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**URBAN ENVIRONMENTAL PROBLEMS IN GHANA:
A CASE STUDY OF SOCIAL AND ENVIRONMENTAL INJUSTICE IN SOLID
WASTE MANAGEMENT IN ACCRA AND SEKONDI-TAKORADI**

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Thesis submitted to the School of Geography,
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Doctor of Philosophy

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LIST OF ABBREVIATIONS

AMA	Accra Metropolitan Assembly
CIA	Central Intelligence agency
COHRE	Centre on Human Rights and Evictions
DACF.....	District Assemblies Common Fund
DfUR.....	Department of Urban Roads
EPA	Environmental Protection Agency
GAMA	Greater Accra Metropolitan Area
GDP	Gross Domestic Product
GMSD.....	Ghana Meteorological Services Department
GSS	Ghana Statistical Service
LTR.....	Land Title Registry
NTEPs	Non-Traditional Export Products
STMA	Sekondi-Takoradi Metropolitan Assembly
T&CPD	Town and Country Planning Department

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ABSTRACT

Unsustainable urbanization in Ghana has resulted in poor environmental conditions in urban settlements in the country. Solid waste disposal, in particular, has become a daunting task for the municipal authorities who seem to lack the capacity to tackle the mounting waste situation.

This study investigates the nature of the solid waste problem in two Ghanaian cities, Accra and Sekondi-Takoradi. It describes the waste situation in the study areas and identifies the causes of the problem from the perspective of key stakeholders in the waste sector. The delivery of solid waste collection services across different socio-economic groups of the urban population and the siting of waste disposal facilities are also examined in relation to the concepts of social justice and environmental justice respectively.

For the empirical investigation, a mixed methodology was used which combined questionnaire and interview data from stakeholders in the waste sector, together with documentary and observational data, to examine the issue of solid waste disposal in the two study sites. The key issues identified by the study include: that Ghanaian cities are experiencing worsening solid waste situations but the municipal governments lack the capacities in terms of financial, logistical and human resources to cope with the situation; that while several causes of the urban waste crisis can be identified, the lack of political commitment to urban environmental management is the root cause of the worsening solid waste situation in Ghanaian cities; and that social and environmental injustices are being perpetuated against the poor in the delivery of waste collection services and the siting of waste disposal facilities in Ghanaian cities. Based on these findings, it has been argued that the solution to the worsening environmental conditions in Ghanaian cities lies in the prioritization of urban environmental management and commitment of Ghana's political leadership to urban settlement development and management.

CHAPTER ONE

INTRODUCTION

1.0. Introduction

Urbanisation is a complex phenomenon that provides opportunities and benefits for countries but also associated with the process are problems of social, economic and environmental nature. In countries around the world, one major environmental problem that confronts municipal authorities is solid waste disposal. As observed by Pacione (2005:111):

“Most city governments are confronted by mounting problems regarding the collection and disposal of solid waste. In high-income countries, the problems usually centre on the difficulties and high cost of disposing of the large volume of waste generated by households and businesses. In lower-income countries, the main problems are related to collection, with between one-third and one-half of all solid waste generated in Third World cities remaining uncollected” (Pacione, 2005:611).

Today, municipal solid waste collection and disposal are particularly problematic in developing country cities, but many Western cities have also grappled with this problem in the past (and some probably still do). In his book *Rubbish*, Girling has observed that before the 20th century, many cities in Europe “drowned in a sea of garbage” with most of their municipal solid waste being dumped into rivers and open sewers. Municipal waste services were then poor and rivers like the Rhine and Thames were nothing more than open sewers as they were heavily polluted with waste and were major sources of infectious diseases (Girling, 2005:10). In 1741, Lord Tycornnel, for example, denounced the:

“neglect of cleanliness of which, perhaps, no part of the world affords more proof than the streets of London, a city famous for wealth, commerce and plenty and for every other kind of civility and politeness; but which abounds with such heaps of filth as a savage would look on with amazement”

(cited in Girling, 2005:10)

In other English cities such as Liverpool and Northampton, “the 1750s brought complaints of dung heaps in the streets” (Girling, 2005:10). Elsewhere in Europe the

situation was not different. In Germany, Bilitewski *et al.* (1997) note that many cities struggled with waste disposal and the Rhine River was heavily polluted with industrial and municipal waste. These examples show that urban waste disposal is not just a new challenge but one that has always confronted poor cities.

Nowadays, Western countries generally rely on land filling to overcome the problem of waste accumulation (Girling, 2005; Pacione, 2005). The landfill seems to have a special attraction for municipal waste managers because it offers a cheap and convenient option for waste disposal compared with other strategies such as reuse, recycling and energy recovery (Charzan, 2002). In fact, with the exception of few countries like Austria, the Netherlands and Denmark who recycle substantial proportions of their waste, most countries in Europe and North America still dump the bulk of their municipal solid waste in landfills (OECD, 2000; Girling, 2005). Thus, the current requirement for countries to move up the waste hierarchy¹ remains a real challenge for even the rich and technologically advanced countries (OECD, 2000).

Recent developments, however, seem to suggest that burying waste in landfills is not a sustainable solution to the mounting solid waste problem. Due to a number of factors (including rising concerns about the polluting effects of landfills, NIMBY² protests and shortage of landfill space), land space for land filling is becoming increasingly scarce and difficult to acquire. By the mid-1990s, for example, half of the one million tonnes of solid waste generated by Central Londoners were being transported more than 64 km to be dumped because landfill space within the Central London area had been exhausted (Kwawe, 1995). Recently, in May, 2008, the lack of waste disposal land created mayhem in the Italian city of Naples when the streets became laden with waste, blocking traffic and causing nuisance and hazards. In an online article titled *Waste erupts in Naples*, this is how 'WasteAge' reported it

“Left with no place to dispose of its trash, Naples has been bombarded by overflowing trash bins and tons of smelly refuse. The stench and public health problem has literally created mayhem. ... the city's landfills reached their limits, and neighbouring communities refused to take the Neapolitans' garbage. Short of options, city trash began piling up” (WasteAge, 2008: online).

¹ The various strategies of waste management arranged in order of environmental friendliness with waste prevention at the top, followed by minimisation, reuse, recycling, energy recovery and disposal

² Not In My Backyard

Even though the crisis in Naples was largely caused by a strike action of protestors against the dumping of waste in their neighbourhood, it does bring to the fore, the fact that with growing 'NIMBYism', landfill space will not always be easy to find. Similar situations have been reported elsewhere in Europe (Chazan, 2002). As a part solution to the problem of landfill space scarcity, many Western countries are resorting to shipping their waste to developing countries, especially in Asia and Africa, where they are supposedly being recycled (Coonan, 2006). This raises concerns about environmental justice (ref. chapter 7) as to whether the trans-boundary shipment of waste, which sometimes contain hazardous components, constitutes useful trade between the countries involved or an opportunity for rich countries to find disposal space for their waste. Faced by the fact that landfills cannot provide a sustainable option for waste management, Western countries are making efforts to move up the waste hierarchy but the pace of progress is rather slow.

While cities in the developed countries have generally overcome the problem of waste accumulation and now grapple with finding appropriate methods of treatment and disposal, developing country cities are still grappling with the basic problem of waste accumulation as well as its disposal. As observed by Pacione (2005) the main problems facing developing country cities with regard to waste management are related to the collection of waste from the city environments, with between one-third and one-half of all the waste generated in the cities remaining uncollected. Examples abound of inadequacies in the provision of waste collection and other environmental services in developing country cities (refer to chapter 5). Recent studies in Africa have shown that the problem of waste management has become intractable and threatens to undermine the efforts of most city authorities. Kirondi (1999) has observed that the city environment in most developing countries is characterised by heaps of garbage, overflowing waste containers, choked drains, clogged streams and stinking gutters. Hardoy *et al.* (1993: back cover) have, therefore, aptly described the Third World urban environment as “among the most health and life threatening of all human environments”.

Unable to provide adequate waste disposal and other environmental services within their entire jurisdictions, municipal authorities in most developing countries tend to concentrate their waste collection efforts in official and wealthy areas while the

poorer areas receive little or no service for waste removal even though waste collection operations are usually funded with public resources (Lohse, 2003). Besides, waste disposal facilities, which are usually poorly maintained, are frequently sited in the neighbourhoods of the poor and other vulnerable population groups (Camacho, 1998; Bullard, 2005) which implies the shifting of environmental burdens on the poor.

The above situations lead to the spatial concentration of environmental problems (brown agenda concerns) in the poor enclaves of cities (Elliot, 2005), thereby helping to create a situation in which the urban poor face multiple burdens, living in unhealthy local environments characterised by a complex of interrelated risks, involving overcrowding, sanitary hazards, unsafe or insufficient water, indoor air pollution, accumulation of waste and disease bearing pests (Hardoy *et al.*, 2001; McGranahan, 2002; Elliot, 2005). This multiple tragedy of the poor remains a worry and raises concerns about social and environmental justice in urban management.

The generally poor waste situations in developing country cities and the perpetuation of social and environmental injustice against the poor remain critical challenges and deviate from the objectives of the Millennium Development Goals (MDGs)³, Agenda 21 and other moves to address the 'Brown Agenda' problems to improve the living conditions of the poor. In line with the situation in poor country cities generally, Ghanaian cities are grappling with mounting solid waste and other environmental problems with socio-spatial inequalities in the distribution of the waste burden. These issues invite research attention.

1.1. Background to the study

Rapid, uncontrolled urbanization in Ghana has saddled the country's cities with problems of physical, socio-economic and environmental nature. Besides the physical problems of poor infrastructure, inadequate housing, congestion and poor accessibility, major cities in the country are confronted by socio-economic challenges including increasing levels of unemployment and poverty, social exclusion and rising crime and violence (Songsore, 2003). Furthermore, environmental conditions in the

³ The MDGs sought to: i). eradicate extreme poverty and hunger; ii). achieve universal basic education; iii). promote gender equality and empower women, iv). Reduce child mortality; v). improve maternal health; vi). combat HIV/AIDS, malaria and other diseases; vii). ensure environmental sustainability; and viii). develop global partnership for development.

cities are appalling due to inadequate provision for services such as water supply, sanitation and waste disposal. These problems, and many others, constitute obstacles to the socio-economic development of the country and, therefore, hinder improvements in the lives of the population. The situation is aptly captured by Songsore (2004:5) when he observes that “in virtually every urban centre in Ghana, from regional capitals to district centres and small towns, many people live in neighbourhoods with little or no provision of infrastructure, services and facilities that are essential to good health”. Many urban residents, therefore, live in health and life threatening conditions (Hardoy *et al.*, 2001) and Ghana cannot take comfort in the United Nation’s observation that urbanization is a positive feature and cities offer the best opportunity to escape poverty (UNFPA, 2007).

Nabila (1993) has blamed the worsening environmental conditions in the cities on the rapidly growing urban population in an unfavourable economic environment whereby city governments lack the resources to provide basic infrastructure and services for environmental management. On the other hand, Tamakloe (2006) attributes the poor environmental conditions in the cities to low institutional capacity for urban management, poor physical planning and the lack of enforcement of development laws, poor provision of infrastructure and services for environmental maintenance and low public awareness of environmental hygiene. Thus, while it is true that rapid population growth is the source of pressure on urban infrastructure and services (Nabila, 1993), the lack of institutional capacity to plan and manage urban settlements and to confront the challenges that accompany urbanization is also a major contributor to the chaotic urban development and poor environmental conditions in Ghanaian cities (Tamakloe, 2006).

Among the many problems that confront cities in Ghana, solid waste disposal is a particularly worrying issue that seems to overwhelm the authorities. In fact, the problem appears intractable and can be likened to a ‘monster’ staring the authorities in the face while they look on helplessly (Kironde, 1999). Tamakloe (2006) has referred to it as “a nightmare” and it would seem that many of the Millennium Development Goals (MDGs) are far from achievable by the target year of 2015 in the waste-laden city environments since solid waste disposal affects most of the issues to be addressed by the MDGs including child health and mortality (Goal 4) maternal

health (Goal 5) the incidence of malaria and other diseases (Goal 7) and environmental sustainability (Goal 7).

1.2. Statement of the research problem

The problem under investigation in this study is the worsening solid waste situation found in urban settlements in Ghana. The concentration of population and business activities in Ghanaian cities is being accompanied by a rapid increase in the volume of solid waste generated from production and consumption activities. Against this situation of mounting waste production, municipal authorities in the country seem unable to organise adequate collection and safe disposal of waste within their jurisdictions. As a result, urban settlements in the country are saddled with a worsening solid waste situation which proves to be intractable and threatens public health and the environment. A cursory observation within the cities shows visible aspects of the solid waste problem including accumulation of garbage, heavy street litter, waste-clogged drains and water bodies and stinking gutters (Figure 1.1).

Figure 1.1: Aspects of the urban solid waste problem in Ghana



(a) Roadside waste accumulation in Accra



(b) A choked drain in Accra

Source: Photos taken during field work

In spite of the concerns frequently raised by concerned groups, institutions and individuals among the populace, the solid waste situation in the cities continues to worsen, thereby posing serious threats to public health and the environment. Besides, the environmental burdens associated with the worsening solid waste situation appears to fall more heavily on the poor even though waste removal and disposal are public funded and regulated. This study was therefore undertaken in order to gain

understanding of the challenges and issues involved in solid waste management in Ghanaian cities to pave the way towards finding a solution to the waste menace.

1.3. Purpose of the study

The purpose of this study was to examine the solid waste situation in Accra and Sekondi-Takoradi, two of the large cities in Ghana, with the aim of enhancing understandings of the problem and the key issues affecting urban solid waste disposal in the country, and also to identify possible solutions to the problem. In other words, this research was an attempt to answer the question ‘why are urban authorities in Ghana unable to organise adequate and equitable waste management within their jurisdictions?’ In line with this, the specific objectives that guided the study were:

- To describe the urban solid waste situation in Accra and Sekondi-Takoradi
- To identify the factors that militate against solid waste management efforts in the two cities
- To explore how the concerns for social and environmental justice are being addressed in the organisation of solid waste disposal in the study areas
- To identify ways to improve solid waste disposal in Ghanaian cities.

1.4. Justification for the study

The worsening solid waste disposal situation in Ghanaian cities has attracted attention among the populace. High profile government officials including Ministers of State, parliamentarians and even the presidency have expressed concern about the deplorable solid waste situation in cities in the country. The solid waste problem is also receiving a lot of media attention shown by the frequent featuring of waste disposal issues in newspapers, TV and radio discussions. Additionally, several Environmental Non-Governmental Organisations (ENGOS), institutions and individuals have expressed concerns about the deplorable solid waste situation in the cities while communities keep complaining to the authorities about waste that is engulfing their neighbourhoods and the health implications for their members. Even political parties and their presidential candidates for the recent election in December 2008 made waste disposal an issue for their electioneering campaigns. Moreover, the perpetuation of social and environmental injustice in the organisation of waste

management in Ghanaian cities seems to attract no attention in the country. It is, therefore, obvious that the solid waste situation in Ghanaian cities requires research attention to shed more light on the issue and pave the way for a solution.

In this regard, the media seems to be playing a pioneering role in drawing attention to the poor waste disposal practices of Ghanaians and the worsening environmental conditions that result from the practice. Academic research in the area include an MSc thesis (Anomanyo, 2004) submitted to Lund University in 2004 which considered the possibility of using 'bioreactor treatment technology' as an integral part of the waste management process in the country; and an undergraduate long essay by Freduah (2008), submitted to the University of Ghana, which examined the problems of solid waste management in Nima, one of the slum communities in Accra. Apart from these, there are a number of studies that have investigated issues related to the urban solid waste problem in Ghana including Songsore *et al.*'s (2005) report on the "*State of Environmental Health in the Greater Accra Metropolitan Area*"; Aryee and Crook's (2003) article titled "*Toilet Wars: Urban Sanitation Services and the Politics of Public-Private Participation in Ghana*"; Songsore and McGranahan's (1996) work on "*Women and Household Environmental Care in the Greater Accra Metropolitan Area*", and Benneh *et al.*'s (1993) study of "*Environmental Problems and the Urban Household in the Greater Accra Metropolitan Area*. Devas and Korboe's (2000) study of *City Governance and Poverty* in Kumasi (Ghana's second largest city) also included an analysis of public services available to the population including solid waste disposal, water and sanitation. In 2001, the Department of Geography at Royal Holloway, University of London and the Institute of Renewable Natural Resources (IRNR) at the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana began a joint DFID-funded study of *Peri-Urban Natural Resources Management at the Watershed Level* in Kumasi. In this on-going study, the pollution of ground water and other natural resources by waste disposal and other human activities are being investigated in the context of the Millennium Ecosystems Assessment.

The above-mentioned studies have examined a wide range of environmental issues including sanitation, water use and pollution, air pollution, the disease burdens associated with poor environmental conditions and the effects of waste disposal and

other human activities on natural resource management, topics that are somewhat related to the urban solid waste problem. However, none of these studies has investigated the issue of solid waste disposal in sufficient detail to create adequate understanding of the problem even though it remains one of the most visible and nerve-racking problems in the urban areas. Thus, the solid waste situation in Ghanaian cities remains under-researched and hence poorly understood. This situation creates a knowledge gap and makes it difficult to find solutions to the worsening solid waste situation in the country. In view of the above, this study can be justified on the grounds that it will further understanding of the solid waste problem affecting Ghanaian cities and provide a useful starting point for addressing an otherwise intractable problem. The study will also contribute to both the theory and practice of urban solid waste management in poor countries generally.

1.5. Outline of the thesis report

This thesis is organised into eight chapters, the details of which are outlined below.

Chapter one: Introduction

This is the introduction to the entire thesis and presents the context of the research. It covers the background to the study, the statement of the research problem, the aims and objectives of the study and the justification for undertaking the research.

Chapter two: Literature review

Chapter two is devoted to presenting a review of the literature related to conceptual issues addressed in this thesis. These include the concept of waste and waste management; the objectives, principles and strategies of waste management, as well as some tools for waste management. The literature review also covers the solid waste situation in developing countries, examining the nature of the problem and the factors militating against effective solid waste management in these countries. The related concepts of social and environmental (in)justices are also presented as they relate to solid waste management in developing countries.

Chapter three: Background information on Ghana

This chapter provides background information on Ghana. The issues covered here include the physical environment, socio-economic conditions, population and

urbanization, and the challenges associated with the urbanisation process, including environmental issue. The chapter ends with a brief description of the two study areas – Accra and Sekondi-Takoradi.

Chapter four: Research methodology and methods

Chapter five covers the methodological approach employed and the methods used to collect data for the research. First, it discusses the positivist and interpretivist ontologies and epistemologies underpinning social investigations. This is followed by a discussion of the quantitative and qualitative approaches as the two dominant paradigms in social science research. The mixed methods approach to social research is also examined, followed by an account of the choice of methods for this research. The construction of the research instruments, the sources of data for the study and a detailed account of how the fieldwork was conducted are also reported in the chapter. Finally, issues relating to validity and reliability, researcher positionality, ethical issues and limitations of the research are discussed.

Chapter five: The solid waste situation in the study areas

Chapter five, the first of a three-part analysis of the data gathered for this study, is devoted to an analysis of the solid waste situation in Accra and Sekondi-Takoradi. It covers analysis of waste generation, the main sources of waste, the organisation of waste disposal and management of waste disposal facilities in the two cities investigated.

Chapter six: Perceptions on causes of the solid waste problem

Chapter six is the second analytical chapter. It examines the causes of the solid waste problem confronting the two cities investigated. The analysis is done from the perceptions of the various stakeholders in the waste sector including waste disposal service providers and their clients and public institutions in the waste sector. It also includes an analysis of the causes of the solid waste problem based on documentary and observational data obtained for the study

Chapter seven: Social and environmental justice

This chapter is the third of the three-part analysis of the empirical data collected for the study. It focuses on analysis of issues relating to social justice in the provision of

solid waste disposal services and environmental justice in the final disposal of solid waste in Accra and Sekondi-Takoradi.

Chapter eight: Conclusion

This final chapter of the thesis discusses the findings of the research in line with the aims and objectives that guided the entire study. The chapter also draws conclusions on the major findings of the study and outlines areas for further research.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2.0. Introduction

This chapter presents a three-part review of the literature on solid waste management as a theoretical framework for the study. The first section discusses some basic concepts related to waste management while the second part focuses on the urban solid waste problem in developing countries, discussing the nature and causes of the problem. The third section of the chapter is devoted to examining the concepts of social justice and environmental justice and how they relate to the subject of waste management.

2.1. Concepts in waste management

2.1.1. Defining waste

Much has been written about the waste problem yet the definition of the term waste is quite rare in the scholarly literature on the topic. As noted by Palmer (2005: online) “the term is frequently left as an undefined primitive in spite of its critical importance” and ... “frequently, a list of types of waste is substituted for the underlying definition”. Definitions of ‘waste’ are rather commonly found in such documents as dictionaries, encyclopaedia and technical reports of governments and organizations. For example, the *Longman Dictionary of Contemporary English* (p.1612) defines waste as “the unwanted material or substance that is left after you have used something” while the *New Shorter Oxford English Dictionary on Historical Principles* defines it as “the unusable material left over from a process of manufacture, the use of consumer goods etc, or the useless by-products of a process”

Gilpin (1996) provides a more elaborate definition of the term waste. According to him, the concept of waste embraces “all unwanted and economically unusable by-products or residuals at any given place and time, and any other matter that may be discarded accidentally or otherwise into the environment” (Gilpin, 1996:228). Gilpin also suggests that what constitutes waste must “occur in such a volume, concentration, constituency or manner as to cause a significant alteration in the environment”. Thus, apart from waste being an unwanted substance that is discarded, the amount of it and

the impact it makes on the environment also become important considerations in defining waste.

McLaren (1993: online) has also referred to waste as the “unwanted materials arising entirely from human activities which are discarded into the environment”. This notion that waste results entirely from human activities is corroborated by Jessen (2002: online) who has noted that “waste is human creation” and “there is no such thing as waste in nature where cut-offs of one species become food for another”. On his part, Palmer argues that, “there is no constellation of properties inherent in any lump, object or material which will serve to identify it as waste ... an item becomes waste when the holder or owner does not wish to take further responsibility for it”. As a default definition, Palmer (1998) suggests that “any substance that is without an owner is waste”. Davies (2008) also describes wastes as:

“...unwanted or unusable materials ... that emanate from numerous sources from industry and agriculture as well as businesses and households ... and can be liquid, solid or gaseous in nature, and hazardous or non-hazardous depending on its location and concentration” (Davies, 2008:4)

Davies (2008:5) further notes that “what some people consider to be waste materials or substances are considered a source of value by others” This relative attribute of waste can be compared with the concept of ‘resource’ which has also been defined as material that has use-value (Jones and Hollier, 1977:20) and “a reflection of human appraisal” (Zimmermann, cited in Jones and Hollier, 1977:20). Just as a material becomes a resource when it gains use-value, it also becomes waste when it loses its use-value. Like resources, waste is also a relative concept or human appraisal because what constitutes waste can vary from one person to another, one society to another and over time. As noted by Jessen (2002:online) “our waste stream is actually full of resources going in the wrong direction”.

Drawing from the views expressed above, the definition of waste to be used in this study is any substance (liquid, solid, gaseous or even radioactive) discarded into the environment because it is unwanted, which causes significant nuisance or adverse impact in the environment.

2.1.2. The classification of waste

A number of criteria are usually employed to classify wastes into types including their sources, physical state, material composition and the level of risk associated with waste substances (Table 2.1). Such classification of waste provides a basis for the development of appropriate waste management practice.

Table 2.1 Classification of waste

Criteria for waste classification	Examples of waste types
Sources or premises of generation	Residential, commercial, industrial, municipal services, building and construction, agricultural
Physical state of waste materials	Liquid, solid, gaseous, radioactive
Material composition of waste	Organic food waste, paper and card, plastic, inert, metal, glass, textile
Level of risk	Hazardous, non-hazardous

The source classification of waste is based on the fact that waste emanates from different sectors of society such as residential, commercial and industrial sources. A good example of the source classification was provided by the World Bank (1999) in a study in Asia which identified the sources of waste as residential, commercial, industrial, municipal services, construction and demolition, processing and agricultural sources (Table 2.2).

Table 2.2: Sources and Types of Municipal Solid Waste

Sources	Typical waste generators	Types of solid waste
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, glass, metals, ashes, special wastes (bulky items, consumer electronics, batteries, oil, tires) and household hazardous wastes
Commercial	Stores, hotels, restaurants, markets, office buildings	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes
Institutional	Schools, government center, hospitals, prisons	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes
Municipal services	Street cleaning, landscaping, parks, beaches, recreational areas	Street sweepings, landscape and tree trimmings, general wastes from parks, beaches, and other recreational areas
Construction and demolition	New construction sites, road repairs, renovation sites, demolition of buildings	Wood, steel, concrete, dirt
Process (manufacturing, etc)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing	Industrial process wastes, scrap materials, off-specification products, slay, tailings
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms	Spoilt food wastes, agricultural wastes, hazardous wastes (e.g. pesticides).

Source: World Bank/IBRD, 1999. *What A Waste: Solid Waste Management in Asia*

In the *Stakeholders' Guide: Sustainable Waste Management*, the UK Environment Council (2000) also employed source classification to identify the major sources of waste as municipal sources, commerce and industry, agricultural sources, demolition and construction activities, dredged spoils, sewage sludge and mining and quarrying operations. Classifying wastes by their sources is a useful way of determining the relative contributions of the different sectors of society to the waste stream and how to plan for their collection and disposal.

Frequently, the material composition of the waste stream is also used to classify wastes into such types as organic waste, paper and cardboard, plastic, glass, ceramics, textiles metal and inert waste (Table 2.3). An example of waste classification based on material composition was conducted by the Surrey County, UK in 2002/2003. An analysis of household waste streams in the county identified nine main types of

materials: paper/card, plastic film, dense plastic, textiles, miscellaneous combustibles, glass, ferrous metal, garden waste and food waste (Surreywaste.info, online).

Table 2.3: Material classification of waste

Waste type	Examples
Paper	Newspapers, cardboards, office waste paper, magazine/glossy
Plastics	Bottles, expanded polystyrene, film plastic, other rigid plastics
Glass	Clear glass, green glass, amber glass, non-recyclable glass
Metals	Steel cans, aluminum cans, other ferrous, other aluminum
Organics	Yard waste-grass, yard waste-other, wood, textiles, diapers, fines, other organics
Inorganic	Electronics, carpets, drywall, other construction and demolition, other inorganic

Using the physical state of waste substances, the materials in the waste stream can also be categorised into liquid, solid, gaseous and radioactive wastes. Examples of these types are shown in Table 2.4.

Table 2.4: Classification of waste based on physical state of waste substances

Waste type	Examples
Liquid waste	Sewage sludge, waste water from bath house and kitchens
Solid waste	Food waste, paper, plastic, metal, debris
Gaseous waste	Factory smoke, vehicle exhaust smoke, fumes from burning waste dumps
Radioactive waste	Radiation, uranium, plutonium, excess energy

Furthermore, the potential health or pollution risk of waste materials is used to classify wastes into hazardous or non-hazardous waste (Table 2.1). On the one hand, hazardous waste refers to wastes with properties that make them potentially harmful to human health or the environment (DELM, 1993; US EPA, 2008). According to the US EPA (2008), hazardous wastes can be liquids, solids, contained gases, or sludge and can be the by-products of manufacturing processes or simply discarded commercial products like cleaning fluids or pesticides. Because of their potential pollution danger, hazardous waste materials require rigorous and cautious means of disposal (DELM, 1993). In the EPA's *Hazardous Waste Listings* (2008) the categories of hazardous wastes include ignitable waste, corrosive waste, reactive waste, toxicity characteristic waste, acute hazardous waste and toxic waste. Special waste is one type of hazardous waste which is usually so dangerous to treat, keep or dispose of that it requires special disposal arrangements (US.EPA, 2008). Examples include hard clinical waste such as human parts, contaminated swabs and sharps. On

the other hand, non-hazardous waste does not pose a danger and can be dealt with easily, examples being inert materials such as uncontaminated earth and excavated waste such as bricks, sand, gravel and concrete slates (Environment Council, 2000).

Waste can also be classified by whether it is biodegradable or non-biodegradable waste. Biodegradable waste typically originates from plant or animal sources and can easily be broken down by bacterial action or by other living organisms and so has a relatively short lifespan in the environment. This type of waste is commonly found in municipal solid waste as food waste, yard waste and paper. Other biodegradable waste materials include human excreta, animal droppings, sewage and slaughterhouse waste (Lapidos, 2007). In contrast with biodegradable waste, non-biodegradable waste, which includes most plastics, metals and ceramics, are waste substances that cannot be broken down by natural processes or living organisms (Lapidos, 2007).

The classification of waste into types, as discussed above, is very important for waste management planning. Among other things, it provides useful information that enables municipal authorities to organize waste management operations including the frequency and means of collection, and appropriate disposal methods. The developed countries have made great advances in waste data generation and analysis which have enabled them to improve waste management over the years. In most developing countries, however, even the most basic data on waste such as the quantities generated and composition of the waste stream are lacking, making it difficult to organise waste management effectively (Hardoy *et al.*, 2001).

2.1.3. The concept of waste management

The business of keeping our environment free from the contaminating effects of waste materials is generally termed waste management. Gbekor (2003:18), for instance, has referred to waste management as involving “the collection, transport, treatment and disposal of waste including after care of disposal sites”. Similarly, Gilpin (1996:201) has defined waste management as “purposeful, systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovery and disposal of solid waste in a sanitary, aesthetically acceptable and economical manner” while Schubeller *et al.* (1996:7) focus on municipal solid waste management which they define as “the collection, transfer, treatment, recycling, resource recovery and

disposal of solid waste in urban areas”. It can be deduced from these definitions that waste management is the practice of protecting the environment from the polluting effects of waste materials in order to protect public health and the natural environment. Thus, the priority of a waste management system must always be the provision of a cleansing service which helps to maintain the health and safety of citizens and their environment (Cooper, 1999). Further, Gilpin (1996) regards the business of waste management as a professional practice which goes beyond the physical aspects of handling waste. It also “involves preparing policies, determining the environmental standards, fixing emission rates, enforcing regulations, monitoring air, water and soil quality and offering advice to government, industry and land developers, planners and the public” (Gilpin, 1996:228). Waste management, therefore, involves a wide range of stakeholders who perform various functions to help maintain a clean, safe and pleasant physical environment in human settlements in order to protect the health and well-being of the population and the environment. Effective waste management is, however, a growing challenge to all municipal governments, especially in developing countries.

2.1.4. The goals of waste management

In 1976, the United States Congress enacted the Resource Conservation and Recovery Act (RCRA) which authorized the EPA to regulate waste management and disposal practices. The goals of waste management that were set by the RCRA included:

1. the protection of human health and the environment from the hazards posed by waste disposal
2. the conservation of energy and natural resources through waste recycling and recovery
3. reducing or eliminating the amount of waste generated, and
4. ensuring that wastes are managed in an environmentally-safe manner (RCRA, 1976)

Other writers agree with these objectives of waste management. For example, Schubeller *et al.* (1996) have stated the goals of municipal solid waste management as protecting environmental health, protecting the quality of the environment, supporting the efficiency and productivity of the economy and the generation of employment and income for people. On her part, Cointreau (2001:online) argued that “the overall goal

of urban solid waste management is to collect, treat and dispose of solid waste generated by all urban population groups in an environmentally and socially satisfactory manner, using the most economical means available". Similarly, the Ghana Environmental Protection Agency has noted that waste management is essential in the present day context for the following reasons:

1. To protect human health against waste-related hazards and risks
2. To prevent pollution of the environment and its natural resources like air, water and land
3. To produce energy which could be an alternative for the fast depleting fossil fuels and other conventional sources of energy
4. To make optimum use of the waste generated
5. For a better and sustainable future.

(Ghana EPA, 2002)

It can be concluded from the above that the main objective of waste management is to protect public health against waste-related hazards and risks, and to maintain ecosystem services by preventing the pollution of the natural environment and its resources such as land, water and air as well as the aesthetic quality of the environment. The objectives of waste management are also in line with the goals of the Millennium [Ecosystems] Assessment (MA), the United Nations' 2005 study of the consequences of ecosystem change for human wellbeing. Chapter 15 of the MA report focuses on 'waste processing and detoxification' and points out that failure in waste management is the cause of the growing incidence of wastewater-borne diseases, human health impairment and ecosystem damage (Millennium Assessment Report, 2005). The report emphasises the necessity of waste management at local, national and global scales in order to protect and conserve the world's ecosystems and their resources.

To achieve the goals of municipal solid waste management, it is necessary to establish sustainable systems of solid waste management which will meet the needs of the entire urban population including the poor. The systems put in place for solid waste management must be appropriate to the particular circumstances of the city and its

various localities. To achieve sustainable waste management, such a system must harness and develop the capacities of all stakeholders in the waste sector (Schubeller *et al.* 1996) including civil society, businesses, private sector waste companies and government agencies. Due to their low technical, financial and managerial capacities, most municipal authorities in developing countries fail to achieve the goals of waste management and are, therefore, unable to achieve the basic objective of waste management which is to protect public health and the natural environment against waste pollution (Hardoy *et al.*, 2001; Pacione, 2006).

2.1.5. The principles of waste management

The principles of waste management, as identified by Schubeller *et al.* (1996:19), are “to minimize waste generation, maximize waste recycling and reuse, and ensure the safe and environmentally sound disposal of waste”. This means that waste management should be approached from the perspective of the entire cycle of material use which includes production, distribution and consumption as well as waste collection and disposal. While immediate priority must be given to effective collection and disposal, waste reduction and recycling should be pursued as equally important longer-term objectives (Schubeller *et al.*, 1996).

Cointreau (2001: online) has also identified ten principles that should guide a sustainable and integrated solid waste management programme. According to her scheme, such a programme should:

1. Be supportive of good governance
2. Provide economic service delivery
3. Establish cost recovery mechanisms for long-term financial sustainability
4. Conserve natural resources
5. Embrace public participation
6. Foster environmentally appropriate technologies and sites
7. Seek appropriate levels of source segregation, recycling and resource recovery
8. Conduct strategic facility planning and development
9. Build institutional capacity
10. Invite private sector involvement

In line with Gilpin's (1996) notion of waste management, this means that waste management involves much more than the practical organization of waste collection, transportation, treatment and disposal. While these are important aspects of waste management, several other issues are equally important including good governance, public and private sector participation (Cointreau, 2001). The waste management situations in most developing countries show that the goals and principles of waste management are far from being achieved (Schubeller *et al.*, 1996; Hardoy *et al.*, 2001; Pacione, 2005).

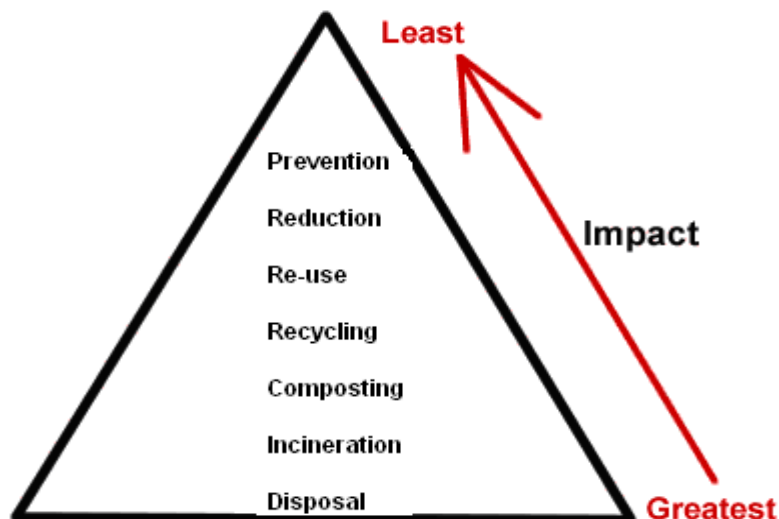
2.1.6. Integrated waste management and the waste hierarchy

In recent years, the concept of integrated waste management (IWM) has become popular as a new approach to waste management. As defined by the World Resource Foundation (WRF, cited in Environment Council, 2000:23), IWM refers to "the use of a range of different waste management options rather than using a single option". In other words, IWM is an approach which relies not only on technical solutions to the waste problem, but on a wide range of complementary techniques in a holistic approach. The approach involves the selection and application of appropriate technologies, techniques and management practices to design a programme that achieves the objectives of waste management (Tchobanoglous *et al.*, 1993). The concept of IWM seems to have emerged from the realization that technical solutions alone do not adequately address the complex issue of waste management and that there is the need to employ a more holistic approach to waste management. As argued by Rhyner *et al.* (1995:17), "a single choice of methods for waste management is frequently unsatisfactory, inadequate, and not economical". Use of an integrated approach to managing solid waste has therefore evolved in response to the need for a more holistic approach to the waste problem. In this approach, all stakeholders participating in and affected by the waste management regime are brought on board to participate in waste management. Furthermore, issues such as social, cultural, economic and environmental factors are considered in the design of an IWM project (Tchobanoglous *et al.*, 1993; Rhyner *et al.*, 1995; Schubeller *et al.*, 1996).

These elements most commonly associated with integrated solid waste management are waste prevention, waste reduction/minimization, re-use of materials and products, material recovery from waste streams, recycling of materials, composting to produce

manures, incineration with energy recovery, incineration without energy recovery and disposal in landfills in that order of priority (Durham County Council, 2007: online) These elements of IWM are frequently formulated into a waste hierarchy model which Girling (2005:178) has described as “a penny-plain piece of common sense that places the various strategies for waste management in order of environmental friendliness, from best to worst”. As shown in the model (Figure. 2.1), waste prevention and reduction are placed at the top to show that the best way to deal with waste is to prevent its production and, where this is not possible, to produce less of it. At the other extreme, disposal is placed at the bottom to show that it should be the last resort among the strategies for waste management.

Figure 2.1: The waste hierarchy



Source: Adopted from: Lancashire CPRE: <http://www.lancashire.gov.uk/environment/lmwlp/pdf/>

The waste hierarchy was originally set out in the EC Framework Directive on Waste (Girling, 2005) and is a useful guiding principle for waste management planning. Intergraded waste management and the waste hierarchy both inspire sustainable waste management and can reduce the environmental hazards associated with waste disposal. It is therefore important for stakeholders in the waste sector to realize that an integrated approach which constantly strives to move up the waste hierarchy can be a useful tool for sustainable waste management. In spite of efforts by municipal authorities to improve waste management, most countries in the world still resort to strategies at the bottom of the waste hierarchy. In both developed and developing

countries the bulk of solid waste collected by municipalities is still disposed of in landfills.

Other instruments that encourage good practice in waste management are the proximity principle (PP) and the best practicable environmental option (BPEO) (Environment Council, 2000). The proximity principles calls for the disposal of waste as close to its source as possible. Among other advantages, this practice reduces the time, energy and expenses involved in the transportation of waste to disposal sites, and also minimizes the possibility of accidents associated with the transportation of waste. With regard to the BPEO, it encourages the use of waste management strategies that achieve the most benefits in terms of cost, energy and time, and that also cause the least damage to the environment.

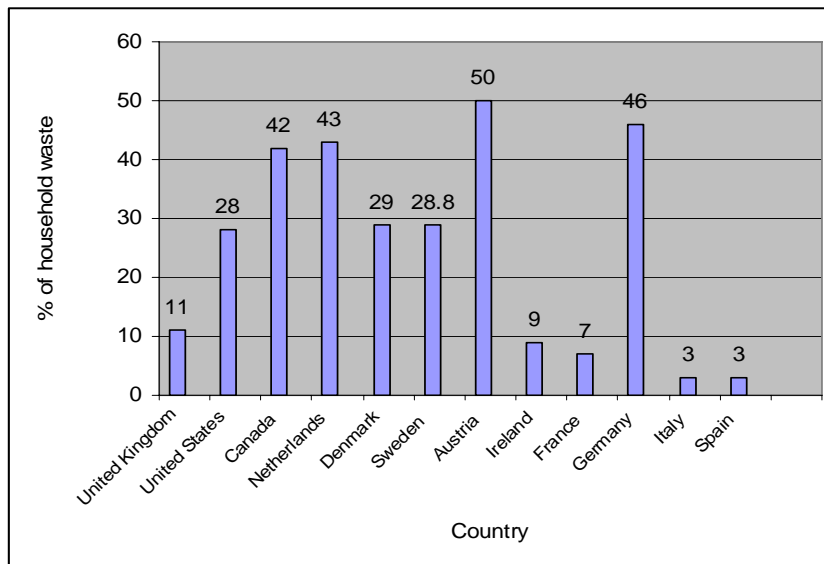
2.1.7. Sustainable waste management

Another important concept of waste management is ‘sustainable waste management’ (SWM). SWM is an integral part of sustainable development (the Brundtland Commission’s approach to development which seeks to “meet the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987) because the amount of waste generated and how it is managed has profound implications for the quality of the environment and for the prospects of future generations. Thus, in keeping with the objectives of sustainable development, sustainable waste management can be regarded as an approach to waste management that, in addition to protecting human health and the environment, ensures that the scarce resources of the earth are conserved for both present and future generations of humanity. It therefore becomes important to minimize natural resource extraction and consumption by recycling waste materials, and conduct waste management efficiently to curtail the environmental impacts of waste disposal and protect ecosystem services for both current and future generations (Millennium Assessment Report, 2005). In line with the waste hierarchy, the best way to achieve sustainable waste management is to reduce the amounts of waste we produce (Girling, 2005). Where waste is unavoidable a sustainable approach is to encourage re-use and recycling of products to prevent them from getting into the waste stream. Finally, where waste prevention/reduction, re-use and recycling are economically impossible, waste is processed to recover their intrinsic values such as energy. Sustainable waste

management also seeks to increase co-ordination between the producers of goods, retailers, manufacturers, the public, local authorities and all concerned with the management of waste and reusable materials and equipment (London Waste Action, 2007).

In spite of the enormous benefits associated with sustainable waste management strategies such as re-use and recycling, only a handful of countries are able to put them into practice. For instance, most of the economically developed countries are still unable to recycle much of their waste. Figure 2.2 shows that only a few of these countries were able to recycle up to 40 percent of their household waste in 2002 with the bulk of their waste still dumped in landfills or incinerated.

Figure 2.2: Household waste recycling in some Western Countries, 2002



Source: Institute of Waste management, in Charzan, D (2002).

Moreover, recent proposals for improving waste management in many rich countries called for more incineration rather than recycling (Chazan, 2002; Girling, 2005) which is just one step up from land filling at the bottom of the waste hierarchy. The fact that even the rich industrialized countries find it difficult to move up the waste hierarchy is evidence that sustainable waste management is not easy to achieve. As would be expected, the waste management performance of the poor countries is even worse as most of them still grapple with the mere removal of waste from human settlements with hardly any arrangements for recycling apart from the operations of

informal recyclers. Thus developing countries in general remain at the bottom of the waste hierarchy, dumping most of their waste in uncontrolled landfills or open dumps or, worse still, in rivers and other water bodies. If the rich industrialized countries are struggling to implement sustainable waste management, the concept only remains a distant dream in developing countries.

2.2. The urban solid waste problem in developing countries

2.2.0. Introduction

Rapid urbanization which occurred in the developed world in the late 19th and early 20th centuries is now underway in the developing parts of the world (Songsore, 2004; Tannerfeldt and Ljung, 2006). In Asia, Africa and Latin America, cities are growing rapidly, fuelled by large-scale rural-urban migration and natural increases within the cities (Songsore, 2004). According to Hardoy *et al.* (2001), the urban population in these regions grew more than fivefold from 346 million in 1950 to 1.8 billion in 1995, and even though Asia and Africa are relatively less urbanized, they both have very large urban populations and rapidly growing cities (Songsore, 2004). Current projections show that most of the world's future population growth will take place in developing countries with more and more people in the urban areas (Tannerfeldt and Ljung, 2006). As noted by the United Nations,

“A combination of large starting populations and a projected rate of urban population growth that remains relatively high over the next 25 years will result in a marked increase of the urban populations in both Asia and Africa. As a result, Asia will rank first and Africa second in terms of the number of urban dwellers in 2030”.

(UN-DESA, World Population Revision, 2005:online)

The rapid urbanization which is currently occurring in the developing parts of the world has many positive impacts including economic growth and modernization but it is also accompanied by problems of a social, economic and environmental nature. Thus, while cities in these countries grapple with socio-economic problems such as poor shelter, unemployment, poverty and misery, there are also mounting environmental problems including poor sanitation and water quality, slum development and a worsening solid waste situation which, among other problems, have become great challenges to municipal authorities (Kwawe, 1995; Hardoy *et al.*,

2001; Pacione, 2005). In particular, the urban solid waste situation in most poor countries is worrying. The growing consumption of products among the rapidly increasing urban populations is leading to mounting waste generation well above the capacities of municipal authorities responsible for waste management. Most municipal authorities in developing countries are, therefore, overwhelmed by an intractable waste situation as shown by recent studies in major urban centres in Africa, Asia and Latin America (Oniobokun and Kumuyi, 1999; Hardoy *et al.*, 2001; Pacione, 2005). Most cities in the developing world are, therefore, drowning in waste (Chazan, 2002).

The appalling solid waste situation in the world's poor cities has attracted attention even at the global level. For instance, the waste problem was considered so important that in 1992, a whole chapter (Chapter 21) of the United Nations programme for sustainable development in the 21st century (Agenda 21) was devoted to it, titled *Environmentally Sound Management of Solid Wastes and Sewage Related Issues* (UN Department of Economic and Social Affairs, Division of Sustainable Development, 2004). In Section 1, paragraph 12 (g) of its Resolution 44/288, the UN General Assembly "affirmed that environmentally sound management of wastes was among the environmental issues of major concern in maintaining the quality of the Earth's environment and especially in achieving environmentally sound and sustainable development of all countries". To address the waste problem confronting the world, four major programme areas were identified which were:

- Minimizing wastes
- Maximizing environmentally sound waste reuse and recycling
- Promoting environmentally sound waste disposal and treatment
- Extending waste service coverage

In addition to chapter 21, a number of programme areas included in other chapters of the Agenda 21 document were related to the issue of waste management. These included:

- Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources (chapter 18)
- Promoting sustainable human settlement development (chapter 7)

- Protecting and promoting human health conditions (chapter 6)
- Changing consumption patterns (chapter 4)

(UN Department of Economic and Social Affairs,
Division of Sustainable Development, 2004: online)

While Agenda 21 was meant to address global problems confronting humanity, the focus of the waste problem was on developing countries, especially the major cities where the solid waste problem has become an issue of major concern due to the serious effects it has on human health and the environment.

In most cities in the developing world, the poor environmental sanitation created by the waste situation militates against the achievement of the major objective of solid waste management which is to protect human health and the environment from the hazards posed by waste (RCRA, 1976; Schubeler *et al.*, 1996; Hardoy *et al.*, 2001). Also, achievement of many of the Millennium Development Goals (MDGs) depends on maintaining clean and healthy human settlements. For example, reducing child mortality (MDG 4), improving maternal health (MDG 5), reducing malaria and other environment-related diseases (MDG 6) and ensuring environmental sustainability (MDG 7) are directly affected by the quality of waste management. Furthermore, effective and sustainable waste management will promote the attainment of the remaining MDGs.

The waste problem is, however, not only limited to cities in poor countries. While the developed countries have largely overcome the problem of waste removal from human settlements, they still grapple with the difficulties and high costs of collection and struggle with the implementation of sustainable waste management strategies (Pacione, 2005). Besides, growing land scarcity and stricter environmental standards now make it difficult for many rich cities to find adequate and suitable disposal sites for the large volumes of waste being generated by their urban populations (Pacione, 2005; Chazan, 2002). For some rich countries, a way out of this dilemma is to export waste to poor countries and it is estimated that 50 to 80 percent of all waste collected for recycling in Western countries end up in developing countries (Coonan, 2007; Basel Action Network, 2008). In 2006 for example, Britain alone is said to have

exported over 200,000 tonnes of plastic waste to China for recycling, along with more than 2 million tonnes of used paper or cardboard and large quantities of steel and redundant electrical goods (Coonan, 2007).

2.2.1. The nature of the waste problem in developing countries

While data is generally lacking in the waste sector of developing countries, available studies on the topic suggest that solid waste management is generally characterized by inefficient collection methods, insufficient coverage of the collection systems and improper disposal of municipal waste (Onibokun and Kumuyi, 1999; Hardoy *et al.*, 2001; Pacione, 2005). Major urban settlements are, therefore, characterised by waste accumulations and poor environmental sanitation (Habitat, 1997; Onibokun and Kumuyi, 1999; Hardoy *et al.*, 2001; Pacione, 2005; Palczynski and Scotia, 2002:12). In 2002, the United Nations Centre for Human Settlement (UN-Habitat) raised concern about the solid waste situation in poor country cities in the following words:

“The need for the collection and disposal of solid waste in urban settlements is far from adequately recognized. Uncollected refuse accumulates in drains, roads and open spaces, disrupting community life and creating additional problems in the operation of other public services” (Habitat 2002:online)

In many Third World cities, writers suggest that large proportions (between 30 and 50 percent) of the solid waste generated by the residents are never collected for disposal and end up rotting on the streets, in drains and in streams (Hardoy *et al.*, 2001; Pacione, 2005; Ali, 2006). Hardoy *et al.* (2001) for instance have reported the extensive lack of solid waste collection in cities across the developing world. Pacione (2005) has also commented on the lack of provision for urban waste management in poor countries and the resulting poor environmental conditions in the cities. According to him, most poor city governments have great difficulty regarding the collection and safe disposal of solid wastes. He estimates that between one third and one half of all solid waste generated in Third World cities remains uncollected and the collection rate could be as low as 10 – 20 percent in some cases. Depicting a similar picture of the problem, Cointreau (2001), has estimated that in some cases, up to 60 percent of solid waste generated within urban centres in poor countries remains

uncollected and such refuse accumulates on waste lands and streets, sometimes to the point of blocking roads.

From different parts of Africa, studies have documented the abysmal solid waste situation in major cities. In 1989 for example, Adelibu and Okenkule investigated the solid waste situation in Nigeria's commercial capital Lagos, where they found that:

“... in many parts of the city, streets are wholly or partially blocked by solid waste. Similarly, open spaces and marketplaces are littered with solid waste. In most cases, drains are clogged or totally blocked and many compounds are hemmed in by solid waste”

(Cited in Achankeng, 2003:16).

Another Nigerian city reported to have a severe municipal waste problem is Port Harcourt, River State. According to Palczynski and Scotia (2002) the city which was once known as the “Garden City” for its trees and clean streets has now gained the nickname “Garbage City” because of the dire waste situation which now characterizes it. Still in West Africa, the Senegalese capital, Dakar has a very poor waste disposal situation. Home to some three million out of the 8.5 million Senegalese, the city of Dakar produces about 1,100 tonnes of solid waste each day but most of the waste remains uncollected (Palczynski and Scotia, 2002). According to Palczynski and Scotia (2002:12), “discarded paper, fruit skins, old cloths and other wastes have become part of the landscape of the West African town where just about every street is lined with waste and overflowing refuse bins go unemptied for many days”.

In a four-city study of *Urban waste and governance in Africa* sponsored by Canada's International Development Research Centre (IDRC) in 1999, which investigated the solid waste situations in Abidjan (Cote d'Ivoire), Ibadan (Nigeria), Dar es Salaam (Tanzania) and Johannesburg (South Africa), all the investigators found the solid waste situations in the cities to be abysmal. Onibokun and Kumuyi (1999) who investigated the topic in Ibadan found the Nigerian city to be contaminated with decomposing solid waste which could be found everywhere in the city including the streets, drains and water bodies. Generalizing for Africa, the co-authors have observed that “a visit to any African city will reveal aspects of the solid waste problem such as

heaps of uncollected garbage, roadsides littered with refuse, streams blocked with junk, waste disposal sites constituting a hazard to residential areas and inappropriately disposed toxic waste” (Onibokun and Kumuyi, 1999: 2-3). Similarly in Abidjan, Cote d’Ivoire (Ghana’s western neighbour), Koffi Attahi (1999) found that only some 54 percent of the solid wastes generated by residents of the capital city were removed for disposal with the remaining waste piling up in mounds all over the city and clogging drains and streams.

Likewise in Johannesburg, South Africa, Swilling and Hutt (1999) who took part in the IDRC sponsored four-city study reported waste collection in the city to be inadequate, giving rise to waste accumulations with implications for public health and the environment, and Kironde (1999) who investigated the topic in Dar es Salaam, Tanzania, reported that most parts of the city never benefited from a public waste disposal service. He quoted several East African newspapers including the *Sunday News* (Nov. 2, 1998 p.5) and the *African Event* (Nov. 1985, pp3-5) which have referred to Dar es Salaam as a ‘garbage city’ and a ‘litter city’ respectively and the *Weekly Review* (Jan, 25, 1985, pp2-3) which referred to Nairobi as a “city in a mess” due to the appalling waste situation. Kironde also reports that in most urban areas in Tanzania, only a fraction of the waste generated is collected and safely disposed of by the municipal authorities. According to Kironde (1999:102), “common features of African urban areas are stinking heaps of uncollected waste; waste disposed of haphazardly by roadsides, in open spaces or in valleys and drains; and waste water overflowing into public lands”.

Other studies have presented similar findings. In a UNEP-commissioned study of waste management in Kenya in 2001, the investigators reported that:

“In Nairobi, like many developing country cities, the solid waste sector is largely characterized by low coverage of solid waste management services, pollution from uncontrolled dumping of waste, inefficient public services, chaotic or unregulated private sector participation and a lack of key solid waste management infrastructure” ... “Not surprisingly therefore, only 23 per cent of the estimated 1500 tonnes of solid waste generated daily get collected in Nairobi, a city of about three million people.

Furthermore, the city is surrounded by four fast growing satellite towns which do not have waste disposal facilities”

(UNEP, 2001: online).

In Bamako, the capital city of Mali, Klundert and Lardinois (2005: online) have reported the “depressing waste disposal situation which has become an environmental issue of major concern”. The solid waste disposal situation in Lusaka, Zambia, is also reportedly bad, with 90 percent of the 1400 tonnes of daily waste output left uncollected, causing a nuisance and public health risk to the population (Hardoy *et al.*, 2001; Palczynski and Scotia, 2002) while in Uganda, a study by the Namilyango College (2001) of *Domestic waste management in Kampala city* reported that too much garbage was lying in the streets uncollected, creating a nuisance and environmental pollution and posing a risk for public health. Even though the municipal authorities were applying all the means at their disposal, according to the researchers, the piles of waste only seemed to grow from day to day. Also in Kinshasa (Congo), most of the waste generated in the city is said to be put out on the road, on illegal dumps, in storm water drains or buried in open sites (Hardoy *et al.*, 2001). In Kumasi, Ghana, a study by Devas and Korboe (2000) showed that most areas of the city had inadequate waste collection services in addition to other environmental problems.

The waste accumulation problem is not only limited to African cities. Asian and Latin American cities equally face daunting solid waste problems and many are unable to provide adequate waste disposal services for their residents. In 2007, a study of the urban solid waste situation in the eleven countries that form the Asian Productivity Organization (APO, 2007)⁴ showed that solid waste management is a major challenge in Asian cities. The report of the study which was edited by the Environmental Management Centre – Mumbai, India showed that:

“despite huge expenditures in waste management, urban areas in most APO member countries are still grappling with the challenge of preventing environmental degradation due to the nonsystematic solid waste management. Solid waste has therefore become an important concern in the Asia Pacific Region and it needs to be

⁴ APO member countries: Bangladesh, China, India, Iran, Malaysia, Nepal, Philippines, Singapore, Sri-Lanka, Thailand and Vietnam.

resolved through an integrated community, private sector and policy based approach”.

