovery that “ Direct cost recovery from users should be applied where it is possible to charge a full commercial price covering all operating and capital costs, for services such as liquid and solid waste collection, public toilets, issue of permits etc.” (MLGRD, 2010).The policy also stated that: “This shall be treated as a major factor for achieving sustainability where the services can be designed to earn revenue. However, tariffs should be set at levels that will not discourage the use of the services, especially where this would create health risks” (MLGRD, 2010)

When asked as to whether the current fee is adequate to enable full cost recovery, the Environmental Sub-Committee chairman, responded:

“We have raised the fee for door-to-door services from GH¢5 to GH¢10 and fixed the communal container charges between 10Gp and 50Gp depending on the volume of refuse to be disposed. Formerly there was a fixed charge of 10Gp or 20Gp.The raise should support the PS to recover their cost. The current rate will be reviewed shortly and increase further if there is the need to” (Personal communication with the Environmental Sub-Committee chairman, July2013)

Tariffs reviews are normally carried before the end of each year by STMA. The current fee was fixed according to STMA officials in December, 2012 and approved by the general Assembly of STMA in January, 2013.

On their part Zoomlion Gh.Ltd asserts that in general they are able to recover cost. In sharp contrast Vermark responded that they are not able to recover cost of operations. They attributed this to some of the frequent equipment breakdown mentioning that maintenance cost can eat deep into expenditure.

Number of job created

Arrangements for privatization entail among others the creation of jobs and privatized solid waste collection and transportation system is no exception since it requires both skilled and unskilled labour to flourish. Zoomlion on their part mentioned that they started with 10 administrative staff and 40 waste collectors. Since 2008 the company has been able to employ about 225 unskilled hands as waste collectors, sweepers and for drain cleansing. While Vermark mentioned that they started with eight (8) administrative staff and 10 Drivers and waste collectors. The number has now risen to 21.

5.5 Stimulating Government Mechanism

Here the variable stimulating government mechanism will be measured by existence of bye laws on PSWC, performance monitoring, complaint mechanism, capacity building, the tender

procedure, penalty and fines and existence of transfer stations and solid waste treatment facility.

Existence of Bye laws on privatized waste collection

Bye laws are important legal instruments that help regulate waste related practices in the metropolis. Also in a bid to help curb indiscriminate dumping of solid waste in the city which are detrimental and injurious to health, the metropolitan Assembly in addition to the Criminal code Act 29 of 1960 and the Environmental Sanitation Policy of Ghana (1999) which was revised in 2010 has enacted its own bye-laws for ensuring proper sanitary conditions or practices in STMA.

Investigation in connection with the issue of existence of bye-laws on PSWCT reveals that, STMA has its own bye laws and are jointly enforced by the Waste Management Department and the Environmental Health Department. The EHD functions as the lead department with the responsibility of enforcing bye-laws related to general environmental sanitation in STMA. Sanctions for non-performance by the private sector have clearly been stated in the contract document: “The Assembly will have the right to impose sanctions for default or inadequacy in performance. The Assembly shall be entitled to invoke any sanction available to it to address any default or inadequacy in performance, despite any forbearance or indulgence on previous occasions of default or inadequacy in performance.” (STMA, 2010, p.III-32)

In case of default or inadequacy in performance the sanctions to be impose is stated as follows: “The franchisee shall pay the sum equivalent of Ten (10) Per cent of the total monthly cost of provision of the Solid Waste Services in the collection Zone by the franchisee as liquidated damages to the Assembly for each and every day that the franchisee shall fail or refuse to perform its duties and obligations or to comply with the provisions of the Agreement, (STMA, 2010,p.III,32)

The agreement further stipulates that “The franchisee shall further pay to the Assembly as liquidated damages the sum of ₵50.00 for each premise which, after investigation by the Assembly, has been determined by it to have been missed on any collection day, or within 24 hours of an appointed collection date.” (STMA, 2010, p.III, 32)

“Observations of spillage and windblown litter from improperly covered or contained vehicles and equipment operated by the franchisee will also be subject to a penalty to the franchisee at the rate of GH₵10.00 per offence.”(Personal communication with chairman of environmental sub-committee of STMA, July, 2013)

“Though the law exist and the appropriate sanctions have clearly been spelt out in the contract documents it’s very difficult enforcing it to the later due to political interferences.”(Personal communication with the Metro environmental health officer STMA, July, 2013)

Based on personal observations, it becomes clear that many service providers continue to flout the rules of engagement without attracting any sanctions. Some of the offences being manual dislodging of faecal matter with communal waste containers without any covering, and during refuse evacuation exercises without the net or tarpaulin being used.

Users Perspective on of the existence of Metro bye-laws on privatized solid waste collection

When Users were sampled in the operational zone about their knowledge of existence of privatized solid waste collection overwhelming 100% of the respondents indicated that they are aware of the existence of such a law. In a follow up question as in the table 5.11 below, to know how they got to know of the existence of laws on privatized solid waste collection, 47% of the respondents indicated that they got to know about such a law through the local FM radio station.33% of the respondents indicated that they got to know of it through the private service provider while the remaining 20% of the respondents also indicated that the got to know of such a law through the Metropolitan Assembly.

Table 5.11: User’s medium of knowing the existence of waste collection bye-laws

Selected service user’s=60		
Medium of knowing the existence of waste collection laws	Frequency	Percentage %
Through the Metro Assembly	12	20.0
Through the Private service provider	20	33.3
Through local radio station	28	46.7
Total	60	100.0

Field study: July, 2013

This means that the local radio stations are powerful medium that can be used to sensitize the general public in relation to service delivery in the metropolis in order to achieve the required sustainability in PWCT system in STMA. In that it will raise the awareness level and increase patronage as well service user’s obligation to pay for their service fee without defaulting.

“Some of the local FM radio stations devote some airtime to sensitize the general public on the dangers associated with bad sanitary practices in the city. Through this radio programmes that I got to know of the existence of such a law” (Personal communication with a service user, July, 2013)

Performance Monitoring

Monitoring is vital tools when it comes to ensuring quality of service provision. The study reveal that, performance monitoring in service provision by the private sector has been stated in the contract document that: “All duties of the Franchisee, as specified in this agreement, shall be monitored by a person, group of persons, or a firm designated by the Assembly as the Monitor. The Assembly may assign the responsibility for monitoring the performance of the services to the Assembly’s own staff, or may enter into agreement with a private entity, to oversee the performance of the service. The Franchisee shall cooperate fully with the Monitor (STMA, 2010, p.III-45). The parameters set for performance monitoring in STMA require the PS to provide following information and is supposed to deliver this information at monthly review meeting with STMA officials;

- Number of households Served/Registered
- Number of Containers Served
- Service Frequency
- Waste Quantities from Landfill Records
- Equipment Availability and Performance

- Franchisee’s Staff Inputs
- Revenue Collection Levels
- Service Quality (Container sites, Complaints).

Based on the information above the study further reveals that indicators has also been clearly set to guide the monitoring of the PS performance in service delivery in STMA. The following performance indicators should be used to establish the efficiency, effectiveness of the Franchisee’s Service:-

- Number of households and establishment served.
- Frequency of collection for door-to-door ad communal container areas
- Number of trips made in a month per vehicle.
- Frequency of Equipment breakdown.
- Accident rate per vehicle
- Customer Tariff Collection Rates.
- Length of street sweeping/drain cleaning per month

According to STMA officials,, the only existing monitoring mechanism is to carry out equipment’s checks and supervision but an interview with the environmental sub-committee chairman proved otherwise that there is no such mechanism in place. Another method they have adopted of late is to monitor the performance of the provider through monthly review meetings. Investigation reveals that no effective monitoring mechanism is in place neither does any effective supervision take place in the service area. A request for copy of monitoring schedule as an effective established monitoring mechanism yielded no any positive result.

Table 5.12: User’s perspective on performance monitoring of the private contractor

Selected service user’s =60		
Performance monitoring	Frequency	Percentage %
Yes	0	0
No	60	100.0
Total	60	100.0

Field study: July, 2013

In the table above,100% of the respodents indicated that they do not participate in monitoring the performance of the private contractor. This response implies that the service users were not given the opportunity to participates in monitoring the performance of the service provider.

Complain mechanism

The contract document of 2010 requires that the service provider establishes a complaint mechanism for dealing with feedbacks from the service users. “The franchisee shall establish and operate a complaint and public liaison office within its assigned zone of service. The franchisee shall also establish and operate a telephone line at the said office for receipt of complaints and public comments. The said office shall have at least one responsible person in charge and present during collection hours and shall be open during all collection hours.” (STMA, 2010, p.II-39).The agreement also makes it mandatory for the service provider to provide a log book for receiving and responding to such feedback, but the study reveal that no such checks by STMA officials ever took place; “A complete log of all communications is to be maintained, including a record of actions to follow-up on any complaints or comments. The franchisee shall make the log and record available for inspection whenever requested by

the Assembly and/or its Monitor. The franchisee shall respond to all complaints regarding Services provided under this Agreement in a courteous and prompt manner within Two (2) days. Should a complaint go unsolved for longer than Four (4) days, the Assembly will have the right to demand an explanation or resolution to its satisfaction.” (STMA, 2010, p.II-39).It means that an official designated office for the receiving complaint form service users should be established.

The response from the service providers reveals both Zoomlion and Vermark have a complaint mechanism in place. Further investigation reveals however that no any effective complaint mechanism or section exist in accordance with the provisions of the contract agreement neither does any complain log book found. What exist are only telephone contact details of either the driver or the supervisor .The table below confirms these findings

Table 5.13: Users perspective on complaint service over dissatisfaction of service provision

Selected service user's =60		
Complain service	Frequency	Percentage %
Yes	0	0
No	40	66.7
Direct call on Service provider	20	33.3
Total	60	100.0

Field study: July, 2013

In table 5.13 above, 67% of the respondents indicated that they have not witnessed or are aware of any complaint mechanism.33% of the respondents say that the way to file a complaint only is direct call the service provider. None of the respondent did confirm any existence of complaint section set to receive their complaint in their area.

“I have not personally seen any complaint office established in this area to receive our complaint and attend to it promptly. Since some of us have the mobile number of their supervisor we only call when they fail to come and collect our waste” (Personal communication with a service user, July, 2013)

The tender procedure

Proper tender procedure is a way of ensuring transparency, fair competition and accountability in order to achieve sustainable service delivery it ensures that PS with requisite equipment and man power resources capable of delivering effective and efficient services is given the node. Secondary sources available reveal strict adherence of tender procedure in awarding the contract. Investigations reveal that the tender procedure or the call for the expression of interest for the award of contract is usually published in the Ghanaian daily newspapers. After receipt of expression of interest, various bidders were duly invited to purchase the tender document of which over ten companies came for the tender document.

“For transparency in the process all bidders were invited to the office of the Metro chief executive and in their very naked eyes the bids in the bidding box firmly locked were opened and the various bid prices were read out to the bidders. A date was set for the evaluation of the document presented by the metro tender committee”

(Personal communication with the Head, Waste Management Department, July, 2013)

This procedure was clearly stated in the tender document: “The Employer will open the bids, including modifications made pursuant to Clause 22, in the presence of the Bidders' representatives who choose to attend at the time and in the place specified in the Bidding Data”. It also stated that “The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid Security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening” (STMA, 2010, p.I-11) Bid evaluation followed suit leading to the award of contract to the deserving or qualified bidders in accordance with rules of the process thus it states that “The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 26. Subject to Clause 32, the Employer will award the Franchise to the Bidder whose Bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated Bid price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 3, and (b) qualified in accordance with the provisions of Clause 4” (STMA, 2010, P.I-12)

Capacity Building

Capacity building in solid waste collection ensures that those in charge of monitoring the performance of service providers have the requisite skills and know how able to discharge their duties satisfactorily and to enhance the sustainability of service provision in the city. Available secondary data from the waste management department and from the interview conducted indicated that though some form of capacity building in the form of monitoring and evaluation were given to staff of the department some few years back, the officers assigned this responsibility failed to discharge their duties as required of them leading to lapses in the area of monitoring of the performance of the service providers. This study reveals was largely due to factors like poor remuneration and motivation, as well as lack of institutional and logistical support coupled with lackadaisical attitude on the part of some workers.