(APO, 2007:6)

In 1994, a survey conducted by Ghosh and others (cited in Hardoy *et al.*, 2001:80) in Baroda, Bhilwara, Sambalpur, and Siliguri (all in India) pointed to “great inadequacies in the provision for rubbish collection as well as for water, sanitation and drainage”. Similarly, a study of waste management operations in 35 Indian cities with more than one million populations was conducted by the Federation of Indian Chambers of Commerce and Industry in February 2007 which showed that most cities in the country fared badly in handling solid waste (FICCI, 2007). In Sri Lanka, Perera’s (2003) overview of solid waste management in major cities reported that solid waste management was a major problem in Sri Lankan cities. Perera described Colombo, the capital city, as “facing a crisis situation” with regard to the disposal of around 1500 tonnes of solid waste materials per day. He found illegal dumping of solid waste on roadsides, vacant lots or river banks to be some of the problems associated with solid waste management in Colombo and other Sri Lankan cities. Furthermore, Perera (2003) observed improper discharge of garbage which led to poor sanitary conditions and waste-clogged drains in the cities with associated health problems. Even China, with its speedy industrial development, seems to have left the waste problem largely unsolved. Liu (2007: online), has observed that:

“As China undergoes its historic drive towards industrialization, it is also witnessing the rapid accumulation of urban garbage. The nation’s 668 cities generate an estimated 150 million tons of rubbish each year, accounting for roughly one-third of the world total. Currently, as much as 7 billion tons of this garbage remains untreated and two thirds of China’s cities have been inundated by rapidly spreading garbage mounts”

(Liu, 2007:online).

The urban waste situation in Latin American cities seems to be much better than in Africa and Asia. For instance, while most African and Asian cities have very low levels of waste collection, about 70 percent of the population in many Latin American cities are reported to have waste collection services (Hardoy *et al.*, 2001:80-81).

However, this is not to say that Latin American cities have no problems with waste disposal. Arreaza, (online), for example, has observed that:

“waste accumulation is one of the biggest environmental concerns in Latin American cities and is a key contributor to the urban environmental crisis that many Latin American cities face. Despite several programs and studies about the problem and potential solutions such as recycling, the concern remains”

Hardoy *et al.* (2001) also report abysmal waste situations in a number of Latin American cities including Bogota (Columbia), where some 2,500 tonnes of solid waste is left uncollected every day and is simply left to rot in small tips or in canals, sewers and streets; and Sao Paolo (Brazil) where one-third of the population is living in areas without any service to collect solid waste. Furthermore, 70 per cent of waste collected in the municipality of Sao Paolo is said to be improperly discarded in terms of both the treatment process and the location of waste dumping areas.

Hardoy *et al.* (1993; 2001) have provided statistics on the levels of waste collection in selected cities across the developing world (Table 2.5) which show abysmal performances.

Table 2.5: Solid waste collection in selected cities in developing countries

City(Country)	Percentage of solid waste collected	Year
Accra (Ghana)	10	1989
Addis Ababa (Ethiopia)	60	1998
Ahmedabad (India)	65	2000
Baroda (India)	05	1994
Kampala (Uganda)	10	1993
Kumasi(Ghana)	30	2000
Latin American cities	50-70	1999
Lusaka and other cities (Zambia)	10	1997
Mombassa (Kenya)	40	2000
Ouagadougou (Burkina Faso)	30	1995
Sao Paolo (Brazil)	70	1998

Source: Hardoy et al 1993 pages 59-60; Hardoy et al, 2001 pages 80-81

The above analysis has shown that even though cities in poor countries generally have low levels of solid waste collection and disposal, there seems to be great variations in

the scale of the waste problem across regions and countries (Hardoy *et al.*, 2001). Regionally, Latin American cities appear to have better environmental management than African and Asian cities. This is reflected in the high level of waste collection (up to 70 percent in some cases) in Latin American cities compared with the very low levels of waste collection in African and Asian cities as shown in Table 2.5. What this means is that while all developing country cities grapple with solid waste collection and disposal, some are doing relatively better than others. Regionally, Africa seems to have the worst situation with regard to urban solid waste management (Hardoy *et al.*, 2001).

2.2.2. Spatial disparities in the magnitude of the solid waste problem

While city authorities in developing country cities are generally unable to provide adequate solid waste disposal services within their jurisdictions, the literature on the topic also shows that there are spatial disparities in the scale of the waste disposal problem within cities. These disparities are socio-spatial in nature as waste collection services are concentrated in, if not confined to, official areas and wealthy residential neighbourhoods while the low-income communities receive little or no attention. In particular, many writers have described solid waste collection services in the cities which show enormous disparities between rich and poor residential areas.

In the IDRC sponsored study of *Urban waste and governance in Africa* (cited above), Koffi Attahi (Abidjan), Onibokun and Kumuyi (Ibadan) Kironde (Dar es Salaam) and Swilling and Hutt (Johannesburg) all reported enormous disparities in the qualities of waste disposal services provided by municipal authorities for residents of the cities that they investigated. In the East African city of Dar es Salaam, Tanzania, Kironde (1999) found that the collection of solid waste is usually confined to the city centre and high-income neighbourhoods while other areas never benefit from public solid waste disposal. Consequently, most residents of the low-income areas in the city have to bury or burn their waste or dispose of it haphazardly. From Johannesburg in the extreme south of the continent, Swilling and Hutt (1999:179) also reported “a highly uneven distribution of resources for the delivery of solid waste service”. According to them, the legacy of apartheid policies has led to massive differences in the quality of service between rich/white and poor/black areas of Johannesburg. From Abidjan in West Africa, Koffi Attahi (1999) reported an arrangement for waste removal which

favours the rich with a very regular home collection service but neglects the waste collection needs of the poor, leaving them to bear the filth. A study by Songsore and McGranahan (1993) of *Urban household environmental problems in the Greater Accra Metropolitan Area* (GAMA - Ghana) also found that the areas most affected by the non-collection of solid wastes were the poor residential settlements, commercial areas and lorry stations which constitute the living and working places of the low income populations. The co-authors observed that the wealthy and formal residential areas which enjoy regular waste collection services in the city are largely occupied by wealthy and influential government officials, businessmen and professionals. Also in Kumasi, Ghana, Devas and Korboe (2000) found that the waste collection service provided by the metropolitan authorities was skewed in favour of a small group of wealthy residential areas where home collection was very regular. In poor neighbourhoods in the same city, however, most residents only had access to an erratic communal skip service, frequently located at great distances from some residential units. Moreover, many peripheral communities in Kumasi had no service, compelling households to dump their waste in any available space (Devas and Korboe, 2000).

Other examples of the spatial disparities in the quality of waste disposal services within cities abound in the literature. In Ibadan, Nigeria, Onibokun and Kumuyi (1999) found that the Ibadan Urban Sanitation Committee (IUSC) which is responsible for solid waste management in the city covered the relatively better off local government areas of the metropolis. The rest of the metropolis was without any waste collection service and residents used every means convenient to dispose of their refuse. Again in Nigeria, a study by Meekyaa and Rakodi (1990) in the towns of Aliade, Ihugh and Ugba, revealed that while refuse disposal is a local government responsibility, this was not performed effectively with refuse collection services limited to wealthy neighborhoods. Consequently, most households had no waste removal services and dumped refuse in their backyards, burnt it or buried it. Achankeng's (2003) study of Yaoundé, Cameroon, also revealed that the authorities failed to remove large amounts of solid waste trapped in inaccessible residential quarters inhabited mostly by lower-income members of the population even though wealthy neighbourhoods received regular services for waste removal. In Nairobi, Kenya, a report written in 1994 noted that house-to-house collection was provided in

formal settlements while in the informal settlements, collection was limited to clearing large piles of waste when they became a health hazard, and even this was not undertaken regularly. Poor areas in the city were therefore heavily littered with refuse and contaminated with rotting waste with attendant health risks (Alder, 1995, cited in Hardoy *et al.*, 2001). Even though Latin American cities are reported to have better waste collection rates, Arroyo *et al.* (1999) and Ferguson (1996) (both cited in Hardoy *et al.*, 2001) found that in most cities in the region, it is usually the high and middle-income areas that enjoy regular waste collection service while the low-income neighborhoods can count only on erratic services, if any at all. In Montego Bay (Jamaica) for example, waste is meant to be collected from all residential areas twice a week but the actual frequency of collection is said to vary from twice a week in formal sector residential areas to never in some of the largest informal settlements (Ferguson, 1996, cited in Hardoy *et al.*, 2001). The socio-spatial disparity in waste collection service provision is, therefore, a common occurrence in developing country cities.

The abysmal waste situations in developing country cities can have enormous implications for public health and the environment. The decomposing piles of wastes, especially in communities of the poor, have the potential to attract and harbour vermin and rodents which spread diseases (Hardoy *et al.*, 2001). The accumulated wastes also attract foraging animals like dogs and goats which scatter infected waste materials, spreading diseases and causing a nuisance (Songsore and McGranahan, 1996). Besides, accumulated waste in the cities become hot beds for the breeding of pathogens that cause diseases like dengue fever, malaria, leprosy and even elephantiasis while the blockage of drainage systems by waste materials creates stagnant waters which also become ideal breeding grounds for mosquitoes and other vectors that spread disease pathogens (Hardoy *et al.*, 2001; Perera, 2003). Moreover, solid waste materials that find their way into water courses like drains, streams and lagoons block the flow of flash waters during storms and cause extensive flooding in some of these cities (Zahari, 2007). Waste pollution in the cities also causes the pollution of both surface and underground water and cause damage to natural ecosystems (Perera, 2003). Thus, the poor solid waste situation in the cities “constitutes a disaster for human health and environmental degradation” (Achankang, 2003:7-8). In view of the public health and environmental effects of inadequate waste

disposal in poor cities, it behoves their governments to pay much more attention to the issue of waste disposal in order to achieve the objectives of waste management and create congenial environments for urban residents.

2.2.3. Causes of the solid waste problem in developing countries

Researchers have identified several factors that militate against solid waste management efforts in poor country cities. In a GEF/UNDP/IMO Regional Programme report, for instance, Linden *et al.* (eds.) (1997) identified ten common constraints to be militating against solid waste management efforts in Asian countries.

These were:

1. Inappropriate technologies/processes
2. Enforcement inefficiencies/non-existent; illegal dumping
3. Lack of financing
4. Lack of training/human resource
5. Lack of political support
6. Lack of legislation
7. Policy conflict among levels of government/overlapping responsibilities
8. Rapid increase in waste generation/limited data
9. Lack of awareness among public, and
10. Limited land areas; land tenure issues

(Linden *et al.*, 1997: online).

These factors, according to the report, frustrated the waste management efforts of municipal authorities in Asia and made it difficult for them to keep their city environments clean and safe for the populations. After studying the solid waste problem in Tanzania, Kironde (1999) has also attributed the abysmal performance of the waste sector to resource constraints including the scarcity of financial, physical, human and technical resources for the organization of waste management operations. In a study of the solid waste problem confronting the city of Kampala, Uganda, researchers from the Namilyango College (2001) identified several causes of the waste problem including the lack of dumping sites, ignorance of the masses about the need for proper waste disposal, inefficient collection methods, poor government attitude towards waste management, poverty of the people, corruption among public officials and lack of trained personnel for waste management. These have posed

serious constraints to the waste sector and dampened efforts towards waste management in the city. Many other writers have elaborated on how the factors cited above (plus others) interact to aggravate the solid waste problem in poor country cities. What follows from here is a detailed examination of the factors responsible for the abysmal waste situation in poor country cities.

2.2.3.1. Financial and economic constraints

Many writers have cited the scarcity of funds as a major constraint to solid waste management in all developing countries (Cointreau, 2001; Ogawa, 2002; Lohse, 2003; Pacione, 2005). Lohse (2003:4) has described the problem of municipal finance in developing countries as “the gap between financial resources and municipal expenditure needs”. According to him, this fiscal gap is widening as urban populations expand, increasing the demand for infrastructure and services including waste disposal. Lohse (2003:4) explains that one reason for the municipal finance gap is that “most municipalities lack the autonomy to establish their tax basis, rate structures, and enforcement procedures, and so cannot raise revenues commensurate with their expenditure requirements”. In the context of Nigeria, Onibokun and Kumuyi (1999) have blamed the lack of fiscal autonomy among municipal governments on excessive central government control of the lucrative sources of revenue, a situation which leaves local governments with few options. Ogawa (2002) has also observed that the finance problem in developing countries is most acute at the municipal government level where the local taxation system is inadequately developed and therefore the financial basis for public services is weak. He attributed the problem of finance to the low capacity of local governments for cost recovery and their heavy reliance on state subsidies for waste management operations. This view is corroborated by Attahi (1999) who investigated the waste problem in Abidjan, Cote d’Ivoire, and found that even with an elaborate system of taxes and levies such as the drainage tax levied on landed properties, state subsidies sustain most municipal programmes including waste management. According to his study, only 30 percent of the cost of waste management is recovered in Abidjan. Zurbrugg (2002) maintains that the low fees usually charged for waste collection and insufficient funds from central municipal budgets cannot finance adequate levels of service.

Investigating ‘urban waste and governance’ in Ibadan, Nigeria, Onibokun and Kumuyi (1999) found that the lack of funds and other resources had turned many of the urban councils and municipal planning authorities into “purposeless bodies” and a “drain on the regional/state governments” as they are unable to perform their duties (Onibokun and Kumuyi, 1999). The authors quoted various sources to reveal the challenges facing local councils in Ibadan and other Nigerian cities:

“they are perpetually in debt and are basically under funded; their patterns of expenditure do not reflect a defensible set of priorities; the local governments have little concern for cost effectiveness and avoidance of waste; their financial controls are ineffective; and, their financial information often comes too late or is too obscure to be useful”.

(Onibokun and Kumuyi, 1999:88).

These constraining characteristics greatly hamper the ability of local governments in the country to perform waste management and other responsibilities.

Ahorlu (2006: online) has also reiterated the finance problem of municipal waste departments and how it affects waste management operations in African cities. In his paper ‘*Waste management in Africa – a look at institutional constraints, hazardous waste and public-private partnership options*’, Ahorlu (2006: online) observed that the “provision of adequate funding for solid waste management on an ongoing basis is a major problem in African cities”. In his view, the fact that the huge amounts of money required for running municipal waste management operations usually come from limited municipal budgets calls for efforts to improve the overall municipal financial systems. Cointreau (2001) has also observed that in spite of the deplorable waste situation in poor country cities, it is common for municipalities to spend 20-50 percent of their available recurrent budget on solid waste management alone. This observation is corroborated by Devas and Korboe (2000) in their study in Kumasi where they found waste management and sanitation to be the largest public sector, with refuse trucks alone consuming 45 percent of the city’s recurrent expenditure.

On their part, Tagoe *et al.* (2005: online) have attributed the finance problem of poor city governments to a lack of good financial management and planning among

municipal governments. According to the authors, the lack of financial management and planning, particularly cost accounting, “depletes the limited resources available for the waste sector very quickly and causes the solid waste management services to be unreliable, thus losing the trust of service users”. Another reason cited for the poor financing of solid waste is that urban environmental management in general, and solid waste management in particular, is given a very low priority in developing countries (Onibokun and Kumuyi, 1999). As a result, very limited funds are usually provided to the sector by both national and local governments and the level of service required to protect public health and the environment cannot be attained (Ogawa, 2002). Armah (1993) has also attributed the financial difficulty of municipal governments to over reliance on central government subventions for the provision of municipal service. According to him, any organization that relies so much on central government subventions to operate a waste management service is bound to fail because such subventions are often limited and unreliable.

As a solution to the crippling municipal financial problem, Lohse (2003) has suggested a number of sources from which local governments may raise revenue for municipal infrastructure and service finance including internal and external sources (Table 2.6) but many urban governments seem unable to take advantage of the situation.

Table 2.6. Sources of local government revenues

Sources				
Internal sources			External sources	
Land-based revenues	Non-land-based revenues	User charges	Intergovernmental transfers	Borrowing
Property taxes	Taxes on households, vehicles, animals, etc.	Service charges (water, parking, sewerage, waste etc)	General purpose grants, regular transfers or formula-based shared taxes	From governmental sources
Land fees	License fees for various businesses and occupations	Administrative fees such as building permits, registration etc.,	Grants for specific purposes	From private capital markets (including international markets).

Source: Lohse, (2003). *Improving municipal finance*, Habitat Debate

While some of the sources are already being explored, corruption and inefficiency usually constrain efforts to raise revenues (Armah, 1993; Ogawa, 2002). Besides, the technical capacities and political will to raise revenues from the sources suggested by Lohse seem to be lacking among many municipal governments across the developing world.

Closely related to the problem of finance are economic constraints which also militate against effective solid waste management in developing countries. Ogawa (2002) has observed that economic and industrial development play key roles in solid waste management because an enhanced economy provides a more sustained financial base and enables more funds to be allocated for solid waste management while a sound industrial base enables a country to produce suitable but inexpensive equipment for waste management. By their nature, however, developing countries have weak economic and industrial bases and are unable to provide the financial and logistical resources for sustainable development of solid waste management systems. In Ogawa's view, the lack of local industries to manufacture suitable but inexpensive solid waste management equipment is responsible for the importation of expensive, yet frequently unsuitable, equipment/vehicles which also drain the scanty foreign exchange of poor countries. Ogawa (2002: online) therefore concludes that "the low industrial base and limited foreign exchange for the importation of waste management equipment are major causes of the solid waste problem confronting poor countries".

Another important way in which the low industrial base harms the solid waste sector in developing countries is the low market for recyclable waste materials (Hanrahan *et al.*, 2006). Waste recycling projects are affected by the availability of industry to receive and process recycled materials. However, the low industrial base of most poor countries fails to provide ready markets for recyclables and can therefore be regarded as an obstacle to the development of recycling projects which could significantly reduce the volume of waste lying on the streets or going to landfills. From the above analysis, the poor solid waste situation in poor country cities can partly be attributed to the low financial capacity of municipal governments and the weak industrial base of these countries.

2.2.3.2. Inadequate personnel for waste management

The poor waste disposal situation in poor country cities has also been attributed to the general dearth of qualified personnel in the waste sector (Onibokun, 1999; Ogawa, 2002). According to Onibokun (1999) most municipal authorities are unable to attract suitably qualified personnel for the various aspects of waste management such as planning, operations and monitoring. Ogawa (2002) corroborates this observation when he notes that developing countries characteristically lack the technical expertise required for solid waste management planning and operation and this is usually the case at both national and local levels. He argues that many officers in charge of solid waste management have little or no technical background training in engineering or management. Without sufficiently trained personnel, however, solid waste management projects cannot be effective and sustainable. Ogawa (2002) has observed that in many cases, solid waste management programmes initiated by external consultants have collapsed in the hands of local management due to the lack of expertise and loss of funding. Lohse (2003) has also observed that local governments in developing countries generally lack the required capacity and technical expertise to accomplish effective and sustainable waste management programmes.

Several studies in Africa and elsewhere in the developing world confirm the dearth of qualified waste management personnel and how this results in failure to undertake effective and sustainable waste management in the cities. One example was the study carried out by researchers at the Namilyango College in Kampala (Uganda) who found that the failure of waste management programmes in Kampala and other Ugandan cities was largely the result of a lack of trained manpower/personnel to execute waste management programmes. Kironde (1999) also found that human resources for waste management in Dar es Salaam were very inadequate in terms of managerial and technical staff and even labourers.

The lack of qualified waste management personnel has been blamed on the lack of training and poor conditions of service in the sector. Generally, employees in the waste sector are poorly paid and have very poor conditions of service which makes many people shun jobs in the sector, including labourers (Kironde, 1999). Thus, besides the difficulty of attracting professional waste management staff, it is also

difficult to attract labourers to the waste sector in spite of the high levels of unemployment in poor country cities (Onibokun, 1999; Kironde, 1999). The unwillingness of people to work in the waste sector has also been attributed to meagre wages for the cleansing staff in spite of the tedious work they do. Kironde (1999), for instance, cites examples from Tanzania where wages for waste workers are very low even though they work for long hours. Majira (cited in Kironde, 1999:160-161) reports that in July 1995, waste workers in Dar es Salaam, went on strike to protest against poor working conditions including the lack of protective gear and the fact that they were all casual workers even after a year of being employed, and therefore had no other benefits apart from receiving their low daily wages. In Kampala, waste labourers are also said to work under very dehumanizing conditions, sometimes loading waste trucks with bare hands or using polythene bags as gloves (Namilyango College study, 2001). In Asian cities, Hanrahan *et al.*, (2006) have reported the general lack of institutional and managerial capacities for urban environmental management among municipal governments. Many other examples exist of the poor working conditions in the waste sector in developing countries and how this affects the ability of municipal authorities to attract qualified staff and labourers alike.

The general shortage of staff in the waste management sector of developing countries is also connected with the low esteem accorded waste management personnel (Onibokun, 1999). In most cultures, there is a negative public perception regarding work which involves the handling of filth (Hanrahan *et al.*, 2006), a situation which may be influenced by the practice in many developing countries where households without toilet facilities dispose of human excreta together with household solid waste (Songsore and McGranahan, 1996; Hardoy *et al.*, 2001). This situation leads to disrespect for waste and sanitation work and in turn induces low morale among waste labourers (Ogawa, 2002). The lack of public appreciation and respect for waste management jobs makes many people, even the poorly-educated and unemployed, reluctant to take up employment as waste labourers. It therefore seems that poor country cities will continue to struggle with the implementation of their waste management programmes unless they train and motivate staff for the sector.

2.2.3.3. Technological constraints

The technologies employed in municipal solid waste management in most developing countries are also said to be inappropriate and inadequate. Zurbrugg (2002) has observed that adoption of the conventional waste collection vehicles used in rich countries constrain solid waste management operations in developing countries. Apart from the high acquisition and maintenance costs involved, developing countries actually lack the engineering capacity to support the operation and maintenance of such sophisticated equipment like compactors and skip lifts. Yet, this is the equipment usually employed by municipal authorities and private sector waste contractors in many poor countries (Armah, 1993; Achankeng, 2003). Besides, the high cost of new equipment compels many poor country municipal governments to import used equipment from western countries. Such vehicles arrive already near the end of their useful life and so frequently require repairs due to breakdowns. In the absence of spare parts and the required engineering skills to maintain the trucks, only a small part of the fleet usually remains in operation after a short period of their use (Achankeng, 2003).

In Tanzania, Kironde (1999:153-154) found that shortage of equipment was a major problem facing the waste disposal operations of the Dar es Salaam City Council. Onibokun and Kumuyi (1999) have also noted of Ibadan and other Nigerian cities that equipment for waste management are unavailable in the desired quantities and the existing ones are difficult to maintain due to lack of expertise and funds to purchase the needed spare parts. At the time of their study in 1999, only about one-third of the 43 pieces of equipment for the Ibadan waste management office were in working order. In Uganda, the waste management department in the capital city, Kampala, was said to lack basic equipment like trucks for waste collection and equipment for maintenance of disposal sites (Namilyango College, 2001).

Besides the shortage of suitable equipment, the poor spatial organization of many developing country cities, characterized by unplanned housing developments, poor road quality and poor access within settlements does not support use of the large and heavy western type waste collection vehicles (Armah, 1993). Usually, the large waste trucks cannot gain access to many unplanned residential areas due to poor roads

(Hardoy *et al.*, 2001). There is, therefore, the need to design and manufacture appropriate but inexpensive waste management equipment that is suitable for the conditions in developing countries. This calls for research into waste management technologies that will suit local conditions.

2.2.3.4. Institutional constraints

Inefficient institutional arrangements adversely affect urban management in poor countries generally and environmental service delivery in particular (UN-Habitat, 1989; Ogawa, 2002; Zurbrugg, 2002). According to UN-Habitat (1989), it is characteristic of developing countries to have several agencies involved in the delivery of solid waste and other municipal services. Furthermore, Ogawa (2002) has observed that there are often no clear roles or functions of the various agencies involved in urban environmental management. At the same time, no single agency is usually designated to coordinate the activities of waste sector agencies (Armah, 1993; Attahi, 1999). Ogawa (2002) has, therefore, observed that the lack of coordination among the relevant urban sector agencies often results in different agencies duplicating one function. In the case of externally supported solid waste management projects, it is common for different agencies within the same country or city to act as counterparts of external support agencies for different waste management projects without any collaboration of efforts (Ogawa, 2002). Institutional inefficiencies of this nature can lead to duplication of functions, gaps in service delivery and waste of already scarce resources, or even the collapse of solid waste management programmes (UN-Habitat, 1989). Zurbrugg (2002) has also noted deficient management capacities of institutions involved in urban environmental management in poor country cities. Solving the waste problem in poor cities will, therefore, require improvements in the institutional arrangements and capacity building for waste management and other aspects of the urban environment. Ogawa (2002) has suggested that in large metropolitan areas where there is more than one local government, coordination among the different local governments and among agencies in urban management is critical to achieving the most cost effective alternatives for solid waste management for the entire city.

2.2.3.5. Lack of legislation and enforcement

The lack of legislation on solid waste management has also been cited as being partially responsible for the undefined roles of agencies in the waste sector as well as the lack of coordination among them. In the report of their African Development Bank (ADB) sponsored literature-based study of solid waste management options for Africa, Palczynski and Scotia (2002: iv) noted that “no country [in the study] has a specific waste management legislation even though legislation is being drafted now in some countries”. Ogawa (2002) has also observed that legislation related to solid waste management in developing countries is usually fragmented and several acts (such as public health, local government and environmental protection acts) include clauses relating to solid waste management. A case in point is that of Dar es Salaam which reportedly has 58 pieces of legislation dealing in one way or the other with the environment including solid waste (Onibokun, 1999). Such rules and regulations are, therefore, to be enforced by different agencies with duplication of responsibilities and gaps in the regulatory provisions which constrain the development of effective solid waste management systems. Furthermore, some of the laws are completely out of date and therefore of little use. The lack of adequate legislation makes it difficult to assign clear mandates to urban sector institutions connected with waste management, a situation which greatly constrains the waste sector.

Besides the scarcity of legislation on waste management, Onibokun (1999) has also noted the inability or unwillingness of municipal officials to enforce existing laws on environmental sanitation including the scanty legislation on waste disposal. This situation is particularly grave in the major cities where there is a general lack of public compliance with waste disposal laws (Ogawa, 2002) if they exist at all. The non-enforcement of waste disposal laws engenders lack of fear of the law among the public and encourages negative waste handling practices such as littering and dumping of waste in drains and at roadsides. Such practices worsen the waste disposal situation and increase the burdensome tasks of waste collection, transportation and disposal for the resource-constrained municipal authorities. Thus, inadequate legislation and non-enforcement of waste disposal laws greatly constrain efforts to address the solid waste problem that currently confronts developing country cities. In line with what Girling has suggested (for the UK) it seems evident that the solution to

the waste crisis in poor country cities cannot be found in prayers of wishful thinking, but rather in legislation, enforcement and penalties.

2.2.3.6. Lack of good governance and civil society

The low status of environmental services in poor country cities has also been blamed on the lack of good governance which promotes the well-being of the people, and on the lack of civil society action to exert pressure on governments to live up to their social responsibilities (Devas, 1999; Kwawe, 1995; Hashmi, 2007). Due to ‘bad governance’, municipal governments in poor countries show little regard for the well-being of the citizens and so renege on their responsibility to provide basic infrastructure and services to keep the cities clean, healthy and safe (Hashmi, 2007). Commonly, autocratic styles of administration by supposedly democratic regimes alienate public opinion and participation in urban management (Devas, and Korboe, 2000; Hashmi, 2007), a situation which does not augur well for effective waste management. From a governance point of view, the fact that the ordinary residents of cities, especially the poor, are denied participation in decision-making about issues that affect them means that their concerns may never be taken on board and their needs for such services as water, sanitation and waste disposal are therefore unlikely to be met (Devas, 1999; Devas and Korboe, 2000).

The problem of poor urban governance is further compounded by the lack of effective civil society action to compel governments to enact and enforce environmental laws, and to carry out their responsibilities to the citizenry. In fact, some writers see a fledgling civil society as the panacea for the ills plaguing the developing nations of the world (Cohen and Arato, 1992; Kwawe, 1995) even though others have questioned the ability of civil society to achieve political accountability in undemocratic poor countries (Devas, 1999). According to Hashmi (2007) a strong civil society is necessary for the promotion of “a robust liberal democratic order in the Third World” where governments are generally unaccountable and unresponsive to the problems of society. Hashmi sees strong civil society as a solution to the political lassitude of developing country governments. This view is collaborated by Cohen and Arato (1992) who also regard civil society as important for the promotion of democracy and rights. Recognition of the important role of civil society explains why multilateral organisations increasingly find them useful partners in promoting good governance

and poverty reduction (Hashmi, 2007) and in promoting the general interest of society, having lost confidence in the state.

According to the UNDP (2005), civil society action is critical for establishing strong safeguard policies and no government can achieve sustainable development without the active involvement of a fully-fledged civil society. In spite of the important role that civil society can play in promoting good governance and the general interest of society, civil society pressure or action is generally weak in developing countries, and even non-existent in many areas. Kwaive (1995) has observed that tax-paying citizens have the right, and in fact, the duty to call on government to maintain infrastructure and provide services where these are lacking. However, this is generally not the case in many poor countries because urban residents lack the ability to organise themselves to pressurise local governments to live up to expectation. In Uganda, the Namilyango College (2001) which investigated the solid waste problem in the city of Kampala, partly blamed the poor environmental conditions in the city on the unconcerned attitude of the public and the failure of residents to hold the authorities accountable for the situation. Toula (2005) has also noted that even though most residents in poor country cities complain about the poor environmental conditions in their settlements, they are often unprepared to organise themselves in groups to mount pressure on the authorities to address their concerns.

There is evidence that civil society pressure can compel uncaring governments to improve services for citizens. In 2003, hundreds of residents of Koalack city in Senegal staged a series of demonstrations to complain about the lack of services in their community and vowed to disrupt government programmes if their demands were not met (Toula, 2005). Unable to stand the force of the demonstrations, the city council held a series of meetings with the protestors to discuss their concerns following which substantial improvements occurred in the city's infrastructure and services (Toula, 2005). This example shows that civil society can help shape society for the better by holding unresponsive governments accountable. But, developing countries generally lack civil society. Thus, even though other factors have been cited as causing poor environmental sanitation in poor country cities, the lack of a strong civil society is also a contributory factor.

2.2.3.7. Political neglect

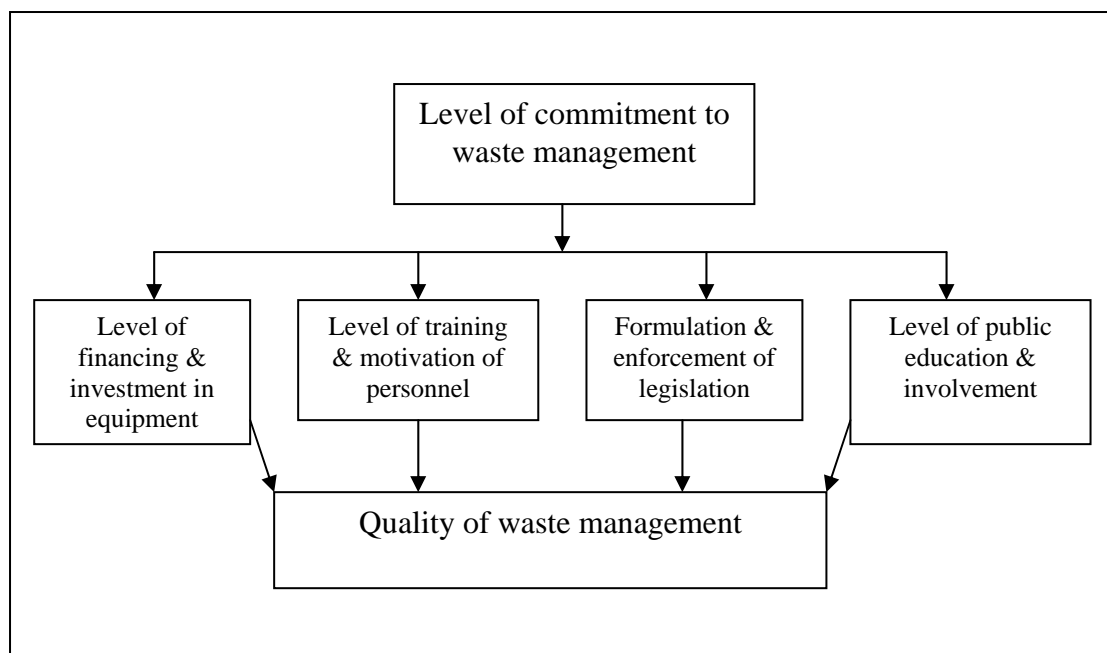
While the various factors discussed above are important contributors to the poor solid waste situation in poor country cities, some researchers find political neglect to be the root cause of the waste problem in poor country cities. Both national and municipal governments in poor countries seem to lack the political will to manage the rapidly growing cities and to provide infrastructure and services for environmental maintenance. Several studies point this out including Onibokun and Kumuyi (1999:82) who have noted the fact that “most local governments in Nigeria do not accord high priority to waste management”. The authors refer to Koehn’s (1992) work in Northern Nigeria which showed that waste management and general environmental sanitation ranked very low on the priority lists of local governments with none of them including waste management among their priority functions. In Koehn’s study, the five functions that were accorded most importance by local governments in Northern Nigeria were, in descending order of importance, education, revenue collection, agricultural services, medical services and water supply while those that were identified in the ‘other important functions’ category were “community development, road construction and maintenance, maintenance of law and order, and market and motor vehicle parks”. Surprisingly, sanitation and waste management were neither considered to be priorities nor important functions by any of the local governments that participated in Koehn’s study. (Onibokun and Kumuyi, 1999:82) concluded that this would explain why the status of waste management was very poor in the country as a whole.

Similarly in a study conducted by the Namilyango College in Kampala (2001: online), the researchers attributed the root cause of the waste problem in the Ugandan capital to “poor government attitude towards waste management”. From the citizens’ point of view, according to the study, “it is realized that little attention is paid to environmental sanitation in Kampala so very few resources are committed to waste management”. The researchers therefore blamed the issue of poor waste management on the lack of political interest in the sector. In Dakar, Senegal, Ka-Mbaya *et al.* (2006: online) also found a steady decline in urban environmental quality as the government had completely ignored the issue of waste management. According to Ka-Mbaya *et al.* (2006; online) the central government as well as the various

municipal councils in Senegal had “relegated the issue of solid waste to the background” as though it was not important. Their proposed solution to the worsening solid waste situation in Senegalese cities was, therefore, for the country’s political leadership to appreciate the importance of environmental sanitation and proper waste disposal and to commit themselves to addressing these problem. It is therefore evident that the governments of many poor countries do not care much about environmental sanitation which is the root cause of the worsening waste disposal situation in their cities. The lukewarm attitude towards environmental sanitation is shown in the failure of these governments to formulate legislation, create capacities and provide resources for urban environmental maintenance.

From the analysis above, it can be concluded that the quality of solid waste management is directly affected by the level of financing and investment in waste management equipment, the level of training and motivation of waste management personnel, the level of enforcement of waste disposal legislation and the level of public education and involvement in the planning and organisation of waste management, factors which are themselves affected by the level of political commitment to the solid waste problem (Figure 2.3).

Figure 2.3: Conceptual model of the factors affecting the quality of solid waste management



Source: Designed from analysis of field data

A government that regards waste management as a priority would demonstrate its commitment by providing an enabling framework within waste management can be organised effectively to protect public health and the environment. Strong political commitment to solving the waste problem in any city therefore is reflected in adequate investment. The poor solid waste disposal situation that currently confronts developing country cities can therefore be ultimately attributed to the low political commitments of their governments to the issue of solid waste management.

As a typical developing country, Ghana also has a serious waste management problem in all its major cities. Urban settlements in the country are characterised with worsening waste disposal situations which the authorities seem unable to deal with. A survey of literature on the waste disposal situation in the country shows that no major research has been done on the subject and it is the need to investigate the problem that has motivated me to embark on this research. In the analysis chapters of this research, the solid waste problem in Ghanaian cities could be examined in relation to the situation in other poor country cities examined in the above review. The remaining part of this chapter is devoted to examining the concepts of social and environmental justice and their relevance for the organisation of solid waste management in poor country cities.

2.3. Theoretical framework for the study

Two related concepts, social justice and environmental justice, have been employed in this thesis, to investigate the problem of solid waste management in two Ghanaian cities. There are, however, other theoretical frameworks that could also be used such as political ecology, sustainable waste management and good governance. Political ecology (Blaikie, 1985; Bailey and Bryant, 1997), for instance, could be used to study how political, economic and social factors affect the organisation of waste while the concept of good governance (frequently employed by the World Bank/IMF in its surveillance over the transparency of government accounts, the effectiveness of public resource management and the transparency of the regulatory environment for private sector activity) (IMF, 1997) could be a useful framework for examining aspects of the waste management system in Ghana such as the management of financial and other resources for waste management and the regulatory framework for private sector involvement in waste management. Within the broader framework of sustainable

development, the concept of sustainable waste management (see Section 2.1.7) is also an appropriate framework for studying not only the effects of improper waste management on human health and the natural environment but also the implications of current waste management practices for resource conservation and environmental sustainability (Schubeller *et al.*, 1996; Watson and Bulkerley, 2004). However, one single study cannot easily be embedded within all these theoretical frameworks so a choice had to be made among them, thus, social/environmental justice. Furthermore, existing studies on solid waste management in developing country cities show that social justice and environmental justice have received less attention than the other concepts in the investigation of environmental issues. Following these concepts in the current study was, therefore, seen as an opportunity to examine an important environmental problem from a different perspective.

2.3.1 Social justice and urban solid waste management

It is desirable, at least from an egalitarian perspective, that the collective benefits of society (such as public money and natural resources) as well as its collective burdens (such as public debt and pollution) are equally allocated among its members. In the real world, however, vulnerable members of the population such as the poor and minority groups are discriminated against as they frequently receive less of the benefits and bear more of the burdens (Tilly, 2004). Such discrimination against vulnerable groups in society has been conceptualized as ‘social injustice’ (Clark, 1985; Miller, 1999; Syme and Nancarrow, 2001). As defined by Atkinson (1983:3) the term social justice refers to “perceived unfairness or injustice of a society in its distributions of rewards and burdens”. Syme and Nancarrow (2001: online) have also referred to social injustice as “when not all people within a society have equal access to facilities, services or systems within that society”. Advocacy for social justice is therefore an effort to correct injustices in society and to achieve fair and just treatment for all societal groups in the distribution of collective rewards and burdens.

2.3.1. 1. The concept of social justice

The term ‘social justice’ seems to have an uncertain origin. Some people attribute it to Luigi Taparelli who is said to have coined it in a book he wrote in 1840, entitled ‘*The Theoretical Treatise on Natural Law Based on Facts*’ (Novak, 2000; Behr, 2005) yet others attribute it to Karl Marx who is said to have detailed it in opposition to

liberalism (Loberfield, 2004). Antonio Rosmini-Serbati, is also noted to have given prominence to the concept in his book *La Costituzione Civile Secondo la Giustizia Sociale* in 1848 (Novak, 2000). Today, usage of the term social justice has attracted much debate among writers.

With regard to the meaning of social justice, Miller (1999) has suggested that the term is best understood as forming part of the broader concept of ‘justice’ in general. According to him, actions are ‘just’ when they are taken in attempt to bring about a “just state of affairs”, or when they actually have this desirable result. Miller (1999:7) has also suggested a number of conditions that must be met before we can describe a situation as just or unjust:

- The situation in question must involve sentient beings
- It must be a situation in which a person or group is enjoying a benefit or suffering a burden relative to others
- It must be a situation which has resulted from the actions of sentient beings, or is at least, capable of being changed by such actions
- The people affected by the situation in question must be equally deserving of the benefit or burden in question.

The kind of justice described by Miller is usually referred to as ‘distributive justice’, and operates on the general principle, ‘to each his/her due’. In line with this view, Miller (1999:1) argues that “a just policy or state of affairs is one that ensures that no person, or more usually category of persons, enjoys more or less of the advantages due them or bear more or less of the burdens they ought to bear relative to other members of the society”. In this sense, a situation of social justice exists when all members of a given society, irrespective of status or class, receive equitable shares of public assets and bear equitable shares of collective burdens. The Green Party (2007), on its part, sees social justice as reflecting the general rejection of discrimination based on variables such as class, gender, ethnicity or culture. From the above review, the central concern regarding social justice seems to be one of fairness and equity in the allocation of societal rewards and burdens among its members. In other words, the advocacy for social justice is a call on those entrusted with the management of

societal affairs to justify their actions so long as these actions affect the well-being of people. According to Barry (1989; cited in Johnston *et al.*, 2000:754), therefore, “a theory of social justice is a theory about the kind of social arrangements that can be defended”. In this regard, Johnston *et al.* (2000) argue that equality is the norm and so it is inequality that requires justification.

An important question that also arises is whether the distribution of societal benefits and burdens should be based on merit or need. In this regard, those who subscribe to strict distributive justice would consider a just distribution as one based on merit (Miller, 1999) but others who are mainly concerned about improving the situation of the disadvantaged in society, regard strict distributive justice, based on the merits principle ‘to each his/her due’, to be insensitive to the plight of the disadvantaged members of society (Flew, 1999). In their view, social justice should narrow, if not eliminate the gap between the well-off and the worse-off in society. In other words, their view of social justice is one based on need. In line with Rawls’ difference principle, they, therefore, call for a distribution system which allows allocations that do not conform to strict equality so long as the inequalities have the effect that the least advantaged in society are better off than they would be under strict equality (Flew, 1999). Catholic social teaching also advocates this kind of social justice. Emphasizing the sanctity of all human life and the inherent dignity of the human person, Catholic social teaching advocates a distribution system with preferential options for the poor or disadvantaged in society (USCCB, 2003). According to this teaching, not only does every human person have a fundamental right to life, but also a right to those things that are required for human decency. For all people to live decently, they will require adequate provision of not only tangible goods such as shelter, foods and clothing but also services that create decent living conditions including water, sanitation and waste disposal.

Social justice is also seen as an attempt to expand equality from the political to the economic realm (Loberfield, 2004). A more extreme advocacy for social justice therefore regards economic inequality as unjust and calls for the abstraction of resources from the wealthy in order to cater for the worse-off in society (Flew, 1997). For Flew (1997), social justice is seen as taxing away some of the justly acquired income and capital of the better off in order to give it to the worse off. Therefore, the

wealthy members of society should be made to share their justly acquired wealth with those who are worse-off as a means of achieving harmony in society. In support of this, Mill (cited in Novak, 2000) is of the view that fair treatment for all is the highest abstract standard of social and distributive justice towards which the efforts of all virtuous citizens and institutions should be made to converge. This is a call for affirmative action to narrow the gap between the wealthy and poor in line with Rawls's difference principle. In other words, it is justifiable to reduce the luxuries of the rich in order to reduce the miseries of the poor even if this is achieved by coercive means. While not explicitly calling for the use of force to redistribute wealth in society, Catholic social teaching seems to advocate this kind of social justice. According to Higgins (2001), social justice has been a major theme in Catholic social teaching and definitions of the term have featured in several church documents including papal encyclical letters. For example, Pope Pius XI's 1937 encyclical letter stated that "it is the function of social justice to require of each individual, that which is necessary for the common good" (cited in Higgins, 2001: online).

Social justice is here presented as the duty of individuals as well as of the state and is considered necessary for the common good and the proper functioning of society. Both the individual and the state are, therefore, called upon to do what is required to promote the wellbeing and dignity of the less fortunate members of society for the common good of the whole. The above review has shown that while the general notion of social justice is one of fairness in the allocation of societal benefits and burdens, views differ on what this actually means and how it should be achieved. While some analysts equate social justice with distributive justice, others use the term to refer to the coercive redistribution of wealth to ensure that the worse-off in society are more comfortable than what simple distributive justice would achieve.

While social justice is usually examined from a social dimension, it can also be looked at from a spatial perspective. Johnston et al (1994) have observed that even though geographical perspectives on social justice are informed by work in other disciplines, there is also a specifically geographical interest in distributions among populations defined by the places in which they live. In welfare geography for instance, attention is focused on both social and spatial inequalities in distributions that affect human welfare (Clark, 1992). The term 'territorial social justice' has been

used to refer to distributions among populations defined by location (Johnston *et al.*, 2000). This notion was also expressed by Mandel (cited in Peet, 1998:106) when he noted that ‘unequal development conventionally thought of in non-spatial terms as the vertical differentiation of economic sectors is also horizontal or inherently spatial’. Mandel compared the structure of spatial relations with non-spatial relations like class struggle in Marxist analysis and attributed the disparities to capitalist forces when he observed that “the historical survival of capitalism depends on the differentiation of space into over- and underdeveloped regions, the principal role of underdevelopment being to furnish reserves of labour and compensatory markets to relieve pressures in a spasmodic, contradictory capitalist development” (cited in Peet, 1998: 106).

Territorial social injustice finds expression in many developing countries where socio-economic development is spatially concentrated in few regions while vast areas of the countries remain largely undeveloped. Cities in developing countries usually replicate these uneven spatial developments within their jurisdictional spaces (Johnston *et al.*, 2000) and this includes the provision of services such as water and waste disposal. Studies have shown that social inequality or social injustice, therefore, finds expression in spatial terms in the provision of waste disposal services and there can be enormous spatial disparities in the levels of waste disposal services provided for wealthy and poor communities in poor country cities (Hardoy *et al.*, 2001; Pacione, 2005). The result is that while the poor majority of urban residents live in squalid and dehumanizing environmental conditions created by the lack of waste disposal services, the wealthy segments of the population live in cleaner and safer environments.

The spatial concentration of poverty-related problems in low-income communities in poor country cities has been referred to as the ‘pollution of poverty’ (OECD, 2001; Elliot, 2006). According to Elliot (2006), the term ‘pollution of poverty’ was used for the first time at the 1972 Stockholm Conference on Environment and Human Settlements to refer to the environmental concerns of the poor such as the lack of clean water and sanitation and waste accumulations, problems that result from the lack of development, unlike those resulting from the development process (green agenda problems). The ‘pollution of poverty’ or concentration of brown agenda

problems in the communities of the poor can be regarded as amounting to social injustice because the poor equally deserve to live in healthy communities where their lives and health will be protected. This injustice of ‘pollution of poverty’ has been highlighted by numerous authors (e.g. Satterthwaite and McGranahan, 2000; Hardoy *et al.*, 2001; Pacione, 2006; Elliot, 2006) and the United Nations in several of its conferences on human settlements including Habitat I (Stockholm, 1972), Habitat II (Istanbul, 1996), the MDGs, the 2006 African Ministerial Conference on Housing and Urban Settlements (AMCHUD) and the 2006 Asia-Pacific Ministers Conference on Housing and Urban Settlements (APMCHUS) (UN, 2008).

2.3.1.2. The social justice debate

In spite of the growing call for social justice in the management of societal affairs, there are critics who see the quest for social justice as lacking justification. Loberfield (2004) for example has argued that social justice is a meaningless expression and there is no justification for saying that societal benefits should be distributed equally among its members. Referring to the concept as a ‘code for communism’, Loberfield (2004: online) argues that equality is a political notion which cannot be expanded to the economic realm. In his view, the underlying assumption of social justice is that society is responsible for economic inequalities among people. He attacks this assumption and argues that “there is no personified society who plans and perpetuates this alleged inequality but only a society of persons acting upon the many choices made by their individual minds”. Even Flew (1997), an advocate of social justice, agrees that the term is often employed quite thoughtlessly and few of those who employ it have attempted to produce a systematic and consistent rationale for its application even though he also argues that this is still not adequate to show that the expression is empty and meaningless. According to Flew (1997: online), “there is sufficient regularity in the usage of the expression [social justice] to provide it with a meaning, albeit a meaning that is somewhat vague and variable” (Flew, 1997).

Fredrick Hayek (1899-1992) the late Austrian economist and political philosopher, is probably the most ardent critic of the advocacy for social justice. In his view, social justice is a virtue which should be left to individuals to practice rather than attempting to employ it as a regulative principle of order in social systems (in Novak, 2000: online). According to Hayek, the distribution of societal benefits or rewards is not a

virtuous act that can be achieved by individuals yet there is no personified society to practice that virtue of social justice. In his view, such benefits as property, good education, jobs and incomes are distributed according to merit and not according to any system of justice. Hayek showed his allergy to the term and contempt for the advocates of social justice in the preface to his book *'The Mirage of Social Justice'* where he stated that:

“I may, as a result of long endeavours to trace the destructive effect which the invocation of ‘social justice’ has had on our moral sensitivity, and of again and again finding even eminent thinkers thoughtlessly using the phrase, have become unduly allergic to it, but I have come to feel strongly that the greatest service I can still render to my fellow men would be that I can make... speakers and writers... thoroughly ashamed ... to employ the term social justice”

(Hayek; cited in Higgins, 2001:online)

Hayek further contends that “many writers who habitually employ the phrase simply do not know themselves what they mean by it but use it as an assertion that a claim is justified without giving a reason for it” (in Higgins, 2001: online). In his view, the term lacks a definition because any attempt to define it leads one into “embarrassing intellectual difficulties” (in Higgins, 2001). Hayek is said to have referred to the term as “an instrument of ideological intimidation for the purpose of gaining the power of legal coercion” (Higgins, 2001: online). Like Loberfield, therefore, Hayek sees no merit in the expression social justice and condemns its usage and any attempt to employ it in the management of societal affairs. In the view of the critics, therefore, social justice is a misnomer and there cannot be any justice in the distribution of the benefits and burdens that accrue to society. On this note, the critics dismiss the term as a meaningless concept.

The criticisms against social justice have, however, been refuted. Behr (2005: online) for instance disagrees with the critics’ assertion that the concept is hollow and without meaning and argues that “at its origins, the expression was far from hollow” as the critics claim, and “if it has been emptied of meaning subsequently, the reason for this lies elsewhere”. Flew (1997) has also noted that Hayek was wrong in saying that those who use the expression are asserting that “a claim is justified without giving a

reason for it". According to Flew (1997: online), "everyone asserting that some policy is required by a kind of justice is in fact, giving what - if but only if their assertion were true- would constitute the best of reasons".

Flew (1997) also contends that terminological changes over time, render Hayek's argument ineffective. He refers to the fact that social justice is a phrase associated with socialism yet interestingly, Hayek dedicated his most famous work - *The Road to Serfdom* - in which he condemned the usage of social justice, "to the socialists of all parties". In the preface to the second edition of *The Road to Serfdom* which appeared almost 30 years after the original publication, Hayek declared that he was still prepared to defend the book's major conclusions but warned against possible misunderstandings arising from terminological changes.

"At the time I wrote (*The Road to Serfdom*) socialism meant, unambiguously, the nationalization of the means of production and the central economic planning which this made possible and necessary. But since then, socialism has come to mean chiefly, the extensive re-distribution of incomes through taxation and the institution of the welfare state"

(Hayek, cited in Flew, 1997: online).

Flew (1997) therefore uses the contradictions in Hayek's own writings to refute his arguments. Furthermore, Flew asserts that the socialists or liberals who chiefly use the expression 'social justice', apparently use it equivalently with "equality and social justice", which clearly refers to what they themselves see as the "ideal eventual distribution of goods and services of all kinds; the extensive redistribution of incomes through taxation and institutions of the welfare state" (Flew, 1997: online).

Higgins (2001), another advocate of social justice, has also countered Hayek's assertion that the expression social justice is meaningless and without definition. Higgins (a catholic bishop) argues that definitions of social justice abound in several church documents including papal encyclical letters and Vatican Council II's Constitution on the Church in the Modern World, *The Church and Social Justice*, and *Catholic Social Principles*. To show that social justice is not just a virtue to be left to

individuals but something that can also be promoted by society, Higgins (2001) quotes part of Pope Pius XI's 1931 encyclical letter:

“It is the function of social justice to require of each individual, that which is necessary for the common good. Consider a living organism: the good of the whole is not properly being secured unless arrangements are made for every single member to receive all that it needs to fulfil its own functions. The same is true of the constitution and government of a community; the common good of a society cannot be provided for unless each individual member, endowed with the dignity of a personality, receives all that he needs to discharge his social functions”

(Pope Pius XI, quoted in Higgins, 2001: online).

Higgins further argues that Catholic social teaching as propounded in official church documents and commentaries of the type mentioned above, most emphatically does not regard social justice as “an instrument of ideological intimidation” as claimed by Hayek. He discards Hayek's criticisms of the term as “a misreading of Catholic social teaching that borders on the absurd in light of the heavy emphasis in the corpus of Catholic social teaching on the principles of subsidiarity” (Higgins, 2001: online).

It can be inferred from the above discussion that the expression social justice is a debated one. Despite its appeal, not everyone supports it. It is seen by some as a meaningful concept which can, and should be employed in the conduct of societal affairs in order to achieve greater well-being for the underprivileged in society through policies that ensure fair distribution of the benefits that accrue to society. Critics of the expression, however, consider it to be a misnomer and rail against its usage and any policies based on it.

Despite the criticisms against usage of the term, explanations of the term by advocates suggest that making it the basis of social policies will give the disadvantaged in society a better place in today's unequal society. While instances of social injustice can be found everywhere in the world, the poor country city is one area where it is most noticeable.

2.3.1.3. Social movements and social justice

From the mid 20th century, concerns about inequalities and injustices gave rise to civic actions among marginalized groups in Western countries oriented towards defending and improving their access to resources, incomes and services (Johnston *et al.*, 2000; Diani, 2003). It has been argued that mobilization for civic actions was possible because the relative affluence of the advanced industrialized countries had resolved the problems of production and distribution and had released political energies to focus on non-material issues and usually, it was the affluent middle class that were especially attracted to the movements (Inglehart, 1977, in Johnston *et al.*, 2000). Civil society groups have since proliferated in other parts of the world. Outside Europe and North America, the break-up of the Soviet Union and widespread democratization of the Third World are said to have resulted in the emergence of civil society as a critical arena for contemporary social change, leading to the proliferation of social movements in these regions of the world (Johnston *et al.*, 2000). Civic action groups include Non-Governmental Organizations (NGOs), grassroots movements and social movements.

Johnston *et al.* (2000:758) have referred to social movement as “the organized effort of multiple individuals or organizations, acting outside formal state or economic spheres” while Diani (2003:3) has defined social movements as “networks of informal interactions between a plurality of individuals, groups and /or organizations engaged in political or cultural conflict on the basis of a shared collective identity”. Social movements can, therefore, be regarded as civic action groups, made up of rational individuals acting in their self-interest. The demands of social movements may be focused on the state (e.g. the passage of new laws), economic actors (e.g. wage demands), on society as a whole (e.g. the changing of norms relating to race or sexuality) or any combination of these (Diani, 2003).

While in the past, social movements were largely associated with cities, they can now be found in both urban and rural settings. Rural-based social movements, which are common in Asia, Latin America and parts of Africa (Costoya, 2007) have usually focused on defending local people’s access to land and other environmental resources that impact on their livelihoods (Bendana, 2006). In some Latin American countries,

for instance, social movements have emerged in farming communities in opposition to capitalism and neo-liberal policies that promote private property but threaten local peoples' access to land and livelihoods (Bendana, 2006). Urban-based civil society movements, however, have included resistance to inadequate income and poor work conditions, resistance to slum clearance, and access to improved shelter and services (Costoya, 2007).

Johnston *et al.* (2000:758) have referred to urban social movements as “protests challenging state provision of urban social services and/or environmental regulations” with examples such as popular movements against expressways, movements to preserve neighbourhoods threatened by redevelopments and squatters' rights movements. In the 1960s and 1970s, urban social movements sprang up in neglected suburbs of many Western cities demanding improved conditions and services in their communities (Bendana, 2006) and today, urban social movements can be found in every Western society, “distinguished by their grassroots orientation and non-hierarchical mode of organization, their distance from and non-involvement in formal politics, and their emphasis on direct action and protests” (Pacione, 2005:444). Pacione (2005) has identified the three main goals of urban social movements as:

- Collective consumption issues (e.g. housing and urban services)
- Defence of cultural identity (e.g. physical threats to neighbourhoods) and
- Political mobilization (e.g. for control and management of local institutions).

Two of these goals are directly related to the focus of this thesis: First, the need of all urban residents - both rich and poor - for adequate waste disposal services (as discussed in this thesis) is related to the collective consumption goal of urban social movements which focuses on demand for better conditions of living including a safe environment, improved infrastructure and adequate services. Secondly, the defence of cultural identity relates to territorial integrity and the movement for environmental justice (see section 2.4) with regard to the location and management of waste disposal facilities.