User charges, Penalty and fines

User charges, penalty and fines are important mechanism necessary to enhance sustainability of privatized solid collection. Investigation reveals that user fees are fixed in broad consultation with the service providers excluding the users. “MMDAs shall set user charges with full participation of private sector service providers and users” (MLGRD, 2010); but contrary to the policy provision users are not consulted. It is the Assembly which normally determines the upper limits of user fees to be charged in the operational area. The service provider is then required to provide a tariff structure for different services in a format to the metropolitan Assembly. Though in table 5.2 majority of the service users indicated that the user fee is affordable, and in another table 5.10 overwhelming users indicate prompt and regular payment of user fee notwithstanding there are still recalcitrant users who in some cases try to dodge the responsibility of paying their fees. In such a case appropriate penalty or fines is applied by taking the defaulters to court.

“The service providers are to ensure that they submit list of defaulters to WMD office and WMD will in turn send the list to the EHD department to prosecute the culprits at the court, this mechanism is very effective in ensuring that users pay their fees in order to keep the service provider in business otherwise many of them would go out of

business in a very short time” (Personal communication with the Regional Environmental Health Officer, July, 2013)

Existence of solid waste treatment facility and transfer stations

Transfer stations in cities across the world are very important and contribute effectively in sustainable service delivery. In this case it has over the years been proven to be much more cost effective when it comes to solid waste collection and transportation services than trucks going directly to the final disposal site. Fuel and other running costs are substantially reduced. Mileage demand on trucks has proven to be much lower so that maintenance and operational costs are lower and prolong the lifetimes of trucks. (UNEP, 2005) Interview and personal observations with various STMA officials indicated that there are currently no transfer stations or any solid waste treatment facility for treatment and recycling of solid waste in STMA due to lack of funds. According to the Head of Waste Management Department, plans are far advanced to get these facilities in the metropolis.

“Many private sector companies including Zoomlion Gh.Ltd. as well foreign companies have over the years come and go expressing interest in providing such a facility to facilitate waste collection in STMA. Besides the Assembly is also sourcing for funds to provide such facilities in the metropolis” (Personal communication with the Head, WMD, July, 2013)

5.6 Summary

The current solid waste collection and transportation organized in STMA encompasses both door-to-door waste and communal container waste collection. It entails collection, transportation and disposal of waste at the final disposal site. The collection is provided by Zoomlion, Vermark, Cudjoe construction and Stanley Owusu Co.Ltd. The study reveals that standards are set for working conditions for private sector workers participation in service delivery and that the service provider is paying its workers according to set standard. Some service providers also provide its workers with protective clothing and health insurance others do not. The study reveal Zoomlion Gh.Ltd has nine (9) trucks, while Vermark has Seven (7) trucks for service delivery With regard to covering of waste during transportation of waste to the final disposal net instead of tarpaulin is used. On frequency of vehicular breakdowns. Vermark admitted that they experience frequent equipment breakdown, while Zoomlion confirm they also experienced breakdowns but not all that frequent. The study also discovered Zoomlion is able to recover cost while Vermark not able to recover cost of operations. The study reveal the existence of law on PSWCT and that its enforcement was the responsibility of the Environmental health Department of STMA.WMD ensures that it forward the list of defaulters received from the PS to EHD for prosecution. On performance monitoring the study reveals that though it has also been stated in the contract document and the only means WMD used is through monthly meetings to review the performance of the private sector. Users on the other hand are not involved in monitoring the performance of the service provider. There is also no effective complaint mechanism installed in the operational zone. With regard to tender procedure the investigation reveals that there was transparency in the award of contract. Also, capacity building in the form of monitoring and evaluation were given to staff of the department some few years back the officers assigned this responsibility have failed to discharge their duties. The study further reveals that user fees are fixed in broad consultation with the service providers to the neglect of service users. Also there is penalty in a form of court action for service users who default in payment. Also there currently no transfer stations or any solid waste treatment facility for treatment and recycling of solid waste in STMA due to lack of funds.

CHAPTER SIX

Conclusions and Recommendations

6.1 Introduction

This study investigated the level of sustainability of privatized solid waste collection and transportation in STMA. This chapter therefore provides an insight of the research with conclusions and recommendations. The research questions posed in Chapter One will be answered in the final part of this Chapter. It will be followed by findings of the study which will reflect upon review of the literature in chapter two. Finally recommendations are provided regarding the sustainability of the privatized solid waste collection and transportation in STMA.

6.2 Answering the research questions

Based on the results of the findings of the fieldwork carried out for the purpose of this research the following are the conclusions drawn:

6.2.1 How is the current solid waste collection and transport system organized in STMA?

Privatized solid waste collection and transportation in STMA came into full swing under the UESP/World Bank Urban I project between 1994 and 1998. The metropolis was then divided into two (2) operational zones and has currently been re-zoned into four (4). The sole contractor at that period was ABC Waste Management Ltd which started its waste collection services in August, 2001. The actual contract commenced in January 2002 after evaluation of competitive bids. Other companies like Zoomlion and Rusaben waste Company Ltd. were contracted between 2002 and 2004 respectively to augment the operations of ABC Waste Management Ltd. Currently, there are four (4) private waste management companies currently working in the Metropolis. The companies are; Vemark Environmental Services, Zoomlion Ghana Ltd, Cudjoe Const. (GH) Ltd, J.Stanley-Owusu & Co. Ltd. There are two main systems of solid waste collection and transportation in STMA, these are; Door-to-Door Services and Communal Container Services. The door-to-door services involved the collection of waste from house-to-house in STMA. The main system in STMA therefore entails collection, transportation and safe disposal of waste at the final disposal site.