2.3.1.4. Social justice and solid waste management in poor country cities

The concept of social justice provides a useful framework for the analysis of solid waste disposal service delivery in developing country cities. Solid waste generated in the cities can be regarded as a collective burden that needs to be managed while the service for waste removal can be regarded as a collective benefit of the urban society. In most cities, garbage collection is a duty entrusted to public funded municipal authorities and should, therefore, be extended to all areas of the city for the purpose of protecting human health and the natural environment and to promote human dignity (Schubeler, 1996). To achieve the objectives of waste management, and in line with the requirements of social justice, it becomes important to ensure that services for waste removal are fairly and equitably provided for all residents of the cities, irrespective of such variables as class, ethnicity or culture. Social justice in its different manifestations would require the organizers of solid waste disposal service to ensure fairness and equity in providing the service to the various segments of the populations within their jurisdictions. In other words, municipal authorities responsible for the organization of solid waste disposal have a social duty to ensure that all residents of the city, irrespective of social class, ethnicity or gender receive fair, equitable and adequate service for waste disposal to protect them from the nuisances associated with waste.

The review of studies on the solid waste situation in developing countries has shown that the organization of waste collection services is usually unfair and inequitable. While municipal authorities (and their waste contractors) are usually unable to undertake adequate waste collection in cities, their efforts are usually concentrated in the few high-income residential areas and official premises where they provide regular waste removal and ground cleansing service. On the other hand, low-income residential areas usually receive little or no service for waste collection (Kironde, 1999; Onibokun and Kumuyi, 1999; Hardoy *et al.*, 2001). Thus, there are usually great spatial disparities in environmental quality between rich and poor areas within cities so that while the wealthy populations usually enjoy patches of clean space and fresh air, the poor residents of the cities usually suffer health and life-threatening squalor. The literature is replete with examples of this nature as shown in Section 2.2.2 of this chapter. This class-based discrimination can be regarded as social

injustice as it provides one category of residents (the rich) a disproportionate share of a public service and causes another category of residents (the poor) to bear a disproportionate share of the burdens or nuisances associated with the non-collection of waste.

There are a number of grounds for making a claim for social injustice in waste management. In defence of their discriminatory practices in delivering waste collection services, some municipal authorities have argued that the rich residents of the cities pay for the regular services they receive while the poor are unwilling to, or cannot pay for waste disposal (Attahi, 1999; Devas and Koboe, 2000, cited in Hardoy *et al.*, 2001). However, some studies have shown that poor residents appreciate clean environments and are willing to pay for waste disposal if the service would be provided (Devas and Koboe, 2000, cited in Hardoy *et al.*, 2001; Namilyango College Study, 2001). Therefore, the excuse that the poor are unwilling to pay for waste disposal is not entirely valid. Moreover, it is often government policy that exempts poor urban residents from the payment of waste disposal levies (Armah, 1993; Attahi, 1999) so it is not justifiable to use their 'non-payers' status as reason to deny them good service. In addition, several studies have shown that the levies paid by the wealthy residents for their waste disposal services usually constitute just fractions of the actual costs of the services they receive which means that public funds are used to subsidize the service provided for the rich while the same cannot be said of the many low-income communities where the service is usually very poor or non-existent (Songsore and McGranahan, 1996; McGranahan and Satterthwaite, 2000). Even so, social justice calls for abstraction of wealth from the rich in order to provide for the poor so taxes paid by the rich could be used to subsidize services for the poor. In this regard, Armah (1993) has suggested a system of levies which allows cross subsidies from industrial and business sectors to the residential sector and from high-income areas to low-income areas in the cities yet this has not been heeded by most city authorities. It is also known that most municipal governments in poor countries depend heavily, some entirely on central government subventions (public money) to operate their waste management services (Armah, 1993; Kironde, 1999; Onibokun and Kumuyi, 1999) yet they discriminate in providing services for the rich and poor who should have equal claims to such a public funded service. The above analysis

provides adequate grounds for claiming social injustice in the waste management systems of developing country cities.

The causes of social injustice in the organization of solid waste management in poor country cities can be attributed to a number of factors including weaknesses in policy and its implementation at both the national and local government levels. In every country, the state is the primary institution whose policies and institutions contribute to social (in)justice. Through its policies and institutions, the state usually has a major influence on the allocation of public resources and services for the different segments of the population. This usually occurs through the policy guidelines provided and the institutional frameworks created to implement policies and programmes. Again, it is the state that sets the stage for the political economy of waste management in the country. Social justice in waste management, therefore, depends on how the delivery of this service is organized by the state including the kind of policies enacted, the institutional arrangements for service delivery, the role of the public and the allocation of resources for providing the service to those who need it. In many developing countries, studies have shown that inequitable services for waste management can be attributed to weak policy frameworks and a lack of resources for waste management. Developing countries generally lack policies on waste management (Namilyango College Study, 2001; Palczynski and Scotia, 2002) which means that municipal authorities have no guidance on issues regarding waste management. The lack of waste management policies coupled with resource scarcity and lack of capacity for waste management negatively affect the implementation of waste management programmes and delivery of waste collection services, causing most municipal authorities to limit their operations to a few city areas, usually the wealthy residential neighbourhoods and official grounds, while neglecting other areas in the cities.

Poor governance at the local government level further contributes to social injustice in waste management in poor country cities. While major policy decisions regarding waste management may be taken at the national level, local governments are usually responsible for translating these to direct projects that affect urban residents or citizens. In the cities, it is the local government agencies that apportion resources for general environmental management including waste disposal. In other words, they distribute the benefits of waste disposal among the various individuals and population

groups in the city. Miller (1999) has noted that if we are genuinely concerned about social justice, we must apply the principles of social justice to the sub-state institutions that individually or together produce distributive effects that range across society. The occurrence of social injustice can, therefore, be attributed to poor governance and lack of concern for fairness and equality among local governments in poor country cities.

2.3.2. Environmental justice and solid waste disposal

It is the basic right of all humans to live, work, learn and play in a clean, healthy, sustainable and just environment (Bullard, 2005). The way to achieve this is to ensure that environmental benefits such as clean water, fresh air and other resources are evenly distributed among all population groups while environmental burdens such as resource depletion, water, air and land pollution are minimized and evenly distributed over all population groups irrespective of such variables as class, income or location. Evidence from around the world, however, shows that the equitable distribution of environmental benefits and burdens among the various population groups is an ideal that is far from being achieved. The reality in most communities around the world is that vulnerable population groups such as the poor, women and ethnic minorities - people disadvantaged in terms of education, income and occupation - tend to live amid the worst environmental conditions while the more affluent members of society reside in clean and healthy locations where they enjoy clean water and fresh air (Shrader-Frechette, 2002; Local Government Brief, 2004; Bullard, 2005). Thus, while some population groups battle with health and life-threatening environmental conditions at the locations where they live, work, learn and play, others groups are protected from these harms. Furthermore, the disadvantaged groups are also frequently excluded from access to natural resources, access to information and participation in environmental decision-making on issues that affect them (Shrader-Frechette, 2002 Scholar, 2006). The spatial distribution of population groups into safe and unsafe locations, the unequal access to natural resources and participation in decision-making all occurs on the basis of such socio-economic factors as income, class and even gender, amounting to discrimination against the weak, powerless and vulnerable in society. This is regarded as environmental injustice.

2.3.2.1. Defining environmental (in)justice

Definitions of ‘environmental (in)justice’ abound in the literature with some focusing on the positive (environmental justice) and others on the negative (environmental injustice). Shrader-Frechette (2002:4) for instance defines environmental justice as entailing “both a more equitable distribution of environmental goods and bads and greater public participation in evaluating and apportioning these goods and bads”. This means environmental justice is basically concerned with equity in environmental matters including participation in the allocation of resources and burdens in a community. In 2003, participants of two workshops in Budapest on *Improving Environmental Justice in Central and Eastern Europe* deliberated on situations that could be regarded as constituting environmental justice. In a communiqué they issued at the end of the workshops, the participants noted that:

“A condition of environmental justice exists when environmental risks and hazards and investments and benefits are equally distributed without direct or indirect discrimination at all jurisdictional levels and when access to environmental investments, benefits, and natural resources are equally distributed; and when access to information, participation in decision making, and access to justice in environment-related matters are enjoyed by all”

(Local Government Brief, summer 2004:4)

Similarly, the United States Environmental Protection Agency (EPA) has referred to environmental justice as:

“the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people including racial, ethnic or socio-economic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of federal, state, local and tribal programs and policies”

(cited in Bullard, 2005:4).

From these definitions, environmental justice, therefore, seeks to promote the environmental rights of all citizen groups through their participation in environmental decision-making and implementation, equitable access to environmental benefits or resources and equitable distribution of the harms associated with human use and interactions with the environment. The concern for environmental justice, therefore, goes beyond the distribution of harms and goods. According to Schlosberg (1999:1) "... besides inequality, we must speak about recognition of the diversity of the participants and experiences in environmental justice". The view expressed by Schlosberg is also captured in the following statement:

"environmental justice is not only about inequalities in how environmental *goods* and *bads* are distributed but also about allowing diverse groups to participate in decision-making processes and balancing the distribution of power and responsibility"

(Local Government Brief, Summer 2004 edition: 4)

It can be deduced from the above definitions that environmental justice means more than equal distribution of environmental benefits and harms among different population groups: it also includes participation in the formulation, implementation and evaluation of environmental policies and programmes so far as these affect people where they live, work, recreate, learn or play.

Looking at the concept from the other side of the coin, environmental injustice is said to exist whenever and wherever the conditions for environmental justice are lacking. While definitions of it abound in the literature, the nature of environmental injustice is well captured in the following quote from the participants in the 2003 Budapest workshop:

"An environmental injustice exists when members of disadvantaged, ethnic, minority or other groups suffer disproportionately at the local, regional (sub-national), or national levels from environmental risks or hazards, and/or suffer disproportionately from violations of fundamental human rights as a result of environmental factors, and/or are denied access to environmental investments, benefits, and/or natural resources, and/or are denied access to information; and/or participation in decision making; and/or access to justice in environment-related matters"

(Local Government Brief, summer 2004:4)

The above definitions of environmental injustice and justice suggest that environmental justice is about participation in environmental decision making; participation in the implementation, monitoring and evaluation of environmental programmes or projects; and fairness in the distribution of environmental benefits and harms. In line with the idea of sustainable development, some writers have also referred to intergenerational environmental justice, calling on the present generation to conserve the environment for the wellbeing of future generations (Shrader-Frechette, 2002; Bullard, 2005). In this regard, the depletion of natural resources and irreversible environmental pollution by current generation would constitute acts of environmental injustice against future generations. Furthermore, there is growing concern about what may be referred to as ‘international environmental injustice’ with regards to such issues as the growing international trade in solid waste from affluent nations to poor nations (Coonan, 2006). The growing volumes of solid waste which are being shipped from rich countries to poor ones often contain substantial amounts of hazardous substances which become environmental hazards in the recipient countries. Such incidences have occurred in China, and the Ivory Coast (Coonan, 2006).

Like social injustice, environmental injustice is the result of lack of concern about the health and economic situations of vulnerable groups in society. Matsuka, (2003: online) has identified the causes of environmental injustice to be “institutionalized racism, the commoditization of natural resources [such as land, water and air], unresponsive, unaccountable government policies and regulations and the lack of resources, power and influence in affected communities”. Activists and advocates of environmental justice, therefore, focus on addressing these issues in order to prevent the occurrence of environmental injustice.

2.3.2.2. The principles of environmental justice

In the United States where environmental justice activism has been strongest, the following principles (drafted and adopted by delegates to the First National People of Color Environmental Leadership Summit in October 1991) are among the principles on which the movement operates. Among other things, environmental justice:

- Demands that public policy be based on mutual respect and justice for all people, free from any form of discrimination or bias
- Calls for universal protection from the disposal of toxic/hazardous waste and poisons that threaten the fundamental right to clean air, land, water and food
- Affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples
- Demands the right to participate as equal partners at every level of decision-making including need assessment, planning, implementation, enforcement and evaluation
- Protects the rights of victims of environmental injustice to receive full compensation and reparations for damages as well as quality healthcare
- Considers governmental acts of environmental injustice a violation of international law, the Universal Declaration on Human Rights and the United Nations Convention on Genocide

(First National People of Color Environmental Justice Leadership Summit, 1991).

Guided by these principles, the movement for environmental justice seeks to prevent the pollution of poverty or disproportionate concentrations of environmental burdens in minority and low-income communities (EJRC, 1996). The key principles of environmental justice are also reflected in the United States EPA's definition of the concept (quoted earlier).

2.3.2.3. The nature of environmental injustice

The nature of environmental injustice is that, consistently, people with low socio-economic status such as those in constrained economic situations or minority ethnic groups usually bear an unequal share of environmental harms that are associated with the socio-economic progress of human society. Environmental injustice occurs in many forms. It may involve the depletion or pollution of natural resources upon which people depend for survival (Shrader-Frechette, 2002; Bullard, 2005), the siting of polluting industries in poor neighbourhoods, or the dumping of toxic waste in low-income communities where the residents lack the resources and power to ward off pollution (White, 1998; Matsouka, 2003; Timney, 1998; Shrader-Frechette, 2002;

Bullard, 2005). Environmental injustice is both socio-economic and geographic in nature and usually denies the victims adequate access to resources and livelihoods.

In the United States, claims that neighbourhoods of the poor and people of colour are disproportionately polluted have led to a surge in academic and scientific inquiry into the issue, and the results indicate significant racial and economic disparities in the spatial distribution of risks (Goldman, 1993; Scorecard: online). According to Goldman (1993) racial discriminations were found in 87 percent of studies on environmental hazards, while income disparities were found in 74 percent of cases. Scorecard has reported that the perpetuation of environmental injustice has resulted in a situation where:

“the socio-economic stratification of American society is mirrored by disparities in several health indicators; the poor are generally less healthy than the rich, ... ; and people of colour suffer disproportionately from chronic diseases such as cancer, heart disease and diabetes; moreover, black workers are more likely to be employed in hazardous occupations resulting in serious illness and injury than white workers”

(Scorecard: online)

The growing evidence in support of environmental injustice has resulted in condemnation of the practice and the rise of the environmental justice movement. The quest for environmental justice was reflected in a 1993 speech by former President Clinton:

"When we talk about environmental [in]justice, we mean calling a halt to the poisoning and pollution of our poorest communities, from our rural areas to our inner cities. When our children's lives are no longer cut short by toxic dumps, when their minds are no longer damaged by lead paint poisoning, we will stop wasting energy and intelligence that could build a stronger, more prosperous America."

(Bill Clinton - June 14, 1993; cited in White, 1998:61).

In 2005, a countrywide review of evidence of environmental inequalities in the United States concluded that “most of the evidence indicates that there are disparities by race and class in the distribution of environmental hazards, whether defined by facility

location, emissions, ambient concentrations of air pollution, or environmental enforcement and clean-up activities” (Scorecard: online).

Evidence of environmental inequality exists elsewhere. According to Filcak (2004), the pollution of poor communities is common throughout Central and Eastern Europe and, indeed, throughout the world. In the Czech Republic for example, he observed that poor communities were choice locations for the siting of polluting energy firms and waste treatment facilities. As a result, residents of these communities bear more of the negative environmental impacts from waste treatment and energy production even though they generally use proportionately less of the energy produced. In her study of the water problem in Central Asia, O’Hara (2004) also observed that deprived sectors of the population such as the rural poor and those in disadvantaged geographical locations are denied a fair share of water resources, a situation which further widens the gap between the well-off and worst-off in the region. Furthermore, O’Hara found that while water bodies in Central Asia are generally polluted, communities living along the lower reaches of rivers and along the Aral Sea are disproportionately affected as they have more limited access to water which is also more polluted (O’Hara, 2004). In the Philippines, silt and toxic discharges from extensive open pit mining by multinational corporations are ruining the lands and waters of native people (Gidicks, 1993). According to the Centre for Environmental Concerns in Manila, mining companies dump around 160,000 tonnes of chemical-laced tailings into Philippines’ rivers and lakes every day. Runoff from the tailings is said to have contaminated rice fields, killed biological life in the rivers and lakes and led to severe health problems among the native Itogon people (Gidicks, 1993). Protests by the natives were met by government troops sent to protect the assets of the mining companies. The above are examples of situations of environmental injustice perpetuated against population groups who are disadvantaged in one way or another.

2.3.2.4. The environmental justice movement

Early in the twentieth century, mainstream environmentalists emphasised nature and largely focused on the protection of threatened forests, rivers and non-human species rather than protecting humans and their environments (Chamacho, 1998). Even in the academic community, environmental scholarship traditionally focused on such issues as whether to give rights to trees and rocks and whether nature had intrinsic or

inherent value (Camacho, 1998; Shrader-Frechette, 2002), an approach to environmental issues which has been referred to as biocentrism and ecocentrism (Shrader-Frechette, 2002:5). According to Camacho (1998), mainstream environmentalists did not fully recognize the fact that social inequalities and imbalances of power contributed to environmental degradation, resource depletion, pollution and environmental hazards that disproportionately impact the poor and other marginalized groups in society. There was, therefore, a general lack of concern over justice in the early environmental movement.

Grassroots environmental movements that later emerged began to notice society's most vulnerable groups and called for protection for their environments and eroding livelihoods (Shrader-Frechette, 2002; Bullard, 2005). Contrary to the 'biocentric' environmentalists, the grassroots environmental movements recognize that many communities faced environmental risks where they lived and worked and that vulnerable groups such as the poor, ethnic minorities, migrants, refugees and those in disadvantaged geographical locations consistently bore disproportionate levels of pollution and livelihoods depletion (White, 1998; Shrader-Frechette, 2002). Due to their constrained socio-economic situations, the victims of environmental injustice often lack the resources and political power to influence environmental decision-making to prevent pollution of their communities. Usually, support from activist groups and local leaders have been important in encouraging grassroots protests against environmental injustice which also lead to the formation of environmental justice movements (EJMs) (Shrader-Frechette, 2002; Bullard, 2005). In the United States, the EJM has been described as the "the confluence of three of the nation's greatest challenges" - the struggle against racism and poverty, the effort to preserve and improve the environment and the compelling need to shift social institutions from class division and environmental depletion to social unity and global sustainability" (Matsuka, 2003: online).

Since the 1980s, grassroots protest movements have emerged in countries around the world to confront environmental injustice and to organize oppressed communities to stand up for their fundamental rights to livelihoods and safe environments (Kiefer and Benjamin, 1993). Numerous examples of such grassroots environmental protest action exist. In the US, these include protests at Love Canal, Forest Glen and Algeld

Gardens where protesters successfully prevented the siting of polluting industries or toxic landfills (Elson *et al.*, 1990; Shrader-Frechette, 2002). In Algeld Gardens for example, *People for Community Recovery* successfully crusaded against the establishment of yet another landfill in an already waste-polluted neighbourhood while at Forest Glen, protesters compelled the federal government to respond by promising buyout offers to residents as well as financial aid from the Federal Emergency Management Agency (Elson *et al.*, 1990).

Outside the United States, examples of environmental protests include demonstrations on the mining island of Marinduque in the Philippines in April 1996. A mine tailings dam burst and spilled the tailings into two large rivers on which the local people relied for fish for their food and livelihood (Shrader-Frechette, 2002). The disaster, which affected fourteen villages and threatened twenty others, outraged the local people who mobilized to oppose the country's mining act and mining activities in general. Support from other native and environmental grassroots organizations along with church social-action networks mounted pressure on the government which led to the enactment of laws banning mining in the area for between fifteen and twenty-five years (Shrader-Frechette, 2002). Another example is the ongoing protest in India against the 'perpetrators' of a December, 1984 industrial disaster at Bhopal where poisonous gas leakage from a Union Carbide factory has since killed thousands of people and left tens of thousands more with lifelong diseases due to contamination of the local environment (Reuters, 2002).

In Nigeria, the Ogoni ethnic minority group in the Niger Delta provides an African example of grassroots environmental protest action. For many years, the operations of Shell, Chevron and other multinational oil companies in the oil-rich Niger Delta had caused extensive environmental damage to the homeland of the Ogoni people who were also denied a fair share of proceeds from oil extraction. In 1993, the *Movement for the Survival of the Ogoni People* (MOSOP), with over 300,000 members, was led by Ken Saro Wiwa (author, TV producer and environmentalist) in non-violent protest campaigns against the destruction of their land and water resources by the oil industry (Achebe *et al.*, 1995). The Nigerian military government cracked down on the protestors and arrested many of the Ogoni leaders including Ken Saro Wiwa. After a long period of detention, Ken and nine other leaders of MOSOP were charged with

incitement to violence and murder and were executed by hanging by the Nigerian military government on November 10, 1995. The execution of the leaders of MOSOP prompted international outrage and immediate suspension of Nigeria from the Commonwealth of Nations (Achebe *et al.*, 1995). In Columbia and the state of Wisconsin (United States) Gedicks (2005) reports that native communities organized themselves and made alliances with a wide variety of groups to publicize their situation and apply pressure on multinational mining, oil and logging corporations to stop the systematic displacement, dispossession, and in some cases, destruction of native communities for the purpose of resource extraction. In countries around the world, such grassroots and environmental action groups are consistently confronting institutionalized environmental injustices, and to protect oppressed communities and groups.

The movement for environmental justice is therefore growing from strength to strength and is founded upon the belief that the environment can shape our well-being, our potential, and capacity (Shrader-Frechette, 2002). While environmental justice activists believe that not everyone can live in a perfect environment with the best clean water and air, they also believe that no socio-economic group deserves to live in a polluted area that threatens their health due to discrimination (Timney, 1998; Filker, 2004). As pointed out by Bretting and Prineville, “environmental justice advocates are not saying take the poison out of our community and put it in another community. They are saying that no community should have to live with these poisons” (cited in Shrader-Frechette, 2002:12). Environmental justice advocates also believe that communities cannot grow when racism, prejudice, and discrimination - what Shrader-Frechette (2002) has referred to as “blights on the tree of life” - are manifest. The movement, therefore, calls for the prevention of environmental pollution and the concentration of pollution in any particular community.

While the mainstream and grassroots environmental groups have focused on different agendas in the past, there now seems to be a coalescing of efforts by the two groups and the environmental movement is increasingly being seen as an attempt to unite the concerns of both the environmental and civil rights movements (Camacho, 1998; Bullard, 2005). Camacho (1998) has observed that mainstream environmental organizations are beginning to understand the need for environmental justice and are

increasingly supporting grassroots groups in diverse ways including technical advice, direct financial assistance, fund-raising, research and legal assistance. In addition, many local governments are lending support to the call for environmental justice and in some cases have also elicited the cooperation of environmental industries (Shrader-Frechette, 2002). Successes have, therefore, been chalked which have brought justice to many communities that hitherto suffered undue environmental burdens. However, environmental injustice continues to be perpetuated against many disadvantaged population groups in countries around the world which means that enormous challenges still confront the environmental justice movement in the attempt to achieve justice for oppressed population groups and to promote social unity and environmental sustainability.

2.3.2.5. Environmental injustice and municipal solid waste disposal

Numerous studies show that in both rich and poor countries, residents of poor communities and disadvantaged geographical locations suffer environmental injustice in relation to waste disposal (Camacho, 1998; Hardoy *et al.*, 2001; White, 2005; Bullard, 2005). In the United States where there is a very high correlation between race and socio-economic status, communities of colour and ethnic minorities are frequently the major victims of environmental injustice (Timney, 1998; Wright, 2005; Bullard, 2005) and researchers have come up with significant evidence to support the claim that race is the central determining factor with toxic exposure from waste. Attention has therefore been focused on examining the racial composition and income levels of communities living near toxic municipal solid waste landfills and the demographics of hazardous waste facility locations (e.g. Heiman, 1996; Camacho, 1998; Timney, 1998; White, 2005; Bullard, 2005).

Elsewhere, researchers have found that the poor and other vulnerable groups such as women are also major victims of environmental injustice in relation to waste disposal (Grellier, 2004; Steger, 2004). In Africa, waste disposal environmental injustice is widespread. Consistently, as in other regions of the world, municipal authorities site their waste disposal grounds in the poorest communities in or around the cities (Attahi, 1999; Kironde, 1999; Hardy *et al.*, 2001). In keeping with Steger's (2004) observation in Central and Eastern Europe, the steady stream of garbage produced in the cities flow down the path of least resistance as the burden of waste is dumped on

the least empowered members of society. When viewed from an environmental justice perspective, it becomes evident that the socio-economic status of communities and their geographical locations are the key factors in determining where municipal authorities locate landfills and other waste disposal grounds. As noted by Steger (2004) the residents of wealthy urban communities often have the bargaining power and political influence to prevent waste facilities from locating in their localities but the poor do not. The broad picture, therefore, shows that waste is dumped on the poor. Chapter seven of this essay will relate the issue of social and environmental justice to waste management in the two study areas. The remaining of this chapter examines some global concerns and initiatives at addressing human settlement environmental problems generally, including the waste disposal problem, in developing countries.

2.4. Global concerns and initiatives on urban environmental issues

The worsening environmental conditions (such as slums, poor sanitation and waste disposal) in Third World cities have attracted attention at the global level and led to initiatives to address these problems. The 1972 Stockholm conference on the human environment was one such initiative. Before the 1970s, the United Nations' environmental agenda mainly focused on issues related to the green environmental agenda. It was the Stockholm conference that gave developing countries the opportunity to bring their own environmental problems to the fore and this led to greater internationalisation of the UN environmental agenda (Leitman, 1999). At this conference, the world's attention was drawn to the fact that in addition to the more global 'green agenda' issues, problems in the immediate living environment, especially in the poor countries, needed attention. This development led to the inauguration of the 'brown agenda', a term used to describe the occurrence of such environmental problems as poor shelter, indoor-air and water pollution, poor sanitation and waste accumulation in poor country cities (Leitmann, 1999; McGranahan and Satterthwaite, 2000; Elliot, 2006). Generally caused by lack of development and lack of access to infrastructure and services, the problems associated with the brown agenda create unsanitary conditions in the living environment and pose immediate threat to human health and the environment (McGranahan and Satterthwaite, 2000; Elliot, 2006). These problems are generally characteristic of poor country cities and are usually more concentrated in the neighbourhoods of the poor where environmental services are inadequate or lacking compared to the wealthier

neighbourhoods which generally have much better provisions for environmental maintenance (Devas and Korboe, 2000; Elliot, 2006).

The ‘brown agenda’ is often contrasted with the ‘green agenda’ which encompasses such environmental concerns as resource depletion, ecosystem disruptions, and global climate change (Elliot, 2006), problems that largely result from urban-based production, consumption and waste generation (McGranahan and Satterthwaite, 2000). Compared with the brown agenda, green agenda concerns are more regional or global in scale, have more dispersed and delayed impacts and threaten long-term ecological sustainability (Leitman, 1999; MacGranahan and Satterthwaite, 2000). Furthermore, issues on the green agenda are of greater concern in the developed countries rather than poor countries where the brown agenda is of most concern (Elliot, 2006). Aspects of the urban environment commonly emphasised in the two agendas are shown in Table 2.7 while Table 2.8 shows features of the problems on each agenda. The brown agenda problems such as poor water quality, inadequate sanitation and waste accumulation are interconnected and reinforce each other to create unsafe living conditions and threaten ecosystems especially in Third World urban communities of the poor.

Table 2.7. Aspects of the urban environment emphasised in the Brown and Green agendas

Aspect	The Brown Agenda	The Green Agenda
Water	Inadequate access and poor quality	Overuse: need to protect water sources
Air	High human exposure to hazardous pollutants	Acid precipitation and greenhouse gas emissions
Solid waste	Inadequate provision for collection and removal	Excessive generation
Land	Inadequate access for low-income groups for housing	Loss of natural habitats and agricultural lands to urban development
Human waste	Inadequate access for safely removing faecal materials (and waste water) from living environments	Loss of nutrients in sewage and damage to water bodies from the release of sewage into waterways

Source: adapted from McGranahan and Satterthwaite, 2002

Table 2.8. Features of problems on the Brown and Green agendas

Features of problems on the agenda	The Brown Agenda	The Green Agenda
Principal area of impact	Human health	Ecosystem health
Timing of impact	Immediate	Delayed
Scale of impact	Local	Regional and global
Worst affected group	Present generations	Future generations

Source: adapted from McGranahan and Satterthwaite, 2002

Another global initiative which can be regarded as addressing problems including those in the poor country city environment is the Millennium Development Goals (MDGs). The MDGs derive from earlier international development targets and were officially established at the 2000 Earth Summit where world leaders recognised the need to extend greater assistance to the world's poorest nations to enable them to improve the living conditions of their populations (OECD, 2008). It is evident from the list that many of the MDGs are linked with the concerns of the brown agenda which means that the achievement of the MDGs will require addressing the brown agenda concerns as well. For example, the aims to reduce child mortality, improve maternal health, eradicate malaria and other diseases and promote environmental sustainability cannot be achieved unless the large majority of urban residents in developing countries have access to adequate housing, sanitation and safe water as well as services for the safe removal and disposal of solid waste and human excreta. The two agendas (the MDGs and the Brown Agenda) are therefore conjoined and progress is required in both areas if the living conditions of the large majority of urban residents in poor countries are to be improved.

Agenda 21, a comprehensive plan of action and a blueprint to guide development into the 21st Century, also sought to address some important environmental issues including solid waste management. The importance accorded the solid waste problem is evidenced in the devotion of a whole chapter of the Agenda 21 document to discussing 'environmentally sound management of solid wastes and sewage-related issues' (UN, 2004). In this regard, the UN General Assembly affirmed that "environmentally sound management of wastes was among the environmental issues of major concern in maintaining the quality of the Earth's environment and especially in achieving environmentally sound and sustainable development in all countries" (UN, 2004: online). While the main aim of Chapter 21 is to address the waste problem

confronting the global community, the waste situation of developing countries is emphasised. Thus, all stakeholders, including national and local governments and their development partners, are called upon to work together to address the growing waste problem particularly in the cities of poor countries (UN, 2004). Participants at the Earth Summit agreed that the best starting point for the achievement of sustainable development was at the local level. In view of this, local governments were encouraged to draw up their own 'Local Agenda 21' (LA21) strategies with the participation of their citizens, and guided by the principle of sustainable development. Among the important issues that have featured on Local Agenda 21 plans of poor country cities are improvements in water quality, sanitation, solid waste disposal and slum settlements (UN, 2004).

In 2001 the United Nations commissioned the Millennium Assessment (MA) to assess changes to the world's ecosystems and the consequences of these change for human well-being. The report of the assessment showed that the exploitation of natural resources to meet growing demands for food, fresh water, timber, fibre and fuel was causing extensive changes to the world's ecosystems (Millennium Assessment, 2005). The assessment also found that the gains made in human progress and economic development have been achieved at a growing cost of ecosystem degradation and the pollution of environmental resources and services which are so critical for the survival and well-being of both present and future generations (Millennium Assessment, 2005). One of the ways in which the world's population is degrading ecosystems and their services is the improper disposal of waste, including hazardous waste, solid and liquid waste and human excreta (Hardoy *et al.*, 2001; Elliot, 2006). As noted by the MA report, "humankind produces a large variety of wastes that are introduced into the environment either by accident or by design" (Millennium Assessment, 2005:419). In poor countries in particular, the MA has drawn attention to the fact that improper disposal of waste commonly leads to the contamination of water bodies, wetlands and other sensitive environments, thereby, polluting ecosystem resources and reducing the services they render to the population (Elliot, 2006; Satterthwaite and McGranahan, 2000). Principally in the cities, improper disposal of solid waste threatens the sustainability of ecosystems and degrade the resources and services they provide for human well-being and survival. In

this regard, the ability of many peri-urban ecosystems to sustain future generations can no longer be taken for granted.

In spite of the efforts to promote healthy environments in poor country cities, and notwithstanding the enormous support from both the United Nations and bilateral development agencies towards this objective, poor countries appear unable to tackle the problems associated with the urban environment and many of their residents continue to endure unsanitary living conditions and lack adequate access to basic infrastructure and services including potable water, sanitation and waste disposal. In other words, the worsening environmental conditions in the cities, the “retreat of poverty” (Elliot, 2006:21) into particular health and life-threatening geographical locations (such as slums and unstable sites), and the widespread lack of access to basic infrastructure and services in the cities shows that poor countries are generally unable to achieve the goals of such agendas as the MDGs, Local Agenda 21, the Brown Agenda and the recommendations of the Millennium Assessment.

The above initiatives can be regarded as efforts to promote sustainable urbanisation (the application of sustainable development in the urban context) especially in poor countries. The quest for sustainable urbanisation is based on recognition of the strategic role of cities in promoting socio-economic development, and the daunting challenges of rapid urban growth which also need to be tackled (UN-Habitat, 2002). The double-edged-sword nature of cities is also captured by Cedric Pugh when he notes that:

“Cities are the engine of economic growth and provide jobs, services and the promise of a better life. The rapid growth of cities, however, with the associated concentration of industries, motor vehicles and impoverished slums, can be a threat to health, the environment and the ecological resource base, and to the urban economy itself, thus negating the opportunities urbanisation can offer” (Pugh, 2000: x).

If developing country cities are to be sustainable and promote the welfare of their residents, urban governments must be able to work out the daunting problems of governance, social and institutional change, infrastructural development and service

provision, poverty reduction, pollution control and environmental management (Pugh, 2000).

Sustainable urbanisation is, therefore, an attempt to address the phenomenon of urbanization from a sustainable development approach. In this regard, it could be defined as urbanisation that meets the needs of current urban populations without compromising the ability of future urban populations to meet their own needs. To achieve this, cities must be able to provide for both current and future generations such things as shelter, food and water, employment, education, healthcare and healthy living environments, all in a context of good governance. It becomes evident then, that sustainable urbanisation is a “multi-dimensional process” which aims to address not only the environmental problems associated with cities, but also the socio-economic, political and institutional concerns (Atkinson, 2001; Elliot, 2006). Sustainable urbanisation also encompasses the linkages between cities and their environments, at local, regional and global levels (UN Habitat, 2002). This means that the sustainability of urban settlements in general cannot be achieved by treating them in isolation (Elliot, 2006). Programmes aimed at promoting sustainable urbanisation must therefore embrace the relationships between all human settlements in the rural-urban continuum in addition to addressing all aspects of sustainability within the context of the opportunities and challenges posed by the massive scale of global urbanisation (Atkinson, 2001; UN-Habitat, 2002).

Since its popularisation in the 1990s, the concept of sustainable urbanisation has been adopted by the UN-Habitat and its partners including national and local governments, civil society, international organisations and urban practitioners as a common framework for jointly addressing the problems associated with rapid urbanisation, particularly those associated with the brown agenda (Elliot, 2006). While there is little to show for the rhetoric on promoting sustainable urbanisation in poor countries (Hardoy *et al.*, 2001; Atkinson, 2001; Satterthwaite and McGranahan, 2002; Pacione, 2006), the notion can generally be regarded as providing a useful framework for addressing the daunting challenges of rapid urbanisation. In this regard, programmes aimed at tackling the problems associated with rapid urbanisation such as the Sustainable Cities Programme, Agenda 21 (especially Goal 7) and the Habitat Agenda can be regarded as part of the overall agenda for sustainable urbanisation. In order to

achieve sustainable urbanisation in poor countries, substantial efforts are required in both policy and practice to address the problems of infrastructure, shelter, sanitation and waste disposal among others.

This chapter has reviewed the literature related to the various themes in the study. These include concepts related to waste and waste management; the solid waste problem in developing countries; the concepts of social and environmental justice and their relevance for examining the issue of waste management as well as global concerns and initiatives for the promotion of healthy human settlements. The next chapter is devoted to presenting background information on Ghana generally, and the two study sites, namely Accra and Sekondi-Takoradi.

CHAPTER THREE

BACKGROUND INFORMATION ON GHANA

3.0. Introduction

This chapter presents country information on Ghana, describing the broader physical, demographic, socio-economic and urbanisation contexts within which the research problem is embedded. The challenges of urbanisation and the problems of the urban environment are also examined, followed by a description of the study areas – Accra and Sekondi-Takoradi.

3.1. The physical context

Ghana is centrally located on the West African coast, bordered by Togo to the east, Cote D'Ivoire to the west and Burkina Faso to the north (Appendix 10). With a total land area of some 239,460 sq. km, the land generally consists of low plains with a dissected plateau in the south-central area and scattered areas of high relief. Lying just above the equator, Ghana has a tropical climate with mean annual temperatures ranging between 26°C and 29°C but temperatures are generally higher in the north than in the south (Ghana Meteorological Services Department (MSD), 2006). Both the amount and distribution of rainfall vary across the country and generally decline towards the north. Total annual rainfall ranges from about 1,100 mm in the north and south-east where Accra, one of the study areas is located, to about 2,100mm in the extreme south-west where Sekondi-Takoradi the other study area is also located (Dickson and Benneh, 1988). The associated vegetation types are wooded grasslands in the north and along the south-east coast, and forest in the south. Ghana is endowed with a rich natural resource base including minerals, forest products and water resources which earn some foreign exchange for the country and support local industry. The fairly fertile lands and favourable climatic conditions in the country also support crop cultivation in most parts of the country.

Ghana is confronted by a number of environmental issues including recurrent drought in the northern savannah lands which frequently leads to crop failure and food shortage. Food security is, therefore, a major problem in the northern part of the country where the level of poverty is also highest. In many areas in the north, the

intensive cultivation of crops, animal grazing and frequent bushfires cause widespread destruction of plant and animal life and expose the fragile soils thereby promoting land degradation in an already stressed climatic environment. In the humid forest areas in the south, the 'slash-and-burn' system of farming, exploitation of timber and fuel wood and polluting activities of mining companies are major causes of environmental destruction.

3.2. The population

3.2.1. Spatial distribution and settlement

Ghana's 20 million plus population is unevenly distributed over ten administrative regions (Figure 3.1). Generally, the southern coastal and forest regions are more densely settled than the northern savannah lands (Figure 3.1). Data gathered for the 2000 population census shows that the Ashanti Region has the largest share of the national population (19.1 percent) followed by the Greater Accra Region (15.4 percent), Eastern (11.1 percent) and Western (10.2 percent) with the remaining six regions having less than 10 percent each (Ghana Statistical Service, 2002). The Upper-West and Upper-East Regions in particular have very low shares of the national population (3.0 and 4.9 percent respectively) (GSS, 2002).

The spatial disparities in population distribution are caused by historical, environmental and political factors. Along the coast, fishing encouraged early settlement but it was trade with European merchants starting in the 15th century that attracted more people to the area and provided the impetus for urban settlement growth. After British colonial rule which ended in March 1957, the development of infrastructure and the creation of administrative centres have greatly contributed to the further urbanisation of Ghana's coastline. From east to west, major urban centres in coastal Ghana include Keta, Ada, Tema, Accra, Winneba, Cape Coast and Sekondi-Takoradi. In the forest region, cash crop farming, mining and trade were among the major factors that first promoted urban developments (Dickson and Benneh, 1988) but the creation of administrative centres and expansion of modern infrastructure have greatly contributed to the process in recent decades. Kumasi, Koforidua, Sunyani, Ho and Obuasi are presently among the important urban centres in the forest region of Ghana. Unlike the south, northern Ghana had no particular opportunities to attract

population or encourage early urban development. A few centres, however, developed as capitals of early kingdoms including Yendi, Wa, Bawku and Bole while others have developed as administrative centres after independence including Tamale, Navrongo, Bolgatanga, Tumu and Lawra.

Fig. 3.1: Ghana: Administrative regions and distribution of large settlements



Source: Adapted from Owusu, G 2005.

Besides the above factors, policies pursued by the British colonial administration before Ghana's independence favoured the south and kept the north relatively underdeveloped and, therefore, unattractive to population and settlement. The colonial administration regarded the north as a supplier of cheap manual labour for the cocoa, oil palm and mining industries in the south. The north was, therefore, kept undeveloped in order to sustain the flow of cheap labour. For instance, while the south benefited from secondary, technical and vocational institutions, school education in the north was limited to the primary level to prevent the people from acquiring qualifications that could take them out of the labour reserve (Claveland,

1991). After independence, successive governments have also done little to bridge the gap between the north and south. The north, therefore, still lags behind in socio-economic development and so remains unattractive to settlement and investment. Thus, the skewed spatial distribution of settlements in Ghana has been influenced by a combination of physical, historical and political factors.

With regard to urbanisation, the Greater Accra Region has an overwhelming proportion (87.7 percent) of its population residing in urban areas with the Ashanti Region being the only other region with more than half its population (51.3 percent) in urban settlements. All the other regions have less than 40 percent of their populations in urban settlements, with the two Upper Regions having less than 20 percent each in urban areas. Within the regions, the capital towns are particularly attractive to population due to their relatively better infrastructure and services and the economic opportunities they are perceived to offer. The concentration of population in the urban centres, however, leads to overcrowding and pressure on the limited infrastructure and services. The limited and poorly maintained infrastructure together with inadequate provisions for environmental services leads to rapid deterioration of environmental conditions in urban centres in the country. Particularly in the large cities like Accra, Kumasi, Sekondi-Takoradi and Tamale where population and business activities are concentrated, the inability of the authorities to provide adequate infrastructure and services for the maintenance of the city environments results in appalling environmental conditions.

3.2.2. Age structure of the population

Typical of a developing country, Ghana has a very youthful population. In the 2000 population census, the proportion under 15 years constituted as much as 41.3 percent of the total population while those in the 15 to 64 years bracket formed 53.7 percent. Those above 65 years constituted only 5.3 percent of the national population (GSS, 2002). The youthful nature of the country's population suggests that population growth rate will remain high in the future with rising levels of urbanisation. The growing concentration of population in the cities will further increase pressure on existing infrastructure and services. Furthermore, the associated production and consumption activities of the growing urban population will generate increasing

volumes of waste which could worsen the already bad solid waste situation in the cities.

3.2.3. Educational attainment and employment

The level of literacy and educational attainment are both low in Ghana. Even though English is the country's official language, only 12.7 percent of the population of 15 years and older were literate in English while 34.2 percent were literate in both English and a Ghanaian language per the 2000 census. According to the 2000 census data, the remaining 46 percent of the adult population were unable to read and write any language (GSS, 2002). With regard to formal school education, 43.4 percent of the population six years and above had no formal education in 2000 while a similar proportion (43.9 percent) had only basic education up to year nine (junior secondary school). According to the census report a further 9.7 percent had up to secondary education⁵ while 2.2 percent of the population in the school-going age group (six years and above) had attained tertiary (university or polytechnic) education (GSS, 2002).

The literacy rate and educational attainment among the population can significantly affect the success of environmental awareness programmes aimed at improving waste management. Information about waste disposal, including labels on waste containers and educational campaign leaflets such as those issued by the Ghana EPA, are usually transmitted in written form and so the ability to read and understand such information is very essential for the effective participation of citizens in the waste management programme of cities. Furthermore, formal education generally sensitises people on environmental hygiene and the dangers of improper waste disposal. The current poor waste disposal attitude of the Ghanaian public can largely be attributed to the low literacy rate and educational attainment in the country which adversely affects the environmental attitudes of the population. Apart from that, educational attainment also affects the structure of employment (formal and informal) among the population with implications for the success of the tax regime. People with formal education tend to find employment in the formal sector where incomes are easy to tax at source while the majority of those without formal qualifications work in the informal sector where

⁵ Secondary education here includes senior secondary, technical, vocational, teacher, nursing and agricultural training colleges

incomes generally escape taxation even though these may be higher than formal sector incomes. According to the 2000 Housing and Population Census, only a small proportion (about 19.6 percent) of the economically active population were employed in the formal sector while the large majority of Ghanaians worked in the informal sector where incomes generally escape being taxed (GSS, 2002). Such an employment structure, therefore, poses constraints to revenue mobilisation for urban infrastructure development and service delivery including waste management.

3.3. The economic context

In 2005, Ghana had a per capita income equivalent of US\$ 600, roughly twice that of the poorest countries in West Africa and much higher than its oil-rich neighbour, Nigeria (CIA, 2008). Socio-economically, this makes Ghana one of the better-off countries in the sub-region (Aryee, 2001). The relatively better socio-economic standing of Ghana within West Africa is usually attributed to the much praised 'successful implementation' of World Bank/IMF-sponsored structural adjustment policies from the early 1980s (Aryee, 2001; Songsore *et al.*, 2005). In spite of claims that the implementation of structural adjustment policies has put Ghana on a sound economic footing, the country remains poor and is still heavily dependent on external financial and technical assistance. The domestic economy is greatly dependent on the primary sector (especially agriculture which provided 56 percent of employment in 2006 and contributes the bulk of the country's Gross Domestic Product (GDP) but services and industry are also important (CIA, 2008).

Ghana's major export crops include cocoa, timber, oil palm, coffee, cotton, *shea* nuts and copra. While these are mostly exported in their raw state, they are also increasingly being processed by local industries for both local and foreign markets. A wide variety of food crops are also produced by the country's farmers including cereals, cassava, yams, cowpea, peanuts, plantains, bananas and vegetables, the consumption of which generates large quantities of organic solid waste especially in the cities. The commercial and services sectors are also important, contributing as much as 29 percent of employment and 37.5 percent of GDP in 2006. Besides, these sectors of the national economy are major contributors to the growing volumes of solid waste in the country's towns and cities. As a non-industrialised country, Ghana's

industrial sector is dominated by small-scale manufacturing firms including food processing, breweries, furniture making, clothing and leather works, building and construction works. In 2006, the industrial sector employed 15 percent of the work force and contributed 25.3 percent of GDP (CIA, 2008). While the industrial sector generates only a small proportion of the solid waste in the country (AMA sources) this proportion is on a gradual increase and includes materials like plastic and metal which are difficult to dispose of.

Due to the slow rate of economic expansion, estimated at 4.5 percent per annum (CIA, 2008), unemployment remains high in the country with many school leavers finding it difficult to get jobs. The 2008 estimated rate of unemployment is 11 percent which is much higher than what pertains in Nigeria (5.8 percent) but lower than in Ivory Coast (13 percent) and Mali (14.6 percent) (CIA, 2008). The proportion of the population below the poverty line (living on less than US\$1 a day) was estimated to be 28.5 percent in 2007 (CIA, 2008). Among other things, the slow rate of economic expansion affects the ability of both national and municipal governments to provide infrastructure and services for the rapidly growing population, thereby worsening the living conditions of the people.

3.4. The political and administrative context

After independence in 1957, Ghana was plunged into a period of political instability as military and civilian regimes took turns to rule the country until 1992 when a new constitution was approved to restore multi-party constitutional democracy. Compared to her neighbours in the West African sub-region, Ghana currently has an enviable political standing. In recent decades, the country has achieved greater peace and political stability than most if not all countries in the sub-region. This is in addition to the successful conduct of five consecutive general elections since 1992. These developments have earned the country such titles as ‘island of peace in West Africa’ and ‘beacon of democracy’ in West Africa.

In spite of Ghana’s relative peace and stability for more than two decades, little has been achieved with regard to urban planning and environmental management. Urban growth has been chaotic while basic infrastructure and services are lacking. Much of

this situation may be blamed on the political instability that characterised the country before 1992. Successive governments were often unable to complete their development projects before they were removed from office and this slowed the socio-economic progress of the country. Recent governments also fail to take advantage of the peace and political stability that now prevail in the country to promote urban development and maintenance. Among other things, resource scarcity, the lack of capacity and frequent replacement of public officials with every new government greatly affect urban planning and management including the provision of infrastructure and delivery of environmental services.

3.5. Urbanisation in Ghana

Rapid urbanisation in recent decades has resulted in an enormous increase in the proportion of Ghana's population residing in urban centres with a corresponding increase in the number of urban settlements in the country. Data published by the GSS in 2002 shows that the urban share of the total population increased from 23 percent in 1960 to 44 percent in 2000 (Table 3.1). During the same period, the number of urban settlements⁶ in the country increased from 98 to 364. In the 2000 census, the total urban population stood at nearly 8.3 million representing 43.9 percent of the national total of 18.9 million (Table 3.1). From this, it would be a safe projection to place the current level of urbanisation in the country well beyond 40 percent. In spite of the rapid growth of urban settlements in Ghana, most of them remain small by world standards. As shown in Table 3.2, even the Accra metropolitan area (AMA), the largest urban agglomeration in the country, recorded just a little over two million people in the 2000 census followed by Kumasi as the only other city that recorded over one million people. All other settlements in the country recorded less than 300 thousand people in the 2000 census.

⁶ In Ghana, a settlement with a threshold population of 5000 is regarded as urban

Table 3.1: Trends in urban population growth in Ghana, 1948 to 2008

Year	Total population	Percentage urban	No. of urban settlements
1960	6,744,234	23.0	98
1970	8,555,211	28.9	135
1984	12,296,081	31.3	203
2000	18,912,079	43.9	364

Source: Ghana Statistical Service, 2000 Population and Housing Census (2002)

Table 3.2: Ghana: Population growth in the ten largest cities, 1970 to 2000

City	Total Population		
	1970	1984	2000
Accra Metropolis	634,809	1,005,834	2,045,125
Accra Central	624,091	969,195	1,658,937
Kumasi	346,336	496,628	1,170,270
Sekondi-Takoradi	143,977	188,203	289,593
Tamale	83,653	135,952	202,317
Ashaiman	22,549	50,918	150,312
Tema	60,767	100,052	141,479
Obuasi	31,005	60,617	115,564
Koforidua	46,235	58,731	87,315
Cape Coast	56,601	65,763	82,291
Wa	13,740	36,067	66,654

Source: Ghana Statistical Service. 2000 population and housing report.

Special report on urban localities

The rising level of urbanization in the country has generally been attributed to demographic factors of rural-urban migration and natural population increase within the urban areas (GSS, 2002; Songsore, 2003). The vigorous urban industrial development programme of Kwame Nkrumah's (Ghana's first post-independence Prime Minister) created economic opportunities in the cities and made them great attractions that set off massive rural-urban migration in the country. Furthermore, the general lack of opportunities in the rural areas, due to their neglect in the development process, is a push factor that encourages rural urban migration. According to Songsore (2003), natural increase has also been a significant factor in the overall growth of

population in both rural and urban areas in the country, especially after independence when migrations to the towns were becoming more long-term and permanent with wives accompanying husbands (Songsore, 2003).

Another explanation for the rising level of urbanization in Ghana is the reclassification of settlements. Ghana's definition of 'urban' as a settlement with a threshold population of 5000 means that villages and towns attaining this threshold are reclassified from 'rural' to 'urban'. This is evident from Table 3.1 as the number of urban settlements in the country increased greatly from 98 in 1960 to 364 in 2000 with a corresponding increase in the proportion of the urban population from 23 percent to 43.9 percent (GSS, 2002). Recently in late 2007 when the field work for this study was underway, the Ministry of Local Government embarked on the creation of new districts with capitals. The establishment of new capital towns was an indication that more settlements had been upgraded from rural to urban status which will further increase the number of urban settlements. New district capitals usually receive seed capital to upgrade their infrastructure and services to levels that befit their status. As new centres of administration, they, therefore, become growth poles with enormous attraction to the populations in the surrounding rural areas. It is, therefore, expected that the creation of these new centres will further increase the urban population in Ghana.

In a rather poor country like Ghana where cities lack adequate infrastructure (e.g. housing, roads, health and educational facilities), jobs and services for environmental maintenance (e.g. water, sanitation and waste disposal), rising urbanisation will worsen not only the socio-economic conditions of urban residents but also the environmental conditions in which they live, work, learn and pray. As the urban populations grow, their production and consumption activities generate increasing volumes of waste in a system that already has a frustrating waste situation.

3.5.1 The challenges of urbanisation in Ghana

Due to the unmanaged urban growth process, urban settlements in Ghana are characterised by challenges of a demographic, socio-economic and environmental nature. Rapid population growth is a major challenge in Ghana and seems to be a root cause of many other problems in the cities. The current fertility rate of 4.5 births per

woman is the lowest in the West African sub-region yet it translates into a national population growth rate of 2.6 percent per annum and the urban population is growing even more rapidly at about 4.1 percent per annum (GSS, 2002). The rapid growth of urban population is exerting mounting pressure on the limited infrastructure and services in the cities. Major cities in Ghana are, therefore, characterised by acute shortage of housing, traffic congestion and overcrowding in hospitals, schools, banks and other service facilities. Services for maintaining the urban environment such as water, sanitation and waste disposal are also overstretched leading to unsanitary environmental conditions in the cities with implications for public health and the environment. Besides the problem of population pressure, Ghanaian cities are also confronted by socio-economic problems. Associated with the weak national economy are low productivity, rising levels of unemployment and underemployment, poverty and destitution in the cities. The economic hardships faced by urban residents are pushing many people into social vices like crime and prostitution (Songsore, 2003). The high levels of unemployment among the youth can be attributed to the lack of educational qualifications and skills while a large proportion of the elderly owe their 'unemployed' status to the large scale retrenchment of public sector workers in the 1980s as part of World Bank/IMF Structural Adjustment measures (Songsore, 2003). In a situation where the large majority of urban residents lack jobs and incomes, little tax revenue can be mobilised for the provision of public services such as solid waste collection and sanitation.

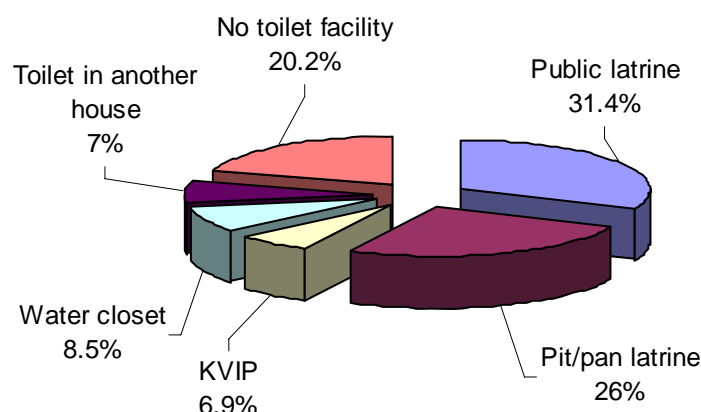
Furthermore, urban settlements in Ghana are characterised by a plethora of environmental problems including unplanned developments, poor drainage, inadequate sanitation, slum developments and very poor traffic situations. The failure to plan and control the rapid growth of urban settlements has resulted in chaotic physical development in the cities. Among other things, acute shortage of housing and high cost of rented accommodation in the cities is pushing many people to build their own houses while others are encouraged by the prospects of high profits to invest in housing development. Housing and other developments are, therefore, occurring rapidly around the cities but urban management institutions such as the Town and Country Planning Department (T&CPD) and the municipal assemblies seriously lack the resources to plan and control these developments. As a result, much of the recent housing developments in the cities are unplanned and many are occurring in areas for

which no land use plans have been prepared. This situation is causing chaotic urban development in the country with negative consequences including poor road access within the cities which impede the provision of utilities, emergency and environmental services including waste collection.

Urban settlements in Ghana also have serious drainage problems. The poor layout and unplanned developments that characterise cities in the country block drainage channels and impede the free flow of flash waters associated with torrential rains in the rainy season. Furthermore, indiscriminate waste disposal activities of the general public, such as littering and dumping of refuse into drains and streams, often lead to the blockage of existing drainage channels and gutters leaving no way for storm water to flow out of the cities. During periods of prolonged heavy rainfall, which are common in the rainy season, many streams and drains overflow their banks and flood waters gush through houses and roads causing damage to property and sometimes claiming lives. In many low-lying areas of cities like Accra, Kumasi, Sekondi-Takoradi and Tamale, floods have become annual events due to the poor drainage systems.

The sanitation situation in most Ghanaian cities is also far from satisfactory. Figure 3.3 shows the type of toilet facilities available to the Ghanaian population as recorded during the 2000 housing and population census, indicating that over one-fifth of the population had no toilet facility. According to the census report, the water-closet toilet, which was available to only 8.5 percent of the population in 2000, is not common in Ghanaian households because of the high cost of construction and the need for piped water for its use. In their study of environmental health burdens in Accra and Tema, Songsore *et al.* (2005) found that, as a general rule, wealthy, planned areas which are fully developed, tended to have little sanitation burden because of adequate provision of water and in-house toilet facilities. In contrast, the highly populated and crowded low-income communities in the city tended to bear the worst sanitation burdens, due to the relatively poor sanitation facilities including public toilets and in-house bucket latrines.