6.2.2 How sustainable is the current private sector service delivery in STMA?

The researcher, in assessing the main variables namely: social equity and acceptability, environmental effectiveness, economic efficiency and stimulating Government mechanisms presented the findings of the research from the field based on the ISWM Model by taken into consideration the relevant indicators associated with the main variables.

Based on the assessment on the **social equity and acceptability** the study concludes that with regards to the working conditions the labour law makes it mandatory for paying workers according to the minimum wage as such the service providers are paying their employees according to set standard. Socially, this is therefore good in promoting sustainability of the privatized solid waste collection in STMA. With regard to protective clothing, the study concludes that Zoomlion provides full protective gear while the selected contractor Vemark, provide only hand gloves and nose mask except that the workers do not use it and the reason is that they find it uncomfortable to use it during work and the government does not also inspect it. Socially, it does not promote sustainable service.

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delivery, because the health of the workers is at risk which will lead to low productivity. On the employees' health and safety conditions, the study reveals that Zoomlion cater for the medical expenses of their workers through national health insurance facility while the selected contractor does not provide health insurance facility for its employees. Preventive vaccination is what is also missing. Socially this is not sustainable in enhancing the sustainability of service provision since workers may not be well motivated to put in their best for fear that in the event of any sickness he may not get adequate medical attention. This may affect quality of service delivery and users may feel reluctant to pay their user fees which may affect revenue generation, and hence affect the sustainability of service provision.

On environmental effectiveness the study also concludes that the service is sustainable because the study reveals that both Zoomlion and the selected contractor satisfy the requirement for equipment type and number required for service delivery in the metropolis. The study further reveals that though most of the refuse trucks are imported, they are however designed to suit the local environment and as such its spare parts are locally available. With regard to covering of waste during transportation of waste to the final disposal site, the study concludes that it is sustainable since Zoomlion and the selected contractor cover their waste with net during transportation to the final disposal site. Environmentally it is sustainable because air pollution and littering of the municipality would be avoided. On frequency of breakdowns, the study concludes that environmentally, it is sustainable. Though they experience breakdowns it does not take more than twelve hours to fix the problem and secondly the selected private contractor has a back-up vehicle in case of any breakdown. The study reveals that some communal containers could take up to three days of uncollected waste before experiencing any shock or spill-over while in some areas it takes approximately 48 hours of uncollected waste to experience spill-over. On maintenance schedule, the study concludes that Zoomlion Gh.Ltd. have well equipped mechanical workshop for building and repairing containers and servicing their operational trucks as such they have well designed maintenance schedule for all of their equipment's. While Vermark the selected contractor do not have a mechanical workshop on their own but have a maintenance schedule for their operational trucks. Technically, it is sustainable because trucks are service on time to return to collect waste to avoid spillage in service areas hence the satisfactions expressed by users in table 5.4.

On economic efficiency and with regard to regular payments the study concludes that majority of service users in the operational zones of both companies pays regularly and with no default payment over the past six months. Financially it is good for the PS to recover cost and hence promote sustainability in service delivery. On the ability of the Private Sector to recover cost, financially the service is not sustainable on the part of the selected contractor since it is not able to recover cost citing high cost of maintenance as a result of frequent equipment breakdowns, but sustainable in Zoomlion's case in.

6.2.3 Which government mechanisms have been put in place to enhance sustainable Private Sector service delivery in STMA?

The study concludes that there is in existence of law on privatized solid waste collection and transport systems in STMA installed to enhance sustainability of service delivery and that its enforcement is the responsibility of the Environmental health The implementation aspect is very weak and is occasionally marred by political interference and as a result some SP

continue to flout the rules of engagement and no appropriate sanction has been applied so far. Weak institutional framework does not integrate well in the government Model of ISWM Model and therefore cannot enhance sustainability of service provision.

Performance monitoring in the study area is very weak. The study concludes that no effective performance monitoring mechanism has been installed to check the performance of the contractor. Likewise service users have not been given the chance either, to monitor the performance of the SP. It is not sustainable because it does not integrate well in the ISWM Model which requires that all stakeholders are rope in order to enhance sustainability of waste service delivery. The study concludes that no effective complaints mechanism has been installed as specified in the contract agreement. The complaint mechanism is weak and cannot enhance sustainability in service delivery because majority of service users are left out without any well-orchestrated means to lodge their grievances in the event of uncollected waste.

User fee are also fixed without consultation with service users who are mostly represented by various Assembly members and unit committee members this does not enhance sustainability in service provision. This is based on the ISWM Model which sought to involve all stakeholders in achieving sustainability of service and in the words of (Klundert and Anschutz, 2001) involving the stakeholders help make the system sustainable because they command an enormous influence to achieve desired sustainability or objectives

No transfer stations exist in STMA. Also, waste treatment facility and consequently waste segregation or separation is also absent to assist service delivery in STMA which technically does not enhance sustainable service delivery. This is also based on the view of (Imran et al., 2008) who suggested that the concept of waste management hierarchy composed of the 3Rs forms the required ingredients as far as sustainability in waste services are concerned.

The study further concludes that there is in existence of a penalty for non-performance by service providers as well as court action for defaulters of service fees, institutionally, this is sustainable in the sense that its application will enable users to pay continuously for service provision without defaulting. With regard to the tender procedure the study concludes that there was total transparency in the system as such it enhances sustainability of service delivery for the reason that it will allow for recruiting competent contractors to provide better services to users devoid of favouritism where incompetent contractors are recruited.