Figure 3.2: Toilet facilities available to Ghanaians in 2000



Source: Ghana Statistical service, 2002

The lack of adequate toilet facilities in low-income areas in the cities often gives rise to open defecation in bushes, on beaches, along roads and drains and the use of the ‘wrapper method’ which involves the careless disposal of faeces in black polythene bags (Songsore *et al.*, 2005). As a result, the environmental burdens associated with sanitation are more concentrated in the low-income areas of the cities with implications for public health. For instance, in Accra and Tema, Songsore *et al.* (2005) found that infectious diseases like diarrhoea, dysentery and skin diseases were more prevalent in poor communities without adequate access to toilet facilities and waste disposal, especially among children under six years of age.

Apart from the above challenges, the urban landscape in Ghana is characterised by slum settlements which are homes to the urban poor. Located on unsuitable lands at the outskirts and some inner city areas, the slums are generally characterised by substandard housing, poor sanitation and waste accumulations which create unsanitary environmental conditions. The inner city slums are mostly occupied by poor indigenes, while those at the outskirts of the cities generally accommodate recent migrants to the cities.

Major urban settlements in Ghana are also saddled with a worsening traffic situation. Traffic congestion is currently a major problem in Accra and Kumasi and is fast showing up in other cities as well including Tema, Sekondi-Takoradi and Tamale. In the Central Business Districts of these cities, road travel is characterised by slow

speed, longer trip times and increased queuing. The growing traffic problem can generally be attributed to poor road designs and the fact that road developments in the cities have not kept pace with increases in population and use of motor vehicles. The limited capacity and poor quality of public transport in the country is encouraging private vehicle ownership among a fast-emerging middle class. In Accra and Kumasi, for example, it is suggested that over 60 percent of all vehicle journeys are undertaken by private cars (Tamakloe, 2006) and this proportion keeps increasing. Private cars are used for all kinds of journeys: for work, shopping and for social journeys. Unlike buses, however, these private cars do not economise the use of road space and so contribute to congestion and slow traffic. The situation is further compounded by the activities of street hawkers who literally besiege the roads as they sell their products to motorists and passengers in traffic. Among the many negative effects of the poor road design and chaotic traffic situations in the cities is the difficulty of getting access to many waste collection points in the cities. The slow traffic also leads to longer trip times for waste collection trucks, thereby increasing their fuel consumption and hence the cost of waste management.

3.6 Framework of local government and institutional responsibilities for urban solid waste management in Ghana

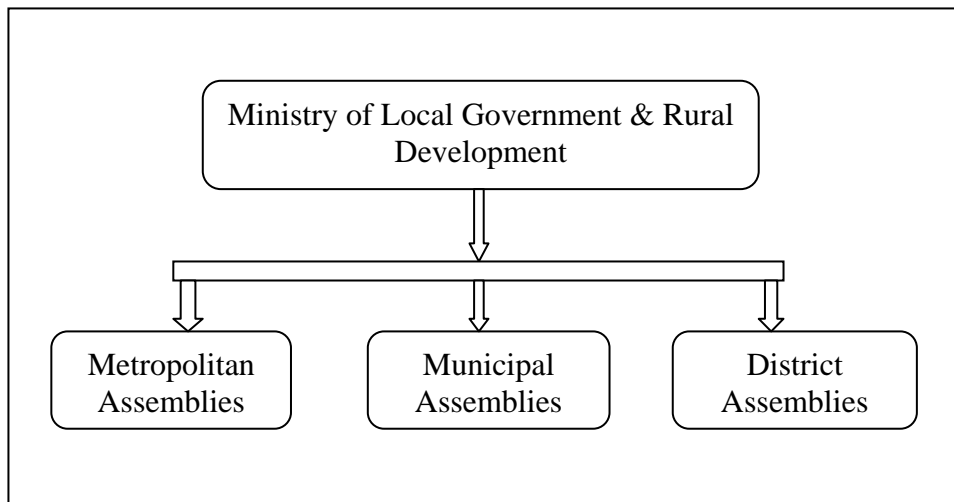
Administratively, the country is divided into ten regions (Figure 3.1) with each region further divided into districts which are commonly referred to as assemblies. Depending on their population size, the assemblies are classified as ‘metropolitan’ (more than 250,000 people), ‘municipal’ (between 95,000 and 250,000 people) or district (between 75,000 and 95,000 people). Currently, there are 170 assemblies made up of six metropolitan, 40 municipal and 124 district assemblies. The metropolitan, municipal and district assemblies (MMDAs) are the basic units of local administration and form the framework for the country’s local government and decentralization programme which began in the early 1990s. Under the decentralised local government system (Figure 3.2), the Ministry of Local Government and Rural Development provides broad policy frameworks within which the MMDAs perform deliberative, legislative and executive functions which include the:

- overall development of the areas in their jurisdictions.
- mobilization of resources for the development of their localities

- development of basic infrastructure and provision of services
- development and management of human settlements and the environment
- promoting and supporting productive activities and social development
- maintenance of security and public safety
- ensuring ready access to the courts and for the promotion of justice

The responsibilities are huge and therefore require enormous financial, logistical and human resources which are not readily available.

Figure 3.2: Framework for local government administration in Ghana



Within urban settlements in the country, decisions regarding the organisation of solid waste management, such as what level of service to provide in different areas, charges for the service and who should provide the service, are made by the various MMDAs and implemented by their Waste Departments (in the metropolitan Assemblies) or Water and Sanitation sub-departments (in the municipal and district assemblies). Based on the recommendations of the Ministry of Local Government and Rural Development, major cities in the country operate a three-tier system of waste collection whereby high-income areas are provided a weekly house-to-house collection service while middle-income areas are provided a weekly kerbside collection. All communities designated as low-income are provided communal containers which are to be emptied on a daily basis. On account of their illegal status, squatter settlements in the cities do not benefit from waste disposal and other

environmental services like sanitation and water supply. Spatial variations in environmental quality across the cities closely reflect the hierarchy of waste disposal services provided for different socio-economic groups, with the higher-income residents living in cleaner environments while the poor live in squalid conditions. The inability of the assemblies to provide the necessary infrastructure and services in the settlements within their jurisdictions result in poor environmental conditions in the settlements which greatly undermine the standard of living of the people.

3.7 The study areas

Two Ghanaian cities, namely Accra and Sekondi-Takoradi, were selected for the empirical investigation of the urban solid waste problem in the country. The following section presents the profiles of these two cities including their physical, human, economic and environmental characteristics.

3.7.1. Accra

Located on the south-east coastal plains of Ghana (Appendix 10), Accra is the capital city and largest urban centre in the country. The city is linked to the rest of the country by road and to a limited extent, by rail. Its present site was occupied by villages of the *Ga* people when European merchants first visited the area in the late 15th century (Adu-Boahen, 1975). Three separate trading posts built by the Dutch (Usher Town), Danes (Christianborg) and English (James Town) (all later acquired by the English in the 19th Century) grew and gradually coalesced to form Accra which later became the capital of the Gold Coast (Ghana's name before independence). Accra remained the capital city when Ghana gained political independence from British rule in 1957. After independence, infrastructural development was rapid including the development of roads, government offices and accommodation, schools, health centres and recreational facilities. The development of infrastructure and services and the creation of job opportunities made Accra an attraction and induced an influx of population from all parts of the country and beyond. Since becoming the capital city, Accra has grown rapidly to engulf many surrounding rural settlements which now nest within the city as 'urban villages' (Songsore, 2003).

According to the GSS (2002), the metropolitan area of Accra accounted for about 25 percent of the country's urban population and contributed approximately 20 percent

of the gross domestic product (GDP) in 2000. Accra also employs about 10 percent of the national workforce and one-third of the national urban workforce (World Bank, 2007). The Accra metropolis houses the majority of Ghana's industries and is the headquarters of most financial institutions, government ministries, NGOs and multinational corporations in the country. Today, Accra is a sprawling city and presents a varied appearance with buildings of modern, colonial, and traditional architecture. The city is much larger than any other in the country in terms of area, population, economy and other variables, thereby exercising primacy over Ghana's urban system.

Today, many of the settlements that form part of the Accra metropolis fall outside the original plan of the city which was developed in the 1920s (interview with Town and Country Planning Department - T&CPD, Accra). New residential communities are springing up rapidly at the fringes of Accra and speedily extending its built environment. Residential communities in the city can be roughly categorised into three types which are low-density high-income areas, average-density middle-income areas and high-density low-income areas (T&CPD, Accra). Areas such as the Airport Residential Area, Cantonments, East Legon, West Ridge, Ringway Estate and North *Dzorwulu* (Appendix 11) are well-planned residential areas with plush housing, utilities, paved roads and drainage systems. The residents of these high-class areas enjoy excellent environmental services including piped water supply, regular cleansing of the streets and drains, and house-to-house garbage collection.

The average density middle-income residential areas include such communities as *Kaneshie*, *Dansoman*, *Madina*, *Teshie-Nungua* and *Kokomlemle* (Appendix 11). Many of these communities were once cherished residential areas. However, the infrastructure and services have deteriorated over the years. Most households in these communities have no in-house toilets and depend on public toilets. Others, however, resort to open defecation in nearby bushes or adopt the 'wrapper method' (Songsore, 2003). Because of the relatively poor waste removal services in these middle-income communities, waste accumulation is a growing problem in many of them. However, the high-density low-income areas such as *Chorkor*, *Jamestown*, *Mamobi*, *Nima*, *Sabonzongo* and *Sukura* (Appendix 11) are the most neglected. Characterised by poor infrastructure and lacking basic services like sanitation and waste collection, these

communities have dire environmental conditions. The public toilets found in these communities are inadequate for the generally large populations and are usually so poorly maintained that one needs a lot of courage to use them. Many of the residents, therefore, resort to open defecation in open drains, some on the beach, in nearby bushes or on open lands, or the popular 'wrapper method'. Waste accumulation is also a huge problem in these poor communities. The few communal waste containers (skips) provided by the municipal authorities are almost always overflowing with their content but many areas even lack the containers, a situation which encourages indiscriminate waste disposal in the communities. The general environmental conditions in these communities, therefore, leave much to be desired.

Accra is the most important commercial, manufacturing and communications centre in the country. Commercial activities are organised in the numerous business districts of Accra including Accra Central, *Mokola*, *Kaneshie*, *Agbogbloshie*, *Madina*, *Circle* and *La*, where commercial activities are conducted in large, crowded open-air markets, malls, supermarkets, kiosks and on the street. Trade items in these commercial areas include a wide variety of foodstuff like fruits, vegetables, roots and tubers, cereals, fish and meat products while the supermarkets and malls trade in imported consumer goods including textile and leather products, white goods, household appliances, tools, toys, processed foods and stationery among others.

As a non-industrialised country, Ghana has few large urban-based industries which are concentrated in the large cities like Accra, Tema, Kumasi and Sekondi-Takoradi. Major industries in Accra include vehicle and appliance assembly and repairs, breweries and food processing, textiles, metal and wood products, plastics and pharmaceuticals among others. In recent years, there has been a proliferation of both print and electronic media and communication firms in the capital city which now play a great role in public education and interaction. In addition, a large number of small businesses have proliferated to offer photocopying, facsimile, telephone, and internet services in the city. The concentration of population, commercial and industrial activities in the Accra metropolis places mounting pressure on the limited infrastructure and services including housing, transport, water supply, sanitation and waste disposal. While the city of Accra continues to grow rapidly, its boundaries are not clearly demarcated, a situation which poses problems for the planning and

management of the city. The lack of clear boundaries for what constitutes Accra also poses problems for the development of roads and other infrastructure and the provision of services including water supply, sanitation and waste disposal.

3.7.2. Sekondi-Takoradi

Sekondi-Takoradi, the third largest city and capital of the Western Region, is located on the west coast of Ghana. The two parts of the twin-city developed around Dutch and English forts built in the 17th century. Sekondi, much the larger and older part of the twin-city, grew up from 'Fort Orange', a trading fort built by the Dutch in 1640. The town flourished after the construction of a railroad to link its seaport to the mineral and timber resources in the hinterland to facilitate their export. From 1928, however, the Sekondi port became commercially obsolete when a large deep-sea harbour was opened at Takoradi. Today, Sekondi is a mixture of old and modern developments on a hilly site extending to the shore. The old port is now used by fishing and pleasure crafts and there is a naval base nearby. Takoradi, the newer part of the twin city, is better planned with modern buildings and many tree-shaded residential areas. Its deep sea harbour handles about a third of Ghana's imports and exports and also serves a number of landlocked West African countries including Burkina Faso, Mali, and Niger. There is also an air base for the Ghana Air Force in Takoradi. The two separate settlements have now merged to form a large urban agglomeration known as the Sekondi-Takoradi Metropolitan Area (STMA) which formed one of the study sites for this investigation.

The twin-city is an important educational, commercial and industrial centre. Major industries include fishing, food and wood processing, boat building and repairs, energy and technology industries. The twin-city also has several beautiful beaches with good facilities which attract tourists from both within and outside the country. Besides, brisk commercial activities in Sekondi-Takoradi attract traders from surrounding towns and villages and neighbouring Cote d'Ivoire as well. Locally produced items traded in the markets include foodstuffs like fruits, roots and tubers, vegetables fish and meat, while imported ones comprise a wide variety of goods including auto parts, white goods, electrical and electronic products, textile and leather products, household hardware, canned foods and drinks, toys and stationery among others. Hawking is also a brisk business in the city especially around lorry

stations and along major roads. The commercial activities generate enormous quantities of solid waste and create traffic and other problems in the city.

With a 2000 census population of 289,593, the twin-city is growing rapidly, expanding to engulf surrounding settlements. Its current resident population is estimated to be over 400,000 aside a floating population of over 100,000 (interview with the metropolitan planning officer, STMA, September 2007). Like other cities in the country, the authorities in Sekondi-Takoradi are confronted with numerous physical, socio-economic and environmental problems including poor road and housing infrastructure, inadequate water supply, poor sanitation and waste disposal. Particularly in the low-income communities, much of the solid waste generated by households remains uncollected leading to waste accumulations in the city.

Both Accra and Sekondi-Takoradi appear to face a serious solid waste problem which calls for investigation. This study is therefore concerned to investigate the nature of the solid waste problem in Accra and Sekondi-Takoradi; the factors responsible for the poor solid waste situation; the concerns of social and environmental injustices in the delivery of solid waste disposal services and the final disposal of solid waste in the two cities.

CHAPTER FOUR

METHODOLOGY AND METHODS

4.0. Introduction

This chapter presents the general approach and specific techniques adopted to address the objectives for the research. It begins with a discussion of the ontological and epistemological underpinnings of quantitative and qualitative research and the arguments for and against combining the two approaches in a single research. The strengths and weaknesses of the two opposing approaches are briefly pointed out and the rationale for combining them in a single study is further explained. The chapter also presents the research design and the methods used in the selection of the research participants and for data collection. How the data was analysed and interpreted are also briefly presented after which issues relating to positionality and reflexivity are discussed. The chapter concludes with a look at the limitations of the methodology employed in the conduct of the study.

4.1. Ontological paradigm and epistemological underpinning of the study

The methodological approach we follow in pursuing a research project, such as the methods we employ in collecting data and the sources we contact for such data, are all closely connected to the ontological and epistemological assumptions we hold about reality (Grix, 2004). Historically, the two dominant ontological perspectives that have inspired social science research have been positivism and interpretivism (Robson, 1993; Guba and Lincoln, 1994; Bryman, 2001; Grix, 2004). Positivism holds reality to exist independently of our knowledge of it (Grix, 2004) and regards the social world as something revealed to us, not constructed by us (Miller and Brewer, 2003:236). It follows from the positivist ontology that 'objective knowledge' is possible, for there is a fixed and unchanging reality which research can accurately access and tap. Positivism, therefore, subscribes to the application of natural science methods and practice to the social sciences (Denscombe (2002:14). Thus, the fundamental characteristic of positivism is the contention that the methods, concepts and procedural rules of the natural sciences can, and should be applied to the study of social phenomena (Bryman, 2001; Grix, 2004).

The epistemological assumption that follows from positivism is that in a world made known to us through our sense experience, people simply receive the sensory stimuli and recount the response and thus contribute very little to knowledge (Miller and Brewer, 2003). In positivist thinking, therefore, the confirmation or refutation of theory can only be revealed from data gathered through the way the world is observed and experienced via our senses - in this case, 'objective, official statistics' (Miller and Brewer, 2003:237). Data for the positivist model of social research is thus called 'hard data' implying that it is untainted by the interpretative and meaning-endowing processes of the researcher or the researched (Creswell, 2003) and such data is numerate, seeking to measure and describe social phenomena by the attribution of numbers (Miller and Brewer, 2003). In the words of Weber (cited in Miller and Brewer, 2003:237), "this gives an elective affinity between the natural science model of social research and those data collection techniques which give best access to sense-experience data". "These techniques notably include questionnaires, social surveys and experiments which generate numerate data and supposedly render social phenomena 'objective', untouched by people's interpretative and reality-constructing capacities" (Miller and Brewer, 2003: 237).

Contrary to the positivist view of social reality and how it can be known, interpretivism regards reality is a complex social construction of meanings, values, and lived experience (Cohen *et al.*, 2000; Grix, 2004) and can, therefore, be better understood through people's interpretive or meaning-endowing capacities rather than through our sensory observation and experience of the world as believed by the positivists (Robson, 1993; Bryman, 2004). Data for interpretivist research is, therefore, obtained through the interpretations people give to their situations and experiences of reality. Often referred to as 'soft data', such data is usually verbal, seeking to reveal and describe social phenomena by the attribution of words (Grix, 2004; Bryman, 2004). Interpretive research, therefore, differs from the positivist or natural science model of investigation and employs research methods and data collection techniques that allow research subjects to interpret their own experiences of the world rather than those employed in positivist studies. Interpretivist data gathering techniques, therefore, include observations, interviews, documents and audiovisual materials which generate data mostly in the form of words (Creswell, 2003).

4.2. Quantitative and qualitative approaches

Some research methodologists believe that the differences between positivism and interpretivism is important because sticking to one of these ontological positions will lead a researcher to employ a different epistemological approach and research methodology than if he/she were to stick to the other, and that one's epistemological position can lead to different views of the same social phenomena (Robson, 1993; Denscombe, 2002). The ontological dichotomy between positivism and interpretivism has therefore generated epistemological distinctions between quantitative and qualitative research visions. In social science investigations, quantitative research usually rests upon the assumptions of positivism while qualitative research rests upon interpretivist assumptions (Bryman, 2001; Denscombe, 2002).

The departure point of quantitative social research, as the name suggests, is numerical measurement of social phenomena (Bryman, 2004; Grix, 2004). Researchers who employ the quantitative approach usually use a very structured approach in which competing explanations are formulated in terms of the relationships between variables (Grix, 2004). Thus, quantitative researchers usually condense what they study into a number of key attributes which are generally taken as indicators or variables (Miller and Brewer, 2003). The ultimate goal of quantitative research, as stated by Miller and Brewer (2003: 193), is "to find as small a set of variables as possible which explain as much as possible" and the broader philosophical thinking which informs the approach is that, to know something, one must establish general sets of relationships which are robust across as many instances or cases as possible (Miller and Brewer, 2003). Generalization is, therefore, the goal and the main reason why the researcher is interested in establishing relationships is to demonstrate that these are general features of social life (Ragin and Becker, 1998; Miller and Brewer, 2003; Grix, 2004). As Ragin and Becker point out, this kind of approach is well-suited to testing theories, identifying general patterns and making predictions. The quantitative approach is, therefore, deductive in nature and is associated with positivism and the natural science model of investigation (Miller and Brewer, 2003).

In contrast, qualitative research is seen by many as almost the complete opposite of quantitative research. In general, qualitative researchers tend to work in the interpretivist philosophical tradition, using methods of data collection which are

flexible and sensitive to the social context in which the data are being produced (Grix, 2004). The approach usually involves “in-depth investigation of phenomena through such means as participant observation, interviewing, archival or other documentary analysis or ethnographic study” (Ragin, 1994:91), methods which do not rely on, but can involve numerical measurements. In line with the interpretivist paradigm, qualitative researchers generally seek to amass information from their studies on event, institution or geographical location, with a view to discerning patterns, trends and relationships between variables (Grix, 2004). The language of qualitative research tends to revolve around case-studies and social contexts instead of variables and hypotheses as is the case in quantitative research. As noted by Holloway (1997:80), “qualitative research involves the interpretation of data whereby the researcher analyses cases in their social and cultural context over a specific period of time” and may develop theories that emphasize tracing process and sequence of events in specific settings (Grix, 2004).

Some researchers take extreme positions on the relative merits of qualitative and quantitative approaches in social science research (Preece, 1998). A major argument against qualitative research is that it is usually small-scale and non-representative, generating results that cannot be generalised beyond the cases investigated (Grix, 2004). This ‘inability to generalise’ from small samples or a few cases is seen to compromise the validity of results obtained through qualitative research. Furthermore, in the view of critics, the immersion of researchers in the social context they study leads to a lack of objectivity and a propensity to use personal opinions instead of evidence to support arguments (Preece, 1998). Thus, qualitative research is often accused of being unscientific, unrepresentative, open to bias and even to manipulation, whether this is conscious or unconscious (Grix, 2004; Bryman, 2004).

In spite of its reputation, quantitative research has also been criticised on several grounds. One of such criticisms is that researchers working within the quantitative tradition are often reluctant to move from statements of correlation to causal statements and this can affect understanding of the social situations being investigated (Silverman, 2000). According to Preece (1998:43) the quantitative approach can also be criticised as reductionist, as using pre-conceived or half-understood concepts, and thus, is open to bias or manipulation in a different way. Furthermore, overdependence

on quantitative methods can lead to a neglect of the social and cultural context in which the variable being measured operates (Grix, 2004). Critics also argue that quantitative research is not value-free, as some of its proponents suggest, because no one can be fully detached from any type of research (Silverman, 2000; Grix, 2004). Moreover, numerical measurement, which is so important in quantitative research, is said to be difficult when it comes to some facets of human action such as behavioural phenomena (Bryman, 2004; Grix, 2004). Thus, practitioners on each side of the methodological divide accuse their ‘opponents’ of a distortion of truth. While such “conflict” often usefully serves to highlight principles, there is usually much value in accommodation.

4.3. Combining the two methodologies

Following the quantitative-qualitative debate, the question has arisen whether the two ‘opposing approaches’ can be usefully combined in a single study⁷. In the view of Blaikie (2000) triangulation or method combination is actually difficult because of the different epistemological and ontological underpinnings of the two research strategies. Such writers as Guba and Lincoln (1985), Hughes (1999) and Blaikie (2000) have, however, argued against the idea of combining the two research strategies in a single study with the reason that research methods carry epistemological commitments and the use of any data collection technique is not simply an issue of collecting data but a commitment to either positivism or interpretivism (Blaikie, 2000; Grix, 2004). This means that quantitative and qualitative researches are grounded in two incompatible epistemological principles. According to Guba and Lincoln (1985) combining the two approaches is inappropriate and represents failure to recognise the distinction between a paradigm and a method. They argue that the use of any data gathering technique involves commitment to the approach with which it is usually associated and this makes method combination inappropriate.

Contrary to the above position, some writers emphasise the usefulness of combining the two approaches in spite of their epistemological underpinnings (Grix, 2004; Bryman, 2004). Bryman (2004), for instance, has argued that methods themselves

⁷ . The combination of method is variously referred to as triangulation (Blaikie, 2000; Grix, 2004) multi-strategy research (Bryman, 2004), mixed methods research (Creswell, 2003) or multiple methods (Robson, 1993).

should be viewed as mere tools for collecting data and should not be looked upon as being automatically rooted in epistemological and ontological commitments. He, therefore, views research methods from one strategy as “capable of being pressed into the service of another” (Bryman, 2004:454). In support of this position, other research methodologists (including Denzin, 1989, Robson, 1993, Bryman and Cramer, 1997, Creswell, 2003 and Grix, 2004) recognise that there is much to be gained from a fusion of quantitative and qualitative methods in a single study of social phenomena. Denzin (1989), for instance, has suggested that triangulation might be done in social research by using different methods, sources, investigators or theories while Robson (1993) also observes that a social research question can, in most cases, be attacked by more than one method. According to Robson, there is no rule that says only one method must be used in an investigation. He goes on to suggest that using more than one method in a single investigation can have substantial advantages even though it almost inevitably, adds to the time investment required. Preece (1998:127) also supports the combination of qualitative and quantitative methods when he observes that while some disciplines have come to be associated more with qualitative or quantitative approaches, both find a place in most fields of study.

The views of these scholars suggest that the methods of quantitative and qualitative approaches can complement each other in a single study of social phenomena. As noted by Grix (2004: 84), “as long as you are aware of how you are employing a specific method, and what this method is pointing you towards, and how this relates to the ways you employ other methods, there should be no problem”. In this regard, Grix (2004) has advised that it is generally a good idea for social scientists to use more than one method of enquiry to improve the chances of getting better, more reliable data and to minimise the chances of biased findings. He argues, for example, that there is no reason why one should not employ methods usually associated with quantitative research in an in-depth case study. These arguments provide a firm basis for the combination of quantitative and qualitative methods in social science investigations. Thus, the criticisms notwithstanding, the mixed methods strategy of social investigation is fast becoming popular among researchers (Grix, 2004; Bryman, 2004).

4.4. Methodological approach

As stated in chapter one, the purpose of this study was to investigate solid waste management in Accra and Sekondi-Takoradi with a view to understanding the nature of the solid waste problem and its causes, and issues of social and environmental justice in solid waste management. The varied nature of the data required and different sources from which they had to be gathered made the mixed methods approach appropriate. In line with this methodological approach, research tools associated with both quantitative and qualitative approaches were combined to collect the data. These were interviews, questionnaires, field observation and documentary analysis. The choice of the mixed methods approach was informed by a number of reasons. First, it was meant to achieve the ‘logic of triangulation’ Denzin (1989:13) since no single method (such as questionnaire, interviewing of documentary analysis) could completely capture all the relevant features of the study. Furthermore, the combination of qualitative and quantitative methods enabled me to crosscheck the data gathered by different methods, thereby, making the results of the study valid and credible. As observed by Bryman (2004:131) “combining different methodologies in a single study enhances the researcher’s claim for the validity of his or her conclusions if they can be shown to provide mutual confirmation”.

The decision to combine quantitative and qualitative methods in this study can also be justified on the grounds that it made it possible for me to explore the research questions from different perspectives which would lead to broader understanding of the issues connected with solid waste management in Ghanaian cities. Bryman (2004) has argued that while quantitative research is associated with the researcher’s perspective, qualitative research is concerned with seeing the object of study through the eyes of the people being studied. Thus, combining qualitative and quantitative methods in the present study made it possible for the issues relating to waste management in Accra and Sekondi-Takoradi to be captured from the perspectives of key stakeholders in the waste sector as well as from my own perspective. Furthermore, combining different methods of data collection and analysis provided me with the opportunity to obtain in-depth information from the different categories of participants including waste disposal service providers, clients for the service, public institutions involved in waste management in one way or the other and

communities hosting waste disposal facilities in the study areas. Without this mixed methodological approach, reliance on any single approach to data gathering could lead to loss of valuable information.

4.5. Selecting the study sites

Accra and Sekondi-Takoradi which are the first and third largest urban agglomerations in Ghana formed the sites for this study. Detailed descriptions of these cities have been given in chapter three under 'background information on Ghana'. Of course, these two cities are not the only Ghanaian cities confronted by the solid waste crisis. All major cities in Ghana including Kumasi, Tamale, Cape Coast, Koforidua Wa and Bolgatanga face equally tragic waste situations that need to be investigated. After establishing that the waste menace was common to all Ghanaian cities, a simple random sampling was employed to select two out of the ten largest cities based on the 2000 Housing and Population Census report. Accra and Sekondi-Takoradi were selected in the process.

I was further motivated to focus on these two cities by the fact Accra and Sekondi-Takoradi represented a large city and a medium sized city respectively in the Ghanaian context and so provided an opportunity to investigate the problem of solid waste disposal at two different scales. A third motivation for maintaining this selection was that even though both cities are coastal, they are located in different climatic zones - Accra in the dry south-east coastal plains and Sekondi-Takoradi in the south-west rain-forest zone of Ghana. This climatic variation was also seen to provide the opportunity to investigate the effects of climate on the waste situation in the two cities.

4.6. The research population and sample

Since all residents of Accra and Sekondi-Takoradi are involved in some aspect of solid waste management (they generate waste or require waste disposal services or are affected by waste disposal), the entire populations of the two cities were regarded as the study population for this research. In the 2000 Housing and Population Census, the broader metropolitan area of Accra recorded total populations of 2, 039, 825 while Sekondi-Takoradi had a total population of 289, 593 (Ghana Statistical Service, 2002). For the purpose of the fieldwork, however, key stakeholders in the waste sector

were identified to include waste disposal service providers and their clients, public institutions whose functions affect waste management and communities affected by solid waste disposal facilities (Table 4.1).

Table 4.1: Key stakeholders in the study

Category of stakeholders	Actual participants selected for study
Waste disposal service providers	<ul style="list-style-type: none"> • Municipal Waste Management Departments • Private sector waste companies • Informal waste collectors/waste pickers
Public institutions with functions affecting solid waste management	<ul style="list-style-type: none"> • Environmental Protection Agency • Town & Country Planning Department • Lands Commission • Department for Urban Roads
Waste disposal service clients	<ul style="list-style-type: none"> • Households • Businesses • Institutions
Communities near solid waste disposal facilities	<ul style="list-style-type: none"> • Residents living in close proximity to final waste disposal facilities

4.7. Collecting the data

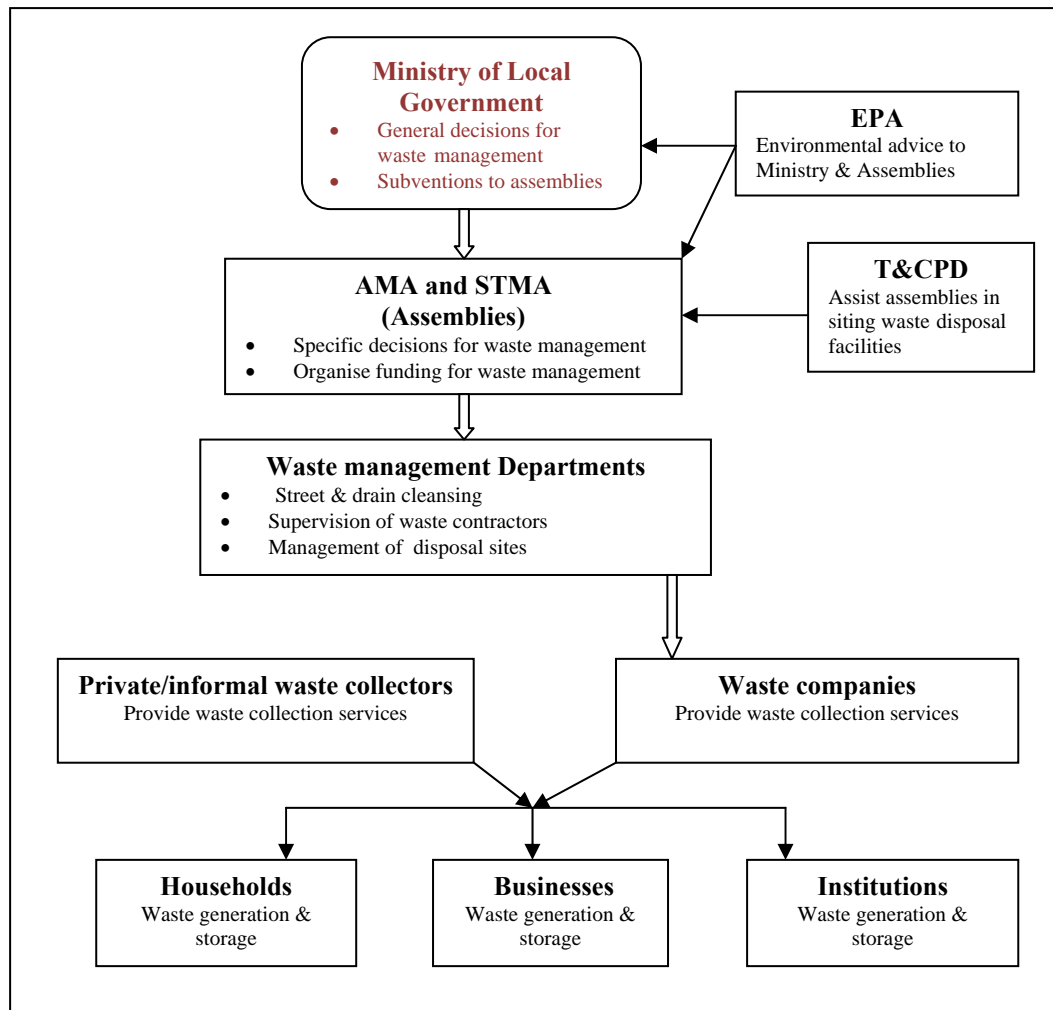
As noted earlier, the collection of data for this study was done in two phases. The first phase was a pilot study undertaken in Accra over a five-week period in September-October 2006. This enabled me to familiarize myself with the research environment, identify key stakeholders in the waste sector and pre-test the research instruments (questionnaires and interview guides). In this phase of the fieldwork interviews were held with key staff of the Accra metropolitan waste management department, six waste companies and five businesses/institutions while questionnaires were administered to 30 householders in six residential communities, two each of low-income, middle-income and high-income communities. The main fieldwork was carried out in both Accra and Sekondi-Takoradi from the end of August to the middle of December in 2007.

4.8. Selection of respondents for the study

After identifying the stakeholder groups among the study populations in the two study areas, the next task was to select those who would actually participate in the interview discussions and questionnaire survey. Figure 4.1 presents a conceptual diagram of the key stakeholders who participated in the study⁸

⁸ The Ministry of Local Government was not directly involved in the data collection

Figure 4.1: Conceptual diagram of waste sector stakeholders and their responsibilities



Source: Designed from fieldwork data

4.8.1. Municipal waste departments and public institutions

For the municipal waste departments and public institutions (EPA, T&CPD, DfUR and LC), my intention was to interview senior officials who would be well-placed to provide adequate answers to my interview questions. In elite interviews of this nature, I was very much aware of my subordinate position in relation to most of my respondents. In all the institutions I visited, therefore, I tried to develop rapport and also employed much humility to induce the respondents to grant me the interviews. Here, the letter of introduction written by my supervisors was very useful. In Accra, five officials of the waste department were involved in formal and informal interview discussions. These were the Director of the Waste Management Department, the Principal Environmental Health Technologist, a mechanical engineer and one

supervisor at each of the two waste disposal facilities at *Oblogo* and *Tweebleo*. In Sekondi-Takoradi, the head of the waste management department and two other officials took part in the interviews. With regard to the public institutions (EPA, LC, T&CPD and the DfUR) one official was selected from each of them in both Accra and Sekondi-Takoradi. Thus eight officials from four public institutions were involved in the interviews.

4.8.2. Private waste companies

With regard to the private waste companies, there were 18 of them operating in Accra and only two in Sekondi-Takoradi at the time of the fieldwork (Table 4.2). In Accra, six of them were already involved in the pilot study earlier in September-October 2006. In the main fieldwork, I intended to interview the managers of all the 18 companies but resource constraints did not allow me to achieve this so this was limited to 14 (including two of the six companies that participated in the pilot study). In effect only two of the waste companies in Accra, namely Bensyd Ltd and Mohas Ltd, never participated in the entire study (both pilot and main). In the case of Sekondi-Takoradi, the managers of the only two private waste companies were interviewed.

Table 4.2: Private sector waste companies in Accra and Sekondi-Takoradi

Accra		Sekondi-Takoradi
1. Liberty Waste Services	10. ABC Waste Limited	1. RUSABEN Ltd
2. Almanuel Limited*	11. Mohas Limited**	2. ABC Waste Ltd
3. Golden Falcon	12. Yama Waste Services	
4. Catrol Limited	13. Gee Waste Limited*	
5. Bensyd Limited**	14. Daben Cleansing Limited*	
6. Yafuru Limited*	15. J. Stanley Owusu Co. Limited	
7. Meskworld Limited	16. Asadu Royal Limited*	
8. Vicma Waste Limited	17. Jakora Ventures	
9. Ako Waste management*	18. Zoomlion Ghana Limited	

*Participated in both pilot and main fieldwork.

** Did not participate in any of the fieldworks

Source; AMA Waste Management Department, Accra. 2007.

4.8.3. Private informal waste collectors

Private informal waste collectors were found operating only in Accra. None were found in Sekondi-Takoradi. In Accra, they worked mostly in the multiple central

business districts. Interviewing them was, however, quite difficult, contrary to what I had expected. They were usually busy working and quite unwilling to stop their work to be interviewed. Thus, while I planned to interview up to 15 of them, I was only able to interview nine by the time I rounded up the fieldwork in December 2007. Because the informal waste collectors were not confined to any particular place in the city and one only came across them by chance, no systematic technique could be used to select those to be interviewed. I, therefore, approached them wherever and whenever I saw them, introduced myself and my study and requested them to grant short interviews. I tried the snowballing technique of contact but this did not prove useful as the waste collectors usually worked as individuals and in most cases, did not know where others would be working. In some cases, I had to offer cash incentives to motivate them to grant me the interview. Once they consented, however, many of them co-operated well and were quiet amused that someone was interested in their work.

4.8.4. Householders

One of the objectives of this study was to assess variations in the quality of waste disposal service provided for residents in different socio-economic communities, namely, low-income, middle-income and high-income residential communities. This necessitated the interviewing of householders in the three different types of residential areas in the two cities investigated. The unplanned nature of many parts of the cities and the lack of household sample frames precluded the random selection of samples of householders. In this situation, the most feasible means of obtaining samples of householders for the interviews was the multi-stage sampling technique. Thus, the first stage of the sampling process involved selecting communities to represent the three types of residential areas. In each city, five examples of communities in the different residential classes (high, middle and low-income) were obtained from the T&CPD. From the lists obtained in each city, two communities were randomly drawn from each residential class group (Table. 4.3) in which householders were selected for the questionnaire surveys.

Table 4.3. Residential communities selected for the household survey

Residential status	Study areas	
	Accra	Sekondi-Takoradi
High-income areas	Cantonments East Legon/Shiashie	European Town Airport Ridge
Middle-income areas	Kaneshie Apenkwa	Essikado Tanokrom
Low-income areas	Chorkor Mamobi	Esaman Kwesiminstim

Guided by information from the T&CPD (that the respective populations of low, middle and high-income settlements in Ghanaian cities, including Accra and Sekondi-Takoradi, were roughly 70%, 25% and 5%), this was used as a rough guide to determine the number of questionnaires to administer in each residential class category.

Once the communities to be surveyed had been selected, and the number of questionnaires to be administered in each had been determined, the next stage was to select the participating households in each of the selected communities. In the absence of a sample frame for households in the selected communities and the fact that some householders were unwilling to participate in the survey, a convenient way of selecting the sample was to combine the willingness of householders with a roughly even spatial selection of households in each community. In this regard, we (I and my two field assistants) were able to administer 590 questionnaires in all: 450 in Accra and 140 in Sekondi-Takoradi (Table 4.4).

Table 4.4: Household selection for questionnaire survey

Residential communities	Number of participants		
	Accra	Sekondi-Takoradi	Total
Low-income communities	200	80	280
Middle-income communities	150	40	190
High-income communities	100	20	120
Total	450	140	590

4.8.5. Institutions and businesses

In both Accra and Sekondi-Takoradi, the managers/proprietors of businesses such as shops, supermarkets, restaurants and hotels were interviewed. In the absence of

sample frames, the random sampling technique could not be employed. With the assistance of the field assistants, businesses and institutions were selected by convenience and those who consented were interviewed. The process went on until the target number of interviews had been conducted. In all, ten businesses and ten institutions were interviewed in Accra while five each were interviewed in Sekondi-Takoradi.

4.8.6. Residents of communities near waste disposal facilities

In both Accra and Sekondi-Takoradi, interviews were conducted with samples of residents of communities near final waste disposal facilities to find out their concerns about the location and maintenance of the waste facilities in their backyards. In Accra, the communities involved were *Oblogo* and *Tweebleo* while in Sekondi-Takoradi, it was the *Mpinstim* community. Once again, the absence of sample frames for households in the affected communities precluded the use of random sampling techniques to select participating households. Thus, a convenience approach was adopted whereby households residing close to the waste dumps were targeted and approached. As was the case in the questionnaire survey, those who consented to the request for interviews were interviewed. My initial target was to interview ten households in each affected community. In the course of the fieldwork, however, these had to be reduced due to time constraints and the difficulty in getting consenting respondents. Thus, eight householders were interviewed at *Oblogo* (Accra) while seven each were interviewed at *Tweebleo* (Accra) and *Mpinstim* (Sekondi-Takoradi).

4.8.7. Waste pickers

Waste picking is a vibrant and growing business in all major cities in Ghana and an increasing number of unemployed urban residents are making a living out of it including men, women and children. The major waste items that are usually salvaged by pickers are plastic and metal which they sell to recyclers. As would be expected, the waste pickers were usually found at the waste disposal sites but some also walked the streets and picked up discarded items from homes and shops. I engaged in informal discussions with some of the waste pickers during my visits to waste disposal sites. I also engaged a few of them on the streets as they went about collecting waste items of interest. As was the case with the informal waste collectors, I often had to provide some incentive to get the waste pickers to stop their work and

talk to me. I was able to interview ten and six waste pickers in Accra and Sekondi-Takoradi respectively.

4.8.8. Other respondents

Apart from the key stakeholders already identified above, a number of people were also approached accidentally and engaged in informal interviews on the topic of waste disposal in the two cities. In Accra, four people were engaged in this manner. These were a traffic police officer, a commercial vehicle driver, a lady teacher and a young man who called himself 'area boy'. In Sekondi-Takoradi, three people were engaged in interviews in this manner – a young woman who dropped litter on the road, an elderly woman who was seen dumping a basket of waste into a drain and a young man who was seen placing litter in a street bin. A number of informal interviews were also conducted with market women and street hawkers in both cities.

4.9. Methods of data collection

After carefully considering the research questions, the nature of the data needed for the analysis and the prevailing conditions on the research field, it became evident that the best way to collect adequate data for the research would be a combination of the methods of both quantitative and qualitative approaches. This is because some of the data required were qualitative in nature and could best be obtained through interviews while others were quantitative and thus, could be elicited by means of questionnaires. Furthermore, aspects of the data were physically observable and could be gathered through direct field inspection or observation. There was also a range of published information including newspaper articles and other publications that could yield useful data for the study. In view of this, I became convinced of the usefulness of combining different methods from both qualitative and quantitative approaches in my attempt to gather the data needed for this investigation. The study, therefore, employed interviews, semi-structured questionnaires, field observation and documentary analysis, drawing upon the strengths of these different methods to improve the quality or validity of the data.

4.9.1. Interviews

Interviewing is a useful way of collecting qualitative data because the technique is 'introspective' and allows respondents to report on themselves, their views, their

beliefs, practices, interactions and concerns (Freebody, 2003). Besides, most people are more willing to talk in an interview than the case would be if they were asked to write or fill out a questionnaire (Robson, 1993). The interview technique is associated with a number of advantages over questionnaires and these showed up in the interviews I conducted. Interview creates the opportunity for interviewees to ask for clarification when they do not understand a question just as the interviewer can ask for elaborations on answers given by interviewees. Furthermore, there is the guarantee that all questions would be answered or, at least, attempted by the interviewee (once he/she can allow enough time for the interview) which ensures a high response rate. Moreover, it becomes possible to check on the reliability of a response by asking the same question differently and at different stages of the interview (Freebody, 2003). The interview technique was employed to obtain data from a number of stakeholder groups in the study. These were:

- Officials of the municipal waste departments
- Officials of urban sector public institutions (EPA, T&CPD, DfUR and LC)
- Private waste companies and informal waste collectors
- Owners/operators of businesses and staff of institutions
- Residents of communities residing around waste disposal facilities.

4.9.1.1. Developing the interview guides

Adequate preparations were made before my encounter with the interviewees. In doing this, I was guided by Bryman's (2004) advice on the use of the interview technique in data collection. These include:

- developing interview guides based on the research questions
- avoiding double barrelled or multiple barrelled questions
- the identification of possible interview themes or subjects
- identifying the possible respondents from a given population
- deciding the mode of recording the interview (note-taking, tape recording or both)
- seeking permission from interviewees, and
- arranging suitable time and place for the interviews

(Bryman, 2004)

Based on the objectives set for the study and guided by Bryman's advice, interview schedules were developed for each of the different participant groups (listed above) in order to address issues specific to their respective roles in waste management. In all cases, the interview schedules were semi-structured so as to allow the respondents some latitude to pursue what they considered relevant while making sure that my own questions were adequately answered.

The interview schedule for the municipal waste departments (Appendix 2) was the most detailed and was divided into appropriate sections to deal with the various issues in waste management. The themes which were covered by the questions included stakeholders in the waste sector, the waste situation in the cities, resources for waste management, constraints and participation. The interview schedule for the private waste companies also covered issues relating to their contracts, finance and logistics, personnel and constraints to their operations (Appendix 3). Separate interview schedules were also designed for public institutions in the waste sector (namely the EPA, LC, T&CPD, DfUR). These schedules were simple but covered relevant issues relating to their functions and how these influenced waste management in the cities (Appendix 4). Apart from the above, separate interview schedules were also developed for businesses and institutions that (together with householders) form the clientele for waste disposal services in the study areas. Much like in the household questionnaire, the issues raised with the businesses and institutions concerned their waste generation activities and means of waste disposal, available services for waste removal, payments for the service and their general perceptions about the waste situation around their premises and in the cities. Interview schedules were also designed for discussions with a sample of informal waste collectors and residents of communities residing near waste disposal sites. With the informal waste collectors, the issues discussed included their background, nature of their work, clientele for their services and how they perceived their role vis-à-vis other service providers in the organisation of waste management (Appendix 5). The interviews with residents of communities located near the waste disposal sites also sought to find out how their communities came to host the facilities, their concerns about the siting of the facilities in their communities and how waste disposal at the sites affected them (Appendix 6).

4.9.1.2. Ensuring validity and reliability of the interview guide

Care was taken to ensure that the interview schedule was valid and reliable. First of all, the themes on which the interview questions were developed were drawn from the objectives stated for the study. After developing the interview guide, it was given to two research students (who had also used interviews in their own research) to review and comment on its structure and contents. After this, the interview guide was given to my supervisors who provided useful advice for improvement. The instrument was also tested with key stakeholder groups in a pilot study in Accra in September-October 2006 which showed that the questions were easily understood by the respondents. I also compared the responses obtained with the study objectives and it became evident that the interview schedule was very reliable as it generated the right kind of data. A few inadequacies were, however, identified in the design. These included the ordering of themes and questions in some of the schedules and repetition of issues in a few questions. These were corrected to improve the quality of the instrument before using it in the main fieldwork.

4.9.1.3. Conducting the interviews

Aware of the challenges involved in elite interviews (Burgess, 1984; Cotterill and Letherby, 1994), I made adequate preparations to maximise the chances for successful interviews. I began by writing to key stakeholders (namely the municipal waste departments, the waste companies and four public institutions) to inform them of my study and to request interviews with them (Appendix 1). Copies of the interview schedules were attached to the letters of introduction to let the potential interviewees know the issues to be covered in the interviews. Two 'appointment for interview' slips were attached to the letters on which participants were to indicate the names of their institutions/organisations, their own rank or title and contact telephone number/email. They also indicated on the slip, their preferred date, time and venue for the interview. I later followed this up with visits to confirm arrangements for the interviews. During the visits, I also retrieved appointment slips I had not yet received by post. Each participant kept a copy of the appointment slip and I kept the other copy to keep track of the appointments. A day before each appointment, I made telephone calls to remind the participants of our meeting and to confirm if they would be able to keep to the appointment. Close to the appointed time on the interview day itself, I

phoned the interviewees again to be sure they were ready for the meeting. Those who could not make it (and there were several of them) had their dates and times rescheduled (in some cases several times).

I was always punctual for the interviews, usually arriving much earlier than the appointment time. After politely and humbly greeting the interviewee (which is very important in Ghanaian culture), I would repeat the purpose of our meeting and wait for the interviewee to get ready. Before the interview started, I always reminded the interviewees that the interview was for the purpose of research only and assured him/her of confidentiality and anonymity in the use of the information he/she would provide. After this, I would indicate my wish to audio record the interview if the interviewee would grant me permission, making it known to him/her that audio recording would take a much shorter time for the interview. In cases where the interviewee objected to audio recording of his/her interview (and there were several cases) I resorted to writing down the responses using a copy of the interview schedule. At the end of the interview, I thanked the interviewees and asked if they would like to read the transcripts of their interview for validation purpose. Many of them were happy to validate their interviews but others said it was not necessary. As a result of these measures I was able to conduct very successful interviews with the elite respondents and was able to gather the data I needed for the study.

The interview with non-elite participants such as the private informal waste collectors, owners of businesses and residents of communities around waste disposal facilities did not need elaborate preparation beyond designing the interview schedules. For the communities near the waste disposal facilities, however, I always made initial visits and talked with a few people in order to familiarise with the research field. After this, I was able to interview many of them during the first attempt but a few interviews had to be pre-arranged.

Throughout the interviews, I made efforts to maximise the data that I obtained from the respondents. I always began the interviews by introducing myself to the respondents and telling them about my study and how it was an attempt to understand the waste problem with the hope of influencing improvements of waste disposal in the

cities. This was helpful in stirring the interest of most respondents and facilitated the successful conduct of the interviews.

My observation was that while it is often believed that the researcher is in control of the interview situation, interviewing elites is a different experience because they usually feel they have power over you and you are conscious of that. Frequently during the interviews with government officials and the managers of some waste companies, I was aware of my lack of control of the situation and this made it difficult to obtain some of the responses I needed. For example, some of the interviewees insisted that their voices should not be recorded notwithstanding the assurance of confidentiality in the use of the information they provided. Yet it was impossible to capture all that they said on paper while they spoke as my writing speed lagged behind their speeches. This led to gaps in the data I recorded for some of the interviews and attempts to get these filled later were mostly unsuccessful. Some participants were also not willing to report on certain issues while others were unwilling to substantiate claims they made. The whole experience was also time-consuming. Thus, in spite of the advantages of the interview technique for gathering data, it also has some limitations. In spite of these limitations, the interviews were generally successful in generating data for analysis of the issues involved in the study.

4.9.1.4. Validation of the interview data

It is important for researchers to check their interpretations of interview data with respondents to ensure that people in the field find them credible and feasible. While giving credence to what people say, the researcher must develop and maintain a critical attitude towards what respondents tell him/her. Checking is important because people's accounts, even if truthful, often contain contradictions and inconsistencies that need to be represented and explored. Thus, steps were taken to validate the interview data obtained from respondents. To achieve validity of the interview data obtained from the municipal waste departments of the two cities, the interview transcripts were later presented to the interviewees to comment on. The few changes they suggested were accommodated before the data were used for the analysis. Furthermore, information given by staff of the municipal waste departments were compared with what other stakeholders like householders near waste disposal

facilities said and vice versa. Some of the inconsistencies were also viewed against documentary sources and the field observation data.

With regard to the private sector waste companies the responses obtained from each of them were compared with what was obtained from the other companies and the municipal waste departments. In a few cases, there were inconsistencies so the respondents involved were contacted for clarification and/or corrections before the data were finalised for use in the study. Miller and Brewer (2003) have also noted that validity checks can be made by comparing the verbal reports of respondents with other sources. Thus, some of the responses obtained from interviewees were compared with documentary sources such as newspaper articles and available official records. The validation process revealed that some of the information and claims made by respondents could not be substantiated, particularly issues that bordered on allegations of corruption. I took note of these in my use of the data. Interview data obtained from other respondents were equally weighed against some other sources. This way, validity of the interview data was greatly improved.

4.9.2. Questionnaire

The questionnaire is one of the most widely used instruments for collecting data in survey research. Bryman (2004) suggests that the appeal of the questionnaire partly stems from its cheapness and quickness in terms of administration, the absence of the interviewer effect and its convenience for correspondence. Apart from these advantages, the survey questionnaire also enables one to collect standardised information in respect of the same variables for everyone in the sample selected (Parfitt 1997; cited in Zahari, 2007). This makes the questionnaire an indispensable tool in gathering primary data about people, their behaviour, attitudes, opinions and awareness of specific issues.

4.9.2.1. Development and testing of the questionnaire

The questionnaire for the household survey was developed to cover an aspect of the objectives of the study which was to investigate issues concerning household waste generation and disposal practices, availability and type of waste disposal services, payments for waste disposal services, householders' perceptions about the waste situations in their communities and how the situation could be improved. The

questionnaire was, therefore, seen as an appropriate tool which allowed for the collection of standardised information across participating households with regard to the variables of interest. The instrument was divided into appropriate sections to allow for the systematic collection of data from households in different socio-economic areas in the study areas (high, middle and low-income communities) (Appendix 8). Thus, some sections of the questionnaire were answered by all participating householders but other sections were specific to households in the different socio-economic areas in the cities. The survey questionnaire was semi-structured, containing both open-ended and closed-ended questions. The closed-ended questions required the respondent to make choices from alternative responses while the open-ended questions provided space for them to give their own answers to questions. An advantage of the semi-structured questionnaire was that while the closed questions made the questionnaire easy to complete, the open-ended questions provided the opportunity for respondents to give more detail information about the issues being investigated.

4.9.2.2. Reliability and validity of the questionnaire

Especially in quantitative studies, it is important to test the reliability and validity of the research instruments to be employed in data collection. Reliability is the extent to which a research instrument yields similar results whenever it is employed to elicit data under constant conditions while validity refers to the extent to which the research instrument records what it is intended to record (Cohen et al, 2000). Burns (2000:450) shows the importance of ensuring the validity and reliability of research instruments by saying that:

“Quantitative research has a great investment in reliability and validity. If the data is not reliable and valid, if the assessment techniques are not reliable and valid, if the design features do not create satisfactory internal and external validity, then the research is worthless in scientific eyes”.

To achieve reliability and validity of the questionnaire, the instrument was designed with great care, matching the questions with the objectives stated for the study. The initial draft was reviewed after which I showed it (together with the proposal for the study) to two other research students who were also using questionnaires in their

studies to review it. Next, I employed the 'expert validation' method (Mensah, 2006) by showing it to my supervisors who gave useful advice for improving the content, wording and layout of the instrument. The questionnaire was also tested with 30 householders in a pilot study which was conducted in Accra in September-October 2006. The responses generated were critically examined in relation to the objectives set for the study and were also compared with each other to check common understanding of items in the questionnaire. The results of the pilot study showed that the questionnaire was well-designed and easy to understand as the respondents had no difficulty in answering the questions. They also showed that the issues raised in the questionnaire were relevant and adequately addressed the concerns of the study. However, a few mix-ups were detected in the design of the questionnaire, especially with the routing of questions, and these were corrected to improve the quality of the instrument and make it more robust for the main fieldwork. The above measures made the questionnaire a valid and reliable instrument for the household survey.

4.9.2.3. Administering the questionnaire

A number of factors including the absence of clear boundaries separating residential communities in the study areas, the unplanned nature of settlements and the absence of household sample frames for the selected communities precluded the use of any random means of selecting the participating households. Faced with this situation, an ingenious way of selecting participating households had to be found. Attempts were made to achieve some kind of spatial representation of the households selected within each participating community by spreading the participating households evenly within the communities selected.

The survey was conducted with the help of two field assistants in each study area. In both Accra and Sekondi-Takoradi, the approach adopted for the administration of the questionnaire was to visit the selected residential communities. Using the crude spatial (convenience) sampling approach explained above, a member of the survey team would select a household and approach it to introduce the study and request an adult member to fill out the questionnaire. To reduce the time and energy involved in the administration of the questionnaires, and to reduce non-response or loss of the questionnaires (when they were left with respondents and had to be retrieved later), we always impressed upon the respondents to fill out or answer the questionnaire

while we waited. While this may not have given the respondent much time to ponder over some of their responses, the gain was the high response rate. There were cases where the householders identified declined participation in the survey in which case we moved on till we found a willing respondent. Throughout the process, we were mindful of the need to ensure geographical representation of locations within the communities.