The study further concludes that some form of capacity building in the form of monitoring and evaluation were given to staff of the WMD department some few years back but the officers assigned this responsibility failed to discharge their duties, institutionally this does not promote sustainability in service delivery in the sense that the SP would remain unmonitored and would therefore means continuous flouting of the rules of the game.

Generally, the study concludes that the privatized solid waste collection and transportation in the study area is not sustainable since most of the assessment indicators on the basis of the ISWM Model were not achieved by the selected contractor and on the part of the regulator.

6.2.4 What needs to be done to increase sustainable solid waste service delivery by the Private sector in STMA?

STMA official's perspective

STMA officials see enforcement of the bye-laws on the privatized solid waste collection as crucial to bring defaulters to pay for service delivery and to also take all necessary action to ensure that the SP adhere to set standards in service provision in accordance with the contractual agreement. They also proposed reforms in the current billing system and provision of adequate training and motivation as well as recruitment of persons with the requisite know how not on the basis of 'whom you know' for revenue collection. They also propose providing tax rebate on imported waste collection equipment, provision of subsidy to help the SP

Service provider's perspective

Both companies were of the view that enforcing the bye-law by prosecuting defaulters of user fees would play a crucial part to enable them in cost recovery which they see as crucial in the sustainability of the system. They also point to the fact that the metro Assembly should do well to support them in educating the service users on their obligations in service provision. They also agitated for the Assembly to fix realistic fees to enable them recover full cost of service delivery taking into consideration, rampant soaring prices of spare parts, and fuel in the country. They recommended that the Assembly should support them financially or should provide tax holiday and subsidy to help sustain them in the system.

Service user's perspective

The service users also called for proper monitoring and complaints mechanism in their area and urge that all users should pay for service delivery regularly since it is the only way for the PS to recover cost of operations.

Table 6.1: Sustainability outcome Matrix

Sustainability Goals	Stakeholders level	Indicators	Outcomes
Social equity and Acceptability	STMA	Awareness creation	--
	Zoomlion	Wages paid, provision of protective gear, reimbursement of medical expenses, social security benefits, on the job training skills	++
	Vermark	Affordability of user fees, willingness to pay, level of satisfaction	+ -
	Service User's		
Environmental Effectiveness	STMA	Waste segregation & recycling Existence of final disposal site	--
	Zoomlion	Type of equipment, frequency of collection, equipment maintenance, back up vehicle, frequency of equipment breakdown, No. of trips per day, covering of waste to the final disposal site	++
	Vermark		++
	Service user's	Type storage facility, source separation	+ -

Economic

Zoomlion

Ability of PS to recover cost, Employment

efficiency	Vermark	generation	+
	Service User's	Prompt & regular payment	+
			+
	STMA	Existence of bye-laws on PSWC, proper tender procedure, existence of waste treatment facility, existence of transfer stations, existence of capacity building,	+
			++
			--
	Zoomlion	evidence of performance monitoring an	--
	Vermark	complaint hotlines	+-
	Service Users		-
		Compliant mechanism	-
	Awareness on existence of bye-laws on PSWC	-	
		+	

Source: Developed by the Author base on the Findings in Chapter 5 of this study

Key to Outcomes

+	Positive
++	Very Positive
-	Negative
--	Very Negative

6.3 Reflections upon the literature

The literature review is in relation to sustainability of privatized solid waste management services based on the ISWM model as well as on the Government models. The findings from this study will therefore reflect on the literatures in chapter 2.

During the shift from public to privatization there was hope and anticipation of a positive outcome. Ten years ago things were quite negative, but the research conducted has revealed that many things have changed. Now private contractors operating in the study area are paying their workers according to minimum daily wage which contradicts a similar study by (Obirih-Opareh, N., 2002) in Accra in connection with wages and fringe benefits. The finding shows rather an update since in a period of 6-10 years quite a lot have changed.

The study also confirms the study by (Post et al., 2003) in Accra and Hyderabad in India that employees in the PS are usually not reimbursed for medical expenses. The study reveals that Vermark do not provide health insurance for its workers but interestingly in ten years the introduction of health insurance enable Zoomlion to ensure its workers. The study also bears a similarity with the study by (Post et al., 2003) concerning protective gear because Vermark provides only hand gloves and nose mask to their waste collectors. But with regard to Zoomlion the study differs considerably.

It is interesting to note that whereas (Obirih-Opareh, N., 2002) was mentioning Donkeys, carts, pushcarts, power tillers as some of the equipment formally used for waste collection, the situation is not quite the same again. Things have changed considerably over the ten years period with the introduction of modern equipment like skip loaders, roll-on-roll-off vehicles and compaction trucks.

Concerning frequent breakdowns of equipment the study further differ from the study in Tanzania by (UN-HABITAT, 2010) that Many PS who provide a solid waste service

delivery in most municipalities suffer from frequent breakdowns of collection vehicles, which last for many months awaiting the requisite finance to purchase spare parts which may have to be imported from overseas. They differ on the grounds that with regard to the PS in the study area the study revealed that though the PS experience equipment breakdown, it does not take more than twelve (12) hours to bring it back to road. Furthermore the research contradicts the same study about lack of maintenance which contributes to poor solid waste collection performance since both companies have maintenance schedule in place. Choguill (1996) cited in (Kassim, 2009) argues that the basic element of any sustainability criteria is that the cost of the service must be recovered from the users. This study differs from (Kassim, 2009) in Dar es Salaam, Tanzania indicating that collection of fees from the households is not sufficient for cost recovery. They differ in the case of Zoomlion but confirm the study in the case of Vermark because they are not able to recover cost. .

Concerning monitoring and complaint mechanism of privatized solid waste service provision the study confirm the study by (Post et al., 2003) that in most low income countries, official monitoring and supervision of privatized solid waste collection and transportation is exceptionally weak due to bad logistics, understaffing, low remuneration and corruption. There are similarities in both studies in the sense that the research reveal that currently department responsible for monitoring and control are understaffed and do not also have the requisite logistical support to monitor the PS

6.4 Recommendations

Sustainability of service delivery hinges on better revenue collection mechanism installed. As such revenue collectors should be well motivated with better incentives and should be properly trained to enhance their performance. Appropriate billing system should also be installed to enable efficient fee collection and avoid leakages and corruption in the system. Employing persons with requisite skills in Accounting would help streamline the system and increase stability in revenue generation. Service Fee adjustments should also be reviewed regularly in relation to hikes in fuel prices which are typical characteristics in the country, so that the PS would not run at a loss and can recover cost.

Capacity building in monitoring and supervision for staff of Environmental health Department and the waste management Department and broad categories of waste collectors, supervisors as well as drivers should be regular and should involve all staff of the two Departments. Newly recruited staff to these Departments should be given adequate capacity building to enable them cope with the workload at the Department.

Legal enforcement structures should be strengthened to make it work effectively devoid of any political favour or interferences.

The Assembly should support the private sector by providing subsidy and tax rebate on imported vehicle and spare parts. Also government should impose a universal tax on product deemed to generate lots of wastes as it is currently being done in the energy sector. Such money could be used to provide subsidy to Support the PS

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ANNEX 1: Interview Guide for Sekondi-Takoradi Metropolitan Assembly Officials.

A. General information

Title.....

Department.....

B. How is the current solid waste collection and transport system organized in STMA?

1. Can you briefly explain about the way in which solid waste system was organized in STMA before the extension of the collection services to the private sector?
2. When did private sector participation start in STMA?
3. Why did you involve the PS in solid waste collection and transport?
4. What type of contract exists between STMA and Private Sector in service delivery?
5. If it is a franchise why did you chose it? Why not contract?
6. What is the duration of the contract for the Private sector in service delivery?
7. What are the terms of reference?
8. Does the PS pay license fee?
9. Who set the user fee?
10. What does STMA do to ensure that it is effective to support the PS?
11. Is the PS involve in fee setting?
12. Who is responsible for user fee collection in STMA?
13. How do you ensure that the right of the PS is achieved?
14. What does STMA do if users refuse to pay?
15. How is the selection procedure carried out for PS participation?
16. Do you promote waste recovery, reuse and recycling? If yes, in what ways?
17. Do you think that service delivery has improved with the introduction of the private sector? If No, why?
18. What is your biggest problem faced with the private sector?
19. If there is, how do you plan solving it in the future?

C. Sustainability of the current privatised solid waste collection service delivery

20. Do you set standard for working conditions for PS Involvement?
21. Do you have a list of contractors who have worked in STMA for the past few years?
22. Do some of them come and disappear? If yes why?
23. Who are those active in service delivery now?
24. What happen when PS come to say that it cannot work anymore because users are not paying for service provision?
25. What type of equipment's are specified in the contract agreement for waste collection activities in STMA?
26. Do you check if these equipment's are designed according to the local know how before they commence service delivery?
27. Is the equipment property of the private contractor or STMA?
28. Which of the equipment belongs to STMA?
29. Which of the equipment belongs to private sector?
30. Are their spare parts locally available?

D Government mechanisms put in place to enhance sustainable private sector service delivery in STMA?

Institutional Capacity

31. How is the tender procedure organized in STMA?
32. How is the tender for solid waste collection services awarded?
33. Is the bidding process open to all contractors? and how?
34. Does STMA have feedback mechanisms for citizens (eg.complaint desks, etc.)
35. If yes, How quickly do you response to complaints?
36. If no, how do you deal with complaints from the public?
37. Do you have a mechanism which allow service users to assess the performance of the private contractors in waste collection?
38. What is being done to provide capacity building for those in charge of monitoring and control?
39. What inspection, supervision, and/or performance monitoring do you provide in the areas served by private sector
40. Does STMA provide any land, buildings, equipment or human resources to support the private firms' activities initially and currently?
41. Does STMA provide community education, general public education, and public participation workshops initially to support the transition to a PSP system?
42. Does STMA provide any incentive to encourage PS performance in service delivery?
43. If yes can you mention it. If no why?

Financial Mechanism

44. What is the contract period for privatized waste collection in STMA?
45. Is the contract period sufficient for the Private Operator to recover costs?
46. What does STMA do with license fees?
47. Who determines the user charges? Are user fees the same for both commercial and residential users?
48. Do you check if waste is being covered en route to final disposal site?
49. If yes how often? how do you check?
50. Does government support the private sector in terms of subsidy, tax reduction, pay less on spare parts and give the PS discount on imported vehicles?
51. Does STMA support the PS with bank guarantees, or did the city arrange a multi-year contract to enable Bank financing?

Policies

52. Does STMA have any bye laws for PS participation in Waste Management?
53. Do you have any penalty or sanction for the PS when they falter?
54. Has it happened before? If yes what went wrong?
55. What course of action do you take if a private firm does not perform satisfactorily?
56. Do you face any challenges in enforcing these regulations?
57. Do you have a specific department to ensure that laws guiding PS service delivery are strictly followed?

Technology/Infrastructure

58. What method of final disposal site exists in STMA?

59. Is the final disposal site far from the city centre?
60. Does STMA has transfer station?
61. Does STMA plan having such a facility in the future?
62. Does STMA promote waste recovery, reuse and recycling? If yes, in what ways
63. If No does STMA plan having waste recovery, reuse and recycling in the future?

D. Sustainability of solid waste service delivery by the private sector in STMA

64. What are the challenges in providing sustainable solid waste collection services in STMA?
65. How do you compare the privatised waste delivery system with the previous system ?
66. Is the privatized system financially viable?
67. Is it difficult to recover cost of service? If yes why?
68. Have you introduced polluter pay principle to recover cost of service delivery?
69. If yes, is it operating successful in STMA?
70. If No, what can be done to make it work in STMA?
71. Does STMA provide any form of support in case of inability of PS to provide services in a particular locality?
72. If yes, what kind of support do you provide?
73. Are there any problems, observations or issues that you would like to share regarding PSP systems and your experience with them (related to control, reliability, cost, political intervention, performance and other)
74. Based on the current conditions, do you think it is adequate for the private sector to promote sustainable service delivery in STMA?
75. If No, what should STMA do to enhance the sustainability of privatized solid waste collection and transport in STMA?