Where the householder answering the questionnaire was not literate enough to fill out the questionnaire by him/herself, the instrument was administered by a member of the survey team (I or one of the two field assistants) in the form of an interview and the responses recorded on the questionnaire sheet. In some cases, the discussions were held in the local dialects of the respondents and the responses recorded in English. In Accra, the local languages involved were *Ga* and *Twi* while in Sekondi-Takoradi they were *Fante/Ahanta* and *Twi*, languages that all members of the survey team speak well. While the field assistants mainly administered the questionnaire, I tried to combine questionnaire administration with interviewing of householders who showed particular interest in the study and were ready for further engagement. This way, I was also able obtain some amount of qualitative data to further enrich the quantitative responses of householders.

In spite of its advantages as a research instrument, the questionnaire, as a method of data collection also has some limitations. It has been argued that because in most cases a questionnaire is filled in the absence of the researcher, it is difficult to ascertain if respondents who have been carefully selected for the purpose of the survey are those who actually fill the questionnaire (Bryman, 2004). This problem was, however, greatly minimised in this study as most of the questionnaires were filled out immediately and in the presence of members of the survey team. In all, only seven questionnaires (five in Accra and two in Sekondi-Takoradi) had to be left with householders and retrieved later. Another widely acknowledged limitation of questionnaires is the low response rate especially of postal questionnaire (Bryman, 2004). Again, the approach adopted eliminated this problem. Thus, in spite of it being time consuming, the survey exercise went generally well and produced the data needed for the study.

4.9.3. Field observation

According to Yin (1982), observations are a form of evidence that do not depend on verbal behaviour, and the method enables the investigator to observe the phenomenon under study directly. Miller and Brewer (2003:213) have categorised observation into ‘unobtrusive observation’ and ‘participant observation’ based on the degree of participation by the researcher, and into ‘covert’ and ‘overt’ observations based on the level of awareness subjects have of being observed.

The phenomenon under study, solid waste, is one which lends itself to direct field observation. Thus, in addition to questionnaires and interviews, I also conducted field observation as part of the data collection exercise. This involved the observation of waste situations and other conditions that could affect waste management in the study areas such as the layout of settlements and road access within residential communities. Waste disposal sites were also observed to gather data on such things as standard of maintenance and environmental quality in the surrounding or nearby communities. In the course of the field observation, photographs were taken of waste scenes such as street litter, waste storage containers, the transportation and final disposal of waste. I also participated in waste collection tours with waste labourers as they went about their work in some parts of Accra and Sekondi-Takoradi. The exercise enabled me to gain first-hand knowledge of the waste situation in the two cities including the waste disposal habits of the residents, the level of waste disposal services available to residents, the collection, transportation and disposal of waste and the management of final waste disposal sites in Accra and Sekondi-Takoradi.

The field observations undertaken to collect data for this study were largely unobtrusive. The situations observed were mostly waste scenes like street litter, choked drains, waste containers and disposal sites and this was done in ways that did not usually attract the attention of people around. Also, since the observations covered the effects of human action (e.g. street litter) and not human action itself (e.g. littering), the reactive actions of people were largely avoided. Even where the observations covered human actions such as people throwing litter around, they were usually unaware of the observation although there were some exceptions where I directly made people aware of my observations. However, part of my field

observation can be properly referred to as participant observation such as when I joined the waste labourers on their collection tours in the cities. These labourers were very much aware that their activities were being observed as I interacted with them and told them about my research project. In effect, the field observations can be said to cover all the four types identified by Miller and Brewer (2003) – they included both participant and unobtrusive observation, and were both covert and overt in nature. The field observations were used to compare the actual waste situations in the cities with the information gathered through interviews, household questionnaire survey and documentary analysis.

4.9.4. Documentary analysis

The analysis of documents is yet another important source of data for social science research. As observed by Miller and Brewer (2004) documents are a good place to search for answers and they provide a useful check on primary information gathered through interviews and questionnaires. Furthermore, documentary sources can provide a convincing answer when other techniques fail to resolve a question. Apart from that, documentary analysis allows the analyst to become thoroughly familiar with the materials and helps to save on time as well as help corroborate and strengthen the evidence gathered using other tools (Robson, 1993). Since documents are usually written about past events and by authors who know much about the subject under discussion, they can provide reliable and quality information. Furthermore, using more than one documentary source enables you to countercheck the information, a form of triangulation.

On his part, Yin (1994) has noted that documents allow an investigator to trace both factual and interpretive information about the phenomenon or situation under study. According to him, in additions to providing a rich source of data, documents also tend to capture key aspects of the situation being investigated. Creswell (2003:187) has identified some advantages of documentary analysis, noting that the method “enables researchers to obtain the language and words of participants, can be assessed at any time convenient to the researcher, and represents data that are thoughtful in the sense that participants have given attention to compiling them”. Atkinson and Coffey have also observed that there are many research questions and research settings that

cannot be investigated adequately without the production and use of textual materials (cited in Silverman, 2000).

It is evident from the views expressed by the research methodologists cited above that documentary sources can be useful in social science research. In view of their relevance, therefore, this study obtained some of its data from documentary sources. Miller and Brewer (2003) have identified documents commonly used in social science research to include reports, periodicals, newspaper articles, photographs, letters, diaries, memoirs, shopping lists and even random jottings. According to Finnegan (1996:138), “documentary sources had, for a long time, been taken to mean sources in the form of only written documents but its scope has now been widened to include other sources such as radio or film materials which are neither primarily in writing nor in documents in the traditional sense”.

Part of the information for this study was obtained from both the traditional documentary sources like reports and newspaper articles as well as from electronic media sources including television and radio programmes. As part of the data collection process, these sources were critically examined for information relating to the issue of solid waste management in the country. A number of studies were available that had investigated aspects of the urban environment including sanitation, water and waste disposal (see Chapter 1; Justification for the Study). These were reviewed to draw relevant data for this study. The print media also provided a rich source of information about the state of solid waste management in various cities in the country. These included reports of workshops and press conferences on issues about the urban environment including sanitation, water pollution and waste disposal. The documentary data thus obtained were used to supplement the information gathered from the interviews, the household questionnaire survey and field observations. Thus, four different methods of data collection - interviews, questionnaires, field observation and documentary analysis - were triangulated to elicit information for the current study of solid waste management in Accra and Sekondi-Takoradi. This combination of methods allowed the collection of a more inclusive data set for the study.

4.10. Data analysis

Both quantitative and qualitative data were gathered for the study using questionnaires, interviews, field observation and documentary sources. After cleaning up the data from the household questionnaire survey and correcting the few mistakes that were detected in the filling of the questionnaires, the data were coded and fed into SPSS 14.0. for Windows. Analysis was undertaken to generate a descriptive picture of the data gathered on such themes as household waste generation and handling practices, services available to households for waste disposal and householders' satisfaction with the quality of service. This also covered question items relating to the funding of waste disposal and environmental concerns of waste disposal. Simple percentages and means (central tendencies) were used to analyse the quantitative data obtained from the household questionnaire administration.

The qualitative data from interviews conducted with all other categories of respondents were analysed manually by making summaries of the views of the respondents and supporting these with relevant quotations that captured these views, supported with data from documentary sources and my own field observations of the waste situations in the two case-study cities. The analysis (presented in the next three chapters) is organised under themes derived from the data and the research questions that guided the entire investigation.

4.11. Positionality

Research methodologists consider that in qualitative research involving interaction with people, such as in interviews or observations, the researcher's identity in relation to his subjects and his background and experience in relation to the research topic can either enhance or ruin the data gathered and hence the results of the study (Burgess, 1984; Coteerill and Letherby, 1994). Coteerill and Letherby (1994) suggest that when the participants in a study perceive the researcher as an insider with whom they share similar experiences, they are less likely to be suspicious about his intentions and the purpose of the research. This means that a researcher's familiarity with the study environment can enhance the research process. Burgess (1984) is, however, of the counter opinion that one's familiarity with the context of an investigation can impact the research negatively. Burgess (1884) argues that there is a tendency for a

researcher who knows his/her research context to take certain behaviours and issues for granted and thus fail to subject them to in-depth investigation. Burgess' view is supported by Mensah (2007) who also argues that the researcher's background and experience in relation to the research topic can be a hindrance to promoting understanding. In the views of writers like Burgess and Mensah, therefore, the situation where the researcher is quite unfamiliar with his/her study environment and topic will promote more vigorous investigation and create better understanding.

The contrasting views on the effects of researcher positionality on the research process are both important and it cannot be denied that participants' perception of the researcher can have an impact on their interactions with the researcher and hence the data collected. In this regard, researchers are, therefore, advised to take the issue of positionality seriously and take steps to prevent or minimise the effects that their relationships with research participants can have on the data obtained from interviews and observations.

Throughout the data collection exercise, I was, therefore, mindful of the issue of positionality and regarded my position in relation to my research subjects as an important factor that could either enhance or hinder the research process. As a Ghanaian, researching in my home country made me regard myself as an insider (compared with a foreign national researching in Ghana). I was also familiar with the two study areas but the same could not be said of my research subjects, none of whom I had encountered, especially before the pilot fieldwork. Thus, I would largely be regarded as an outsider by most of the people I talked to. That notwithstanding, my proven knowledge of the topic under investigation (which would become clear to participants during the interviews) would influence stakeholders in the waste sector (such as the staff of the waste management departments, public officials and managers of the waste companies) to regard me as an insider with regard to the issue of waste management. This would influence them to shed any suspicions they may have held about my intentions when I first approached them. This was shown in the high level of co-operation most of them showed in the interviews.

Moreover, some of the managers of the waste companies seemed to regard me as 'someone who knows' and perhaps, in a position to help address their problems through my research. For example, one of them made the comment "you people

should try and help us to solve this problem so that the government will listen to our problem”. Such perceptions could actually make some respondents overenthusiastic with their responses, a situation which could have both positive and negative impacts on the information generated. To minimise the confounding effects of positionality, I always explained the purpose of my study to my respondents and impressed upon them that we were all in the learning process in the attempt to find a solution to the waste menace in our cities.

Thus, my familiarity with the study areas and the topic under investigation made me a partial insider and created opportunities for understanding while my unknown status to the research subjects could have put me in the category of outsider and affected their reaction to my queries. My solution to the issue of positionality was to conduct myself decently as a researcher to gain the confidence and trust of my respondents.

4.1.2. Ethical issues

A number of ethical issues were addressed in the course of the research including informed consent, access and acceptance, and confidentiality and anonymity. Robson’s (1993) advice on these issues was a useful guide. With regard to consent, Robson (1993:471) has advised that “whenever possible, the investigator should inform all participants of the objectives of the investigation and all aspects of the research or intervention that might reasonably be expected to influence willingness to participate”. The investigator is further required to “explain all other aspects of the research or intervention about which the participants require” (Robson, 1993:471). In the conduct of this research, the principle of informed consent was given the required attention by explaining the purpose of the study to participants and making them aware that participation was optional and they could choose to answer or not answer any questions in the course of the interview.

Another ethical issue that was addressed in the conduct of this study was access and acceptance which are closely related to the issue of informed consent. Access and acceptance involve obtaining permission to carry out research in a community, institution or organisation (Bell, 1991). Access and acceptance involve both allowing an investigator into a given physical space and also permitting him/her to conduct the investigation in a particular way (Homan, 2002). In the conduct of this study, access

to all premises such as institutions, organisations, businesses, communities and homes were duly negotiated. Prior to the conduct of the interviews, letters were written to all institutions and organisations identified to participate in the study, informing them of the impending study and seeking their consent to visit their premises for the interview discussions. In all cases, approval and consent were obtained before I visited to conduct the interviews. In conducting the household questionnaire survey, permission was always sought by members of the survey team to enter household premises after which the surveyors introduced themselves and the study to prospective participants. This way, the survey team avoided intrusion on any premises.

Confidentiality and anonymity issues were also addressed in the study. In recognition of the ethical requirement that information obtained from, or about, a participant during research should be treated confidentially, none of the information provided by interviewees was disclosed to other people. Where informants have provided information considered to be potentially injurious to them or others when disclosed, such information has been used with great caution and in a manner that would not be linked to their providers. To achieve anonymity of the data gathered from respondents in the household survey, personal data such as names and addresses of householders who answered the questionnaires were left out in the design of the instruments. This way, it becomes impossible to trace any information to a particular householder or participant. In presenting the interview data, the actual names of participants and their settings have been changed to make it impossible to identify those who provided the information. In the case of officials or elites who provided 'potentially injurious' information, these have been presented in a manner that does not allow anyone to trace the information to their providers.

4.13. Methodological limitations

The collection of data for the research was affected by two major adverse factors which limited the amount and quality of information gathered for this investigation. One such limitation was the limited sample size of 590 participants in the household survey in the two case-study cities. I initially planned to use a much larger sample of about 1000 households (700 in Accra and 300 in Sekondi-Takoradi). Unfortunately, a number of factors constrained my intentions and efforts. The most important factor that limited my fieldwork was my involvement in a lorry accident less than a week

after I arrived in Ghana to commence my data collection fieldwork. I arrived in Ghana on July 10, 2007 and on July 14, decided to travel to Sekondi-Takoradi to make preliminary arrangements with key stakeholders for the study. On my way from Accra to Sekondi-Takoradi, the bus on which I was travelling burst a tyre and got involved in a serious accident about 30 km to Sekondi-Takoradi. I later heard in the news that six people lost their lives and several others sustained life-threatening injuries. I was very fortunate to survive but sustained a fractured leg which kept me on admission at both a traditional bone clinic in a village near Sekondi-Takoradi, and the Efiakuma Hospital in Sekondi-Takoradi for close to two and a half months (I left the clinic on October 23 and made two review visits later) during which time I could not collect any data. Even after treatment, my leg was not strong enough which further limited my movement for a good part of the fieldwork period. I had to rely very much on a good friend who drove me around most of the time and three field assistants (two in Accra and one in Sekondi-Takoradi) who carried out much of the household survey while I concentrated on the interviews, field observation and documentary investigation to elicit the required data. In effect, the time for the data collection fieldwork was greatly reduced from five months to about two months (from late October to just before Christmas in 2007). Within this limited time, I could therefore not achieve my target with regard to the coverage of the fieldwork and the amount of data to collect.

The second important factor which constrained my data collection exercise and, therefore, limited the data I collected was the limited resources with which I conducted the fieldwork. Through the efforts of my supervisors, I was lucky to receive an amount of £500 plus air fare from the School of Geography, University of Nottingham for the pilot study which I conducted earlier in September-October 2006. For the main fieldwork, I had hoped that my sponsors - the Ghana Education Trust Fund/Scholarships Secretariat - would provide the required funds/logistics as stated in my award letter. In line with their requirements, I therefore forwarded my research budget proposal to them four months before I arrived in Ghana. To my disappointment, however, the Scholarships Secretariat failed to provide any support for my field work, claiming that my employers (the University of Education, Winneba) should bear the cost of my fieldwork. I raised the issue with my employers but this also proved fruitless as the University claimed it was not its responsibility to

finance my fieldwork. I therefore had to rely on my own limited resources to meet the cost of the entire fieldwork exercise including travel and accommodation, printing and photocopying of research instruments and other documents, payments at various offices and remuneration for my field assistants.

A third limitation of my research methodology is related to the techniques employed in the analysis of the data which is rather too simplistic and does not provide sophisticated statistical analysis of the household questionnaire data. This is, however, due to the nature of the research design which is largely qualitative.

CHAPTER FIVE

THE SOLID WASTE SITUATION IN ACCRA AND SEKONDI-TAKORADI

5.0. Introduction

The first objective of this study was to describe the solid waste situation in the two cities of Accra and Sekondi-Takoradi. In line with this objective, fieldwork was undertaken in the two cities to collect primary data on the waste situations there (see section 4.4). Analysis of the data has shown that both study areas have very poor solid waste management practices, a situation which seems to corroborate what has been reported in other cities in the developing world (Onibokun and Kumuyi, 1999; Hardoy *et al.*, 2001; Pacione, 2005). The poor solid waste situation in Accra and Sekondi-Takoradi was confirmed by the various means by which data were gathered for the study. Direct field observations within the two cities showed very poor environmental conditions due to inadequate disposal of solid waste. Information gathered from media reports on the waste situation in Ghanaian cities also confirmed the appalling waste situation in the major cities. This was reflected in the titles of newspaper items such as ‘*Accra is dark and stinking*’ (Ghanaian Times, September 12, 2006) ‘*Waste engulfs Kaneshie market*’ (*The Chronicle*, February 2, 2007), ‘*Residents sue AMA and waste company for failing to collect garbage*’ (*The Statesman*, July 23, 2006) and ‘*Waste, waste everywhere and not a place to dump*’ (*Daily Graphic*, May 17, 2007). The media reports also showed that the disturbing waste situation in the country was not just apparent during the fieldwork period but had been so for a long time. For example, more than six years ago on January 5th. 2002, the *Daily Graphic* newspaper reported the waste problem in Accra:

“Many areas of Accra are engulfed with waste. On the way to the landfill at Oblogo, waste disposal companies, with tons of rubbish in their trucks, were stuck with nowhere to dump their cargo. The western half of the city was threatened with an epidemic as hills of rubbish quickly formed, flies hovered around, foul stench engulfed areas and there were threats of epidemic”.

(Daily Graphic: January 5th. 2002).

While the general urban waste situation in the country is bad, the study found great spatial variations between the wealthy and official areas of the cities on the one hand, and the poor and informal commercial areas on the other. The wealthy residential areas and official grounds in the major cities are generally clean due to regular cleaning and waste removal services. In most of the cities including Accra and Sekondi-Takoradi, however, poor residential communities and informal commercial areas like the markets and lorry stations have appalling environmental conditions due to the lack of regular cleansing and waste removal by the city authorities and their contractors. Day after day, much of the waste generated in these areas remains uncollected, a situation which leads to waste accumulation in the cities.

The sanitary condition in Accra and Sekondi-Takoradi worsens with each passing day. A casual look around most Ghanaian cities shows piles of refuse, choked and smelly gutters and polluted streams. In the central business areas of major cities such as Kumasi, Accra, Sekondi-Takoradi and Tamale, it is common to see overflowing refuse containers, with refuse sprawling on the streets, whilst the choked gutters stink. There is, therefore, growing concern about the increasing levels of filth in the cities and its impact on public health and the environment. Besides, the issue of final waste disposal has also become a headache to the authorities due to scarcity of disposal sites. In Accra, Sekondi-Takoradi and other large cities, the authorities continue to struggle to find appropriate disposal sites usually amidst protests from residents of communities near the areas earmarked for waste disposal. Waste management therefore presents a real challenge to municipal authorities in the country.

Population dynamics and economic activities have significant impacts on the volume of waste generated in a city and this has been the case in both Accra and Sekondi-Takoradi. Over the years, rapid urbanization in Ghana has resulted in the concentration of population and business in the major cities in the country. The population of the Accra metropolis for instance has increased rapidly over the years, growing from a little over 0.6 million in 1970 to over 2 million in 2000, while the total population of Sekondi-Takoradi rose from about 144,000 to 289,000 during the same period (Table 5.1). The current population of Sekondi-Takoradi (including the floating population) is estimated to be over 400,000 people (interview with the metropolitan planning officer, STMA). Due to continued rural-urban migration and

high rates of natural increase in the country's urban population, cities in Ghana continue to add to their populations at a rather rapid rate.

Table 5.1. Population growth in Accra and Sekondi-Takoradi, 1970-2007

Census Year	Total population	
	Population	Sekondi-Takoradi
1970	624,091	143,982
1984	969,195	188,230
2000	1,658,937	289,593
2007	2,200,000* (estimated)	400,000**(estimated)

Source: Ghana Statistical Service, 2002; *UNESCO, 2008; **STMA, 2007)

5.1. Solid waste generation: quantities, sources and composition

Accra and Sekondi-Takoradi are both important administrative, commercial and industrial centres in Ghana. Besides their resident populations, they also attract traders, visitors and tourists from all parts of the country and beyond. The production and consumption activities of both the resident and floating populations generate enormous quantities of solid waste on a daily basis. A number of factors are contributing to the growing volumes of solid waste in these cities. Over the years, rapid urbanization has been accompanied by expansion of the urban economy, rising incomes among the population and increased production and consumption of products. Furthermore, the free market policies that came with the implementation of structural adjustment programmes in the early 1980s can be regarded to have contributed to the growing volumes of solid waste in the cities. These policies opened up Ghana's domestic market to foreign products, most of which have high levels of packaging. In the major cities, the growing consumption of these waste-laden products, including consumer goods, foods and household products, generate enormous quantities of solid waste far beyond the management capacities of the authorities.

5.1.1. How much waste is generated?

In 2002, the Ghana Statistical Service estimated that each person in the country produced 0.5 kg of solid waste in a day and the various municipal assemblies in the country have since employed this figure to calculate the quantities of solid waste generated within their jurisdictions. The EPA's estimate of 0.5kg per head per day has

also been quoted by several studies including Anomanyo (2004), Kwamena (2006) and Tamakloe (2006). Waste stream data provided by the AMA waste department in September 2007 suggest that the residents of Accra generated about 2000 metric tonnes of solid waste each day, up from 1800 metric tonnes in the year 2000 and 1200 metric tonnes in 1994 (Accra metropolitan waste department). Furthermore, the Ghana EPA has estimated that daily waste generation in Accra will soar up to about 4000 metric tonnes by 2025 (EPA, 2002). In Sekondi-Takoradi, the waste department also estimated the city's daily output of solid waste to be 285 metric tonnes. All these estimates of the quantities of solid waste generated are supposedly based on the per capita waste estimation given by the Ghana Statistical Service in 2000.

It is difficult to establish the accuracy of the per capita daily waste output calculated by the Ghana Statistical Service and the subsequent estimations of waste generation made by the city authorities. The half-a-kilogramme per capita per day waste output measurement was the national average in 2000, some seven years before this study and the situation could have changed over the years since population dynamics have significant influences on the level of waste generation in human settlements. For instance, changes in lifestyles and consumption patterns among the population could bring about changes in the types and levels of waste generation. It is also known that urban residents generate more waste than their rural counterparts due to their higher consumption of products (Onibokun, 1999). If it holds true for Ghana that cities in the country have higher levels of waste generation than rural communities, then the per capita daily rates of waste generation in Accra and Sekondi-Takoradi, which are both major cities in the country, could actually be higher than the national average of 0.5 kg. In this case, the estimated levels of waste generation for the two cities could be incorrect.

In fact, because the total populations of these cities have not been accurately determined, any attempt to measure the total daily waste output for the city (even if the per capita output is known) becomes problematic. In Sekondi-Takoradi for instance, using the estimated functional population of about half a million (about 400,000 resident and 100,000 floating) and the per capita daily waste output of 0.5 kg to calculate the total daily waste output yields 250 tonnes, which is below the 285 tonnes estimated by the waste department in 2007. It would require a total population

of 570,000 generating waste at 0.5 kg per capita each day to obtain the daily total output of 285 tonnes. It can, therefore, be concluded that either the city's functional population or its per capita waste output (or both) has been underestimated by the city authorities.

As a way of testing this, permission was sought from nine households (three each in high-income, middle-income and low-income communities) to weigh their waste output for five consecutive days in order to calculate their daily per capita waste production based on the size of each household. The results of the tests (shown in Table 5.2) suggested a higher per capita daily waste output of 0.56 kg. The sample of nine households was insignificant and the weighing of the waste was done for only five days so the results obtained cannot be used to draw any valid inference on waste generation in Sekondi-Takoradi. However, the results highlight the point that any attempt to measure waste generation in the city should be done with care.

Table 5.2: Calculation of per capita waste generation in Sekondi-Takoradi, October, 2007

Residential areas	Households			Per capita daily waste output
	Household 1	Household 2	Household 3	
Low-income	0.61	0.54	.047	0.54
Middle-income	0.62	0.57	0.55	0.58
High-income	0.53	0.63	0.52	0.56
Average per capita daily output				0.56

According to projections made by the Sekondi-Takoradi waste management department for the period 2006 to 2010, the city's total daily waste output in 2007 was 285 tonnes and waste generation in the metropolis would increase from 268 tonnes in 2006 to 308 tonnes in 2010, while total annual waste generation for the city is expected to increase from 97,686 tonnes to 112, 237 tonnes during the same period. It is interesting to note that even if the slightly higher experimental result of 0.56 kg per capita per day is used for the calculation, the daily waste output for the metropolis still falls short of the current estimate of 285 tonnes. As noted above, it would require a total population of about 570,000, generating waste at a rate of 0.56 kg per capita each day, to obtain a daily waste output of 285 tonnes for the city.

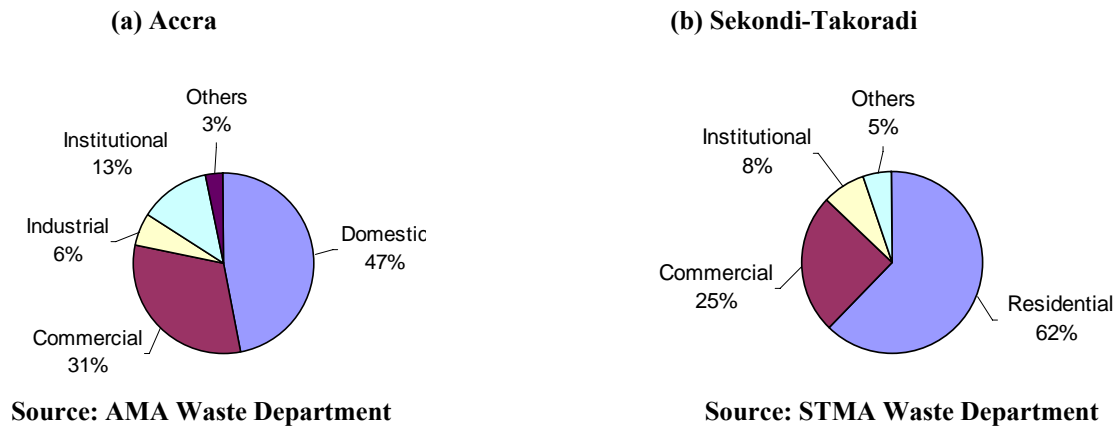
It is very likely that the calculations of waste generation made for Accra will likewise be erroneous and that the authorities are working with inaccurate data. As will be discussed later, the lack of accurate waste generation and characterization data is one of the factors that seriously constrain effective planning and organization of waste disposal in Ghanaian cities. Proper waste audits would need to be carried out to determine the actual rates of waste generation for the various cities in the country and this should be checked against the national average figure which may no longer be valid due to reasons stated earlier. The lack of reliable data on waste generation in Ghanaian cities confirms the assertion by Hardoy *et al.* (2001) that reliable data on waste generation and characterization is generally lacking in poor cities around the world. This situation greatly affects the planning and organization of solid waste management in Ghanaian cities.

The scarcity of data notwithstanding, one thing that is clear is that waste generation is on the increase in Ghanaian cities. In both Accra and Sekondi-Takoradi, staff of the waste departments attributed the rising volumes of solid waste to rapid population growth and rising volumes of commercial activities in the cities. The current waste situations in most Ghanaian cities makes it evident that available resources for waste management do not match waste generation and this leads to inadequate collection and waste accumulations in the cities. It becomes clear to anyone who is familiar with Ghana that the urban waste situation is getting out of hand and there is every indication that the situation will worsen in the future if remedial actions are not taken

5.2. Sources of solid waste

The major sources of solid waste identified by the waste departments of Accra and Sekondi-Takoradi are domestic, commercial and industrial premises. In Accra, estimates made by the waste department (see Figure 5.1a) suggest that waste from domestic sources alone constitutes 47 percent of the total waste output in the city while commercial activities (including trading activities in the open-air market, stores and street trading activities) generate about a third (31 percent) of the solid waste output. Institutional sources such as schools, research centres, offices, health centres and laboratories together contribute 13 percent of the waste output with industries generating 6.0 percent. All other sources generate the remaining three percent of the city's solid waste output.

Figure 5.1: Sources of solid waste in study areas



In Sekondi-Takoradi, the main contributors of solid waste are shown in Figure 5.1(b) which indicates that residential premises also dominate in waste generation, contributing a much larger proportion (62 percent) than in Accra. The proportion of commercial waste (which includes industrial waste) was given as 25 percent while institutional sources produce eight percent of the solid waste output in the city. All other sources make up the remaining five percent. The idea that domestic and commercial sources produce the bulk of the solid waste outputs was corroborated by private waste companies operating in the two cities who also reported that they collect most of their waste from residential areas followed commercial sources. In both Accra and Sekondi-Takoradi bin men of the waste companies with whom I went on waste collection tours also confirmed that most of their waste collection activities were undertaken in the residential communities and commercial premises. Even though these claims could not be supported with any statistics, the general impression is that residential and commercial sources contribute most of the solid waste in the two cities.

It is not surprising that the domestic or residential sector generates a greater proportion of municipal waste in Sekondi-Takoradi than in Accra even though the latter city has a much larger population. This is because Accra has large volumes of commercial and industrial activities which generate large volumes of waste compared with Sekondi-Takoradi where the commercial-industrial sub-sector is small. The industrial sector is missing in the Sekondi-Takoradi classification but the waste

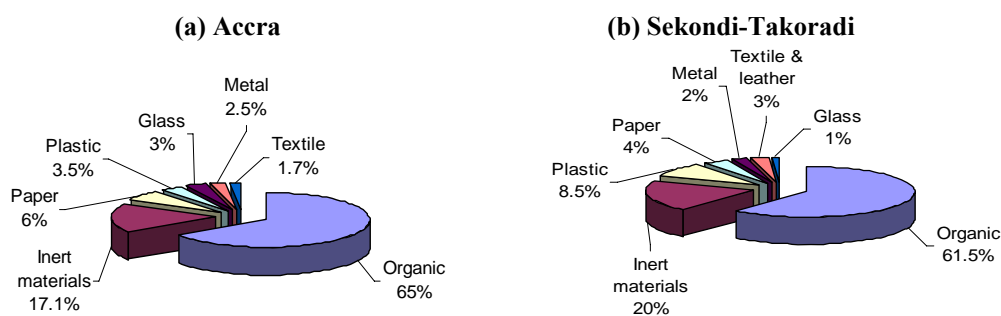
department explained that this is combined with the commercial sources in the classification.

It should be noted that here the waste generation statistics provided by the two waste departments are estimates since, according to them, no waste audits have been conducted to generate actual data on the sources of solid waste. The lack of accurate data on waste generation is bound to affect the planning and effective organization of solid waste management in the two cities.

5.3. Composition of solid waste

The waste composition data obtained from the AMA and STMA waste departments are shown in Figure 5.2. In both cities, the data show the predominance of organic materials which form as much as 65 percent of the total waste output in Accra, and 61.5 percent in Sekondi-Takoradi, coming mainly from residential and commercial premises. This is followed by inert materials like sand, ashes and wood which form 17.1 percent of the waste stream in Accra and 20 percent in Sekondi-Takoradi, coming from such sources as construction activities, household and street sweepings.

Figure 5.2. Composition of Solid Waste



Other important components of the waste stream are paper, plastic, glass, metals and textiles. Paper constitutes 6.0 percent and 4.0 percent of the total waste output in Accra and Sekondi-Takoradi respectively and includes newspapers, packaging cardboards and office waste paper. Plastic waste, including shopping bags, water sachets, bottles and containers forms 3.5 percent in Accra and 8.5 percent in Sekondi-Takoradi while glass constitutes 3.0 percent and 1.0 percent respectively. Others are

metals (3.0 percent and 2.0 percent in Accra and Sekondi-Takoradi respectively) coming mainly from household utensils, spare part shops and auto repair garages; and textile wastes which are mainly produced by garment making shops, plus household rags and upholsteries. Table 5.3 shows the major items in the solid waste stream and their proportions in the two cities.

Table 5.3: Composition of the solid waste stream in Accra and Sekondi-Takoradi

Waste type	Major items	Percentage of waste output	
		Accra	Sekondi-Takoradi
Organic waste	Vegetable and fruit parts, left-over foods, yard trimmings, wood	65	61.5
Inert waste	Rubble, ashes, yard sand, bones	17.5	20.0
Plastic	Bottles, containers, polythene bags, parts of electrical and electronic goods, worn-out tyres,	3.3	8.5
Paper	Cardboard, newspapers, old/torn books, ruffled paper etc	6	4.0
Metal	Cans, household utensils, wires, auto and bike scraps, white goods scraps,	2.5	2.0
Textile and leather	Clothes, footwear, bags, cuttings from tailoring shops,	1.7	3.0
Glass	Bottles, drinking glass, jars, mirrors, louvers, auto windscreens, computer monitor screens etc	3	1.0

Source: AMA and STMA Waste Departments, 2007

The high proportion of organic components in the waste stream can be explained by the fact that Ghana's economy is agro-based and there is a high level of consumption of fresh food products from the farm. Furthermore, most of the staple food products including cassava, plantain, yams, fruits and vegetables yield a lot of waste during preparation and consumption. In addition, factories that use raw agricultural materials such as fruits, sugar cane, vegetables, tubers and cereals also generate a lot of organic waste in their production processes. Besides, due to the lack of storage facilities for perishable food products on the farms and in the markets, post harvest losses are very high in the country. Much of the food products brought from distant rural areas arrive in the city markets already spoilt and add to the waste stream. While advantage could have been taken of the high organic content of the waste stream to produce compost for farming and reduce the amount of waste going to landfills, this has not been achieved. Interviews with staff of the AMA waste departments suggested that apart from the lack of funds to maintain the compost plant, there is a rather low demand for compost manure from farmers around the city who prefer to use artificial fertilizers for the cultivation of vegetables and other crops which they sell to restaurants and households in the city. As a result, the only compost plant for the city has collapsed

and the site is being used as a landfill. The authorities in Sekondi-Takoradi, meanwhile, have never made an attempt to compost waste. Staff of the waste department were of the view that their priority should be improving waste collection and disposal and that the private sector should consider composting of the organic components of the waste stream.

In Accra, one use to which food waste is currently being put is animal feeding. The study found that pig farming in particular is a popular business in some poor communities on the outskirts of Accra with 'Pig Farm', a suburb of Accra, as the main centre. The pig farmers make arrangements to collect food waste from restaurants, schools and other residential institutions where food waste is generated in large quantities. Some farmers also obtain spoilt vegetable, fruits and tubers from food sellers in the market and animal blood from abattoirs for use as animal feed. Interviews with a sample of the pig farmers showed that some of the suppliers give out the food waste free to the farmers but others charge for it. In an interaction with Ayiteye, a pig farmer at Fadama (one of the poor communities in Accra), he lamented that a lot of food waste is thrown away by the residents of Accra which could have been used to feed animals to supply meat for the market. He complained that even though some hotels, restaurants and residential institutions usually throw away large quantities food waste, some are usually unwilling to give it out free to farmers who need it to feed their animals and would usually ask for some payment. He, however, commended others who willingly give off their food waste free of charge.

It is worth commenting on the other major components of the solid waste stream. Inert materials which form as much as 17.1 percent and 20 percent of the waste output in Accra and Sekondi-Takoradi respectively largely emanate from street and house compound sweepings, ashes and rubble from construction and demolition works (AMA and STMS waste departments sources). In Ghana, rubble from construction and demolition works are often used to fill up pot holes on site roads and so are rarely disposed of as waste. Sand and stones from street and compound sweepings, however, form a significant proportion of the municipal solid waste stream. Except for its weight, inert waste does not pose much of a problem for waste management since it is a stable component of the waste stream and has no immediate adverse environmental

impact compared with organic wastes which decompose rapidly and contaminate the environment.

In spite of the significant proportions of metal in the waste streams of the two cities (2.5 percent in Accra and 2.0 percent in Sekondi-Takoradi), the problem it poses for waste disposal is in sharp decline. Until recently, scrap metal was a much more important item in the solid waste stream in the country, emanating from abandoned vehicles, white goods, industrial sources and households hard wares. Currently, there is a surge in scrap metal recycling for iron rod production in the country. Scrap metal is, therefore, in high demand and it is common to see young men rummaging for every piece of metal including scrap auto parts, metals in white goods, bicycle parts, pressing irons, *etc.* These are cleaned and sold to buyers who in turn sell to the recycling firms. Interviews with two scrap metal buyers in Accra showed that scrap metal collection is now a lucrative venture. As a result, dealers who act as middlemen between the collectors and smelter factories now travel around the country to buy scrap metal. Scrap metal recycling factories are springing up in several cities including Accra, Tema and Kumasi and according to the AMA, this has greatly reduced the proportion of metal in the waste stream.

Unlike metal which is on the decline in the waste stream due to recycling, plastic waste is a growing menace in Ghanaian cities, accounting for an increasingly large proportion of the waste stream. The sharp increase in the use of plastic shopping bags and the boom in the sachet water (drinking water in plastic bags) business in recent years together with the ‘throw-it-where-you-like’ attitude of many Ghanaians have greatly increased the volume of plastic in the waste stream. According to IRIN (2007), 270 tonnes of plastic waste is generated each day by the inhabitants of Accra and plastic water sachets alone account for about 85 percent of that refuse. Over the years, plastic has replaced leaves, paper, glass and metal as a cheaper and more convenient container and means of packaging in Ghana. But on the down-side, indiscriminate disposal of plastic materials poses major environmental problems including the clogging of drains and streams, threat to animals, soil damage and pollution of beaches in Accra. Recently, Ghana’s Minister of Tourism, Jake Obetsebi Lamptey noted that “plastic waste has had a terrible impact on tourism, particularly on the beaches east of Accra where rain water carries the waste”. The minister also

lamented that “the visible mountains of refuse in Accra give visitors the impression that Ghana is a filthy country” (Daily Graphic, July 13th. 2007) and truly, it is. Even though some efforts have been made to deal with the plastic waste menace in Ghanaian cities, much of this has just been rhetoric. As far back as July 2004, the government launched a US\$1.5 million plastic recycling project and inaugurated a 16 member ‘Enter the Recycling Task Force’, drawn from the government, plastic manufacturers, water sachet producers and city authorities, to work on establishing plastic recycling plants as well as working with existing recyclers to expand their facilities. Since the inauguration of the laudable project about four years ago, little has been done and plastic waste continues to engulf all major cities in the country. Recycling plastic in order to reduce the plastic waste menace, therefore, still remains a dream in Ghana.

Paper and cardboard also have a substantial presence in the waste stream, contributing 6.0 percent and 4.0 percent of the total output of solid waste in Accra and Sekondi-Takoradi respectively. Much like plastic, paper wastes cause visual intrusion on the streets and contribute to the clogging of drains and streams in the city. In spite of this, the shorter time period taken by paper to decompose makes it a less problematic component of the waste stream than plastic. In a number of cities including Accra, Kumasi and Sekondi-Takoradi, newspapers and other clean sources of paper are recycled by print media institutions and toilet tissue manufacturers. Old newspapers are also sold at the entrances to public latrines for use as toilet tissue. The interviews I conducted in Accra and Sekondi-Takoradi showed that many institutions like schools, offices and hospitals burn their old records including examination papers, office and hospital records when these are no longer needed. With the gradual computerisation of institutions and the transfer of data from paper to computers, paper waste generation could reduce in the country.

Glass (including ceramics) and textiles were also reported to be important elements in the waste stream. Generated mainly by drinking bars, hotels, households and institutions, broken glass is a major hazards and a common source of injury especially among waste pickers who rummage waste dumps for saleable products (Hardoy et al, 2001) and children in low-income communities who play on, or near waste dumps. The only glass factory which was established in Ghana in the early days of

independence collapsed more than twenty years ago and there is no known recycling project for glass in the country.

The study, however, found that there is a high level of re-use of both plastic and glass bottles in the country. Children and women rummage waste dumps for bottles and gallons for sale to clients. Waste pickers who were found salvaging glass and plastic bottles during the fieldwork said they clean these and sell them to producers of traditional medicines for use as containers. Some also said they sell their collections to producers of traditional drinks like *pito* (brewed from guinea corn or maize), palm wine and *hausa beer* (also brewed from maize) who, in the past, used calabash gourds and earthen pots as containers for their products. However, the bottle pickers and their clients can only be interested in the undamaged ones while the damaged ones remain waste. One good practice of breweries in Ghana (including Coca Cola, Ghana Breweries and Kumasi Breweries) is that they all reuse their glass bottles.

Textile and upholstery which form 1.7 percent of the waste output in Accra and 3.0 percent in Sekondi-Takoradi emanate largely from the numerous dressmaking shops and from homes as discarded clothes, footwear, bags, furniture parts mattresses and carpets. Other sources are residential institutions, hospitals, auto interior décor workshops and furniture and mattress factories. Like paper, textile waste causes visual pollution and contributes to the choking of drains and pollution of streams in Accra. However, much like paper, it has a short lifespan in the environment and is not a major worry to the authorities. The study also found that there is some amount of reuse and recycling of textile and upholstery waste in Accra. For example, interviews conducted with some dressmakers showed that pieces of cloth that result from the cutting of patterns are used in stuffing pillows and for making door mats for sale. Similarly, my visit to ASHFOAM, a mattress factory in the Accra Industrial Area also showed that people collect the pieces of foam mattress dumped in the factory yard for pillow-making. Furthermore, discarded leather bags are also salvaged and the leather cut for making sandals and other items for sale. Generally, therefore, it is only the practically unusable textile and leather items such as very old and badly torn clothes, bags and footwear that really remain as waste. On the whole, textile, paper, inert waste and to some extent glass and metal are not as worrying as plastic and organic

waste which remain real menaces in the city environments and cause a headache to the authorities and all who value environmental cleanliness.

5.4. Household waste generation and storage

In the household questionnaire survey, respondents were asked to indicate the waste items most commonly generated in their homes, how they stored their waste before disposal and their waste disposal arrangements. A summary of the responses to the question ‘what waste item is most frequently generated in your home’ is presented in Table 5.2. The data show that the overwhelming majority of households (94.9 percent in Accra and 96.5 in Sekondi-Takoradi) in the sample generated more organic waste than any other waste type. A small number of respondents listed paper/cardboard (3.4 percent in Accra and 4.0 percent in Sekondi-Takoradi) and plastics/polythene (0.9 percent in Accra and 0.7 percent in Sekondi-Takoradi) as the waste items most commonly generated in their homes. Textile and dust were listed by only two and one respondent(s) respectively and only in Accra. That most respondents in the sample indicated organic waste as the commonest household waste item can be attributed to the general household consumption pattern in Ghana where fresh food items like fruits, tubers, roots and vegetables form the bulk of purchases of the average household. The processing and consumption of these food items generate a lot of organic waste in the home.

Table 5.4: Household waste generation

Major waste item generated	Accra		Sekondi-Takoradi	
	N	%	N	%
	450	100	140	100
• Organic materials (e.g. food waste, garden waste)	427	94.9	135	96.5
• Paper/cardboard (e.g. packaging, newspapers, office waste paper)	16	03.6	4	02.9
• Plastic/polythene (water sachet, shopping bags, bottles)	4	0.9	1	0.7
• Leather/textile (e.g. footwear, clothes, bags, upholstery)	2	0.4	---	---
• Dust (e.g. ashes, compound sweepings)	1	0.2	---	---

Source: Household survey in Accra and Sekondi -Takoradi, 2007

Table 5.4 further shows that the number of households whose waste outputs were dominated by materials other than organic were insignificant. In Accra, paper/cardboard was listed by only 16 of the 450 households as the commonest waste item generated while plastic, leather/textile and dust were listed by four, two and one

households respectively. The responses from householders in Sekondi-Takoradi were similar (Table 5.4). It is suspected that those households which listed paper and plastic as the most frequently generated waste materials engaged in some kind of home-based business activities in which paper or plastic were used as raw materials. Similarly, the one respondent who mentioned dust as the commonest waste item in his home may also be engaged in an activity which generates a lot of dust. On the whole, the household survey data on major household waste items corroborates the waste composition data obtained from the AMA and STMA waste departments which also indicated the dominance of organic materials in the waste streams (Figure 5.2).

In both Accra and Sekondi-Takoradi, the general notion among the city waste departments and the waste companies was that waste from poorer homes contained more organic materials than waste from wealthy homes which reportedly consisted of more packaging materials. As noted by the assistant head of waste management in Sekondi-Takoradi, “wastes from these [low-income] communities also decompose quickly because they contain plenty of organic content”. This claim would seem obvious in view of the fact that poor households usually purchase cheaper and bulkier raw food items like tubers, roots, vegetables and fruits which yield lots of organic waste during preparation and consumption. This compares with the wealthier householders who usually shop in the supermarkets and purchase elaborately packaged foreign food products, the waste from which largely consists of paper, cardboard, plastic and cans. My own inspection of the contents of a sample of household waste containers in both Accra and Sekondi-Takoradi also confirmed the preponderance of organic materials in waste containers in poorer communities compared with those in the wealthier communities.

Considering the fact that the solid wastes generated in the poorer communities have very high organic content relative to the wealthier communities, the low-income communities need more frequent collection services to prevent waste decomposition and contamination of their surroundings. This is, however, not the case in Ghanaian cities where waste collection efforts are rather concentrated in the wealthier communities where the waste generated largely consists of packaging materials and should thus require less regular collection. The city authorities’ usual argument for providing less service for the poor is that they (the poor) do not pay for waste

disposal. This point was reiterated by a senior official of the AMA waste department when he said “the problem we have is that the low-income communities who generate most of the waste do not want to pay for disposal ...”

Furthermore, the waste disposal service providers in the two cities were also of the opinion that lower-income households produced more waste than higher-income ones. In Accra, this point was made by the operations manager of ABC Waste Ltd when he said “...as for the rich people, they generate less waste because of their small families. But the poor families always produce more because they are many in the family”. Mr. S.K. Kpodo of the AMA waste department reiterated this when he also said “...one major problem we have is the large quantity of waste we have to lift from the low-income communities”

Observations I made seem to support the view that the wealthier homes generate less waste than poorer homes in the study areas. In Accra, my rounds with the bin men on waste collection tours showed that the waste containers for many homes in East Legon and Cantonments (two of the wealthiest suburbs of Accra) had little content even on the day of collection. In one of the interviews I held with a sample of householders in East Legon, a lady householder told me that:

“I think I’m paying the waste contractor money for nothing because this container is empty most of the time when they come for waste collection. All the people in this house are busy people and no one stays at home to do anything to produce waste”.

To prove her point, the householder invited me to look into her waste container. It was just a day to the collection of waste in her neighbourhood but the only items in her waste bin were a cardboard box, an empty drink can and an old pair of shoes. While she proved her point, her situation may not reflect the general situation in East Legon and the other high-income neighbourhoods in Accra. However, my observation later on when I joined the waste crew of Gee Waste Ltd (the company that collects waste in the East Legon area) showed that many household waste containers were not full even on the day of collection. I also observed that the crew pulled or lifted the containers with much ease which could suggest that their contents were light and

likely to be packaging materials such as plastic and paper and cardboard. Moreover, my observation was that households in many middle-income neighbourhoods (where residents are supposed to have weekly kerbside collection but which is hardly the case) frequently have overflowing bins while the communal waste containers in the many low-income communities were almost always overflowing with waste.

A critical examination of the opinion held by the providers of waste disposal services in the cities, however, shows that it could be an erroneous one. The overflowing waste containers in the poor communities can be explained by the fact that these containers serve very large populations and yet are not removed on regular basis. The fact that each container receives waste from a large number of households causes them to fill up quickly and overflow almost all the time and this seems to have been erroneously interpreted to mean that the residents of poorer communities generate more waste than their counterparts in the wealthier communities. This assertion is quite difficult to accept when one considers the fact that each household in the wealthy communities has its own waste container and receives very regular weekly home collection of solid waste compared with those in the poorer communities that either have very irregular kerbside service (middle-income) or share communal waste containers which almost always overflow due to irregular removal and the large populations they serve.

The storage of waste prior to collection or disposal is an important aspect of household waste handling practices so the survey sought from householders how they stored their waste before disposal. Table 5.5 shows the various methods of household waste storage which included the use of wheeled bins and other closed containers, polythene bags and sacks.

Table 5.5: Means of household waste storage

Type of container	Accra		Sekondi-Takoradi	
	N	Percent	N	Percent
	450	100	140	100
Closed container	254	56.4	59	42.1
Open container	113	25.1	51	36.4
Polythene bag/sack	82	18.2	30	21.5
Other	1	0.2	0	0.0

The survey found that in both Accra and Sekondi-Takoradi, households in the high class residential areas (such as Airport Residential Area and East Legon in Accra, and European Town and Airport Ridge in Sekondi-Takoradi) stored their waste in large plastic wheeled bins which they placed in front of the house for collection by waste contractors (Figures. 5.3 and 5.4). The bins were either purchased by the households from the market or supplied by the waste companies for a fee. In the interviews conducted with a sample of the householders, some reported bin theft to be common in their neighbourhoods and so many households keep their bins inside the compound and only take them out to the roadside on the collection days.



Figure 5.3: Kerbside collection in a high-income area in Sekondi-Takoradi

Source: fieldwork, October, 2007



Figure 5.4: Waste containers at roadside at the Airport Residential Area in Accra

Source: fieldwork, September, 2007

In the middle-income communities where roadside collection is the norm, the majority of householders who participated in the survey (63 percent in Accra and 80 percent in Sekondi-Takoradi) indicated that they stored their waste in closed containers which were either wheeled bins, barrels or other closed containers. In both cities, the remaining middle-income householders stored their waste in a variety of containers including old barrels or buckets, polythene bags, sacks and empty cartons (Figures. 5.5 and 5.6). Similar containers were in use in the low-income communities except that a greater proportion of households used open containers, polythene bags, sacks and empty cartons. The ways in which most middle-income households store their waste are a source of great concern. Uncovered waste containers such as torn polythene bags, old buckets and cartons frequently attract animals like dogs, goats and sheep, as well as rodents to rummage for food in the waste piles which are usually left at the roadside. Furthermore, the waste which usually remains for long periods before it is removed by the waste contractors easily gets scattered onto the roads and into gutters leading to contamination and drain blockage.



Figure 5.5: Waste storage in a middle-income community in Sekondi-Takoradi
Source: fieldwork, October, 2007



Figure 5.6: Variety of waste storage containers in a middle income community in Accra
Source: fieldwork, September, 2007

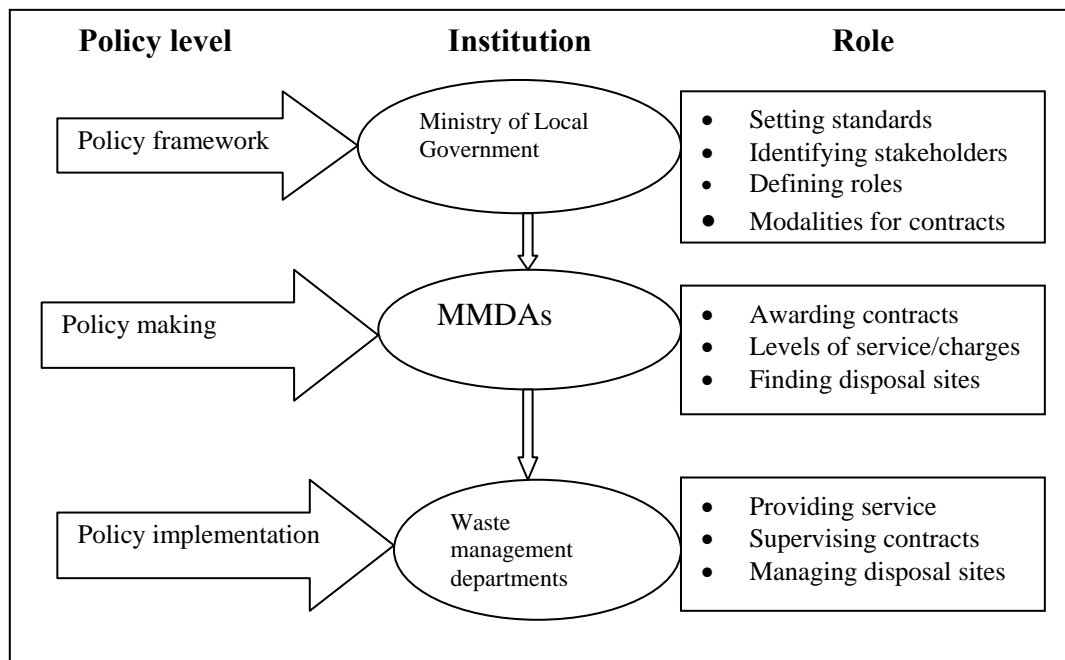
The means of storing waste in the low-income communities were similar to those found in the middle-income areas. However, unlike in the high and middle-income communities where waste is kept in the home or roadside until it is collected by the waste contractors, households in the low-income communities (where the communal container is the means of disposal) do not have to keep their waste in the home for long but take it for disposal in the central containers as soon as it is gathered together in the home. It would, therefore, seem that low-income households with container service are better protected from the immediate hazards associated with having waste waiting around the house for long periods before collection as happens in most middle-income homes. Apart from those households that locate very close to the central containers, low-income households may, therefore, have less direct exposure to decomposing waste which is a serious problem in most of the middle-income communities where waste may be kept in the house until collection vehicles come around.

5.5. The organisation of waste collection and disposal

Figure 5.7 illustrates the nature of the waste management decision-making process in Ghana. The Ministry of Local Government, which has a supervisory role over the Metropolitan, Municipal and District Assemblies (MMDAs), provides the general policy framework for waste management. This involves identifying key stakeholders in the sector, defining their roles, establishing the modalities for awarding contracts

and setting the standards for the organisation of waste management. Based on the government directive that the poor should not be charged for waste disposal, the Ministry also advises the MMDAs on which income groups should, or should not, be charged for waste disposal.

Figure 5.7. Waste management decision-making framework



Source: AMA/STMA

Within the framework provided by the Ministry of Local Government, the MMDAs award contracts for waste collection; determine the levels of service and charges; decide where to provide/who to receive what level of service; acquire equipment; and, find land space for waste disposal. According to the AMA and STMA, contracts for waste collection are usually advertised and applications are assessed on such criteria as the amount of equipment owned by the contractors, experience in waste management or environmental cleansing, and the number of relevant staff. The MMDAs also decide the charges to be paid by households to the waste contractors and the amount to charge or pay the contractors when they transport waste to the disposal sites.⁹ With regard to the level of service to provide in the different

⁹ Contractors who operate franchises in the high and middle-income areas receive direct payments from clients and are charged GHC12.00/tonne when they transport waste to the disposal site. However, contractors who operate contracts in the low-income areas receive no payments from households and

geographical areas within the cities, the criteria used include rough estimations of the average household income, the level of planned housing and the ease of access for waste trucks in each locality. The zoning of city areas for different levels of service is usually based on maps provided by the Town and Country Planning Department which zone the cities into rough income areas. The actual planning and organisation of waste collection, transportation and disposal is done by the Waste Departments of the various MMDAs, in collaboration with the waste contractors, within the framework provided by the Assemblies.

5.5.1. Household waste collection arrangements

As part of the attempt to assess social justice in the organisation of solid waste management in the study areas, the survey questionnaire requested householders who participated in the study to indicate their waste disposal arrangements. In this regard, the data gathered showed that official household waste disposal arrangements in the study communities include house-to-house collection, roadside collection, truck visits and central container collection (Table 5.6). In Accra, a hundred and nine (109) households representing a little over 24 percent of the sample of 450 indicated that they had home collection while 67 households (15 percent) had roadside collection. Respondents from 79 households (nearly 17 percent) also indicated that they kept their waste in the home until a waste truck visited their neighbourhood or employed the services of informal private collectors (Figure 5.8) whenever the waste trucks failed to come for a long time. Of the remaining 195 households in the Accra survey, a further 33 percent disposed of their waste in communal containers located within their communities.

are paid the same rate (GHC12.00/tonne) by the MMDAs when they transport waste to the disposal site

Table 5.6: Household waste disposal arrangements

How waste is removed from home	Accra		Sekondi-Takoradi	
	N	Percent	N	Percent
	450	100	140	100
Home collection	109	24.2	21	15.0
Roadside collection	67	15.0	34	24.3
Taken to truck (or private waste collector*)	79	16.8	05	03.6
Central container	148	32.9	61	43.4
Waste dump	32	07.1	13	09.3
Other	15	03.3	6	04.3

* Private waste collectors were found operating only in Accra

Forty-seven households representing 10.4 percent of the sample indicated they had no waste disposal service. Out of this, 32 disposed of their waste on communal dumps while the remaining 15 resorted to any convenient means of disposal waste including dumping into drains or bushes, burying and burning waste in their backyard.



Figure 5.8: An informal private waste collector at work in Accra.

Source: Fieldwork, September, 2007

In the case of Sekondi-Takoradi, 21 (15 percent) of the 140 householders in the survey indicated home collection to be their waste disposal arrangement while 34 (representing 24.3 percent) indicated roadside or kerbside collection. Of the remaining households in the survey, 3.6 percent (5 households) relied on waste truck visits to

their neighbourhoods while 43.4 percent (61 households) were served by communal containers in their communities. Nineteen (or 13.6 percent of) households in the Sekondi-Takoradi survey had no waste disposal service and either dumped their waste at unauthorised communal waste dumps (Figure 5.9) or by any other convenient means such as in the bush, drain or by burning.



Figure 5.9: Unofficial waste dumping at the roadside near a lake in Sekondi-Takoradi

Source: Fieldwork, October, 2007

The field observation which was done alongside the household survey showed that, in both cities, households without waste collection services were not only found in low-income communities. Some of the high and middle-income households were located in newly developing areas in the two cities where waste collectors do not extend their operations. In such areas, some residents dumped their waste at any convenient location including depressions, roadside, bushes and drains (Figure 5.10) while others employed the services of the informal waste collectors.



Figure 5.10: Roadside waste dumping in a newly developing area in Accra

Source: Fieldwork, September, 2007

Recently, a Chinese waste company, Zoomlion Ghana Ltd, has entered the waste business and appears to be gaining ground rapidly. Through the central government, the company has secured contracts from most district assemblies in the country to undertake waste collection in the towns and cities. At the time of the fieldwork, Zoomlion was in full operation in Accra and was making preparations to begin work in Sekondi-Takoradi. In Accra, the AMA contracts the company to provide mass collection of solid waste in many low-income communities using communal containers. Zoomlion has also introduced a tricycle-cart technology (Figure 5.11) to provide home collection services to middle and high-income households in some parts of the city for a fee.



Figure 5.11: Zoomlion tricycle-carts at the Kaneshie Lorry Park

Source: Fieldwork, September, 2007

According to the AMA waste department, most of the areas that are covered by Zoomlion fall outside the contract zones of the other waste companies but this was refuted by some of the managers of the waste companies who claimed that their contracts were being reduced to create a niche for Zoomlion. Some also argued that they could have covered the areas given to Zoomlion if the AMA had been paying them promptly for their contract work. At the Kaneshie market, it was common to see Zoomlion tricycles packed around piles of waste while the riders were nowhere to be found. Some of the riders I later spoke to complained that the work they do is tedious and filthy yet they are not adequately paid. In an informal interview, one of them noted that riding the tricycle was a back-breaking exercise and he felt very exhausted

at the end of the working day. Another observation is that the activities of ground sweepers and Zoomlion waste collectors are still not enough to keep public grounds in the city clean and environmental conditions in the markets, streets and lorry stations still leave much to be desired as these grounds are strewn with heaps of uncollected garbage, much of which remain and rot in situ.

While environmental sanitation is bad enough in the low-income areas of Accra, it even worse in the many squatter settlements which lack any provision for sanitation and garbage removal due to their 'illegal' status. One of the filthiest settlements within the Accra metropolis is *Sodom and Gomorrah* (Figure 5.12), a squatter settlement near the *Agboghloshie* market in south-central Accra, where 'brown agenda' problems such as poor shelter, lack of drainage infrastructure and waste disposal services have resulted in unhealthy environmental conditions. The metropolitan authorities regard the settlement as 'illegal' and have threatened the residents with eviction on several occasions. According to the AMA Waste Department, it has no obligation to collect waste in illegal settlements. Therefore, all settlements in the city tagged as 'illegal' receive no waste collection service. The *Sodom and Gomorrah* community is perennially water-logged, except in the dry season, and many residents simply dump their waste in the stagnant waters where it decomposes and create health and life-threatening conditions. Apart from the dire environmental conditions within the settlement, there are high levels of unemployment and poverty in the community. It is widely believed among Ghanaians that many of the residents engage in such anti-social activities as armed robbery, drug peddling and abuse, rape and prostitution. This negative perception about *Sodom and Gomorrah* and slum communities in general could be responsible for their general neglect by municipal authorities in the country.



Figure 5.12: A squatter community without waste collection service in Accra

Source: Fieldwork, September, 2007

The above analysis of the waste situation in residential communities in Accra and Sekondi-Takoradi shows that there is great disparity in the level of waste collection service received by the residents of the two cities. At the one extreme, the residents of wealthy communities have the convenience of regular home waste collection while at the other extreme, poor communities have little or no waste collection services, leaving them to their fate, with waste engulfing their communities and homes. Considering the fact that public funds are employed in the provision of waste disposal services for the residents of Ghanaian cities, it can be argued that the organisation of waste management in Ghana lacks social justice due to the unfair treatment for poor residents of the cities (discussed in Chapter 7).

5.5.2. Commercial waste collection

The waste departments in Accra and Sekondi-Takoradi both regard the commercial sector to be the second most important generator of solid waste after the residential sector. Defined to include wastes arising from premises used wholly for the purpose of trade or business or other commercial activities, commercial waste is estimated to constitute about one-third (31 percent) of the total waste output in Accra and a quarter (25 percent) in Sekondi-Takoradi (Figure 5.1) (AMA and STMA waste departments sources 2007). The major sources of commercial waste in the two cities are informal trading activities in the open-air markets and lorry stations, the stores and restaurants.

In Accra, the numerous open-air markets including the *Kaneshie, Mallam, Agboghloshie, Konkomba, Timber, Labadi and Madina* markets are major centres of commercial activities which generate the bulk of the solid waste arising from the commercial sector. Informal interviews with some of the traders and my own observation showed that waste generated in the main market areas included foodstuff waste, polythene, paper and cardboard, raffia materials and leaves. Furthermore, the trading activities of hawkers at the adjoining lorry stations and on the streets in the central business areas of the city generate enormous amounts of solid waste which litter the city environment heavily. The waste situation in the Sekondi-Takoradi metropolis was found to be similar to the situation in Accra. In the twin-city, trading activities in the Sekondi Market and the Takoradi Market Square generate the bulk of commercial waste. The main sections of the open-air markets are for the sale of staple foods like cassava, cocoyam, yams, vegetables, fruits, cereals, fish and meat. Considering that a lot of the foodstuffs, transported from distant rural areas, goes bad on the way to the markets, the wastes generated in the markets are enormous and largely organic in nature, consisting of rotten food items like cassava, plantain, fruits and vegetables, as well as unusable parts of food products such as peelings, stalks, husks and leaves. All kinds of waste materials can, therefore, be found in the waste containers located in and around the markets (Figure 5.13).



Figure 5.13: Waste containers at the entrance to the Takoradi Market Square¹⁰

Source: Fieldwork, September, 2007

¹⁰ An attendant at the market informed me that the waste container had not been emptied for over two weeks.

In both Accra and Sekondi-Takoradi, trading activities in the open-air markets usually spill over onto adjoining streets and lorry stations where the throw-it-where-you-like attitude of hawkers, passengers and other pedestrians result in heavy ground litter consisting of food wrappings, plastic, paper and cans. Without any regard for environmental sanitation, sellers and buyers alike easily peel off the wrappings and packaging of 'ready-to-eat foods' and other products, and discard these on the ground. The same thing happens on the roads where passengers in traffic throw out plastic bags, paper, fruit peelings and uneaten foods from moving vehicles onto the streets, leading to heavy litter on the roads. At the close of each day, therefore, the busy commercial grounds such as the markets, lorry stations and streets are left with thick litter which contaminates the city environments.

The data gathered in the two cities also showed that much of the commercial waste emanates from stores, supermarkets and restaurants. From the field observations as well as interviews conducted with a small number of store keepers in the two study areas, solid waste from the stores largely consists of cardboard, paper, plastic and nylon, materials removed from packages delivered to the stores. The numerous restaurants found all over the two cities also generate a lot of organic waste in the form of food preparation waste and uneaten foods. The above analysis of the commercial waste situation has shown that the sector is an important contributor to the mounting waste problem confronting these two cities and this would be applicable to other Ghanaian cities as well.

The organisation of commercial waste disposal in Ghanaian cities is approached in the same manner as domestic waste disposal in the low-income communities. Primary collection in the open-air markets and lorry stations is by means of skips or communal containers, the type used for waste disposal in the low-income communities. The waste companies operating in the zones where the markets are located provide waste containers in the markets and lorry stations for the purpose of waste disposal. Observations during the fieldwork showed that in spite of the enormous quantities of solid waste generated in the markets, only a few waste containers are usually provided in each market. These are placed at the entrance to the markets since the waste trucks cannot easily gain entry into the crowded markets. Traders in the market are supposed to carry the waste resulting from their trading activities to the containers at the end of

the trading day but many of them fail to do this and leave the waste at the point of generation.

In Accra, some of the traders also engage the services of informal private waste collectors (Figure 5.8) to remove waste from their premises. Most of the informal private waste collectors dump their collections in the waste containers located in the markets and lorry stations but some dump them elsewhere indiscriminately. Two of the collectors I interviewed at the Kaneshie market, *Ayaw* and *Jallo*, explained that they usually dump their collections in the central containers provided by the AMA and its contractors. However, according to the collectors, they sometimes dump their collections elsewhere because the AMA waste department tries to prevent them from using the containers. *Ayaw* and *Jallo* wondered why the AMA did not want them to dump their collections in the waste containers because, in their view, they were only helping the AMA to do its work. When asked if they would be willing to pay to dump their collection in the containers, they both answered in the negative. According to *Ayaw*, what they earned was barely enough to meet their basic needs while *Jallo* reasoned that “if hawkers and others do not pay tax on their earnings, why should we pay when we are even helping to keep the city clean? (translated from Twi language). In spite of this, it may appear unfair that the waste collectors receive payment from clients and place the burden of waste disposal on the city authorities and their contractors. When I asked to know if they would be willing to work for the AMA waste department, the two waste collectors said they were very much willing to do so because they believed it would give them better incomes and job security.

In both study areas, staff of the city waste departments who sweep the market grounds also dump their collections in the central containers. In Accra, a female sweeper whom I talked to told me that some of the traders bring their household waste along to be disposed of in the central containers. According to her, those traders who have no toilet facilities in their homes often resort to the ‘wrapper method’. In Sekondi-Takoradi, the wrapper method of excreta disposal was also reported to be a common practice among traders and many low and middle-income householders who have no toilet facilities in their homes. In view of the fact that the waste containers usually remain for several days or weeks before removal, the wrapper method of excreta disposal can actually worsen the contaminating effects of the decomposing waste.

In both Accra and Sekondi-Takoradi, there was every indication that the city authorities and their waste contractors lacked adequate capacity to handle the waste situations in the markets and other commercial premises. The problem of waste accumulation, however, appears more acute in Accra where many of the markets are perennially filled with waste. My observations in both cities showed that, much like in the low-income communities, only a few waste containers are usually available for primary waste collection in the markets and these are usually located far apart. Moreover, the waste containers are replaced very infrequently and are almost always overflowing with waste as the contractors fail to keep to schedules for their removal and replacement. Only a few containers could also be found at the adjoining lorry stations where the trading activities of hawkers, passengers and pedestrians generate large quantities of waste.

As happens in the low-income communities, it is common for over-flowing waste containers in the commercial areas to remain for many days and sometimes weeks before they are removed and replaced. In some of the markets, the stench from the decomposing waste is often unbearable and keeps many potential buyers out of the markets. In Accra, a group of traders at the *Agbogbloshie* market told me that, there were times in the past when waste containers in the market remained for up to six weeks when the waste companies went on strike. According to them, the health-threatening conditions that occurred in the market compelled many of them to abandon their stalls or sheds and relocate along the roads to sell their wares. The problem here is that wastes generated in these markets are largely organic with very high moisture content and so decompose very rapidly in a rather hot climate. The resulting odour and unsanitary conditions in the markets can, therefore, be worrying. During my visits to some of the markets, it was common to see people, hit by stench from the decomposing waste, covering their nostrils with their hands or handkerchiefs when they went past the waste containers. In spite of this, some traders display their wares and go about their business as usual sitting right in the mess around the containers (Figure 5.14).



Figure 5.14: Traders display wares around a waste container at the Kaneshie market in Accra.
Source: Fieldwork, September, 2007

At the *Kaneshie* market in Accra, some of the traders who sat by their wares around the waste containers told me that they had no stalls to display their wares even though they paid market tolls to the AMA. Thus, any time a waste container was removed these traders would rush to occupy the space created to sell their wares, including fresh vegetables, fish and meat, until a replacement container arrived. My observations in the markets showed that a large proportion of the waste generated also derives from materials used in packaging food products to the markets such as jute and nylon sacks, raffia baskets, cardboard, wooden boxes and plastic bags. In these markets, some of the traders who have no stalls usually spread materials such as plastic sheets, raffia mats, grass and leaves or cardboard on the bare ground to display their stocks. At the end of each day, most of the materials on which foodstuffs are displayed for sale are left on the market grounds together with the food waste generated. All kinds of waste items can, therefore, be found in the central containers or on the ground (Figure 5.15).



Figure 5.15: Waste collection in the Kaneshie market, Accra¹¹.

Source: Fieldwork, September, 2007

Having contracted out waste container lifting to contractors, both the AMA and the STMA waste departments undertake the cleaning of public grounds including the market, lorry parks, streets and drains. In both cities, the sweeping of the markets and lorry parks are scheduled to be done daily but shortages of staff and equipment make it impossible to keep to the schedules and this leads to the accumulation of waste on public grounds. Public ground sweeping is usually done by labourers of the waste departments who use long brooms to gather the waste into heaps. In Accra, these heaps are now collected by the Zoomlion tricycle riders, while in Sekondi-Takoradi this task is carried out by the sweepers.

Waste collection in the stores seems not to be as problematic as in the markets and lorry stations. According to some of the store keepers I interviewed, the large cardboard boxes and plastic sheets which make up the bulk of their waste are usually recovered by people including shack dwellers who use them to construct shelter and market traders who spread them on the ground to display their merchandise. As a result, much of the waste generated by the stores are reused by others and this helps to reduce the quantity of waste generated, at least in the short-run. In the long-run, all

¹¹ Some staff of the AMA waste department were clearing the fallen waste around the container while I was talking to the tomato seller in the left corner of the photo. The photo was taken after the waste had been cleared from the ground into the container.

these materials find their way into the city's waste stream. The data gathered also showed that, in Accra, many of the store keepers employ the services of the informal private waste collectors (who themselves rummage the piles they collect for useful products) while others are served by the formal sector waste contractors on a franchise basis. Some of the shop operators also dump their waste in communal containers in the nearby markets and lorry parks at the close of day. Generally, waste from the stores does not seem to pose much of a problem for the organizers of waste management in Accra since most of it is recovered for use by people.

The information gathered from the AMA and STMA waste departments and from a small sample of restaurants in the two cities showed that some of the restaurants have arrangements with the city authorities and their waste companies to remove waste while others engage the services of the informal waste collectors. Some restaurants also dump their waste in available communal waste containers or else, resort to indiscriminate dumping in the absence of a public waste container. Interviews conducted with a sample of restaurant staff in both Accra and Sekondi-Takoradi also indicated that some of them give out the food waste they generate to farmers for the feeding of animals like pigs and birds.

5.5.3. Industrial waste collection

As a developing country, Ghana's industrial sector is limited and dominated by small-scale production units such as wood/furniture works, building and construction, food processing, wood works, textile and leather works among others. Industrial waste usually consists of by-products and remnants of materials used in production and includes pieces of metals, wood, plastic, paper, textile, and leather. In both study areas industrial waste is not much of a problem because it is limited and much of it is salvaged by waste pickers for sale to recyclers or other people who find use for them. Information gathered on industrial waste disposal showed that many industries have arrangements with the waste companies to remove their waste while a few take their own waste to the disposal sites and pay dumping fees to the city authorities. Some small-scale industries, however, either employ the services of informal waste collectors or dump their waste in nearby communal containers. In Accra, there were also reports of fly-tipping by some factories who do not want to pay the dumping fee at the disposal sites.

5.5.4. Industrial waste collection

Interviews with officials of the AMA and STMA waste departments indicated that offices and residential institutions such as schools and hospitals generate the bulk of waste from the institutional sectors of the two cities. Follow-up field observations and interviews with a sample of these institutions showed that the bulk of their solid waste outputs consist of paper and cardboard, plastics and food wastes. Others were glass, cans, and hazardous waste. In three major residential educational institutions that were visited (namely the University of Ghana, Accra Polytechnic and Accra Teacher Training College), paper and cardboard, plastics and organic food wastes were the preponderant waste items found at their waste collection stations but there were also substantial quantities of glass and cans. Interviews with conservancy staff in these institutions indicated that the waste largely emanates from offices, halls of residence and restaurants on the campuses.

At the Korle-Bu Teaching Hospital and Labadi Polyclinic in Accra and the Efiakuma Hospital in Takoradi, discussions with some cleaning staff and observations made at their transfer stations also showed that the wastes arising from healthcare premises include hard clinical wastes such as blood-stained bandages and swabs, sharps like needles and blades and expired pharmaceuticals. Additionally, the health centres generate some amount of food waste from the kitchens, restaurants and admission wards, textile waste from the clothes of unknown dead bodies, yard waste from the pruning of trees and trimming of hedges, as well as plastic, paper and cardboard, bottles and cans which arise from gift items brought to in-patients by families and friends. Observations made at waste collection points of some government departments and private sector offices showed that paper is the dominant item in their waste containers together with some amount of plastic and food waste.

In both Accra and Sekondi-Takoradi, institutions like schools, hospitals and government offices generally have arrangements with the city authorities and their waste contractors for the removal of waste from their premises. The waste companies operating in the zones where these institutions are located usually provide the waste collection service even though requests for the service are made through the city waste departments. Most of the institutions also have arrangements for the pre-collection and storage of waste on their premises before final collection by the waste

contractors. The frequency of collection by the service providers varies from one institution to another depending on the type and quantity of waste they generate. However, discussions with those in charge of waste in the sample of institutions visited indicated that waste collection from their premises is generally regular and they found the service satisfactory.

In the two cities investigated, the waste collected from the various institutional premises including hazardous waste from the health centres and laboratories are all co-disposed of with general municipal solid waste. In view of the fact that clinical and laboratory waste often contain hazardous substances, the practice of co-disposal could exacerbate the environmental health burdens associated with final disposal facilities. In Accra, an environmental health officer of the city waste department indicated that the department was aware of the implications of the practice and steps were being taken to minimise problems from hazardous waste. One such measure, according to him, is the periodic spraying of the landfills with chemicals.

5.6. The final disposal of solid waste in Accra and Sekondi-Takoradi

The final disposal of solid waste is an issue of major concern in Ghanaian cities. Traditionally, the means of solid waste disposal in Ghanaian settlements has been the communal dumping ground. Small towns and large villages usually have communal waste dumps, located at the outskirts of the settlements where households carry their waste for disposal. In the past, most suburbs in the large cities also had their own dumping ground so urban settlements in the country were dotted with numerous waste dumps. With the introduction of modern waste management systems whereby waste can now be transported to landfills far from the points of generation, city authorities in the country have officially closed the communal waste dumps and now maintain one or two major disposal sites. Currently, the waste disposal facilities in most Ghanaian cities are landfills, which are generally poorly maintained. Information gathered for this study shows that the final disposal of solid waste in Accra and Sekondi-Takoradi occur in poorly maintained landfills with severe environmental effects in the host communities.

In Accra, the AMA waste department operates two final disposal facilities. The major one is a landfill in an old quarry pit near *Oblogo*, a poor community on the western

outskirts of Accra. Sited in the belly of a steep hill overlooking the *Oblogo* community (Figure 5.16), the landfill has been receiving waste from the central and western parts of Accra for more than a decade. The other disposal site is a disused compost plant at *Tweebleo* which is being used as a dump. The two dumping grounds are not engineered so there are no provisions to extract the landfill gas and drain off leachate from the decomposing waste. Wastes brought to these facilities by the waste companies are simply dumped and spread around. My field observations at the two sites showed that their waste-receiving capacities have far been exceeded and both facilities were overflowing with waste at the time of the fieldwork in the third quarter of 2007. In spite of this, the city authorities and their waste contractors continue to dump waste at these sites due to the difficulty of securing additional land space for waste disposal. The resulting environmental conditions constitute a great worry for residents of the host communities.



Figure 5.16: The landfill at Oblogo, located close to residential areas

Source: Fieldwork, September, 2007

At *Oblogo*, the road winding up to the landfill is in a very poor state, making it difficult for some of the poorly maintained waste trucks to climb up to the landfill. Often, the waste-loaded trucks break down on their way up to the landfill and can remain for days before they are repaired while their loads decompose and release foul odours into the *Oblogo* community. The location of the landfill up the hill also facilitates the down-flow of leachate-contaminated water from the decomposing waste

into the community. In interviews with residents of *Oblogo*, they complained about the polluting landfill and how it made life in the community unbearable. Among other things, they mentioned the presence of flies including mosquitoes, the stench from the site and the flow of leachate-contaminated water from the landfill into their community. In a short interview, a young woman called Ajala who lived with her two children in a house close to the dump noted that “we have even lost appetite for food because of the smell ... and the mosquitoes are always biting my children and making them ill” (translated from Twi language). Another resident, a middle-aged man named Ofofu, complained about wind-blown waste materials from the dump into the community.

The situation at the *Tweebleo* disposal site was no better. Since the collapse of the compost plant in the early 1990s, the site has simply been used as a dump for waste emanating from the eastern part of Accra. According to AMA sources, the compost facility went out of operation due to lack of funds to maintain it, a situation partly caused by the low demand for compost manure in and around Accra. Due to the lack of irrigation facilities, crop farming is a very limited business in and around Accra which has a rather dry climate. Moreover, interviews with some gardeners in Accra showed that most of them prefer to use chemical fertilizers which they consider superior to compost manure. The reasons given by some of the gardeners for their preference for chemical fertilizers seem to suggest that they place little value on compost manure. A common reason given by the sample of farmers for preferring chemical fertilizers was that chemical fertilizers made their crops, mostly vegetables, grow faster and produce higher yields which give them more income. Some also regard compost manure as unclean because it is produced from rotten wastes which sometimes contain human excreta. To sustain any composting project, therefore, the authorities may need to educate farmers in and around the city on the value of manure in order to boost demand for compost manure.



Figure 5.17: The towering waste dump at *Tweebleo* near *Teshie* in eastern Accra

Source: Fieldwork, September, 2007

Observations at the *Tweebleo* disposal site showed a huge mountain of waste covering a large area of land space (Figure 5.17). The dumping ground has now been extended beyond the original compost yard and there is a section for the disposal of raw excreta drawn from public and private latrines in the city. Upon entering the ‘waste yard’, as it is referred to, one is greeted by a strong stench from the excreta cesspools and stinking waste. The area is also swarming with flies which make it virtually impossible for one to stay in the yard for more than a few minutes. According to the AMA department, the capacities of both the *Oblogo* and *Tweebleo* disposal sites have been exceeded. For want of disposal land space, however, the department still allows the waste contractors to send their collections to the sites while efforts are being made to find additional waste disposal land space. The AMA, however, seems to have great difficulty in acquiring further land for waste disposal (discussed in the next chapter).

The final waste disposal situation in Sekondi-Takoradi is not so different from the situation in Accra. In the Sekondi-Takoradi metropolis, all wastes collected from the city environment by the waste department and its private sector contractors are transported to a dump at *Mpinstim*, a poor community on the eastern outskirts of the city along the Accra road. Observations conducted at the dump site showed that the surroundings are heavily inhabited with some homes very close by yet conditions at the waste dump are dire (Figure 5.18). Trucks that bring waste to the site tip their load

at the entrance and a caterpillar is used to push and spread the heaps further into the waste yard. The ghastly conditions at the dump notwithstanding, there were several waste pickers busily salvaging items from the freshly tipped loads when I visited. Among the items they recovered were plastic and glass bottles, wood and metal. My interactions with some of the pickers revealed that most of the recovered items were sold to recyclers but some were used by the pickers themselves.



Figure 5.18: The final disposal ground near *Mpinstim* is a poorly managed facility

Source: Fieldwork, October, 2007

Because the city authorities lack the capacity to maintain the waste dump, they have contracted this responsibility to RUSABEN Ltd, one of the two waste companies undertaking waste collection in the Sekondi-Takoradi metropolis. RUSABEN Ltd, however, equally appears to lack adequate resources for proper maintenance of the facility and this has resulted in poor environmental conditions at the site. In interviews conducted with a sample of residents of the host community, they expressed their dissatisfaction with the maintenance of the dump and complained about the dire environmental conditions in their community. Among other things, the residents complained about the stench, flies (including mosquitoes) and wind-blown waste materials in the community. In a short interaction with an elderly man who lived near the waste dump, part of his comment can be translated as: “this waste dump is a big problem to us. It smells so badly and the mosquitoes are also worrying us in our homes because of the waste dump”. From my own observation, the decomposing

wastes exude an unbearable stench while flies and scavenging animals also abound in the area, scattering the waste and exacerbating the foul odour. At one part of the dump, leachate flow from the waste ran into a pool of dark, stinking water which abounded with mosquitoes.

A member of staff from RUSABEN Ltd who was overseeing operations at the site when I visited conceded that conditions at the site were not the best and attributed the problem to the lack of adequate resources for proper maintenance work. An officer from the office of the EPA who was also present at the site was of the view that “this land is not suitable for a waste dump site; it is too close to the houses and the people living here are suffering from it ... and the company [RUSABEN Ltd] that has been put in charge to maintain it is not capable of doing a good job. They don’t have enough equipment and the job is not satisfactory”. According to the EPA official, his office had called for the closure of the dump but the STMA had not co-operated. On their part, officials of the city waste department blamed the situation on the scarcity of suitable land space for the construction of a proposed modern landfill which the World Bank had pledged to support as part of a four-city project involving Accra, Kumasi and Tamale as well. Thus, until the required land space is found for the proposed landfill project, waste disposal will remain a headache for the Sekondi-Takoradi metropolis.

The above analysis has shown that the authorities in Accra and Sekondi-Takoradi are grappling with mounting solid waste disposal situations. They are unable to provide adequate collection of solid waste from their city environments and tend to concentrate their efforts in the few wealthy residential areas and official grounds while the poor residential and informal commercial areas have little provision for the removal and disposal of solid waste. Many areas in the two cities are, therefore, engulfed with waste. While waste generation continues to increase, the authorities are neither able to improve their capacities for waste collection nor secure suitable waste disposal land space. The current waste management situation in Accra and Sekondi-Takoradi are, therefore, not encouraging and there are hardly any indications that the future situation would be better.

CHAPTER SIX

PERCEPTIONS ON THE CAUSES OF THE SOLID WASTE PROBLEM

6.0. Introduction

Rapid urbanisation over the past decades has resulted in population concentration and high densities in major Ghanaian cities, thereby increasing pressure on urban infrastructure and services. Thus, the demand for environmental services such as water, sanitation, and waste disposal has increased tremendously (Songsore, *et al.*, 2005). Against this situation, city authorities in the country have not been able to keep pace with the growing waste disposal needs of the population. In most cities in the country, road infrastructure and services for waste collection have not kept pace with population growth and have not been extended to some of the new suburban areas. The lack of waste disposal services has resulted in waste accumulation and unsanitary environmental conditions in many parts of the cities. The previous chapter has shown that the solid waste situation in the study areas leaves much to be desired. Analysis of the data has revealed that municipal authorities in Accra and Sekondi-Takoradi are unable to organise adequate collection and safe disposal of the solid waste generated by the residents of the cities.

One of the objectives for carrying out this research was to identify the factors responsible for the poor solid waste situation in the two case study cities. While population pressure can generally be regarded as a root cause of environmental problems in Ghanaian cities, a number of specific factors have emerged from the analysis as the factors responsible for the worsening waste disposal situation in the study areas. These factors are similar to those that affect solid waste management efforts in other developing countries (Section 2.2.4) and can be discussed under three themes:

1. Lack of political commitment for solid waste management
2. Scarcity of resources (funds, logistical and land space for waste disposal)
3. Lack of enforcement of waste disposal by-laws.

This chapter discusses how each of these themes contributes to the poor solid waste situation in the two cities.

6.1. Political commitment for waste management

The data gathered for this study suggests that the lack of political commitment to waste management is the root cause of the poor solid waste situation in urban areas in Ghana. This is shown by the fact that in spite of the magnitude of the solid waste problem in the cities and its impact on public health and the environment, the government accords it very low priority. Thus, even though there has been a lot of public outcry about the worsening waste situations in these cities, the government has not taken any serious steps towards its solution. The political neglect of the waste problem is shown in a number of ways. These include: i) the non-existence of a waste policy for the country, ii) inadequate public education on solid waste disposal and neglect of waste management in the country's educational curriculum, and iii) the inadequate allocation of resources for solid waste management. What follows is a discussion of the evidence in support of the claim that the government of Ghana has a low political commitment for solid waste management.

6.1.1. Failure to formulate a waste policy

One way in which successive governments in Ghana have demonstrated low priority for waste management is their failure to formulate a waste policy for the country. What comes closest to a waste policy in Ghana is the *Environmental Sanitation Policy* of 1999, a document which only makes passing comments about waste pollution of water bodies and contamination of the environment, without adequately addressing the important subject of solid waste and its management. This is in spite of the fact that Ghana was party to the declaration of the MDGs (Goal 7 of which enjoins governments to 'ensure environmental sustainability'), and the Agenda 21 Plan (Chapter 21 of which entreats all governments to promote 'environmentally sound management of solid wastes and sewage-related issues'). These objectives cannot be achieved by any country that trivialises waste management to the extent of not formulating a waste policy that can be implemented to protect human health and the environment.

The lack of a comprehensive waste policy for the country poses major constraints to effective waste management in the cities. Among other things, the government's own position on what constitutes solid waste, its characterisation and how it should be managed is unknown. As a result, municipal authorities charged with the responsibility for waste management within their jurisdictions have no guiding framework for the organisation of waste management. Furthermore, the lack of a waste policy for the country makes it difficult to identify who the key stakeholders are in the waste sector and their respective responsibilities for the organisation of waste management in order to avoid gaps and duplication of roles. There is also no indication of how waste management operations should be funded. It became evident from interviews conducted with municipal authorities in both Accra and Sekondi-Takoradi that the sources of funds for solid waste management are neither adequate nor clearly defined. Moreover, the situation also makes it difficult for municipal authorities to enforce standards, regulations and penalties on waste disposal to bring offenders to book and promote a positive environmental attitude among the citizenry. For example, interviews conducted with AMA and STMA waste management departments showed that there are no national laws on waste disposal while local government by-laws on solid waste disposal are scant. Due to the lack of any national policy backing for the local government by-laws on solid waste disposal, the police and the courts often regard waste disposal offences as too trivial to merit their attention. In part, the solid waste disposal challenge in Ghanaian cities can, therefore, be attributed to the failure of successive governments of the country to formulate a waste policy to provide a framework for the organisation of waste management activities.

6.1.2. Inadequate public education

Ghanaians have a very poor attitude towards environmental sanitation in general and waste disposal in particular. This is shown by the 'throw-it-where-you-like' manner in which people discard waste, a situation which greatly contributes to waste accumulation in the cities. Several newspaper articles have commented on the poor waste handling attitude of the public including the *Daily Graphic* (May 17th. 2007), *The Statesman* (July 23rd. 2006) and *The Chronicle* (February 2nd. 2007). Furthermore, a casual observation in any Ghanaian city will show how pedestrians, passengers, motorists and traders alike litter the streets and commercial grounds with

careless abandon. While this poor environmental attitude among the populace can partly be attributed to the lack of fear of the scanty by-laws (which are also hardly enforced), the situation can largely be blamed on the lack of public education on waste disposal and general environmental sanitation which keep the majority of Ghanaians ignorant about the harmful consequences of improper waste disposal. This view was supported by an official of the Ghana EPA (Accra) in an interview when he observed:

“it seems the public is not well-informed about the consequences of poor waste handling, and that is why people just throw waste around. So we need to do a lot to educate the public in order to improve awareness about environmental sanitation”.

Management of some of the waste companies also blamed the poor waste handling attitude of the populace on lack of environmental education. In Accra, the manageress of Liberty Waste Company, Ms. Ama Adobebe, observed:

“the way people handle waste in this city [Accra] will tell you that they don’t have any education on waste disposal. ... The government should therefore put in a lot of effort to educate Ghanaians on waste disposal. Otherwise we are not getting anywhere. We will continue to live in filth”.

Mr. Emmanuel Mireku, the manager of Meskworld Waste Company in Accra also argued that “... we have this [waste] problem because many people don’t know that how they discard the waste will affect them” while Mr. Godwin Aryeetey of ABC Waste Ltd (which has a branch in Sekondi-Takoradi) warned that “...if we don’t educate Ghanaians about waste, as I see it, logistics alone cannot solve the waste problem. ... We have to change our waste disposal behaviour so we need education”. At the newly-opened office of Zoomlion Ghana Ltd in Takoradi, the operations manager noted that “we all produce waste and waste affects us all so it is necessary to educate people on proper waste disposal. I think that will help very much”. At the waste management department in Accra, the director of waste management, Mr. Ben Laryea, lamented that “we Ghanaians have a very poor attitude towards waste disposal and this must be changed”. Among the solutions that he proposed to the problem was public education on environmental sanitation which shows his

conviction that ignorance is an important factor affecting waste disposal. In both Accra and Sekondi-Takoradi, most of the respondents who participated in the household survey were of the view that the public was not well-informed on the importance of proper waste disposal and suggested public education as a means of addressing the problem. Among the 450 respondents who participated in the household survey in Accra, 97 percent were of the view that ignorance contributed to the poor waste disposal attitude of the population while in Sekondi-Takoradi 86 percent of the 140 householders in the study shared the same view. There, therefore, seems to be consensus among stakeholders that ignorance or the lack of education on environmental sanitation is very much responsible for poor waste handling by the people.

The lack of environmental awareness among Ghanaians can, in turn, be attributed to the government's low commitment to environmental issues and the waste problem in particular which makes it fail to sensitise the populace to environmental sanitation and the need to live in harmony with the environment. This is because there is no visible evidence of government effort to sensitise the population on the need for sound waste disposal practices and living in harmony with the environment. The investigations conducted for this study indicate that enormous opportunities exist for the government to educate the people on environmental sanitation and waste handling including the electronic and print media. Apart from several TV channels and radio stations operating in the country, most towns in Ghana now have private radio stations which broadcast in both English and the local dialects of the people. Considering the wide spatial coverage of both the electronic and print media in Ghana, government-sponsored educational programmes on environmental sanitation or waste disposal through the media can have far reaching impacts on the population. In both Accra and Sekondi-Takoradi, municipal waste departments were convinced of the usefulness of the media in educating the public. However, the local governments lack the funds to sponsor media programmes and so look up to the central government to do this. In Sekondi-Takoradi, the head of the waste management department acknowledged how useful TV and radio could be in sensitising the public on the need for proper waste disposal. However, he was also quick to note that "...the problem is that we don't have the money to pay for TV and radio programmes to sensitise the public about waste disposal ... so we concentrate our efforts on the collection...". Similarly at the

waste management department in Accra, the principal environmental health technologist, Mr. Samuel Kpodo agreed that “public education can help to change the [waste handling] attitude of the people” but also worried about the high cost involved in carrying out such educational programmes on TV and radio. This is where the central government could show some commitment for waste management by sponsoring media programmes to sensitise the Ghanaian public to waste and general environmental sanitation. This, however, has not been the case due to the government’s lack of commitment to the issue of waste management.

6.1.3. Inadequate allocation of resources for solid waste management

The political neglect of the solid waste problem is further shown by the meagre resources allocated from central government sources for waste management operations in the urban centres. Generally, municipal authorities in the country are unable to undertake effective waste management due to the lack of resources but the central government pays little attention to their plight. Available information shows that all local governments in Ghana are constrained by an acute shortage of funds and logistics which seriously constrain the organisation of solid waste management. The helpless financial situation of local governments is largely because the central government lays claim to the most lucrative sources of tax revenue, leaving the local governments with the difficult, often impossible to collect sources. At the same time, the central government makes very limited funds available to the local authorities to finance their infrastructure and services including solid waste management. This situation makes it very difficult for the city authorities to organise effective waste management. Among other things, they are unable to pay their waste contractors promptly, employ personnel and acquire equipment for the maintenance of final disposal sites. This situation affects the operations of the contractors and makes them unable to collect and transport much of the waste generated within their contract zones.

Information gathered from waste contractors in the study areas indicated that they are saddled with huge debts to fuel companies and repair garages and find it difficult to pay their staff due to the delayed payments of their contract monies. The waste management regime in Ghanaian cities is therefore hinged on a vicious cycle of debts as the city authorities owe huge amounts to the waste contractors who in turn owe

heavily to the banks and the suppliers of fuel, spare parts and other logistics. From the data gathered for this study, it is evident that the funds and other resources required for adequate waste management in Ghanaian cities are well beyond the means of local governments alone. The situation, therefore, calls for central government commitment and support to the local authorities to enable them deal with the waste menace. The required commitment is, however, not forthcoming from the central government which seems to lack a sense of urgency of the worsening solid waste situation in the cities and its impacts on public health, the environment and the image of the country's cities.

The above analysis shows how the government of Ghana has demonstrated a very low level of commitment to solid waste management in the country. The government's lack of commitment to the waste problem is shown by the non-existence of a waste policy for the country, the lack of public education on waste disposal, the failure to develop the required expertise in waste management and inadequate allocation of funds for the organisation of waste management operations in cities in the country. The low political commitment to waste management in the country suggests lack of a sense of urgency of the waste problem and its impacts on public health and the environment.

6.2. Resource scarcity for waste management

This study has found that the scarcity of resources is another major constraint to solid waste management in Ghanaian cities. Analysis of the data obtained from key waste sector stakeholders in both Accra and Sekondi-Takoradi shows that shortages of funds, logistics and personnel are major obstacles to effective solid waste management in the country. Other constraints in the waste sector are the scarcity of suitable land for solid waste disposal and a lack of reliable data for the planning and organisation of solid waste management.

6.2.1. The problem of finance

It is well known that the provision of waste management services in any large city is an expensive undertaking that makes huge demands on the finances of local governments (Armah, 1993; Onibokun, 1999; Pacione, 2005). Apart from making investments in capital equipment, money is also required for the day to day

operational cost of the service in the procurement of fuel, spare parts and working gear. To make waste management efficient, therefore, local governments and other service providers should have a reliable and sustainable means of obtaining funds to cover the costs of the service. However, studies have shown that solid waste management in developing country cities is generally constrained by shortage of funds which makes the organisation of waste collection and disposal difficult for the city authorities entrusted with the responsibility of providing the service. Most municipal authorities in poor countries are, therefore, unable to provide adequate service to keep the city environments clean to protect public health and the environment against the contaminating effects of waste (Onibokun, 1999; Kironde, 1999; Hardoy *et al.*, 2001). As a developing country, Ghana is no exception to this.

6.2.1.1. Nature of the finance problem

The data gathered for this study suggest that shortage of funds is a crippling constraint to waste management efforts in Ghanaian cities. From the perspective of the service providers, it is the most important cause of the poor waste situation in urban areas in the country. Due to the dwindling capacities of municipal authorities to cope with the growing problem of waste accumulation in the cities, most Ghanaian cities now involve the private sector in waste management through contracts and franchises. Thus, while the responsibility for waste management remains with the municipal authorities, private waste companies are entrusted with the collection of waste in residential and commercial areas and its transportation to disposal sites. To provide a good service, the companies require funds to acquire and maintain equipment and to recruit staff to carry out their mandates. In this regard, it becomes necessary that the waste contractors receive regular payments from their employers to finance their operations. However, municipal governments in Ghana seem unable to raise sufficient funds to pay for the services of the contractors. In fact, many municipal authorities in Ghana have been heavily in debt to their waste contractors for many years. Thus, the country's waste management regime is hinged on a vicious cycle of debts that seriously affect waste management operations in the cities.

The failure of municipal authorities to make regular payments to the waste contractors makes it difficult, in fact, impossible for the latter to undertake adequate waste collection within the cities. In Accra for instance, the AMA's indebtedness to waste

contractors has been recurrent over the years. In March 2003, for example, the AMA owed more than GH¢1 million (about US\$1 million)¹² in debt to waste contractors who had worked for more than a year without receiving any payment. As reported by *The Chronicle* newspaper on Monday, January 10th. 2005, waste contractors became so disillusioned that they embarked on a sit-down strike action to demand their contract money. As waste engulfed the city, the Ministry of Local Government had to plead with the Ministry of Finance to pay the contractors. However, two years later in January 2005, things became worse when once again, many of the waste contractors abandoned their work due to outstanding arrears amounting to GH¢1.7 million (about US\$1.7 million) (*The Chronicle*, Monday, January 10th. 2005). According to *The Chronicle*, the resulting accumulation of waste in the capital city and the publicity it received from both the local and international media greatly embarrassed the government. Again, the local government ministry had to plead with the finance ministry to pay the contractors to enable them continue their work and spare the government further embarrassment. This time, the Minister of Finance, Yaw Osafo Marfo, was not comfortable with the inability of the AMA to raise funds to finance waste disposal. In addressing the assembly on the issue, he said:

“I consider it morally unacceptable and unfair for us to allow revenue leakages to go on while we take the easier option of using taxes of the poor nurses, teachers and farmers to support waste management in the Accra Metropolitan Area....we are prepared to assist you to resolve the current waste management crisis but before then, we must all be very clear in our minds that revenue measures need to be put in place to ensure that there is no recurrence of this embarrassing problem ever again”.

(*The Chronicle*, Monday, January 10, 2005).

In spite of this warning from the Finance Minister, the financial crisis of the AMA remains. Its debt to waste contractors stood over GH¢ 12 million at the time of the fieldwork in October 2007 and has probably increased thereafter. In Sekondi-Takoradi, the municipal waste department reported that its recurring debt owed to two waste companies had been paid three months before my fieldwork in the city and had

¹² The Ghanaian currency was redenominated in July 2007, making one Ghana Cedi (GH¢) = US\$1

been accumulating thereafter. It is reasonable to expect that the finance situations of other cities like Kumasi, Tamale, Sunyani and Cape Coast will not be very different.

6.2.1.2. Causes of the finance problem

The data gathered for this study shows that the perennial financial difficulties of the municipal authorities are caused by a number of factors. These include the overdependence of local governments on central government subventions and their inability to mobilise revenue from local sources, the government policy of exempting low-income communities from the payment of waste disposal levies and various corrupt practices in the public sector.

Armah (1993:81) has warned that any organisation that relies on central government subvention to deliver a waste disposal service will be strangulating itself and will not operate a sustainable service. According to him, the most effective way of obtaining revenue to cover the cost of waste management in any city is “a system of direct charges which allows some cross subsidy from high income to low-income residents and from the commercial and industrial sectors to residents”. Contrary to Armah’s view, this study found that municipal authorities in Ghana are heavily dependent on central government funding for the provision of waste management and other services with little emphasis on other sources of revenue. Given the unplanned nature of settlements and the largely informal structure of the urban economy, however, the implementation of direct charges as suggested by Armah will be a difficult, if not impossible, task for the authorities. This may explain why local governments in the country continue to rely on central government for funds with little reliance on other sources.

Nationally, the major transfers from central government to the various assemblies are through the District Assemblies Common Fund, (DACF). The DACF was established by Article 252 (2) of the 1992 Constitution of Ghana and the District Assemblies Common Fund (DACF) Act (1993), Act 455, which mandate Parliament to make provision for the allocation of not less than five percent of the country’s total revenue of Ghana to the DACF for the implementation of development programmes in the assemblies. (Ghanadistricts [online]). Section 7(a) of the DACF Act, (1993) Act 455 also requires the Administrator of the DACF to propose annually for the approval of

Parliament, a formula for sharing the common fund to the district assemblies. However, circumstances surrounding the DACF make it an unreliable source of finance for the assemblies. It is a common complaint among the district assemblies that allocations from the DACF are inadequate for their needs and only provide a fraction of their expenditure needs. Furthermore, because the total amount to be disbursed and the formula for disbursement keeps changing, it is never clear to the assemblies how much they will receive each year and when the money will be paid to them. While the funds are supposed to be made available to the assemblies quarterly, it is common for allocations for the first quarter (January – March) to delay into the third quarter of the year. Considering that the DACF is the single most important source of funds for the assemblies, this situation puts them in serious crisis which partly explains the accumulation of debts owed to waste companies and other service providers. The assemblies also complain of unexplained source deductions from the amounts due to them which further worsen their financial plight. Thus the disbursement of the DACF seems to lack transparency, a situation which can easily induce corruption as is suspected by the local assemblies throughout the country.

Apart from the DACF, the assemblies are also mandated to raise revenue from internal sources such as property rates, business licence fees, market and lorry park tolls, building permits and other administrative charges. However, a number of factors greatly limit the amount of revenue that can be generated from these sources. To begin with, central government still controls the most lucrative and easy-to-collect sources of revenue including income taxes, vehicle and driver registration fees and TV licence fees. Such revenues are usually collected by local offices of national level institutions and are paid into the accounts of the national institutions responsible for the sector. This denies local or municipal governments much of the revenues generated within their jurisdictions.

A major reason for the low revenue base of municipal governments in Ghana is the lack of capacity to generate local revenue. The data gathered show that there are several local sources for municipal governments to generate revenue for waste management and other services including property taxes, licence fees for various businesses, parking fees, market dues, building permit fees and other administrative charges. Generally, however, the authorities are unable to take advantage of these

sources due to the lack of qualified finance staff. As a result, the scale of revenue leakage is very high and leads to shortages in revenue mobilisation. At the municipal assembly office in Accra, an officer conceded that “we don’t have enough finance officers to help us mobilise money ...” and “... many traders and businesses escape from tax because we don’t have revenue officers to collect the dues in the markets”. This situation can be attributed to Tamakloe’s (2006) assertion that municipal authorities in the country generally lack the autonomy and capacity to establish their tax base, rate structure and enforcement procedures which would enable them raise sufficient revenues to meet their expenditure requirements.

Furthermore, the lack of reliable data on properties and businesses, and the dearth of well-qualified finance and accounting staff lead to insufficient, poorly maintained records (Lohse, 2003). Poor record-keeping makes it difficult for the municipal authorities to update property valuation for tax purposes. In Accra, this was confirmed by an officer at the AMA finance office who explained that “... the way things are, it is difficult for us to update our records on properties and businesses in Accra to enable us collect the tax monies to finance our projects”. He further explained that “[in a largely informal system where most businesses have no fixed locations] tracking business operators in Accra is a difficult task so only a few businesses are registered for tax purpose”. Furthermore, the property rate system has virtually collapsed leaving a large number of potential tax payers out of the tax net. The finance officer also disclosed that the assembly lacks adequately trained revenue collectors to collect levies from the numerous informal businesses in the metropolis. Also, the lack of a street address system in Ghanaian cities makes it difficult to locate and register properties, businesses and other establishments for tax purposes. Most potential tax payers, therefore, evade payment and this contributes to the low revenue base of municipal assemblies in the country. Well-planned and regulated city environments would facilitate the location of businesses and mobilisation of local revenues for the development of infrastructure and provision of services including waste disposal.

Another cause of the financial predicament of municipal authorities in Ghana is the decision by government to exempt communities regarded as ‘low-income’ from the payment of waste disposal levies. Waste collection in the planned (usually high and

middle-income) residential areas and for formal sector businesses and institutions is usually on the basis of franchise whereby the contractors providing the service collect monthly levies directly from the beneficiaries. On the other hand, waste collection in the numerous low-income communities is provided free of charge. The residents dump their waste in central containers to be lifted by waste contractors who are paid by the municipal authorities. Information gathered from the municipal authorities in Accra and Sekondi-Takoradi suggests that this arrangement creates huge expenditure problems for the city authorities. According to the AMA waste department, about 80 percent of its waste collection activities take place in low-income communities so their exclusion from the payment of waste disposal levies constitutes a huge financial loss to the waste management department. As noted by Mr. Kpodo, “you need to recover the operational cost of waste management in order to provide a good service. How can we do this when 80 percent of our service is delivered free of charge?”. In Sekondi-Takoradi, the head of the waste management department raised a similar concern. According to him, “low class communities produce more waste than the high class ones but they don’t want to pay levies. They don’t pay anything for waste disposal”. Traders in the numerous open-air informal markets also have a central container service and do not pay directly for waste disposal apart from the daily market dues they pay which do not go to the waste management department anyway. This leaves not more than 20 percent of urban residents paying for waste disposal.

Thus, while most of the operational costs of waste management in both Accra and Sekondi-Takoradi are incurred in waste collection, most residents of the two cities do not pay levies for waste disposal. This situation denies the municipal authorities the much needed funds for waste management. Recent developments, however, seem to suggest new thinking on the funding of waste management operations in the cities. Contrary to the government’s position of exempting low-income communities from waste disposal levies, stakeholders in the waste sector have been advocating a policy change to allow them to collect waste disposal levies from all residents in the cities. In this regard, the Mayor of Accra, Nii Stanley Adjiri Blankson, has been particularly unrelenting in his campaign for all residents of Accra to pay for waste disposal. According to the national chairman and other members of the association of waste contractors, the association has also sent a petition to the government to consider the introduction of the *polluter-pays-principle* (PPP) or *pay-as-you-throw* (PAYT) in the

waste sector to facilitate the mobilization of revenue from all waste disposal service users in the various cities (interview for this study). Recently in September 2007, the Minister for Local Government, Kwadwo Adjei-Darko, called for a debate on the PPP/PAYT in view of the unbearable cost the government incurs on waste management (Daily Graphic, at: <http://www.graphicghana.com>). Stakeholders in the waste sector therefore seem to consider the PPP/PAYT as the panacea to the crippling finance problem facing waste management in the country.

The data gathered from the household survey in the two study areas also show that many people support the idea of levying residents to raise the needed funds for waste management (Table 6.1). In Accra and Sekondi-Takoradi, 39 percent and 44.3 percent of householders respectively supported the idea of levying all residents to raise funds for waste management. In Accra, the disaggregated data show that 31 of the 42 households that had no waste disposal service were willing to pay for a service while in Sekondi-Takoradi, 13 out of 20 low-income households without access to service also showed willingness to pay for a home collection service. Furthermore, some of the respondents who suggested ‘community involvement’ explained ‘involvement’ to mean monetary contribution or neighbourhood clean-ups by residents to reduce the burden of waste collection on the authorities. Also, some of those who suggested ‘more resources’ said the resources should come from both government and residents of the cities. The seeming willingness of people to pay for waste disposal may, however, be taken with caution since this may not easily translate into practice.

Table 6.1: Stakeholder suggestions for improving waste disposal in the study areas

City	How to improve waste disposal services in the city				Total
	Levy all residents	Community involvement	Disposal law enforcement	More resources	
Accra	177	109	87	77	450
Sekondi-Takoradi	62	23	35	20	140
Total	239	132	122	97	590

From the above, there appears to be growing consensus among stakeholders in the waste sector for a more pro-active approach to raise revenue for waste management in Ghana which is in line with Armah’s idea that the most effective way of obtaining revenue to cover the cost of waste management in any city is a system of direct charges to all service users. However, as noted earlier, the implementation of direct

charges for waste disposal in the rather unplanned cities with dominantly informal economies would be a formidable task for the authorities. And in view of the great disparities in the economic situations of Ghanaians and in tune with social justice, the any system of direct charges for waste collection must allow “some cross subsidy from high income to low-income residents and from the commercial and industrial sectors to residents” Armah, 1993: 81)

The inability of municipal governments to raise adequate funds to meet their expenditure needs can further be attributed to poor financial administration at both national and local government levels. It is commonly known that various corrupt practices by public officials such as bribery, kickbacks and intentional undervaluation siphon monies from the system. At the national level, the administration of the DACF lacks transparency and the formula for its distribution is not clear to the assemblies and the wider Ghanaian population. According to the formula, the amount allocated to each assembly depends on the size of its population, its poverty index and capacity for local revenue generation. However, it is not clear how these variables are determined for the assemblies since there are no updated data on them. For example, the last population census in the country was in the year 2000 and there is no means of determining the current populations of the various assemblies except to make calculations based on the 2000 census figures. Such calculations, however, cannot be deemed to be accurate due to population dynamics. For the same reason, accurate information cannot be obtained on the poverty indexes of the various assemblies. Furthermore, the system of allocating more funds to assemblies that generate more local revenue and vice versa is unfair considering the fact that opportunities for revenue generation vary greatly among the assemblies. What is of concern here is that the lack of a simple, fair and transparent formula for the disbursement of the DACF creates room for corruption which invariably affects the amount of revenue received by the various assemblies.

Furthermore, unexplained deductions are frequently made from the shares of the various local governments. An example is the deductions made in 2007 supposedly to meet the cost of waste management equipment purchased from Zoomlion Ghana Ltd, for distribution to all assemblies in the country. In the ensuing public debate on the issue, many of the assemblies complained that they did not request any equipment.

There were also general complains about the poor quality of the equipment, especially the unwieldy nature of the *Oborafo* tricycles. As observed by a mechanical engineer at the AMA waste department, “these [Zoomlion] equipment are not good and will only worsen the situation in the near future”. Ghanaians were generally suspicious about the contract awarded to Zoomlion to supply the equipment, while the assemblies worried about the amounts deducted from their shares of the common fund to meet the cost of the equipment. Thus financial matters of the assemblies are frequently characterised by suspicion and mistrust which make accountability impossible.

Corruption is also suspected in the award of waste contracts in recent times. Currently, the government seems to focus all attention on Zoomlion and this raises suspicion among the other waste companies and also among many Ghanaians. Zoomlion which entered Ghana’s waste sector in late 2006 enjoys goodwill from the government and claims to be capable of solving the problem of waste accumulation in the cities which the municipal authorities and their traditional waste contractors have not been able to tackle over the years. For example, in an interview with one of the operations managers of the company in Accra, he boasted that “with Zoomlion, the waste problem in this country will soon be over. We have the technology and we are employing the youth to solve this problem”. According to the operations manager, the company will extend its operations to all parts of the country and will provide door-to-door waste collection services for households, businesses and institutions in addition to the clearance of waste accumulations and cleansing of drains in the cities.

The emergence of Zoomlion as a major partner in the waste industry seems to adversely affect the prospects of the other waste companies. In the interviews conducted with the waste companies, many of them were not happy about the undue attention being given to Zoomlion. The chairman of the association of waste contractors in Accra, Captain (Rtd) Amoh-Twum, for instance, lamented that “only God knows why the Chinese who have the worse pollution record in the world should be doing waste business in Ghana. If Zoomlion has not solved the waste problem in China, how can it solve the problem in Ghana?” On his part, Mr. Tony Kwarteng, the manager of Catrol Ltd (another waste company in Accra) had this to say:

“Look at what the government has done to us? We have been solving the waste problem in Accra but now all attention is on Zoomlion. Zoomlion is now the darling boy”. (Mr. Tony Kwarteng)

To illustrate the point that the government has been unfair to his company and the others by concentrating attention on Zoomlion, Mr. Kwarteng cited an *Akan* (Ghanaian tribal) proverb which can crudely be translated as: “you don’t mistreat the ‘bad medicine man’ who keeps the patient alive till the ‘good medicine man’ arrives”. Meanwhile, there are rumours that key government officials hold shares in Zoomlion which is also alleged to be a major sponsor of the ruling New Patriotic Party (NPP). This plausibly explains the ‘good working relationship’ between Zoomlion and the government and if true, amounts to corruption.