Thank you so much for your cooperation

ANNEX 2: Interview Guide for the Private Service Provider

A. General information

Age..... Sex.....

B. Current Solid Waste Collection System

1. What kind of solid waste collection services and facilities do you provide in STMA?
2. Can you describe the system of solid waste collection you are currently applying in STMA?
3. Do you promote waste recovery, reuse and recycling? If yes, in what ways?
4. Who determine user charges in STMA?
5. Are you involved in fee fixing in STMA? If no why?
6. Does STMA pay you promptly? If yes how often? If no why?
7. Are you paid according to No of trips? If no what is the arrangements?
8. What type of refuse trucks do you use?
9. How many closed types do you have?
10. How many open trucks do you have?

C. How sustainable is the current private sector service delivery in STMA?

Economic Efficiency

11. Have you employed more hands ever since you started service delivery?
12. If yes how many jobs have you created so far?
13. Are the current fees adequate to recover cost of service delivery?
14. Who collects the fees?
15. Are the fees collected regularly?
16. What is your total investment cost?
17. What is your monthly income?
18. What is your maintenance cost per month?
19. What is your labour cost per month?
20. Are you able to recover your cost?
21. Does STMA provide you with Incentives in your operations?
22. If yes, what kind of support/Incentives do you receive from STMA
23. Are service users paying regularly?
24. What course of action do you apply if users defaults in payment?

Environmental Effectiveness

25. How many households do you serve per day?
26. Are you able to cover all the area under your jurisdiction in a day? If No, why?
27. Do you provide street sweeping services in your area?
28. How frequent are the service areas served in a week for door-to-door collection?
29. How frequent are communal containers lifted in a week?
30. How many trips of loads do you make in a day per vehicle?
31. Do you experience frequent breakdowns? If yes, why?
32. How long does it take to repair it?
33. Do you have maintenance schedule for your equipment? If yes how often do you carry

Out maintenance?

34. If No, what measures have you taken to minimize breakdown of equipment?
35. Do you have a backup vehicle?
36. If No what do you do in case of breakdown?
37. Do you get the spare parts locally or imported?
38. Do you cover the waste en route to the final disposal site?
39. How long does it take to reach the final disposal site?
40. Is the road to the final disposal site in good shape?

Social Equity/acceptability

41. How many workers do you have?
42. On what basis do you select your workers?
43. Do you employ your workers based on government standard? If no why
44. Do your workers work on weekends/holidays?
45. If yes, do you pay them overtime/allowances/Incentives for holiday/weekend duties?
46. Are your workers members of labour unions? If no. why?
47. Do you give your workers on the job training skills? If no. why?
48. Do your workers enjoy social security benefits? If no. why
49. Are they paid under labour conditions? If no why?
50. Do you reimburse your workers for medical bills?
51. Do you provide medical check-ups for your workers? If yes, how often?
52. Do you provide your workers with uniform, gloves, boots and masks? If yes, do they use it?
53. Do your workers have a place to wash themselves after close of work? If no why?
54. Are you satisfied with the level of cooperation and attitude towards service delivery in your area?

D. Sustainability of solid waste service delivery by the private sector in STMA

55. Under the current conditions is it possible to deliver quality and sustainable service delivery in STMA?
56. In your opinion what do think the Government or the Metro should do to help you deliver sustainable service delivery in STMA?

Thank you so much for your cooperation

ANNEX 3: INTERVIEW GUIDE FOR SOLID WASTE WORKERS

Position of respondent.....

Date.....

ANNEX 3

Interview Guide for waste collection workers

1. How long have you worked with this company?
2. What was your previous profession?
3. Are you a former government worker?
4. If yes how do you compare the government work and that of the PS
5. What solid waste collection activities are you engaged in?
6. Are you a permanent or casual worker?
7. Have you been given any solid waste collection training by the company?
8. When do you start work and when do you break?
9. What is your monthly salary?
10. How do you compare your salary with those in the Public sector?
11. Do you receive any incentive /allowance for working on weekends and holidays?
12. Does the company organize immunisation/medical check-ups for you?
13. Does the company pay you overtime allowances for weekends/holidays?
14. Does the company pay your social security contribution?
15. Are you satisfied with your current condition of service?
16. How do you work during rainy seasons?
17. Does the company provide you with rain coats?
18. Are you supplied with protective clothing? If yes, do you use it? If no why?
19. Do you have a place provided by the company to wash yourselves after close of work?
20. Do you experience skin rashes, worm infestation and skin scratches?
21. If no what kinds of diseases do you experience in discharging your duties?
22. Does the company reimburse you for medical expenses?
23. Does the company organize immunisation/medical check-ups for you?
24. If yes, what kind of Immunization are you normally given?
24. What are the challenges you face in dis-charging your duties
25. Are you engaged in waste segregation or recover valuable materials?
26. If yes, what type of material do you recover and what do you do with it?
27. What do you like the company to do to improve your working conditions?

Thank you so much for your cooperation

ANNEX 4: Questionnaire for households (service users).

Dear respondent,

I am Ismaila Ibn Is-Haque, a Master student at the Institute of Housing and Urban Development Studies, Erasmus University in Rotterdam, the Netherlands. I am conducting a survey to understand the "Sustainable Private sector Waste Collection and transport in Ghana; the case of Effia Kwesimintim". This study would help me to fulfil the requirements for the award of a Master's degree in Urban Management and Development. I therefore kindly request you to spare a few minutes to answer this questionnaire.