Besides, there have been reports of alleged corruption in the payment of contract monies to waste contractors and one example was reported by *The Chronicle* newspaper in January 2005. When the Ministry of Finance intervened to pay the AMA’s debt to waste contractors, *The Chronicle* hinted that the ministry “suspected underground dealings with regard to the list of contractors vis-à-vis the amounts that were submitted for payment” (*The Chronicle*, Monday 10 January 2005). According to the *Chronicle* report, investigations later revealed that two of the waste companies in Accra, namely VICMA Waste Company and Ako Waste Ltd “had been over-paid by GH¢ 20,000 and GH¢ 4,600 respectively” (GH¢1=US\$1). Suspicion later arose among the waste companies who suspected a deal between AMA officials and the two waste contractors. Corruption is also said to be rife among revenue officials in the cities. It is commonly known that many revenue officers either connive with tax payers, from whom they receive kickbacks, to under invoice their business operations while others take advantage of the illiteracy of market traders and other rate payers to issue tickets for less than the amounts they collect and pocket the difference. There are even rumours that some revenue officers print counterfeit tickets which they issue to unsuspecting tax payers instead of the official ones.

The issue of corruption is a difficult subject to investigate but it is generally believed amongst stakeholders in the waste sector that issues relating to the financing of waste

management in Ghana are not devoid of it. From the discussion so far, the financial woes of municipal waste management departments can be attributed to several factors including their overdependence on unreliable government sources, low capacity for internal revenue generation and various corrupt practices among both national and municipal government officials.

6.2.1.3. Effects of the finance problem on the organisation of waste management

The scarcity of financial resources seriously affects the abilities of municipal authorities to undertake effective waste management. This became evident in interviews conducted with stakeholders in Accra and Sekondi-Takoradi. At the office of the Mayor of Accra, a senior officer who stood in for the mayor noted that “waste management consumes a lot of resources; and because we don’t have enough funds, it is difficult to cover the whole of Accra. ... If we have enough money we can improve the service”. At the Waste Management Department in Accra, I asked the director of waste management, Mr. Ben Laryea, how the shortage of funds affected waste management operations in the city. His response was: “it really affects our operations. ... Because of the shortage, we are not able to pay our contractors and maintain equipment for full coverage ...”. On how the problem of inadequate funds could be solved, the director was of the view that:

“the polluter-pays principle is the best solution to the problem. Everyone who generates waste must also pay for waste disposal We don’t have the funds to provide free service”... and that is why we are pushing for the 3Ps [polluter-pays-principle] ... and if the government allows us to implement it, we will have no problem with waste at all. So those of you who understand the problem should also join the crusade”

(Ben Laryea, Director of Waste Management in Accra)

In Sekondi-Takoradi, officials at the waste management department corroborated the view that inadequate funding for waste management affected their ability to collect waste from the city environment. On how the shortage of funds affected waste management operations in the city, the deputy head of waste management was of the view that “it affects everything; it affects collection, it affects equipment and also maintenance of the dump site. That is why we cannot collect all the waste from the

city ...” It is evident from the views expressed by the municipal authorities in both Accra and Sekondi-Takoradi that the shortage of funds greatly affects the quality of the waste management service delivered.

The shortage of funds also affects the performance of the contractors who operate waste collection contracts in the cities. A summary of views from the contractors interviewed in Accra and Sekondi-Takoradi shows that they need funds to acquire new equipment and maintain old machines, pay salaries and settle debts owed to banks, spare parts dealers, garages and fuel companies. A common complaint among the contractors was that they are paid very low rates (and irregularly) which makes it difficult to meet the operational costs of waste collection in their contract areas. Particularly in Accra, all the contractors interviewed complained that the AMA owed them substantial amounts of money which they needed to enable them work effectively. The chairman of the association of waste contractors (Captain (Rtd) Amoh-Twum) for instance reported that:

“As I speak, the AMA owes our members more than twelve million Ghana Cedis (GH¢12 million) in payment arrears which have accumulated since 2006. And because they are not paying us, we are all indebted to our business partners. As I speak, we owe the fuel companies, spare parts dealers, and our bankers and they are getting impatient with us”

The chairman wondered why the government would not allow the contractors to introduce the pay-as-you-throw system of charges to solve the problem of finance. “The Government cannot pay us, and yet they will not allow us to charge those who generate the waste. Why do we have to take loans from the bank to provide free service to people?” he queried. Other members of the association corroborated the views of the chairman. When asked how the problem of finance affected his performance as a waste contractor, Mr. Yaw Mohamed, the manager of Yafuru Waste Ltd said that:

“As for waste business you can’t do it without money. In this job money is everything. So if they pay us and we have the money, we can work well. But without the money we cannot collect all the waste. If you look over there, you can see

some of our trucks have broke down. ... But if we have the money, we can repair these trucks and increase our coverage”. ... And that is why Accra has this waste problem ...”

(Yaw Mohamed, Manager, Yafuru Waste Ltd)

Similarly, Mr. Frimpong Addo, the manager of Daben Cleansing Ltd complained that:

“We have a big problem with finance. Payment is not prompt at all. The AMA doesn’t pay us well and it is not regular too. So at the moment it is hard for us. We always have to depend on our bankers but these days the interest rate is very high. ... It used to be better. Some time back we were being paid every month. But for a long time now, we have not been paid for about a year. This makes things hard for us”.

(Frimpong Addo, Manger, Daben Cleansing Ltd)

When asked how the delays in contract payments affected the operations of his company, Mr. Addo said

“it affects everything we do because money is everything. Look, just before you entered my office, I was having a meeting with my accountant to think about getting money to pay our staff for two months arrears. We are finding it hard to pay salaries and buy fuel for operations. And some of our trucks are off the road; we have no money to repair them which affect our operations”.

(Frimpong Addo, Manger, Daben Cleansing Ltd)

The inability of the municipal authorities to pay the waste contractors promptly has forced the contractors to adopt a cold attitude towards waste collection resulting in the accumulation of garbage in many parts of the cities. Because the municipal authorities have failed to fulfil their part of the bargain, they seem to lack the moral courage to blame the contractors for their poor performance. It is evident from the views expressed by the waste contractors that inadequate financing of waste management affects the quality of service they render. Among other things, the shortage of funds affects their ability to purchase and maintain waste trucks and other equipment, recruit staff and bear the day to day operational cost of waste collection and transportation to disposal sites.

The municipal authorities in Sekondi-Takoradi and their private contractors are equally saddled with financial constraints which affect the organisation of solid waste management in the city. This came to light in the interview conducted with stakeholders in the waste sector. At the waste management department, the head and his assistant, showed their frustration over the funding of waste management operations in the city. When I asked to know if the department had any problems in the organisation of waste management in the city, the head of the waste department responded that:

“as for problems we have many of them but I think they all border on lack of funds. Our main problem is how to raise enough money to finance our operations. You know, we have privatised waste collection in parts of the city so we need to pay our contractors ... we also have to maintain some equipment for our own part of the job ... But the money we get from government is not much and most of our service is free. So we find it difficult to get the money to pay our contractors and they also complain a lot about the delays”

(Head of Waste Management, Sekondi-Takoradi)

The financial constraints of the waste sector were also confirmed by an official of the finance office of the Sekondi-Takoradi Metropolitan Assembly (STMA). In an interview discussion, one of the finance officers of the assembly reported that most of the assembly's recurrent expenditure is incurred in maintaining environmental sanitation with the bulk of it spent on waste management, especially on payments to contractors and the maintenance and fuelling of waste management equipment. However, the management of the two waste companies operating in the city (RUSABEN and ABC) also complained about the low payments they receive and the delays in payments which affect their operations. In an interview, the operations manager of RUSABEN noted that “sometimes, it takes so long before they [STMA] pay us. When payments delay like this, we find it difficult to work “we need the money to pay salaries and buy fuel for the trucks”. At the premises of ABC Ltd, the branch manager also complained that even though fuel prices kept rising, the municipal assembly had failed to increase the contract fee for waste collection. According to him, profits have fallen greatly due to the rising cost of fuel and spares

for fleet maintenance and this has made the waste business less profitable than before. To a large extent, therefore, inadequate funding of waste management is a major factor contributing to the poor solid waste situation in Accra and Sekondi-Takoradi and this will apply to other Ghanaian cities as well.

6.2.2. Inadequate logistics

The organisation of solid waste management in any large city requires an adequate supply of logistics including vehicles and tools for waste collection and transportation as well as equipment for waste treatment and management of disposal facilities. To provide a sustainable waste management service, there is also the need to maintain a back-up of equipment and ready availability of spare parts for fleet maintenance. However, this is one area where the waste management sector in Ghana appears to be greatly constrained. Among other things, the study found that inadequate logistics hamper the organisation of waste management in both Accra and Sekondi-Takoradi. Interviews with stakeholders in the waste sector and field observations conducted in the two cities showed that the municipal authorities and their private contractors lack the logistics required for the collection and transportation of solid waste to disposal sites and for the maintenance of the disposal sites.

6.2.2.1. The state of equipment at the waste management departments

After contracting out waste collection and transportation to private sector operators, the Accra metropolitan waste management department largely concentrates on supervising the activities of the contractors and carrying out street and drain cleansing. The waste department is also responsible for the maintenance of the final disposal sites. In the case of Sekondi-Takoradi, waste collection is a partnership between the city waste department and the private sector. The Sekondi-Takoradi metropolitan area has been divided into three waste collection zones, two of which are operated by private contractors (ABC Waste Ltd and RUSABEN Ltd) while the third is covered by the city waste management department which also undertakes the sweeping of the streets, lorry stations and markets. But unlike in Accra where the waste management department maintains the final disposal facilities, the maintenance of the final disposal site in Sekondi-Takoradi is also contracted to one of the private companies (RUSABEN Ltd). In both study areas, the waste departments are also supposed to hold back ups of lease equipment to support the operations of the private

waste contractors and to cover areas that may fall outside the demarcated contract zones. However, information gathered for this study showed that in both cities, neither the municipal waste departments nor their private contractors have adequate logistics for their operations.

Visits to the garages of the two waste departments showed several disused machines including waste trucks and bulldozers. In Accra, the principal environmental health technologist of the waste department Mr. S.K. Kpodo noted that “we [the waste department] are very much under-resourced when it comes to equipment for waste management” and blamed the situation on a crippling debt problem which made it difficult to acquire equipment. On the sources of equipment for the waste department Mr. Kpodo clarified that “occasionally, we get some equipment support from the World Bank. The UK and Netherlands governments have also supported us in the past. But they are still not adequate so we have a big problem with logistics”. In view of this, the waste department is unable to play its roles of providing equipment support to the private waste companies and cleansing the streets and drains in the city.

In Sekondi-Takoradi, staff of the waste management department also attributed their inability to organise adequate waste collection within their operation zone to the shortage of equipment for waste collection. Here too, the waste department had no back-up equipment to support the operations of the private contractors. In an interview, the head of the waste management department reported that “... this [poor equipment] situation makes it difficult for us to cover the whole area and even the two contractors we are working with are facing the same problem”. The stock of equipment available to the waste management department is shown in Table 6.2 which shows that only three (one tipper truck and two tractors) of the 15 pieces of waste management equipment were operational at the time of the fieldwork. All the others were out of use due to the lack of funds to maintain them. “This is why we are not able to provide enough service in our operation zone”, lamented the head of the waste management department.

Table 6.2: Equipment available to the waste management department in Sekondi-Takoradi

Equipment type	Number available	Number in use
Compactor	1	-
Bulldozer	1	-
Pay loader	1	-
Back hoe	1	-
Arm roll	2	-
Tipper trucks	3	1
Tractors	4	2
Skip loaders	1	-
Cesspool emptier	1	-

Source: Waste management department, Sekondi-Takoradi

In my conversation with a waste truck driver of the Sekondi-Takoradi waste department, I asked him to comment on the state of the equipment he worked with. Part of his response, which was in *Fante* language, can roughly be translated in the following words:

“...as you can see, the trucks are all very old and are always breaking down. I just brought this one (pointing to the truck he usually drove) from the repair garage but I’ve just realised it still has a problem. I think they couldn’t fix it well. The way it is, it will develop fault again if I take it to the field”

(Waste truck driver, Sekondi-Takoradi)

When I joined this truck driver and his team of three on their waste collection tour the next day (following in a car as there was no space for me on the truck), his prediction came true when the truck actually broke down during the second trip to the dump site at *Mpinstim*. Feeling somehow vindicated, the driver walked to me and said “sir, what did I tell you yesterday about this truck? We have this problem all the time” (translated from *Fante*). In the conversation that ensued, he explained that breakdowns were common with the old truck he drove and this often reduced the number of trips his team could make to the disposal site in a day. This situation contributes to waste accumulation in the city, especially in the low and middle-income areas which receive less attention from the waste collectors. It is evident from the above that the waste management departments in Accra and Sekondi-Takoradi lack adequate equipment for their operations.

6.2.2.2. The equipment problem of the private waste companies

The equipment situation of private waste companies in the two cities is equally poor. In Accra, all the 14 waste companies that participated in the study reported that they did not have adequate equipment for their operations and each company I visited had some broken down vehicles parked in its yard for want of funds to repair them. In most cases, only a few of the vehicles were operational. Some of the companies provided information about their equipment (Table 6.3) which confirmed their claims that they did not have adequate machinery to operate their contracts effectively. For example, Almanuel Ltd which operates a large contract in south-western Accra has only two skip lifts for the 32 communal containers it removes from the low-income communities and four rear loaders for house-to-house and kerbside collection in the high and middle income areas in its zone. Similarly, Daben Cleansing which operates one of the largest contracts in Accra has only three rear loaders, and three skip lifts to pick the 44 skips or central containers it removes from its operation zone. While showing me around his yard, the manager of Yafuru Waste Ltd, Mr. Yaw Mohammed, observed that “look, we used to have seven trucks for waste collection in our zone but only three are working now. The other four are out of operation ... we are waiting for payment so that we can get some spare parts to repair them”. As a result of inadequate equipment, the waste companies are unable to undertake adequate waste collection in their contract areas, a situation which contributes to waste accumulation especially in the low-income communities where collection services are limited.

Table 6.3: Equipment available to waste companies

Waste company	Equipment type and number available					
	Rear loaders	Power tillers	Skip lifts	Skips	Side loaders	Roll-on-off
Almanuel	4	2	2	32	-	-
ABC	5	-	4	27	3	2
Catrol	3	-	3	21	-	1
Yafuru	2	1	2	12	1	1
Golden Falcon	5	-	-	-	-	3
Daben Cleansing	3	-	3	44	2	2
Liberty waste	5	3	4	24	3	3
Meskworl	3	-	4	34	2	3

Source: Private waste companies in Accra

My observations in several low-income communities in Accra and interactions with residents confirmed the equipment problem of the contractors. It came to light that they were neither able to supply enough waste containers for waste disposal in the communities nor able to meet the schedule for their removal and replacement. It was also observed that when the containers get filled or are removed without immediate replacement, the residents dump their waste on the ground which results in waste accumulation at the container sites. Earlier in 2002, the shortage of waste containers in the low-income communities in Accra was also mentioned in a study conducted by the Ghana Statistical Service which found that only 41 percent of households in the high density, low-income communities had a solid waste disposal container provided within 1 km from their houses (GSS, 2002). This situation has not improved much over the years. For instance, in *Chorkor*, a poor indigenous community with a population of 45,379 in the 2000 census, an assembly member, Nii Botei, who showed me around the community, told me that there were only two waste container sites for the entire community, each with two old skips. My observations in several low-income communities showed that the waste containers usually get filled-up in the early hours of the day and garbage accumulates around them during the rest of the day. In some communities where there are attendants at the container sites, residents who come with their waste when the containers are full are turned away, a situation which encourages indiscriminate dumping or fly-tipping in the low-income communities. It is evident from the above situations that inadequate availability of equipment is a constraining factor to the provision of waste management services and, therefore, a major cause of the poor waste situation in Accra.

Information gathered from the two private waste companies operating in the Sekondi-Takoradi metropolis indicates that their waste collection activities are also constrained by inadequate operational logistics and this makes it difficult for them to provide satisfactory waste collection services within their contract zones. At the premises of RUSABEN Waste Ltd, I asked the officer in charge of operations (who stood in for the manager) to tell me about the state of equipment used by his company for waste management in the city. Part of his answer was:

“as for the equipment, what we have is not enough for operations ... because we also maintain the dump site. We have one caterpillar and bulldozer at the dumpsite... For

the collection we have two trucks and a tractor to collect the waste. Some of our trucks are spoilt and we need money to repair them. We need more equipment but it is expensive and we don't have the money ...”

Pointing to two disused trucks and a tractor-with-trailer on the premises of the company, the operations manager observed that “these are some of the equipment we used before”. On whether they would be repaired for use he said “oh no! These machines cannot work again: they are dead. We need new ones”. Asked whether the limited equipment affected the company’s performance, his response was “oh yes, because without equipments you cannot collect all the waste in your contract. ... So we are managing but we have problems”. At the premises of ABC Waste Ltd (which has a branch in Accra) the manger also complained about the shortage of equipment which he said affected operations. “What we have is ok but it is not enough ... If we get more trucks it will help. That way we can cover our zone further”. It is evident from the stories of both RUSABEN Ltd and ABC Waste Ltd that the poor state of waste management equipment affects their operations and is a contributory factor to the poor waste situation in the Sekondi-Takoradi metropolis.

6.2.2.3. Equipment at the final disposal sites

The study also found that inadequate equipment at final disposal sites contribute to poor waste management in the study areas. In both Accra and Sekondi-Takoradi, the poor status of waste management equipment has led to the poor maintenance of waste disposal sites and the associated nuisances to residents of nearby communities. During my visits to the *Oblogo* and *Teshie-Tweebleo* disposal sites in Accra, it became evident that the equipment for the maintenance of these sites was obsolete and inadequate. At the *Oblogo* landfill site, the only machines that were seen in operation were an old caterpillar and a bulldozer which were being used to level and compact the waste brought to the site by waste trucks. Along the road to the waste disposal facility, a number of broken down waste trucks were also seen abandoned. The manager of the *Oblogo* site, Mr. Tetteh who took me round the facility told me that equipment at the site was very inadequate and hampered operations. He conceded that maintenance of the site was not satisfactory and the poor conditions at the landfill did affect the residents of the *Obogo* community. My own observation showed that the poor maintenance of the facility resulted in stench, leachate flow and wind-blown

waste in the surrounding communities. Asked whether his outfit had any plans of obtaining more equipment to improve maintenance of the landfill, Mr. Tetteh said “yes, we have some equipment which are spoilt ... we are waiting for funds to repair them”. According to him, the waste department occasionally hired equipment from road contractors to spread and compact the waste and to put some earth on it in order to reduce the scattering of waste materials into the neighbouring communities.

The equipment situation was no better at the *Teshie-Tweebleo* disposal site in eastern Accra where a disused compost plant has been turned into a simple dump with little site maintenance. The waste is simply dumped and piled into a hill covering a large area of land in the midst of the *Tweebleo* community. On the state of equipment at the site, the manager noted that “... we have two caterpillars but one is now for repairs. We also have a bulldozer. As for the bulldozer it is ok and is working now”. On whether the equipment available was adequate for maintenance of the site, the manager answered in the negative and said “No, not at all. As you can see, this place is big. They bring a lot of waste here but the equipment is not enough so we need more”. Due to the shortage of equipment, the disposal site at *Teshie-Tweebleo* is also poorly maintained and constitutes a nuisance to surrounding communities. Furthermore, human excreta is also brought to the site by cesspit emptiers and dumped in large cesspools which exude an unbearable stench into the surrounding communities. Animals commonly feed on the waste and at the time of my visit, a group of three men were trying to pull out a sheep which has fallen into one of the excreta cesspools.

In Sekondi-Takoradi, the final waste disposal site at *Mpinstim* which receives waste from the entire city is also poorly maintained due to the lack of proper equipment for its maintenance. During my visit to the dump site in November 2007, the only equipment that was available for maintenance work was an old caterpillar which was being used to spread waste dumped at the entrance by waste trucks further into the yard. RUSABEN Ltd, the company which has been contracted to manage the waste dump lacks the necessary logistics for its maintenance. In my interview with the site supervisor, he conceded that the available equipment for work at the site were inadequate. In response to my question *do you consider the equipment you have adequate for the maintenance of the waste dump?* he replied:

“No, I don’t think we have enough. At the moment we use this caterpillar [pointing to the equipment] ... but you can see there is a lot of waste here to level down and this one machine alone is not good enough”

The site supervisor admitted that his company (RUSABEN Ltd) was unable to maintain the dump satisfactorily and attributed this to lack of equipment for operations at the site.

From the data gathered from the waste management departments and their private sector contractors in the study areas, it becomes evident that the equipment problem confronting stakeholders in the waste sector generally stems from the lack of funds to purchase and maintain equipment. Also from the data, part of the equipment problem can be attributed to the lack of spare parts and the engineering capacity for equipment maintenance, a situation which will also apply to other Ghanaian cities. Ghana being a poor country with hardly any heavy industries, most equipment parts are not available locally and have to be imported. Meanwhile, the importation of new and suitable spares is quite beyond the means of the rather impoverished waste sector which is perennially hinged on a cycle of debt. Auto parts imported into the Ghanaian market consist largely of end-of-life pieces from scrap yards in industrialised countries. Repairs made on waste management equipment using these end-of-life spares do not last for long, leading to frequent failure of waste management equipment. In an interview, this was confirmed by Mr. Frimpong Addo, manager of Daben Cleansing Ltd when he noted that “as for new spare parts, they are expensive and you can’t get them to buy. So we sometimes buy ‘home use’ [imported second-hand parts] from *Abossey Okai* [a spare parts market in Accra]. And you know, these old ones, they don’t last and we spend a lot of money to repair them”. My observation of waste management equipment in the two cities showed that most of them are obsolete and need replacement but the shortage of funds makes this difficult for the contractors. These rickety waste trucks break down frequently, sometimes on their way to the disposal sites and it is common for broken-down waste trucks to remain in place for several days, even up to a week or more before they are repaired or taken off the road. The lack of good quality spare parts for waste management equipment maintenance is further compounded by the lack of engineering capacity for equipment maintenance.

Due to the neglect of technical education in Ghana, well-trained auto mechanics and other artisans are in very short supply and the technical sector is dominated by informally trained practitioners many of whom have very little knowledge of auto mechanics.¹³ The activities of such ‘quack’ artisans in the auto repair industry including mechanics, tyre changers and welders further contribute to the poor state of equipment for waste management.

The logistical problem facing the waste sector in Ghanaian cities is not only caused by the shortage of equipment, it is also due to the use of waste management equipment that is largely not appropriate in the Ghanaian setting. Information gathered on the type of equipment used by waste contractors in the study areas and elsewhere in Ghana shows that they replicate the waste management technologies of the rich industrialised countries. Thus, it has become fashionable for the organisers of waste management to acquire sophisticated equipment like rear compactors, skip lifts, mechanical sweepers and side loaders. By their design, however, these machines are meant for use in areas with well-built, all-weather access roads and are not suited to the poor roads and chaotic housing developments that characterise Ghanaian cities. Especially in the numerous low-income urban settlements, chaotic housing developments block access to many locations and greatly obstruct the movements of waste trucks to many locations. These situations thus hinder waste collection efforts and give the organisers ready excuses for failing to provide waste collection services for a large majority of urban residents.

The analysis so far has shown that the problem of logistics in the waste sector of Ghana is caused by a number of factors including the lack of funds to acquire new waste management equipment and maintain old machines for operations, the lack of spares and engineering skills for waste equipment maintenance and use of unsuitable technologies for waste collection. To get around the problem with equipment, it may be useful for the organizers of waste management to consider the introduction of a collection system that uses more rudimentary tools like wheelbarrows, pull-carts and the Zoomlion type of tricycles which appear more suited to the conditions in the

¹³ A personal experience of this was during my fieldwork in Accra when an ‘auto electrician’ told me that the solution to the overheating problem of my car’s engine was to disconnect the temperature gauge.

unplanned communities where accessibility to waste points is a problem. Such simple technologies are being employed to solve the solid waste problem in some Asian and Latin American cities (Practical Action, 2008). These simple machines are easy and less expensive to maintain and could help reduce the cost of waste management in Ghanaian cities. It is, therefore, important to carefully consider the prevailing conditions in a settlement before deciding on the suitability of equipment for waste collection.

6.2.3. Shortage of waste management personnel

Ghana's approach to waste management seems to regard waste as a problem that can be resolved with just funds and logistics. This explains why stakeholders in the waste sector regard the scarcity of funds and logistics as the greatest obstacles to waste management in the country. No doubt, money and equipment are essential for the day-to-day organisation of waste management activities, but the human resource factor is also critically important for the success of municipal waste management projects. The data gathered for this study show that, apart from finance and logistics, the waste problem facing Ghanaian cities is also critically related to the shortage of qualified personnel to carry out various tasks. In both Accra and Sekondi-Takoradi, the shortage of staff emerged as factors militating against efforts to provide waste management services. Data on the staffing situation of the two waste departments were not readily available but the Directors of waste management in both cities admitted that their departments were seriously understaffed and lacked key personnel in engineering, administration, finance and environmental health, a situation which makes it difficult for them to operate on a full scale.

Satisfactory waste management requires a wide range of qualified professionals including engineers, mechanics, administrators, sanitation officers, finance and accounting staff and even researchers (Armah, 1993; Tamakloe, 2006). However, Ghana lacks expertise in the various aspects of waste management. It is on record, for instance, that Kumasi is the only city in Ghana with a qualified waste engineer (*Daily Graphic*, March 23, 2008). An interview with Mr. S.D Amoah, 'an engineer' at the Accra metropolitan waste department shed light on the situation. He noted that:

“Qualified engineers are few in this country and every company is trying to get them; especially the mining companies and construction firms which are able to pay them better ... Some of us are still here because we like to sacrifice our comfort to help the system”.

Due to the lack of engineers, it becomes difficult for municipal waste departments in the country to gain professional advice on such things as the suitability of equipment and the siting, design, construction and maintenance of waste disposal facilities.

Furthermore, it emerged from interviews with the waste departments in the two study areas that they lack researchers among their staff to investigate issues relating to waste management such as the types and quantities of waste generated, their sources and characteristics. As a result, waste departments in the country lack the necessary data to facilitate the planning and organisation of waste management. Besides, the acute lack of funds for waste management in the country is also linked to the shortage of qualified finance and accounting staff who will identify local sources of tax revenue, fix tax rates and employ creative measures to mobilise revenue for urban finance. From the data gathered, other professionals who are lacking in the waste sector include environmental health personnel, administrators and legal and security personnel to help with the enforcement of existing by-laws on waste management. The dearth of professionals in Ghana's waste sector has been attributed to low remuneration for public sector jobs (Tamakloe, 2006; Waste Departments in Accra and Sekondi-Takoradi). Like other public institutions in the country, the waste department is, therefore, suffering from the situation where poor conditions of service make jobs there unattractive especially to well-qualified and technical staff.

The dearth of technical staff for waste management and other urban sectors in Ghana has also been attributed to the failure of the country's educational system to promote technical education (Tamakloe, 2006). The country's institutions of higher learning seem to have failed to introduce relevant courses to train management personnel for the built-environment including urban environmental management. Among the country's institutions of higher learning (such as universities and polytechnics), the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi is the only one with a Planning Department. However, the focus of courses offered by the

department is on project planning and management while settlement planning and management are neglected. According to Tamakloe (2006) (who is a former Dean of the Faculty of Planning and Land Economy at KNUST), students of the Planning Department shy away from courses related to physical planning because they think such courses will only lead them to the public sector where conditions of service are generally poor. Over the years, Ghana has, therefore, failed to produce enough qualified personnel to plan and manage the increasing number of rapidly growing urban centres. While higher educational institutions in the country usually blame their inability to offer relevant programmes on a lack of funding (usually mentioned in matriculation and graduation speeches of Vice Chancellors), which shows government neglect, their curricula usually fail to show that they appreciate some of the basic problems that confront the country. It is evident to even the casual observer that land use, settlement planning and urban environmental management (including sanitation and solid waste disposal) are critical challenges in the country. As centres of learning and research, tertiary institutions in the country ought to play crucial roles in creating understanding of, and finding solutions to these problems through both research and training of personnel for the urban sector. The failure to train personnel for waste management shows that both the government and higher educational authorities in Ghana lack any sense of urgency of the worsening solid waste situation in the country and the commitment to address the issue.

Apart from the lack of professional staff in the urban sector, operational staff (semi-skilled and unskilled labour) are also lacking in the waste sector. The data gathered for this study shows that operational workers such as drivers, waste collectors, sweepers and waste disposal site labourers are all in short supply in spite of the large number of job seekers who roam the streets. In both Accra and Sekondi-Takoradi, the municipal waste departments and their contractors are all unable to employ enough workers due to the lack of funds to pay their salaries. Considering the important roles to be played by both professional and operational staff in the organisation of municipal waste management, the shortage of personnel in the waste sector can be regarded as a major contributory factor to the poor waste situation in the study areas and other Ghanaian cities. It can be deduced from this analysis that the lack of adequate operational staff is partly responsible for the inability of waste contractors to keep to their schedules for waste collection in the cities.

6.2.4. Scarcity of land space for waste disposal

The problem of resource scarcity that confronts waste management authorities in Ghanaian cities also includes the scarcity of suitable land for solid waste disposal. Data gathered for this study shows that the organisers of waste disposal in both Accra and Sekondi-Takoradi have great difficulty in acquiring land for the final disposal of solid waste. In Accra, the land shortage problem was aptly articulated in the title of Asamaah Ndeh's article in the May 17, 2007 edition of the *Daily Graphic*: "*Waste, waste everywhere in Accra, and not a place to dump*". It is estimated that the residents of Accra generate over 1800 tonnes of solid waste each day of which about 70 percent is collected by the waste contractors (AMA sources). However, suitable land for waste disposal is in acute shortage in and around the metropolis which makes waste disposal a headache for the AMA. As observed by Asamaa Ndeh in his article just cited above:

“a place to treat and dispose of waste is not just a place, it must pass so many tests: the haulage distance must be economically feasible; the access roads must be motorable all year round; the ecology must be able to bear the end product of the treatment. ... Thus the geological environment, the hydrological environment, the ecological environment and the social impacts of the nearest community must all be proved favourable by the Environmental Protection Agency”

(Asamaa Ndeh, 2007).

Waste disposal sites in the two case study cities cannot be said to pass the tests indicated above as they are all located very close to residential areas and are so poorly maintained that they constitute environmental hazards and a nuisance to the neighbouring communities as it became evident in interviews with residents.

In interviews with key official of the AMA WMD including the Director of Waste Management, the Principal Environmental Health Technologist and site supervisors at the two dumping grounds, the interviewees all confirmed that the capacities of the *Oblogo* and *Tweebleo* dumpsites had been exceeded but the waste contractors continue to dump waste there because the AMA has not been able to acquire a new disposal site. The director of waste management mentioned that arrangements were

on-going to open a temporary dump site at *Mallam*, which adjoins the *Oblogo* area and the AMA was waiting for the EPA to provide approval. At the EPA, an official maintained that the proposal on the landfill submitted by the AMA did not meet the required standards and was still being studied. This means that the AMA will continue to dump waste at the overflowing landfills at *Oblogo* and *Tweebleo* which will worsen the already bad environmental conditions around them.

As part of a World Bank/IDA sponsored project to improve urban living conditions in five metropolitan areas in the country (namely Accra, Kumasi, Sekondi-Takoradi, Tema and Tamale), there is a proposal to construct a sanitary landfill at *Agyemankata* in the *Kwabanya* area to the north of Accra (Appendix 11). The project, however, has met with stiff opposition from the residents of *Agyemankata*. The community is largely a low-income one but the population also includes some elite elements, including educators and civil servants. Farming and quarrying are major sources of employment for the residents but petty trading is also a growing sector of the local economy. The community members contend that they will be detrimentally affected by the landfill and have petitioned the World Bank, through the Centre on Housing Rights and Evictions (COHRE), to withdraw its support for the project. The NIMBY campaigners have vowed to fight with their lives to protect their environmental rights. They have declared the proposed landfill site a 'no-go-area' (*Ghanaian Times*, February 1, 2007) and are ready to confront any 'outsiders' seen at the site. Several government officials who have visited the site have been confronted including the Mayor of Accra, Mr. Adjiri-Blankson whose vehicle was vandalised when he visited the site, and the vice president of Ghana, Alhaji Aliu Mahama, who was allegedly booed by organised school children (*Ghanaian Times*, February 1, 2007). On a number of occasions, the youth of *Agyemankata* have clashed with the police who have accompanied surveyors and AMA officials to the proposed landfill site (*Ghanaian Times*, February 1, 2007).

When I visited the *Agyemankata* community, I was advised not to go to the proposed landfill area since I could be mistaken for an AMA staff and attacked by the youth of the community. As a result, I could not directly observe the project site to assess the situation by myself. Luckily, I got in touch with some of the residents, including Mr. Isaac Amu Smith, who is also a proprietor of a private school in the community. In

our discussion, Mr. Smith noted that “we have resolved that we won’t allow anyone to dump waste in our community ... and we are ready for anyone”. When I asked to know why the community opposed the landfill project, Mr. Smith explained that the landfill project would affect human health and environmental quality in the area. He was particularly worried about the pollution of water sources since the community had no piped water supply. “The stench from the waste will also be right in our bedrooms and we are not going to allow that”, he said. Besides, according to Mr. Smith, the proposed landfill site was a stone quarry which provided jobs and income for many young people in the community while the surrounding lands are used for farming. Using the site for waste disposal would therefore not only pollute the community but would also erode the livelihood base of many people. Another resident, Mr. Ntim, who later joined our interview, was concerned about the manner in which the AMA had handled issues relating to the proposed site for the landfill. Mr. Ntim argued that “the AMA people want to fool us but we will not agree. You see, they want to impose waste on our community without considering the negative effects”. I also interacted with a group of three young men and two young women who also expressed similar sentiments about the landfill project. Thus, a general believe among the residents of *Agyemankata* seems to be that construction of the landfill would pollute their community and deprive many of them the opportunity to earn a livelihood. After failing to dissuade the AMA from the project, according to Mr. Smith, they wrote to the World Bank in 2003 requesting it to withdraw its support for the project, adding that they would report the Bank to the Commonwealth Human Rights Institute and the UNHCR if it continued to fund the project.

The strong civil society response to the proposed landfill project at *Agyemankata* is an interesting one considering the general lack of civil society mobilisation in the country. That this largely poor urban fringe community has been able to mobilise against a World Bank sponsored landfill project can be attributed to the presence of environmentally concerned elites among the inhabitants who have enlightened the people on the implications of hosting a waste facility and mobilised them to stand against the landfill project. Some of the community leaders who took part in the interviews for this study were well-educated people who showed a high level of environmental concern and awareness of the potential impacts of the landfill in their community. This explains why they could go to the extent of calling on the World

Bank to withdraw its support for the project and seeking the intervention of the Centre on Human Rights and Evictions (COHRE). This isolated case could promote greater environmental awareness and NIMBY sentiments among Ghanaians and encourage people in other localities to ward off undue pollution of their communities. NIMBY protests against the siting of waste disposal facilities have also occurred in Kumasi, Sekondi-Takoradi and other cities in the country (*Ghanaian Times*, February 1, 2007). In Sekondi-Takoradi, for instance, interviews conducted with a sample of the residents of *Mpintim* showed that they were very much opposed to the siting of the waste dump in their community when it was proposed by the municipal authorities. A former assembly representative of the community, Yaw Odei, recounted that many of his constituents have complained about the polluting effects of the waste in the community including stench and wind-blown waste materials around their homes. Following these complaints, he petitioned the metropolitan assembly to stop dumping waste in the community but no one listened to his plea. His attempt to seek the intervention of the EPA also yielded no results. While the residents of *Mpintim* were unhappy about waste pollution of their environment, they lacked the necessary civil society pressure to prevent the action of the authorities, quite unlike their counterparts in *Agyemankata*. While civil society protest action is generally lacking in Ghana, the *Agyemankata* case is a sign that awareness is growing among the people and communities may mobilise against what they consider to be unjust treatment when they have enough political clout.

Based on the information gathered for the study, the difficulty municipal authorities usually have in acquiring waste disposal land can be attributed to a number of factors, including the poor track record of waste disposal site maintenance, failure to involve communities in decision-making and government failure to pay compensation packages for lands acquired for waste disposal. Throughout the country, waste disposal facilities such as landfills and open dumps are poorly maintained, thereby creating dire environmental conditions in the host communities. For example, my field observations at the waste disposal sites in Accra (*Tweebleo* and *Oblogo*), Kumasi (*Dampoase*) and Sekondi-Takoradi (*Mpintim*) showed that they are all inadequately maintained, resulting in depressing environmental conditions in the host communities. The appalling conditions around waste disposal facilities have caused some host communities to protest against further dumping of waste in their

communities. An example was in 2005 when the people of *Oblogo*, led by their chief, demonstrated against further dumping of waste in their community. During the demonstration which lasted several weeks, the protestors blocked the road leading to the landfill, thus making it impossible for waste trucks to go up to the landfill. With nowhere to dump the waste, some waste companies engaged in fly-tipping including dumping on the beach and other water bodies while others stopped waste collection altogether. This created mayhem in Accra as waste accumulated in the city. It took high level government intervention and promises to improve conditions at the landfill and to provide some basic facilities in the community to appease the protestors. As a result of the poor maintenance of waste disposal facilities, many communities are now refusing to accommodate new waste disposal projects. This becomes clear in the current struggle between the AMA and the *Agyemankata* community over the proposed construction of a landfill in the area. Similarly in Sekondi-Takoradi, the residents of *Mpinstin* opposed the siting of the waste dump in their community even though they failed to prevent it due to a weak civil society. Generally, however, the spirit of NIMBYism appears to be growing among communities, probably encouraged by the frequent media reports which draw people's attention to the debilitating effects that improperly managed waste dumps can have on humans and the environment.

Poor governance or failure of [municipal] governments to involve potential host communities in the selection and design of waste disposal sites also contributes to the waste disposal land scarcity problem currently facing cities in Ghana. Here, the *Agyemankata* case is illustrative. The residents of the community claimed that they were not consulted on the selection and design of the proposed landfill site (McCarthy, 2007). In their petition to the World Bank, the community declared that they first heard about the landfill project through a radio announcement and later in a local newspaper after the decision had already been made to locate the landfill in their community. The process, therefore, denied them any opportunity to make inputs in the location and design of the project. The community also claimed that they only gained knowledge of the World Bank's involvement in the project through the media. Once the community became aware that the bank was sponsoring the project, they wrote to the bank requesting that it to withdraw its support for the project. According to residents who were interviewed for this study, it was at this point that the World Bank invited the community to see the Environmental and Social Assessment (ESA)

and resettlement policy framework that had been prepared for the project. Again, the residents of *Agyemankata* indicated that this was the first time they were made aware of these documents and maintained that they were never consulted before and during its preparation and, therefore, they did not participate in its preparation and had not yet seen it (McCarthy, 2007). To go to the extent of finalising the design and sponsorship arrangements for a landfill project without the knowledge of the host community, and for the community to learn about the project only through the media certainly amounts to poor governance. As would be expected, the AMA refuted the charge made by the residents of *Agyemankata* but the resolve with which the community has fought against the project and their reasons for protesting against it show convincingly that good governance has not prevailed with regard to the proposed project. No wonder the local community has vowed to resist the project at all costs.

Furthermore, the unwillingness of landowners to release land for waste disposal can also be attributed to the track record of government failure to pay agreed compensations to land owners. A case in point was the failure of the Ministry of Defence to honour promises made to a group of deprived families whose lands were used for a military buffer zone at *Apremdo* near Takoradi (*Crusading Guide*, Wednesday August 22, 2007). According to the land-owning families, the Ministry of Defence held a meeting with all stakeholders in 2004 and promised that the money for the compensation was ready and would be paid to them. Three years later in 2007, the monies had still not been paid to the land owners and the Ministry was completely unconcerned about their plight (*Crusading Guide*, Wednesday August 22, 2007). Another example is the claim by the chiefs and people of La, the group that virtually owns all lands in Accra, that the government of Ghana has still not paid them compensation for the land on which the University of Ghana was built in Accra as far back as the 1940s. There are numerous other examples of government failure to fulfil promises to compensate land owners after they have given out their lands for public use. When the people of *Oblogo* demonstrated against the dumping of waste in their community in 2005, the director of waste management Mr. Ben Laryea conceded that promises made to build a road, a market and a clinic for the community as compensation for using their land for waste disposal had not been fulfilled. At the time of the fieldwork for this study in September 2007, construction of the clinic was

in progress but work on the road and market had not even started. The frequent breach of promises by government has caused land owners to lose confidence in such promises. As a result, many land owners now demand immediate fulfilment of agreement before giving out their land for public projects including waste disposal (Tamakloe, 2006). This situation compounds the land scarcity problem facing municipal authorities as they usually lack the resources to provide the compensations demanded by land owners in exchange for their land.

6.2.5. Lack of data for the planning and organization of waste management

Accurate and reliable data is an important resource in any area that requires planning and organisation including waste management. In particular, the ability to gather accurate data on the sources and quantities of waste generated, the rate of waste generation, the composition of the waste stream, and key players in the waste sector is crucial for the successful planning and organization of waste management in any city. Without such data, it would be impossible for city authorities to determine the resources and capacities required for effective and sustainable waste management in terms of logistics, personnel, and organization. Therefore, any city that is unable to continuously generate accurate data on the waste situation will be unable to plan and execute an effective waste management project.

Interviews conducted with stakeholders in the waste sector in Accra and Sekondi-Takoradi show that there is a general lack of waste generation and characterisation data for both cities. Senior officials of the waste departments conceded that no studies have been carried out on the waste situations and there is no accurate data on the waste situations. At the waste department in Accra, the Director lamented that “we know research is important for waste management but we don’t have the funds to sponsor such studies”. In the absence of research-based data, estimates have been made based on the personal guesses of senior officials of the waste departments. For instance, the waste department has estimated that Accra generates about 1,800 metric tonnes of solid waste a day, of which 70 percent is collected for disposal. Estimates have also been made regarding the material composition of waste in both Accra and Sekondi-Takoradi. Even though weigh bridges have been installed at the *Oblogo* and *Tweebleo* disposal sites, these can only be used to measure the weight of waste brought to the disposal sites and the figures obtained cannot be used to calculate the

amount of waste generated in the city. Furthermore, not all the waste collected is taken to these sites since many private waste collectors dump their collections elsewhere in the bush, a practice which is often perpetrated by some of the waste companies as well. Apart from this, there is no means of determining the material composition of solid waste generated in the city even though the authorities have made some calculations based on guesswork. The situation is no different in Sekondi-Takoradi where, according to the head of the waste department, available statistics on waste generation, composition and projections of future scenarios are all guesses and, therefore, inaccurate. Using such data to plan waste management operations will not achieve the desired results. Thus, the lack of accurate and reliable data on the waste situation in Ghanaian cities can be regarded as a contributory factor to the seemingly intractable waste situation in the country. The failure to sponsor research on the waste situation in Ghanaian cities can be regarded as further evidence of the government's lack of political commitment to the waste problem engulfing the cities.

For these cities to be able to organise effective and sustainable waste management, the first order of priority should be research to collect accurate, reliable and comprehensive data on the various aspects of waste including the rate of waste generation, sources of waste and composition of the waste stream. Research-generated knowledge of the waste situations in the cities will help determine the organizational and logistical requirements for effective collection and transportation of waste to disposal sites. Knowledge of the quantities of waste generated by the residents will also enable the authorities to determine the amount of disposal land space required for both present and future levels of waste production while accurate information on the composition of the waste stream will be useful in planning an integrated waste management programme that will allow for waste separation for appropriate treatment including recycling, composting and land filling. In order to solve the solid waste problem confronting local authorities in Ghana, it is, therefore, imperative for both national and local governments to make waste management a priority and allocate funds for research to generate accurate, reliable and comprehensive data for the planning and organization of waste management activities.

6.3. Lack of enforcement and public attitude towards waste disposal

From the data gathered, another theme that emerged as a contributory factor to the poor solid waste situation in Ghanaian cities is the non-enforcement of existing by-laws on waste disposal and other aspects of urban development. Even though Ghana has no policy on waste management, there are local government by-laws on waste disposal. As noted by Mr S.K. Kpodo of the Accra metropolitan waste management department "...there is no national policy but we have by-laws on waste disposal". The document was not readily available for me to study but Mr Kpodo explained that the by-laws make littering, fly-tipping and other forms of indiscriminate waste disposal criminal offences punishable by court fines or imprisonment or both depending on the magnitude and circumstances of the offence. These are the Ministry of Local Government's by-laws and are supposed to be enforced in all settlements in the country. If strictly enforced, these by-laws should promote a positive waste disposal culture among the population to keep the cities clean. However, municipal authorities in the country seem unable to enforce the by-laws.

Interviews conducted at the waste departments in Accra and Sekondi-Takoradi showed that the municipal authorities lack the resources to enforce the by-laws. Unable to pay the salaries of environmental task force officers, only a few people have been employed to check littering of the streets and fly-tipping. In my interview with Mr. Kpodo, he noted that "... we don't have enough men on the ground to check indiscriminate disposal so people take advantage to dump waste anywhere they want". When I asked to know why his department would not employ more task force officers to increase coverage, he responded that "it is all about funds; we don't have enough money to pay their salaries and get their uniforms so we can only employ few of them ... our financial situation is very bad so we cannot do much". The situation was no better in Sekondi-Takoradi. According to the deputy head of the waste management department, his office is only able to employ few task force officers who cannot monitor the whole city and so limit their operations to few official grounds. From my observations, uniformed task force officers were very few in both Accra and Sekondi-Takoradi and they seemed to make little impact in preventing indiscriminate waste disposal in the two cities. Even in their presence, people litter the streets without being arrested. At best, an offender will only be shouted at and asked to pick what

he/she has dropped, an order most offenders do not obey, anyway, with some abusing the officers. In Accra, one of the task force officers told me that “everybody is throwing rubbish down ...some people even want to insult you when you talk”.

The police also do not seem to consider it their duty to arrest people who commit waste disposal offences. As remarked by one traffic police officer I talked to in Accra:

“I don’t think it is police work to arrest people who throw rubbish on the floor. Rubbish is AMA [Accra Metropolitan Assembly] job, not we the police. We are not even enough to do our work which is criminal prevention”.

The assemblies have no special courts for waste disposal offences so they rely on the regular courts to enforce the by-laws. However, the courts seem to regard waste disposal offences too trivial to merit their attention. As noted by an official of the waste department in Accra, “... the courts do not see this [waste disposal offences] as serious offence so they are not helping us to enforce the law and bring the culprits to book”. In Sekondi-Takoradi, an officer of the waste management department reported that culprits who were sent to court some time in the past were only warned by the judges and made to go free. The reaction of the courts to waste disposal offences is probably due to the recurrent backlogs of ‘more serious’ cases the courts usually have to dispose of, including land litigations and robbery.

The lack of support from the law-enforcement agencies seems to have discouraged the municipal authorities from attempting to arrest people who engage in indiscriminate waste disposal. This may also explain why they are not encouraged to employ more environmental task force officers since their arrests would have no effect without court prosecution of the culprits. The lukewarm attitude of the courts towards waste disposal offences can in turn be blamed on the lack of a waste policy to spell out waste disposal offences and mandate the courts to enforce them.

The non-enforcement of the by-laws on waste disposal has created a lack of fear for the law and encouraged a ‘throw-it-where-you-like’ culture among the Ghanaian population. As a result, residents of the cities freely litter the streets and dump waste into drains and water bodies and along roads. In fact, indiscriminate waste disposal

has become the order of the day in Ghanaian cities with the public showing a nonchalant attitude towards environmental sanitation. It is common to witness pedestrians and passengers in moving vehicles carelessly throwing litter such as plastic water bags, food wrappings and uneaten foods right onto the roads, sometimes in the full glare of police officers who also show no concern. In fact some of the police officers are themselves culprits of indiscriminate waste disposal; it is common to see uniformed traffic police officers on duty drinking water from plastic sachets (popularly called 'pure water' in Ghana) and dumping the plastic right on the road and those who muster the courage to challenge them can get into trouble. At the Kaneshie Lorry Park in Accra, a commercial bus driver told me that he was once arrested for challenging a policeman who dumped coconut husk on the road. As a result of non-enforcement of the by-laws on waste disposal, Ghanaian city environments are strewn with garbage which can be found on the streets, along roads, in drains and in water bodies. In many residential communities, indiscriminate dumping is a common practice while some industries and businesses engage in fly-tipping including dumping in the sea. In the CBD areas of the cities, the trading activities of hawkers also contribute to the accumulation of waste on the streets. My observations showed that street traders who sell items like coconuts, bananas, oranges and sugar cane also leave heaps of husks and peelings at their business points at the end of each day and there is no one to compel them to remove such waste. The problem of littering and indiscriminate waste disposal is further compounded by the acts of some homeless and inner-city slum residents who use culverts and drains as sites for open defecation when it is dark. The human excreta together with decomposing organic waste in the drains and water bodies generate bad odours which causes a nuisance to passers-by.

Apart from the non-enforcement of waste disposal by-laws in the cities, another issue that contributes to the growing waste problem in Ghanaian cities is unplanned housing developments. Throughout Ghana, the non-enforcement of housing development regulations promotes unplanned housing constructions which block access routes in many communities and obstruct the movements of emergency and service vehicles including waste collection trucks. Furthermore, acute housing deficits in the cities encourages many house owners to make extensions to existing structures to provide more sleeping space for their families or to accommodate renters and earn additional income for their families thereby blocking existing access to many locations.

The non-enforcement of the building regulations in such areas, therefore, promotes chaotic housing developments that block access routes for the provision of services and emergencies. As a result of access blockage, the large waste trucks used by the contractors are usually obstructed from entering many places especially in the low-income communities. Observations conducted in the study areas and elsewhere in the country found access blockage to be a common feature of the urban landscape in Ghana. Many of the waste contractors who participated in this study complained about accessibility problems in the low-income communities which constrain their waste collection exercises. Access blockage in the communities, therefore, provides easy excuses for the city authorities and their waste contractors to leave out many low-income communities from their waste collection exercises and this encourages or even compels residents of such communities to engage in indiscriminate dumping. Experience from Asian countries and elsewhere shows that, if municipal authorities are really determined to serve unplanned low-income communities, the accessibility problem can easily be resolved by introducing simple non-motorised vehicles such as push or pull carts, wheelbarrows and tricycle carts which are small enough to manoeuvre through the narrow streets and footpaths in unplanned low-income communities.

As part of the solution to the alarming waste situation in Ghanaian cities, it is probably necessary to promote the strict enforcement of existing laws on waste disposal and housing development. The strict enforcement of these laws could promote compliance with waste disposal and housing development laws, thereby creating an enabling environment for effective waste management in Ghanaian cities. Besides, court fines imposed on waste disposal culprits could generate part of the much needed revenue for the organisation of waste management while sentences requiring offenders to clean up the streets would both keep the streets clean and deter potential offenders. In the housing sector, efforts could be made to improve services in existing unplanned settlements while further unplanned developments are prevented.

So far, the analysis has revealed a number of related factors to be responsible for the poor performance of the solid waste regimes in Accra and Sekondi-Takoradi. These

include a rather low political commitment to waste management; the scarcity of resources including funds, equipment, personnel, land space and data; lack of enforcement of waste disposal by-laws and building regulations. These themes have emerged as the factors militating against the waste management efforts of municipal governments in Ghana. While the poor waste disposal situation in Ghanaian cities remains a matter of serious concern, the burdens associated with waste disposal seem to be unevenly distributed across the urban populations, raising further concerns about social and environmental justice. The next chapter therefore examines issues of social and environmental justice in the organisation of solid waste disposal in the two study areas.

CHAPTER SEVEN

SOCIAL AND ENVIRONMENTAL JUSTICE IN THE ORGANISATION OF SOLID WASTE MANAGEMENT

7.0. Introduction

Following from chapters five and six which, respectively, described the solid waste situation in the study areas and examined the factors responsible for the poor solid waste situation in Accra and Sekondi-Takoradi, the present chapter is devoted to examining the related issues of social and environmental justice in the organisation of solid waste collection and disposal in the two cities. The chapter is organised in two sections: the first addresses the issue of social justice in the provision of waste collection services, while the second addresses the theme of environmental justice in the final disposal of solid waste.

7.1. Social justice and delivery of solid waste collection service in Accra and Sekondi-Takoradi

The literature review for this study has shown that urban authorities in developing countries are generally unable to provide adequate solid waste disposal services within their jurisdiction (Hardoy *et al.*, 2001; Pacione, 2005). Studies have also shown that the limited waste collection efforts of the city authorities are usually concentrated in few wealthy residential communities and official places in the cities while low-income communities and informal commercial areas generally receive little or no attention (Onibokun and Kumuyi, 1999; Hardoy *et al.*, 2001). Disparities in the quality of waste disposal services for the different socio-economic groups usually translate into enormous spatial variations in environmental sanitation across the cities. Thus, while the residents of wealthy communities usually enjoy clean environments, their counterparts in poor neighbourhoods usually have to contend with dirty streets, garbage-choked gutters, overflowing waste containers and waste accumulations in their surroundings.

Waste disposal is a basic public service which can have serious effects on public health and environmental quality in any human settlement. To protect public health and the environment, therefore, solid waste disposal services should be provided for

all residents, and in all parts of a city. Furthermore, social justice requires the fair treatment of all and fair share of the benefits of society among its members irrespective of such variables as class, gender, ethnicity or geographical location. A good quality waste disposal service or clean surroundings is a societal benefit or public good which all its members desire and equally deserve. The situation in developing countries whereby residents of the wealthy residential areas are given preferential treatment over the poor in the delivery of waste disposal services is, therefore, unfair and unjust, and a breach of social justice.

What the current study found in the two Ghanaian cities that formed the sites for the empirical investigation corroborates the general situation reported for cities in developing countries. It emerged from the data gathered for this study that while the authorities in Accra and Sekondi-Takoradi are generally unable to provide adequate waste collection services within their respective jurisdictions, there are great spatial disparities in the quality of service they provide in the different suburbs of the two cities. The observational data, confirmed by interviews and the household survey, showed that residents of high-income neighbourhoods in Accra and Sekondi-Takoradi receive very regular and reliable waste collection services from the city authorities and/or their private sector contractors while their counterparts in the low-income communities receive little or no service. Thus, while the wealthy enjoy clean environments, the poor live in squalid conditions. The prevailing situation in Accra and Sekondi-Takoradi, which is also the case in other Ghanaian cities, can be regarded as amounting to social injustice. In other words, the claim is made here that the authorities in Ghanaian cities perpetuate social injustice or discriminate against poor and vulnerable groups when it comes to providing services for waste disposal. Social justice espouses the idea that all persons are equal and, therefore, entitled to equal treatment and equal share of society's scarce resources regardless of class, gender, race and ethnicity among others. The delivery of waste disposal services should be based on the principle of a just society which gives individuals and groups fair treatment and a fair share of the benefits of society (Smith, 1973). The concept of social justice is, therefore, concerned with distribution between different individuals and groups. Among other things, social justice calls for the fair and equal treatment of individuals and groups in society, the guarantee of the life and dignity of the human person, and preferential options for the poor and vulnerable in society.

Analysis of the data gathered for this study shows that, in line with the general trend in the country, deliveries of waste disposal services in both Accra and Sekondi-Takoradi are greatly skewed in favour of the wealthy communities whose residents enjoy regular and high-quality waste removal services compared with the poor communities where residents receive little or no service for waste removal. A look at a number of variables that relate to the quality of waste disposal services delivered to residents in the sample populations lends support to the claim for social injustice. These variables are:

- the type of waste disposal services provided for households in rich and poor communities
- householders' description of the waste disposal service they receive
- householders' satisfaction with the waste collection service they receive, and
- householders' comparison of the waste situation in their own neighbourhood with other neighbourhoods

7.1.1. Provision of waste disposal service

One justification for claiming social injustice in the delivery of solid waste disposal service in Accra and Sekondi-Takoradi is the clear variation in the type of waste disposal service provided in different communities. Tables 7.1 and 7.2 show that the types of waste disposal services available to households in Accra and Sekondi-Takoradi include house-to-house collection, kerbside collection, truck visits, central containers and communal dumps in that order of quality. The data show that the quality of waste disposal service available to households in the sample populations falls as we move down the socio-economic ladder from high-income to low-income communities. In Accra for example, while all 100 high-income households in the study have a home collection service, only nine of the 150 middle-income households enjoy the same level of service with 67 households getting kerbside collection and so on (Table 7.1). Furthermore, even though the middle-income communities have poorer waste disposal services than the high-income communities, the options available to most middle-income households (kerbside collection and truck visits) are also better than what pertains in the many low-income parts of the city where the best service available to households is disposal in perennially overflowing communal

containers. Worse still, some low-income areas, especially the squatter communities, have no service at all, a situation which compels the residents to engage in indiscriminate waste disposal practices including burning and dumping in the bush, in drains and even the ‘wrapper method’ of disposal.