A. Back ground information

1	Street				
2	Sex				
	(1).Male	(2).Female			
3	Age				
	(1).Below18yrs	(2.)18–35years	(3).36 –45years	(4)46-64years	(5).65+years
4	Highest level of education attained				
	(1)Primary	(2)Secondary	(3)Tertiary	(4)University	

B. Current Solid Waste Collection System

5	What system of waste collection is being used in your household/establishment?				
	(1) Communal container service	(2) Door-to Door services			
6	Who collects the waste from your house				
	(1)The Metro Assembly	(2) Private service provider	(3) The informal waste collectors		
7	Has the same organization been collecting the waste for the past five years, or has there been a change in who has been collecting your waste?				
8	(1) Yes there has been a change	(2) No there has not been any change			
9.	If yes has there been any change in mode of services				
	(1) Yes there has been	(2) No there has not been a change			

C. How sustainable is the current private sector service delivery in STMA?

Environmental Effectiveness

10	What type of container do you use for storing your waste?				
	(1) plastic container	(2) metal container	(3) basket	(4) plastic bags	
11	Who provided you with the container?				
	(1)The Metro Assembly	(2)Private service provider	(3)Bought it myself		
12	How many times is your waste collected by the private contractor?				
	(1)Once a week		(3)one to three times a week		
13	Are the waste collection services in your household/commercial premises reliable?				
	(1) yes	(2) No	(3) Others(specify)		
14	If no, what happen if waste is not collected at specified time?				
	(1) Spillvoer at most dust bins/communal. containers	(2) No Spillvoer at most dust bins/Communal containers	(3) Presence of rodents/flies all over the place	(4) Presence of Offensive odour	(5) Others(specify)
15	How far is your house to the communal container?				
	(1) Less than 50 metres	(2) 50-100 metres	(3) 100-200 metres	(4) 300 metres	5 400-500 metre s
16	Do you patronize the service delivery by the Private sector?				
	(1) Yes	(2) No	(3) others(specify)		
17	If No, how do you dump your waste?				
	(1) By burning	(2) By burying	(3) Open dumping	(4) Others (specify)	
18	Do you separate your waste before storing it for collection?				
	(1) Yes	(2) No			
19	Are you aware of the existence of Metro Bye-laws on privatized solid waste collection?				
	(1) Yes	(2) No			
20	If yes, how did you get to know about the bye laws?				
	(1)Through the Metro Assembly	(2)Through the Private service provider	(4)Through local radio station		

Social Equity/acceptability

21	What is your opinion of the service that you are receiving for collection of solid waste from your household (or establishment)?		
	(1)Very satisfied	(2) Reasonably satisfied	(3) Not satisfied at all

22	If you are not satisfied with service, would you state your reason?				
	(1)The service is not reliable	(2)the interval between collections is too long	(3)The location of the communal container is unsatisfactory	(4)containers are emptied and thrown anyhow	
23	How long has private contractor been operating in your area?				
	1.) 1-11 months	1-2years	3). 3- 4years	3). 5- 6 years	4) others specify
24	Is there any public education on importance of solid waste management in your area?				
	(1) Yes	(2) .No			
25	Where you informed about the private sector involvement of solid waste collection services in your area?				
	1. Yes	2. No			
26	If answer to above is yes then through which means?				
	1. radio	2 TV	3. Newspaper	4. Pamphlets	5.Community meeting

Economic Efficiency

27	How much do you pay for service provision?				
	(2) 10Cedis		(3) 10Gp to 50Gp		
28	How often do you pay?				
	1.weekly	2. monthly	3. Yearly	4. Others specify	
29	Is the fee affordable?				
	(1)Yes	(2) No			
30	If No how much do you suggest?				
	(1)2Cedis	(2) 3Cedis	(3) 4Cedis	(4) Others (specify)	
31	If Yes are you willing to Pay more for improved services?				
	(1) Yes	(2) No			
32	How do you pay for your waste collection?				
	(1)Through Metro revenue collectors	(2)To private waste revenue collector			
33	Do you pay promptly and regularly?				
	(1)Yes	(2)No			
34	Are you involved in fee fixing for service provision in your area?				

	(1) Yes	(2) No
35	Does STMA seek your opinion before user fees are fixed for your area?	
	(1) Yes	(2) No
36	Do you have a complaint service where you offer your dissatisfactions over service provided?	
	(1) Yes	(2) No
37	Is action taken promptly when you complain of uncollected waste?	
	(1)Yes	(2)No (3)Sometimes
38	Have you been given the chance to rate the performance of the service provider before?	
	(1)Yes	(2)No

E. What needs to be done to enhance sustainable solid waste service delivery by the private sector in STMA ?

39. Do you participate in monitoring the performance of the private contractor’s activities?

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40. If yes, in what ways?

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41. Any recommendations changes you would want implemented to contribute to the sustainability of solid waste services in STMA?

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42. In what ways can the community contribute towards the sustainability of privatized solid waste Collection in STMA?

ANNEX 5: Research Time Schedule

Activity	MAY				JUNE				JULY				AUGUST				SEPTEMBER			
	Weeks				Weeks				Weeks				Weeks				Weeks			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Research Design & Presentation				■	■															
Colloquium 3						■														
▪ Submission of final research proposal Chapter 3						■														
▪ Design of Interview guides						■														
▪ Questionnaires						■														
▪ Departure for Ghana						■														
▪ Reconnaissance Survey							■													
▪ Training Research Assistants							■													
▪ Conducting In depth Interviews with STMA officials, PS							■													
▪ Survey households							■													
▪ Conducting In depth Interviews with STMA officials, PS								■												
▪ Conducting In depth interviews with STMA Officials									■											
▪ Survey Households, PS waste collectors										■										
▪ Analysis											■									
▪ Cross checking Information gaps											■									
▪ Identification & Data Analysis Introductory Data											■									
▪ Data Processing coding text into groups												■								
Data Analysis & Presentation of Findings													■							
Improve research findings														■						
Colloquium 4															■					
Conclusion & Summary of thesis																■				
Submission of draft thesis																	■			
Submission of final thesis																		■		