Table 7.1: Means of household waste disposal among participating households in Accra

Residential area	Means of waste disposal						Total
	Home collection	Roadside collection	Truck and bell	Central container	Communal dump	Other	
High income	100	-	-	-	-	-	100
Middle income	9	67	54	20	-	-	150
Low-income	-	-	25	128	32	15	200
Total	109	67	54	20	32	15	450

Similarly in Sekondi-Takoradi, it becomes evident from the statistics in Table 7.2 that the residents of wealthy communities enjoy the best waste collection services which keep their homes and neighbourhoods clean and safe, while the poor bear the greatest burden of waste, living in squalor and health-threatening environmental conditions. Here, 15 out of the 20 high-income households (85 percent) receive home collection while the remaining five households receive kerbside collection. This compares with the middle-income households among whom only six out of forty receive home collection with 29 households receiving kerbside collection while the remaining five depend on occasional visits by waste trucks to dispose of their waste. Worse still, the option available to most low-income households in the sample is the communal container to which 61 of the 80 households have access with the rest completely lacking a service and resorting to any convenient means of waste disposal including indiscriminate dumping in the bush or drains.

Table 7.2: Means of household waste disposal households in Sekondi-Takoradi

Residential area	Means of waste disposal						Total
	Home collection	Roadside collection	Truck and bell	Central container	Communal dump	Other	
High income	15	5	0	0	0	0	20
Middle income	6	29	5	0	0	0	40
Low-income	0	0	0	61	13	6	80
Total	21	34	5	61	13	6	140

It becomes evident from the situation in both cities that there is a relationship between household wealth or socio-economic status and the quality of service provided: the wealthier households receive the best service and vice versa, which amounts to discrimination on the basis of class, a situation which rightly merits the label ‘social injustice’. The claim for social injustice in the provision of waste disposal services in the two cities is based on the fact that waste disposal is a public service funded with public resources. Thus, any disparities in the quality of the service received by different groups in the population amounts to unfair treatment.

The argument that was presented by the waste departments in Accra and Sekondi-Takoradi for varying the quality of waste disposal service they provide was that the residents of high and middle-income communities pay for waste disposal while their counterparts in the low-income communities pay no such levies. The data gathered shows that in Accra, households in the areas classified as ‘high-income’ pay monthly levies of GHC 12.00 while those in the ‘middle-income’ areas pay GHC 7.00 monthly. In the case of Sekondi-Takoradi, the levies paid by households in high-income and middle-income areas are GHC 4.00 and GHC 3.00 respectively. By government directive, however, the residents of low-income communities are exempted from waste disposal levies (Table 7.3).

Table 7.3: Levies paid by households for waste disposal

City	Monthly levies paid by households for waste disposal		
	High income area	Middle-income areas	Low-income areas
Accra	GHC 12.00	GHC 7.00	No payment
Sekondi-Takoradi	GHC4.00	GHC 3.00	No payment

Note: GH¢1.00 = US\$1.00 (approximately) at the time of the fieldwork

In spite of the fact that the poor do not pay for waste disposal, using the criterion of payment to discriminate against them is not justifiable. Information gathered from the two waste departments shows that great amounts of public funds are involved in the organisation of waste disposal in the two cities. Most of the funds for waste management come from government subventions to the various local governments through the DACF which explains why delays in releasing the subventions always cripple waste management operations in Ghanaian cities. Furthermore, officials of the

waste departments in the two cities also admitted that the levies paid by high and middle-income households are just tokens or small fractions of the cost of the service they receive. As noted by Mr. Kpodo, “those in the high-income areas pay for waste collection but what they pay is far less than the actual cost of the service we provide”. Even though the AMA and STMA have not been able to quantify the level of subsidy on the waste disposal services they provide for different income groups (and could not provide adequate data to allow for a calculation), it is safe to assume that a large proportion of the cost of the regular house-to-house waste collection in the wealthy residential communities is borne by the entire Ghanaian public through government subvention to the assemblies. But the same cannot be said about the poor service provided in the low-income communities. If the statistics were available, there is no doubt that the per capita cost of removing waste regularly from individual homes in the wealthy communities will far exceed the per capita cost of providing (poor and irregular) mass collection services in the low-income communities. Therefore, it is hereby argued that the use of scarce public resources to keep the rich neighbourhoods clean while the poor are left to live in squalid conditions amounts to discrimination and breaching a basic principle of social justice - the equitable distribution of societal benefits (USCCB, 2003). From an economics perspective, waste collection service is a public good and the act of subsidising the cost of waste collection for the rich creates negative externalities or external costs for other residents of the cities who do not benefit equally from the subsidy. In fact, the resources used in subsidising waste collection for the rich could be more usefully channelled to improve service in the poorer areas, and even extend it to those informal settlements which currently have no service for waste collection.

Furthermore, the poor have been misconstrued as people who are unwilling to pay for waste disposal and this further influences the type and quality of waste disposal service to provide in their communities. A general view held among the municipal authorities in Accra and Sekondi-Takoradi is that residents of low-income communities are unwilling to pay for waste disposal. This view appears to influence the waste management departments to provide very poor waste disposal services in the low-income communities. But the data collected for this study do not support this position. In Accra, 31 of the 47 households that indicated that they had no waste disposal service and disposed of their waste at communal dumps or resorted to other

means of disposal (such as burning, burying, or bush dumping) also indicated that they were willing to pay for a home collection service if it would be provided. Furthermore, 62 percent (92 out of 148) of households who indicated they dumped their waste in communal containers for free also indicated their willingness to pay for home collection if the authorities would provide this service in their communities. This refutes the general assumption that the poor are unwilling to pay for waste disposal which has been used as an excuse to refuse them a service that they need so badly and are willing to pay for.

Apart from the disparities in the type of waste collection service provided, the regularity of waste removal in the various socio-economic communities shows further discrimination against the poorer communities. For example, even though both middle and high-income communities in the two cities are scheduled to have weekly waste collection services, the services are actually more regular in the high-income areas than in the middle-income areas. As noted earlier, waste removal in the high-income areas like Airport Residential Area in Accra and Chapel Hill in Takoradi is very regular while overflowing waste containers in most middle-income communities can remain at the kerb for several weeks before they are removed. Worse still is the rate of waste container replacement in the low-income communities. In both Accra and Sekondi-Takoradi, communal waste containers in the low-income communities are scheduled to be removed and replaced daily but in practice, most of the containers usually remain for many days or even weeks before they are replaced, leading to overflows and waste accumulation around the containers. What is more, it is also unfair that a single waste container usually serves a large number of households in the high density low-income communities while households in the high-income areas receive direct home collection service. As was found in *Chorkor*, one of the poorest communities in Accra, only four communal containers served a community that recorded over 45,000 people in the 2000 census. No wonder waste containers in many low-income communities get filled in the early hours of the morning and overflow for the rest of the day. In this regard, the quality of waste collection service delivered to the poor falls short of what is delivered to the rich and this also breaches the ideals of social justice.

7.1.2. Householders' perceptions about the waste disposal services they receive

Answers provided by participating householders to questions on a number of variables lend further support to the claim of social injustice in the provision of waste disposal services in Accra and Sekondi-Takoradi. These include responses to questions regarding householders' satisfaction with the waste disposal service they receive; how they compare environmental sanitation in their communities with other communities and whether or not they are happy with the level of waste disposal service they receive. Table 7.4 shows that, in Accra, householders in the higher-income communities are generally more satisfied and happier with the waste disposal service they receive than their counterparts in the lower-income communities. Furthermore, they also consider their neighbourhoods to be cleaner than other neighbourhoods in the city. (For example, only nine of the 100 high-income householders described the service they receive as 'poor' with the large majority (83 householders) describing their service as 'satisfactory' while the remaining eight described it as 'very satisfactory'). This compares with responses from the middle-income areas where only one householder described his/her service as very satisfactorily while 25, 81 and 20 described their services as satisfactory, poor and very poor respectively (Table 7.4).

Table 7.4: Householders' satisfaction with their waste disposal service, Accra

Residential area	Householders' description of quality of service (home collection and roadside collection only)				
	very satisfactory	satisfactory	poor	very poor	Total
High-income	8	83	9	-	100
Middle-income	1	25	81	23	130
Total	9	108	90	23	230

The statistics in Tables 7.5 and 7.6 equally show that households in the wealthier communities have better waste disposal services than their counterparts in the poorer communities. For instance, 93 of the 100 high-income householders in the sample indicated that they were happy with the waste collection service they received while only seven indicated they were not happy. This compares with householders in the middle-income communities where 68 out of 150 were happy while 82 were not

happy. In the low-income areas, only 25 of the 200 householders said they were happy, with the large majority of 175 being unhappy about their waste disposal arrangements (Table 7.5). In a socially just system, all households would receive a fair level of service irrespective of their socio-economic status or location and their happiness with the service they receive would not vary so greatly between one socio-economic community and another.

Table 7.5: Whether respondents are happy with waste situation in their neighbourhood, Accra

Residential area	Happy with waste situation in own neighbourhood?		
	Yes	No	Total
High-income	93	7	100
Middle-income	68	82	150
Low-income	25	175	200
Total	186	264	450

Furthermore, householders' perceptions of the relative cleanliness of their neighbourhoods in relation to others also confirm the unfairness in the provision of waste disposal services in different residential communities. Table 7.6 shows the summary of householders' views when they were asked to compare general environmental sanitation in their neighbourhoods with the situation in other neighbourhoods in the city. The data clearly shows that the high-income householders in the sample generally considered their neighbourhoods to be among the cleanest in the city while their counterparts in the lower-income communities generally considered their neighbourhoods to be dirtier than most other neighbourhoods in Accra.

Table 7.6: Respondents views about environmental cleanliness in their neighbourhoods, Accra

Residential area	Relative description of own neighbourhood			
	Among cleanest in city	Averagely clean	Dirtier than most places	Total
High-income	96	4	0	100
Middle-income	4	124	22	150
Low-income	0	8	192	200
Total	100	136	214	450

Similar patterns of responses were obtained from the participating householders in Sekondi-Takoradi with regard to their satisfaction with the quality of the waste collection service they received, whether they were happy with the waste situation in their neighbourhoods, and how they viewed environmental cleanliness in their own neighbourhoods in relation to the rest of the city. As Table 7.7 shows, householders in the high-income communities were generally more satisfied with their waste removal services than their counterparts in the middle-income communities which suggests that residents of high-income communities generally receive better waste removal services than those in the middle-income communities.

Table 7.7: Householders' satisfaction with their waste disposal service, Sekondi-Takoradi

Residential area	Householders' description of quality of service (home collection and roadside collection only)				
	very satisfactory	satisfactory	poor	very poor	Total
High-income	7	12	1	0	20
Middle-income	0	6	16	18	40
Total	7	18	17	18	60

The data also show a positive relationship between the socio-economic status of households and how happy they are with the waste situation in their neighbourhood (Table 7.8) in the same way as they show a positive relationship between household income and environmental cleanliness of neighbourhoods (Table 7.9). All this is in spite of the small difference in what they pay for the service (Table 7.3).

Table 7.8: Whether respondents are happy with waste situation in their neighbourhood, Sekondi-Takoradi

Residential area	Happy with waste situation in own neighbourhood?		
	Yes	No	Total
High-income	17	3	20
Middle-income	16	24	40
Low-income	8	72	80
Total	41	99	140

Table 7.9: Respondents' views about environmental cleanliness in their neighbourhoods, Sekondi-Takoradi

Residential area	Relative cleanliness of own neighbourhood			
	Among cleanest in city	Averagely clean	Dirtier than most places	Total
High-income	18	2	0	20
Middle-income	12	35	3	40
Low-income	0	8	72	80
Total	20	45	75	140

The above analysis shows that there is generally a positive relationship between the socio-economic status of households and the quality of waste disposal service they received. This also suggests that poorer householders/communities are provided with a lower quality service on account of their socio-economic status which again breaches the principles of fairness advocated in social justice.

It is also noteworthy that social justice calls for preferential options for the poor and vulnerable in society to enable them cope with life (USCCB, 2003). Thus, the government and city authorities in Ghana have a responsibility to implement options that provide the poor access to acceptable waste disposal and other basic services. The current situation where some people reside in slums and squatter settlements without adequate provision for waste disposal and other basic services like water and sanitation is a deviation from the call for preferential options for the poor and vulnerable members of society. According to the Catholic social teaching, a basic moral test of society is how the poor and vulnerable are provided for (USCCB, 2003). It is evident that the authorities in Ghanaian cities have failed this moral test and need to rethink how to cater for the poor and vulnerable in the provision of basic services. As a way of ensuring social justice, Armah, (1993) has suggested a system of waste disposal levies which allows cross-subsidies from the rich to the poor, and from the industrial and commercial sectors to residents. This will help to raise the needed funds to provide acceptable waste disposal services in all communities in the cities. Besides, social justice requires society to guarantee the safety of human life and the dignity of the human person (Office for Social Justice, 2006). Thus, any city authority that seeks to promote social justice must also ensure that a safe and decent living

environment is created for all residents regardless of class or socio-economic status. It, therefore, behoves governments and municipal authorities to maintain health promoting and life-supporting environments that also allow people to live in dignity. As a result of poor waste disposal services in the low-income communities, however, a majority of the urban poor in Accra and Sekondi-Takoradi live in squalid conditions that are not only health and life-threatening (Hardoy *et al.*, 2001), but also dehumanising. The failure of the municipal authorities to provide adequate waste disposal and other environmental service for poverty alleviation (ESPA), and the squalid conditions in which the poor live as a result, amounts to failure to protect the sanctity of human life and the dignity of the human person (USCCB, 2003) which in turn, amounts to social injustice.

It is evident from the above analysis that there is social injustice in the delivery of waste disposal services in the Accra and Sekondi-Takoradi metropolises. This is shown in the use of public resources to subsidise regular and reliable waste disposal services for the residents of wealthy communities while their counterparts in the poor communities receive little or no service for waste removal. This results in squalid and dehumanising conditions where the poor live and work while the rich are protected from environmental harms associated with waste disposal. Besides, social injustice is also committed through the failure of the city authorities to consider preferential options to improve waste disposal services for the poor and vulnerable, and to protect the health, life and dignity of the majority of the urban poor.

7.2. Environmental justice and solid waste disposal in Accra and Sekondi-Takoradi

Closely related to the issue of social justice is ‘environmental justice’, the move to redress the problem of inequitable distributions of environmental burdens, and to promote a more equitable access to environmental benefits among different population groups where they live or work (Camacho, 1993; Timney, 1993). In poor country cities, access to environmental services such as potable water, sanitation and waste disposal can provide livelihood opportunities for the poor as well as improve their quality of life (Hardoy *et al.*, 2001; Suyanto and Khususiya, 2007). As shown by the literature review (Chapter Two), however, disadvantaged population groups such as the poor and racial minorities often live amidst the worst environmental conditions

(such as near polluted industrial locations and waste disposal facilities) relative to more affluent population groups and, therefore, bear disproportionate shares of environmental burdens and are denied equitable access to environmental benefits such as clean air and water, parks and recreational grounds (Bullard, 1993; Collins *et al.*, 1993; Steger, 2004).

One of the objectives for conducting this study was to examine how the concerns of environmental justice are being addressed in the final disposal of solid waste in the study areas. In this regard, the data gathered appears to corroborate the general finding by researchers that environmental injustice is committed against the poor and vulnerable groups in society. The organisers of solid waste disposal in the two study areas (and in Ghanaian cities generally) appear to breach many of the principles of environmental justice through inappropriate siting and poor maintenance of final waste disposal facilities.

In Accra, the two official waste disposal facilities are both sited in low-income localities: *Oblogo* on the western outskirts and *Tweebleo* in the eastern part of Accra. The information gathered showed that even though the capacities of both facilities have been exceeded, the waste contractors continue to dump their collections at these sites because the city authorities have not been able to acquire additional disposal land space. The two disposal sites are, therefore, overflowing with waste and this has apparent consequences for the residents of the host communities. My observations at the two facilities and interviews conducted with residents of the affected communities showed that they suffer from depressing environmental conditions including stench, leachate flow, flies and the scattering of waste materials into their homes.

At *Oblogo*, the landfill occupies an old quarry pit sited in the belly of a steep hill. Located up on the hill and overlooking the settlement, the poorly managed landfill is a source of great concern for the residents. Even though *Oblogo* is located close to the Weija Water Works which supplies water for the western part of Accra, the residents of this urban-fringe community have no access to piped water. Many households rely on dug-out wells for their water supply while others rely on vendors who bring water in tankers to the community. While the manner in which the vendors handle the water cannot guarantee its safety, the dug-out wells are also at the risk of being polluted

with seepage downhill from the landfill. In an interview with the site manager for the landfill, Mr. Tetteh, he conceded that “in fact, we feel bad about the situation here [*Oblogo*] because of the smell and the waste pollution but as you can see, we are doing our best to make sure we reduce the problem”. In my interactions with a sample of the residents of *Oblogo*, some of them reported that water from the dug-out wells has an unusual taste which they suspect to be the result of contamination from the landfill.

Besides, some of the residents of *Oblogo* are farmers who cultivate vegetables and other staples in the vicinity of the landfill. During the dry season, the nearby *Sampa* stream, which takes its source from the left side of the hill on which the landfill is sited, becomes the source of irrigation water for small-scale farmers in the community. My observations along the stream showed signs of pollution from the landfill including the presence of wind-blown waste materials like plastic and paper on the banks and in the stream water as well. Two farmers I interacted with on the banks of the *Sampa* stream were also of the view that the stream water has been polluted by the landfill. One of them remarked: “Look at the colour of the water. You can see it is not clear ... it is polluted with water from the decomposing waste” while the other said “they have polluted our water ... this can make people sick” (both translated from *Twi*). My attempt to obtain laboratory tests for samples of crops cultivated in the vicinity of the landfill and water samples from the *Sampa* stream and boreholes in the community were frustrated by cost and bureaucratic red tape. However, there is crude evidence from reports from the residents of *Oblogo*, and my own observations that food and water sources in the community may be polluted and thus can affect the health and safety of the residents.

Evidence of environmental injustice was also rife at the *Tweebleo* disposal site near *Teshie* in eastern Accra. The waste dump which occupies a large area of land adjoining a disused compost plant is sited close to residential areas in a predominantly low-income area. My estimation showed that some of the houses are less than a hundred metres from the waste dump (Figure 5.16). While the waste-receiving capacity of the facility was exceeded years ago, waste companies operating in the eastern parts of Accra, including Daben Cleansing and Ako Waste Ltd, continue to dump waste at the site on a daily basis. The large quantity of waste brought to the site

is not treated in any way but is simply dumped and, at best, spread and compacted by a bulldozer. Over the years, the waste brought to the site has built up into a large elongated hill towering in the *Tweebleo* settlement. Within the waste yard, as it is usually referred to, are large pits or cesspools into which human excreta drained from public toilets and private homes in the city are discharged.

Some of the residents I interviewed expressed their worries about the environmental conditions in their community. A young woman noted that "... as for this waste dump, it is really worrying us. They even dump human excreta in a cesspool here and the smell is just unbearable. We are so scared of an outbreak of cholera or some other diseases" (translated from *Twi*). Boye Lamptey, a mason who was carrying out repair work on a house near the entrance to the waste yard also complained about the dumping of human excreta in the waste yard considering its proximity to people's homes. "What the city authorities are doing to us is not good. They know human excreta are a source of many diseases yet they have decided to dump it here near our homes" (translated from *Twi*). He also complained about the abounding swarm of flies including mosquitoes, the windblown waste materials scattering into homes and the unsightly conditions in the community. The prevailing environmental conditions in the *Tweebleo* community is a daily misery for many residents and violate their fundamental right to clean air, water, land, food and a healthy living environment. An interview with an elder of the community, Nii Ayertey, revealed that most of the houses in the vicinity of the waste dump predate the waste facility. He also reported that the residents of the community, including the land-owning family to which he belonged, were not informed or consulted when the site for the disused compost plant was being turned into a waste dump. This constitutes an infringement on the rights of the residents to participate as equal partners in decision-making regarding the planning, siting and management of the waste disposal facility. Besides, according to Nii Atertey, "the government promised to tar our road for us and give us water, a school and a market but where are all these promises? They only deceived us" (translated from *Ga*). Such breaches of trust further contravene environmental justice which seeks to protect the right of victims of environmental injustice to receive full compensation and reparations for damages to their environment. Many of the residents wished they could stop the continued dumping of waste in their locality but lacked the resources and political clout to do so. Asked what he would want to be

done about the waste dump, Acolatste, a resident of the community for instance, noted that “I think they have to stop dumping waste here before the situation becomes catastrophic” but also conceded that “it is not easy for us to stop the government” (translated from *Ga*).

Similarly in Sekondi-Takoradi, there is ample evidence to support a claim for environmental injustice against disadvantaged people because the disposal of all the waste collected from the entire metropolis at *Mpinstim* creates a situation whereby the residents of one poor community bear the brunt of environmental burdens associated with waste disposal. This is in spite of the fact that the residents of *Mpinstim* themselves have hardly any waste disposal services. The disposal site is an unmanaged dump and the high proportion of putrescent materials in the waste stream promotes rapid decomposition of waste materials. This creates depressing environmental conditions in the community making the lives of residents a daily misery.

The environmental injustice of solid waste disposal in the Sekondi-Takoradi metropolis became evident from interviews with a sample of the residents of *Mpinstim* and other stakeholders and also from my own observations at the waste dump. The sample of residents who granted interviews regarding the waste dump in their community complained about such nuisances as stench from the decomposing waste, the prevalence of vermin and flies including mosquitoes, and wind-blown waste materials within the community. In my interaction with an elderly man who lived with his family of six less than 80 metres from the waste dump, part of his comment, in *Fante* language, can roughly be translated as “because of the decomposing waste, you cannot even eat in this house. The smell is bad and the flies are worrying us” while a middle-aged woman who sold charcoal close by also said “this waste is killing us but no one is hearing our complaint ...”. Furthermore, a former assembly representative of *Mpinstim*, Mr. Yaw Odei, reported that many of the residents opposed the siting of the waste dump when the authorities first made the move to dump waste in their community. Following complaints from many of his constituents at the time, he (Yaw Odei), then the community’s representative in the assembly, petitioned the Sekondi-Takoradi Metropolitan Assembly (STMA) to stop dumping waste in the community but no one listened to his plea. His attempt to seek

the intervention of the EPA also yielded no results. According to him, the assembly argued that agreement had been brokered with the chief of the area to use the site for waste disposal. Meanwhile, the residents of the community were not given the opportunity to participate in discussions regarding the siting of the waste dump. This, however, goes against environmental justice which, among other things, affirms the political and environmental self-determination of all peoples, and demands the right of communities to participate in decision-making on environmental matters that are perceived to affect them (Bullard, 2005). Thus, the residents of *Mpinstim* should have been consulted on the important issue of their community hosting a waste disposal facility. As has been the case in many other Ghanaian cities, however, poor governance and environmental injustice denied them this opportunity.

It is the mandate of the EPA to monitor and enforce environmental standards and to ensure that the livelihoods and health of communities are not jeopardised by such polluting projects as waste disposal. According to a senior officer at the Western Regional office of the EPA in Sekondi-Takoradi, his office should have organized a public hearing to assess the environmental impact of siting the waste dump which would have given the residents of *Mpinstim* and other stakeholders the opportunity to participate in the decision-making process. However, according to the officer, the EPA was unable to do this due to a lack of resources and the uncooperative stance of the metropolitan assembly which failed to submit an Environmental Impact Statement (EIS) for the project.

Apart from the main dump at *Mpinstim*, numerous smaller dumps were also found dotting poor communities in the city including *Kwesiminstim*, *Effiakuma* and *Essaman*. Meanwhile no waste dump was found in the plush residential areas within the metropolis. Due to their much stronger socio-economic and political position, wealthy communities in Ghanaian cities seem able to command better waste disposal services and avert the siting of waste disposal facilities. When I asked the head of the STMA waste department why the waste dumps (including the many unofficial ones) appeared to be sited only in the low-income communities, his response was “I think it is easier to find land in those areas. As for the rich areas no one will allow you to dump waste there”. It thus appears that the socio-economic status and political influence of communities greatly influence the siting of polluting projects like waste

disposal facilities. It can, therefore, be claimed that environmental injustice is perpetuated against the poor on account of their low socio-economic status and lack of political influence to avert waste pollution in their neighbourhoods. The disproportionate location of solid waste disposal facilities in poor communities appears to be the norm in Ghanaian cities as observations in other major cities in the country seemed to reveal.

The perpetuation of environmental injustice against poor communities in Ghanaian cities can be attributed to a number of factors. First, there are inadequate policy regulations to control the disposal of solid waste in the country. As noted in chapter six, Ghana has no policy on waste management while the scanty provisions on waste disposal found in the National Environmental Policy and National Environmental Sanitation Policy fail to adequately address issues relating to the siting of waste disposal facilities and environmental safety in host communities. Furthermore, even the scanty policy provisions on environmental protection including waste disposal are scarcely ever enforced. The EPA which has the mandate to enforce environmental regulations is resource-constrained and, therefore, lacks the power to hold municipal authorities accountable for their actions and to protect communities from undue waste pollution and other environmental threats. The EPA is also unable to compel municipal authorities and other organisations to submit EIAs even for projects like waste disposal which are perceived to have considerable environmental impacts. Information gathered at the EPA offices in Accra and Sekondi-Takoradi indicated that the agency is hardly ever consulted on the siting of waste disposal facilities and has never issued any permits for the siting of waste disposal facilities in either of the cities.

Moreover, the lack of civil society pressure to compel the authorities to carry out proper siting and management of waste disposal facilities creates room for environmental injustice. Generally, the majority of residents in communities hosting waste disposal facilities are little educated, mostly unemployed, poor and have low levels of environmental awareness. Their circumstances seem to either make them unaware of the polluting effects of the waste dumps in their communities or deny them the political power to resist the siting of poorly managed waste disposal

facilities in their communities. Unresponsive local governments, therefore, take advantage of their vulnerable situation and abuse their environmental rights.

Besides, the land tenure system in most of Ghana whereby chiefs and clan heads assume roles as custodians of the lands with the right to lease or even sell such lands, creates room for abuses which can lead to environmental injustice. In this regard, some unscrupulous chiefs and clan heads are happy to receive monetary rewards from municipal assemblies and give out communal land for waste disposal. This is usually done without consulting with their people or considering the potential environmental impacts associated with waste disposal in their communities. Nowadays, there are many 'absentee-chiefs' who, themselves, do not reside in their chiefdoms where they may have granted permission for waste disposal facilities to be sited. In this regard, such chiefs never share the concerns of the resident populations who have to bear the burden of waste disposal and poor maintenance of the waste disposal facilities.

The above analysis of the solid waste collection and disposal situation in Accra and Sekondi-Takoradi has shown that municipal authorities in the two cities are unable to organise adequate waste collection within their jurisdictions and tend to concentrate their meagre efforts at waste collection in few wealthy communities and official areas in the cities while many poor communities have little or no waste disposal service. There is, therefore, great spatial disparity in environmental quality between the rich and poor communities in the two cities. This discrimination against the poorer segment of the population amounts to social injustice since waste management activities in Ghanaian cities are largely funded with public money generated from various sources including taxes paid by both rich and poor residents. Furthermore, some of the poor communities bear disproportionate shares of the burdens of waste disposal through the siting of poorly-maintained waste dumps in these communities. Even though municipal officials tried to refute the blame that they deliberately site waste disposal facilities in localities of the poor, the evidence on the ground, as shown in the above analysis, support the claim of environmental injustice against the poor.

On the basis of the above findings about the solid waste management situation in Accra and Sekondi-Takoradi (presented in chapters 5 to 7), a multipart hypothesis may be proposed regarding urban solid waste management in Ghana generally:

- that municipal authorities in Ghana are not able to provide adequate waste disposal services within their jurisdictions;
- that there is a low level of political commitment to waste management in Ghana which is the major cause of the poor solid waste disposal situations in the cities; and,
- that the urban poor in Ghana tend to bear a disproportionate share of the solid waste burden of cities.

CHAPTER 8

CONCLUSION

8.0. Introduction

The current study set out to investigate the solid waste situation in two Ghanaian cities, namely Accra and Sekondi-Takoradi, and was guided by four objectives which were:

- To describe the solid waste situation in Accra and Sekondi-Takoradi
- To identify the factors militating against solid waste management efforts in the two cities
- To find out if the concerns of social and environmental justices are being addressed in the organisation of solid waste disposal, and
- To explore ways to improve solid waste disposal in Ghanaian cities

The last three chapters (5, 6 and 7) have addressed the first three objectives. This final chapter brings the study to a conclusion by summarising and discussing the key findings of the research. Based on the research findings, the chapter makes recommendations for addressing the worsening solid waste problem in Ghanaian cities, thereby addressing the last objective for undertaking the study. The chapter also reflects over the entire research process, pointing out its strengths and limitations. Finally, a number of areas requiring further research are identified.

8.1. Summary and discussion of the research findings

The following summary and discussion of the research findings are based on the four objectives (just stated above) that guided the study.

8.1.1. The solid waste situation in Accra and Sekondi-Takoradi

In keeping with what other researchers have found about the solid waste situation in poor cities around the world, the current study found that Accra and Sekondi-Takoradi both have very poor solid waste situations. In both cities, this is shown by waste accumulation and overflowing waste containers in many residential and

commercial areas, heavy litter on the streets and open lands, garbage-choked gutters and waste-clogged streams.

The analysis has shown that waste generations in the two cities greatly outstrip the capacities of the authorities for waste collection and disposal. In Accra, the municipal waste department claims that 70 percent of the daily waste output is collected for disposal while in Sekondi-Takoradi, the collection rate is said to be 60 percent. While the validity of these statistics cannot be ascertained, one thing that is clear to any casual observer is that enormous quantities of solid waste remain uncollected each day and waste accumulation is a growing problem, making the city environments health and life-threatening.

Apart from the low rates of waste collection in the two cities, the study also found that the municipal authorities and their waste contractors concentrate their waste collection activities in the wealthy residential areas and official grounds in the cities while many low-income communities and commercial areas receive little or no service for waste collection. The data gathered shows that the residents of high-income areas generally receive regular house-to-house waste collection services which keep their neighbourhoods clean and safe. However, kerbside collection which is the norm in most middle-income residential areas is very irregular and unreliable with overflowing waste bins and piles of waste usually remaining at the roadside for many days or even weeks before they are removed for disposal. The waste situation in the numerous low-income communities is particularly worrying: the few communal containers, each of which usually serves a large population, are never removed on schedule and are almost always overflowing with decomposing waste which exude smell and cause other nuisances to the residents. The delivery of waste disposal services in the two cities is, therefore, skewed in favour of the rich and to the disadvantage of the poor, a situation which raises concerns of social justice.

The final disposal of solid waste in both Accra and Sekondi-Takoradi also leaves much to be desired. The study found that crude dumping is the norm in both cities and the loads of solid waste collected by the waste departments and their contractors are dumped in poorly-managed landfills which create dire environmental conditions in the vicinities. The proximity of these poorly-managed disposal sites to residential

areas gives rise to concerns about environmental justice (see section 8.1.4). The lack of adequate services and protection for the poor in the organisation of waste management also means that they are denied the opportunity to live in healthy environments. For some of the poor, this also has implications for livelihood and survival. Songsore *et al.* (2001) for instance have noted the high incidence of filth-related diseases and the associated high disease burden in the low-income areas in Accra due to unsanitary environmental conditions. Such high incidence of diseases in the poor communities can prevent many people from working and earning income to meet their needs.

8.1.2. Causes of the solid waste problem in the study areas

The study identified three main factors to be responsible for the abysmal solid waste situations in the study areas. These factors are (i) the lack of political commitment to address the waste disposal problem; (ii) the scarcity of resources including finance, equipment, personnel, land space for waste disposal and data for waste planning; (iii) lack of enforcement of existing regulations on solid waste disposal and urban environmental management in general.

8.1.2.1. Lack of political commitment

The study found that both the national and municipal governments in Ghana lack a sense of urgency of the urban solid waste situation and so have not bothered to put in place the necessary measures to address the problem. The political neglect of the waste problem is shown in a number of ways including the lack of a waste policy to provide a framework for the organisation of waste management; inadequate resources for the planning and organisation of waste management activities and the non-enforcement of existing regulations for urban management in general and waste management in particular. Further evidence of the low political interest in the waste problem is the lack of public education on waste disposal and environmental management in general, a situation which promotes negative public attitude towards waste disposal and other aspects of environmental management. As observed by Tamakloe (2006) successive governments since independence have failed to pay any serious attention to issues of urban settlement planning and environmental management and this situation is responsible for the chaotic cities and their poor environmental conditions.

8.1.2.2. Inadequate resources

While low political commitment can be regarded as the root cause of the worsening waste situation in Ghanaian cities, the issue of resource scarcity (including finance, logistics, personnel, waste disposal land and planning data) is also a fundamental problem militating against efforts to improve waste management in the country. The study has shown that municipal authorities in the study areas lack the necessary financial resources to organise waste management effectively. The limited funding of the waste sector does not only make it impossible for the waste departments to employ enough professional staff to handle the technical aspects of waste management (such as planning, operations and maintenance of equipment), but also hinders the recruitment of enough labourers to undertake regular cleaning of the street and market grounds. The same finance problem makes it difficult for the waste departments to pay their contractors promptly to encourage them to work with enthusiasm. Thus, the waste sector is characterised by a vicious cycle of debts that deals a debilitating blow to efforts to keep the city environments clean and healthy.

Linked to the problem of finance is that of logistics. The study found that scarcity of funds greatly affects the ability of the municipal authorities and their waste contractors to acquire the necessary equipment for the collection of solid waste from the city environments and its transportation to final disposal sites. In the two cities investigated, the available waste management equipment is obsolete and experiences frequent breakdown or failure. The high rate of equipment failure greatly reduces the number of trips made by the waste trucks to the disposal sites and frequently leads to waste accumulation in the cities. Apart from the fact that available equipment is not adequate to handle the large volumes of waste generated by the residents of Accra and Sekondi-Takoradi, most of the equipment is also unsuited to the housing culture in the numerous low-income communities where the poor layout of structures greatly obstructs the movement of the large Western-style waste trucks used by the formal sector waste contractors. The inability of waste trucks to manoeuvre through the chaotic housing developments promotes waste accumulations in many low-income communities.

The study also found the resource scarcity problem facing the waste sector in the country to include shortage of both skilled and unskilled personnel to carry out various functions. Ghana's educational system lacks courses in waste management, a situation which has created a dearth of qualified waste management personnel. Besides, the waste sector (like other public sectors) is characterised by low salaries and poor conditions of service which discourage graduates from taking up employment in the sector. Over the years, municipal waste departments in the country have, therefore, not been able to undertake adequate planning and effective organisation of waste management due to the shortage of qualified waste management personnel including engineers, planners, administrators, accountants and finance officers among others.

In addition to the problems of finance, logistics and personnel, the waste departments face great difficulties in their efforts to acquire suitable land space for solid waste disposal. In Accra and Sekondi-Takoradi and other Ghanaian cities as well, growing NIMBY concerns or civil society protests against the siting of waste disposal facilities are making it extremely difficult for municipal waste departments to acquire suitable land space for waste disposal. In Accra, a case in point is the stiff opposition from the residents of *Agyemankata* who have vowed to resist any attempt to site a World Bank sponsored modern landfill in their community. In Sekondi-Takoradi, the STMA has also not been able to acquire suitable land space for the construction of a similar facility. The waste disposal land problem is, therefore, a real headache to municipal authorities in Ghana and a huge constraint to solid waste disposal efforts.

The lack of accurate data on the waste situation in the cities is also a constraining factor in waste management in Accra and Sekondi-Takoradi, a situation which could also apply to other cities in the country. It emerged from the interviews conducted with staff of the waste departments in the two cities that no research has been conducted to generate accurate data on the quantities of waste generated, their types and characteristics or even the waste disposal needs of the populations. Without any systematically gathered data, the authorities usually make 'brave estimates' of waste generation and characterisation which become the basis for the planning and organisation of waste management operations. Such 'brave estimates' are, however,

bound to be inaccurate and cannot support effective planning and organisation of waste management. Besides, the same statistics or fixed estimates have been used over the years even though population growth and the associated consumption of products are expected to increase the waste output. The lack of accurate data on the waste situation makes it impossible for the authorities to make realistic projections for the planning and organisation of waste management.

8.1.2.3. Poor public attitude and lack of enforcement

The poor waste handling attitude of Ghanaians also emerged as one of the causes of the poor waste situation in the study areas. The inability of municipal authorities to enforce existing by-laws on waste disposal results in a general lack of respect for the law and a ‘throw-it-where-you-like’ attitude towards waste disposal among the population. It is therefore common to see motorists, pedestrians and passengers littering the streets without any fear of the law. For the same reason of non-enforcement, many householders, traders and other business operators resort to indiscriminately dumping waste in open spaces and into drains, streams and drainage channels. This attitude among the public creates unsanitary conditions in the cities and blocks existing drainage channels, a situation which promotes flooding during heavy rains.

On their part, the municipal authorities lack the capacity in terms of logistics, personnel and legal backing, to enforce local government by-laws on waste disposal. Existing laws on land use and housing development also lack enforcement, a situation that promotes haphazard developments in many low-income areas of the cities, thus blocking road access within the settlements. Such situations obstruct the movement of waste collection vehicles and promote waste accumulation in many low-income settlements in the cities.

8.1.3. Social and environmental justice in solid waste management

The third objective for conducting this study was to find out if the concerns for social and environmental justice are being addressed in the organisation of solid waste management in the study areas. With regard to social justice, the study found that there is much injustice in the provision of waste collection services in the two cities, with much discrimination against the poor segments of the populations. In both Accra

and Sekondi-Takoradi, waste collection from residential areas is skewed in favour of the rich. Generally, wealthy residential neighbourhoods in the two cities receive very regular and reliable house-to-house waste collection services while the numerous poor residential neighbourhoods receive very poor services with some areas getting no service at all. Even though there are no statistics to help calculate the resources spent on waste collection in the different socio-economic areas within the two cities, there is no doubt that the amount of public funds that are used to subsidise very regular waste collection in the wealthy communities far outweigh the funds spent on the poor waste collection services provided for the residents of low-income communities in the two cities. As discussed earlier in Chapter 7, the claim for social injustice is, therefore, based on the argument that significant levels of public funds are employed to subsidise excellent waste collection services in the wealthy communities but very little is done for the residents of poor communities where the service is either very poor or totally unavailable. Besides, the study has shown that the organisers of solid waste disposal in the two cities breach other principles of social justice including their failure to maintain environmental conditions that protect public health and human dignity. It is further argued that, contrary to the ideals of social justice, the authorities in Accra and Sekondi-Takoradi have failed to consider preferential options for the poor and vulnerable who, by their constrained economic status, are in most need of subsidised services. Thus, based on the objective stated, it is hereby concluded that the concerns of social justice have been neglected in the organisation of waste disposal in the two cities investigated.

Much like the case of social injustice in the provision of waste disposal services, the arrangements for the final disposal of solid waste in both Accra and Sekondi-Takoradi are also characterised by environmental injustice against some of the poor communities. The final waste disposal facilities in the two cities are all sited in localities of the poor, and the dire environmental conditions associated with the poor maintenance of the facilities make life a daily misery for many households in the host communities. Among other things, it emerged from the study that the residents of communities in the vicinities of waste dumps in Accra and Sekondi-Takoradi suffer from such nuisances as stench, vermin, flies and, mosquitoes, wind-blown waste materials and leachate flow from the decomposing waste at the dumps. Apart from these nuisances, the residents are also exposed to health risks associated with the

poorly maintained waste dumps. Grimbergen and Thonissen (2007) have reported in their *A Survey of Health in Ghana* that even though malaria and diarrhoeal diseases are common throughout all major cities in Ghana, they are more concentrated in the poorest urban communities where basic sanitation and waste disposal services are lacking. It may be argued here that even though communities hosting waste disposal facilities are not the only ones with poor sanitation and waste collection services, their situations are likely to be exacerbated by their proximity to the decomposing waste. Songsore *et al.* (2005) have also reported deep spatial disparities in the incidence of sanitation, waste and hygiene related diseases in the Accra metropolis with higher concentrations in the poorer communities. In their analysis of clinical records from health institutions in the city covering the period 2000 to 2005, Songsore *et al.* found that filth related diseases like intestinal worms, malaria, diarrhoea, cholera, typhoid fever, dengue fever and skin diseases were more commonly reported at health centres in those communities with poor environmental sanitation, and were also among the commonest causes of ill-health and death, especially among children, in these communities. According to them, the affected communities are those commonly characterised by such conditions as poor housing, frequent floods and stagnant waste waters, solid waste accumulation, poor sanitation and improperly located waste dumps some of which are also sites for the disposal of human excreta. In contrast, clinics that were located in wealthy communities recorded fewer cases of filth related diseases and more of chronic diseases like diabetes, heart attacks, cancers and stroke. Thus, while wealthy residents of the cities enjoy clean spaces, safer air and better water, their counterparts in the poor neighbourhoods reel in health and life-threatening environments. This shows that rich and poor communities in the city are at different stages of epidemiological transition.

While the comments made by some residents in the affected communities showed their awareness of the environmental implications of living close to the poorly managed dumps, many poor communities in Ghana seem to lack the necessary political muscle to prevent the siting of waste dumps in their localities. The lack of civil society protest against environmental injustice creates room for the abuse of vulnerable communities by unresponsive, unaccountable local authorities.

8.2. Implications of the research findings for improving solid waste management in Ghanaian cities

This study sought to investigate the solid waste disposal problem in two Ghanaian cities. Among the aims of the study was the identification of the causes of the waste disposal problem in the study areas with a view to making recommendations for a remedy. Based on the findings presented above, the following recommendations are made for the improvement of solid waste management in the two cities investigated and in Ghanaian cities in general.

8.2.1. Political commitment to waste management

The study has shown that both national and local governments in Ghana have low level of commitment to waste management and this proves to be the root cause of the waste problem in the country's cities. To address the waste disposal problem, the lackadaisical manner in which the national and municipal governments currently approach waste management must give way to a firm commitment to waste management. In this regard, a number of measures are necessary. A major part of the solution lies in the enactment of a national waste policy to guide the conduct of waste management. A realistic policy framework must be formulated to guide urban sector institutions as well as provide them adequate legal support to enforce their mandates. Furthermore, there is the need to strengthen and resource urban management agencies to enable them carry out their mandates of planning and managing cities in the country. These institutions need to be well-resourced with operational funds, logistics and qualified personnel to enable them to discharge their duties creditably.

To tackle the waste problem effectively, national and municipal governments in Ghana must also commit themselves to improving the conditions of service in the waste and sanitation sub-sectors to make jobs there attractive to both skilled and unskilled personnel. Besides, political commitment to waste management should also include active public education on environmental sanitation and waste disposal and the inclusion of environmental education in the country's educational curriculum. Public education on environmental sanitation should be accompanied by adequate

provision of facilities such as litter bins and well-maintained public toilets that encourage the public to handle waste responsibly.

8.2.2. Improved funding and equipment for waste management

In order to improve waste management in Ghanaian cities, the perennial financial crisis that characterises the waste sector also needs to be addressed. In this regard, there is a need for the central government to greatly improve its allocations to municipal governments and also make these allocations more regular to prevent delayed payments to waste contractors who need the money so badly to meet the operational costs of waste collection. At the same time, the municipal governments must be supported to improve revenue mobilisation from local sources. This can be done by attracting qualified finance and accounting staff who will help identify additional sources of funds such as taxes on properties and business, and also improve the financial management practices of the assemblies by plugging leakages and stemming corruption. Additional revenue can also be raised from waste disposal service clients. Analysis of the household survey data has shown that many residents of low-income communities, who currently dump their waste for free albeit in poorly maintained central containers, are willing to pay for improved service while many of those who currently have no waste disposal services are also willing to pay for a good service. This provides hope for the assemblies but they must provide a good service to justify such charges. Enhancing the finances of local governments will enable them maintain infrastructure and provide better waste disposal and other services within their jurisdictions.

Solving the solid waste problem in Ghanaian cities will also require massive investment in equipment and logistics for waste management operations. Adequate investment therefore has to be made in the logistics for waste management including collection trucks and containers, and also in equipment for the maintenance of disposal sites. At the same time, the private waste companies must be supported to acquire adequate equipment and other necessary resources to enable them to discharge their duties effectively. The waste management departments of the various cities should also be supported to establish well-equipped garages with the necessary spare parts, and to recruit well-qualified engineers and supporting mechanics to maintain the equipment. The problem of poor vehicular access for waste removal in

the unplanned communities can also be addressed by introducing simple technologies such as pull-carts, the *Zoomlion* style of tricycles and even wheelbarrows for primary collection in the otherwise inaccessible locations. In order to deal with the problem of street litter, it is hereby recommended that more bins be provided and placed at close intervals in all busy commercial areas and along all major streets in the cities to encourage the floating population to dispose of waste properly and avoid littering the streets. Alongside this, existing waste disposal by-laws should be strictly enforced to deter people from indiscriminate disposal.

8.2.3. Adopting integrated solid waste management

It is recommended that integrated solid waste management (ISWM) be adopted as a guiding framework within which to conduct the business of waste management in the country. In this regard, municipal authorities in Ghana should prioritise the various strategies of solid waste management in the order presented by the waste hierarchy (Figure 2.1). All waste producers such as households, businesses and institutions should be enlightened on the merits of, and encouraged to practice waste prevention, waste reduction and re-use while measures are instituted to promote recycling, composting and incineration for energy with waste disposal being the last options. In particular, since the bulk of solid waste generated in the country consists of compostable organic materials, a successful composting project can greatly reduce the amount of solid waste going for land filling and reduce the need for landfill space. In fact, there is the need to move away from waste disposal in unmanaged dumps, and to the construction of modern landfills designed to control leachate flow and harvest landfill gas (methane) for energy production. These landfills can be supplemented with incineration for energy production, recycling and composting all of which can generate additional revenue to fund waste management operations. The reasons that led to the failure of the *Tweebleo* compost project in Accra (mixed waste storage and collection, low demand for compost due to the high price; the mentality that compost produced from waste cannot be clean and the lack of funds to maintain the plant) provide useful lessons and can be addressed to ensure the sustainability of future composting projects. To solve the problem of residents mixing organic waste with other waste types, waste producers can be encouraged or even mandated to separate 'compostable' waste materials from recyclables to facilitate material collection for composting.

The compost might also be better accepted if farmers are encouraged to use it on cereal crops that get processed before consumption instead of using it in the cultivation of vegetables. The price of compost manure could also be subsidised and kept low to make it affordable to farmers. Even if the sale of compost fails to yield adequate funds to sustain the operation of compost plants, municipal authorities have to accept the fact that the cost of solid waste management can only be minimised and it is highly unlikely that waste can ever yield a profit. After all, solid waste management remains an essential municipal service that aims to protect public health and the environment and should therefore not be treated as a money-making venture.

8.2.4. Providing adequate land space for waste disposal

In addition to providing sufficient funds and logistics for waste collection and transportation, there is also the need to provide adequate land space for the treatment and final disposal of waste collected from the city environments. In view of the difficult land tenure system in the country, the task of acquiring land for waste disposal should not be left to the local governments alone since they usually lack the influence and negotiating power to engage with land owners. In this regard, the central government, through such agencies as the Ministry of Lands and the Lands Commission, must play a leading role by identifying suitably located lands, negotiating with land owners and paying adequate compensation to acquire such lands for the purpose of waste treatment and disposal. In view of the growing NIMBY attitudes towards the siting of waste disposal facilities (e.g. Agyemankata) and the health implications of people living close to these facilities, it would be helpful for the authorities to site future waste disposal facilities in uninhabited areas far from the cities. Boundaries should then be created around these sites and monitored to prevent people from settling near the facilities. Undoubtedly, siting waste disposal facilities at considerable distances from cities will increase haulage distances and hence the operation costs of waste management. The advantage in this, however, will be the prevention of community pollution and NIMBY protests. There will therefore be trade-offs that will have to be considered in order to solve the perennial land scarcity problem that confronts the waste sector in the country.

8.2.5. Generating data for planning waste management

The lack of data on the waste situations in Ghanaian cities is a constraint to the planning and organisation of waste management operations. To overcome this problem, there is the need to gather accurate data on such topics as the quantities and types of waste being generated in the cities, their characteristics, as well as the waste disposal practices among the population. The central government ought to create a national database on waste and also support municipal authorities to undertake regular research to generate accurate data on the waste situations within their jurisdictions to facilitate waste planning and management. Accurate data on waste generation and composition, for example, would be useful in determining appropriate strategies for waste management. The preponderance of organic materials, and to some extent, recyclables in the municipal waste streams, for instance, would suggest that composting and recycling are both appropriate methods of waste management for the bulk of municipal waste in Ghana. To promote these strategies of waste management, however, the current practice of mixed-waste disposal must be discouraged and households must be encouraged to separate the different waste types. In situations where municipal governments lack the capacity to undertake the necessary research to generate waste data, qualified researchers can be recruited from the universities and other research organisations to carry out the research and assist in the planning and implementation of waste management operations. There will also be the need to identify all stakeholders in the waste sector including waste producers, those who provide (formal and informal) waste collection services, waste pickers and recyclers. The contributions of these stakeholders must be recognised and their operations formalised and supported to improve waste management in the cities.

8.2.6. Public education on environmental sanitation

The poor waste disposal culture among Ghanaians can be addressed through public education on environmental sanitation in general and waste disposal in particular. The need to educate the Ghanaian public on waste disposal was captured in a reader's comment on a 'GhanaHomePage' news item: *KMA* [Kumasi Metropolitan Assembly] *owes waste collection contractors ...* which noted in part that "You can employ all the technology there is in the books to clean up Accra, Kumasi and Takoradi but if the

public are not educated that it's not right to litter, then you will always lose money and time" (GhanaHomePage, February 19th. 2009). This can be achieved through such avenues as schools, churches/mosques and the media. Environmental sanitation should be made an integral part of the basic education curriculum, while institutions of higher learning such as the universities and polytechnics should be encouraged to introduce programmes on environmental management, including courses on waste management, to train qualified personnel for the sector. The fact that most Ghanaians are either Christians (68.8 percent) or Muslims (15.9 percent) (CIA, 2008) also makes religious organisations important avenues for environmental education. Municipal governments must, therefore, build partnerships with religious leaders and encourage them to educate their members on environmental sanitation and proper waste management practices such as reuse, recycling, waste prevention and proper waste disposal. This would be a practical way of actualising the popular adage that 'cleanliness is next to Godliness'. Besides, the media, including the numerous radio stations, television and newspapers should be used to raise awareness among the general public on the importance of maintaining a clean and healthy environment. The fact that many of the radio stations broadcast in Ghanaian languages provides an opportunity to reach most of the population. These measures would help address the worsening waste situations in the cities.

8.2.7. Strict enforcement of regulations on waste disposal

The study has shown that the Ghanaian public has a very poor waste handling culture which exacerbates the waste disposal problem in the country. To curtail this negative public attitude, the municipal authorities must strictly enforce existing by-laws on waste disposal including littering and fly-tipping. Once environmental education has been carried out and waste disposal services are extended to all communities including litter bins at all vantage point within the cities, there will be no excuse for persons who engage in improper waste disposal practices and the law should be made to take its course to bring any offenders to book. Prescribed penalties for waste disposal offences should include court fines, orders to clean up the streets and even imprisonment depending on the gravity of the offence committed. Such enforcement measures could change the rather poor waste disposal culture among Ghanaians.

To facilitate the enforcement of the waste disposal by-laws, however, municipalities will have to be supported to recruit enough environmental sanitation guards to monitor waste handling by the public. They will also need the support of the law-enforcing agencies such as the police and the courts to help bring offenders to book. These measures will go a long way to improve the waste disposal situation in Ghanaian cities.

8.2.8. Addressing the concerns for social and environmental justices

The study has confirmed that spatial disparities exist in environmental sanitation between rich and poor neighbourhoods in Ghanaian cities and this is because the authorities overlook the concerns for social justice in the organisation of waste management. Waste accumulation in the many low-income communities can be addressed by pursuing social justice and ensuring that all communities in the cities receive fair and adequate service for waste disposal irrespective of the socio-economic situation of the residents. The view among municipal authorities that squatter settlements are illegal, and for which reason they are denied waste disposal and other environmental services, should be reconsidered. There is the need to give recognition to and incorporate all informal settlements to make them entitled to waste disposal and other environmental services. This is because public health and the environment cannot be protected without extending basic environmental services to all localities in the cities. Municipal authorities should confront the challenge of finding innovative ways to raise additional resources to upgrade and extend environmental services more equitably across the entire jurisdictions of cities. This may include reform of the property tax system and expansion of the tax net as well as efforts to reduce corruption in the handling of public resources. The selective disposal of waste in localities of the poor and powerless also needs to be addressed to ensure that no particular group or community unduly bears the burdens of waste disposal. Waste disposal facilities should be sited at reasonable distances from settlements, away from ecologically sensitive areas and managed properly to avoid the pollution of communities and their resources.

If actively implemented by the authorities, it is hoped that the above recommendations could go a long way to improve waste management and

environmental sanitation in Ghanaian cities, thereby helping to achieve the primary objective of waste management which is to protect public health and the environment.

8.3. Reflections on the research process

Having completed the study, there is the need to reflect on the research process and to point out the strengths and limitations of the entire research. This will be done by discussing the strengths and limitations of the approach that has been used to carry out this study as well as outlining a number of areas where further research is recommended to complement the current study.

8.3.1. Strengths and limitations of the research

8.3.1.1. Strengths of the study

Among other things, the strength of this investigation lies in the triangulation of methods (interviews, questionnaires, field observation and documentary analysis) in a single study which allowed for the use of different strategies to collect data from a range of sources. For example, the use of the direct field observation technique provided me with an opportunity to obtain first hand information on the waste situation in the two cities which kept a clear picture in my mind during the analysis while the interviewing technique allowed for dialogue with key stakeholders in the waste sector to generate rich qualitative data for the analysis of the research themes. Furthermore, the use of questionnaires in the household survey enabled me to cover a reasonably large number of households in the two cities which would not have been possible with only interviews considering the limited time period and other constraints within which the fieldwork was conducted. The triangulation of methods also provided the opportunity to crosscheck the various sources of data, one from another, which greatly improved the validity of the data gathered for the study.

The study was also able to explore the issues surrounding the topic from the perspectives of different stakeholders including municipal waste departments, private sector waste companies, some public sector institutions and householders in the different socio-economic groups. This multi-source approach provided an opportunity to get a more rounded perspective on the waste disposal problem in the two cities. Finally, my familiarity with the research environment gave a further boost to the field

work conducted for the research. Apart from being familiar with the two cities which served as sites for the field investigation, my knowledge of the Ghanaian cultural context enabled me overcome many situations which would otherwise, pose constraints to the data collection process.

8.3.1.2. Limitations of the study

While the study has been successful in collecting and analysing data to address the research objectives, it is still limited in a number of ways. Generally, the factors that limited the research methodology (see section 4.13) can also be said to have affected the quality of the entire research. These include the limited time period for collecting the data due to my accident injuries, and the limited financial and logistical resources I had for the data collection exercise. As a result of these factors, the household survey was limited to a total of 590 households (450 in Accra and 140 in Sekondi-Takoradi). A larger sample would have captured the views of more residents to increase the representation of householders in the study. Another situation that reduced the number of householders to include in the study was the lack of sample frames and street maps that would have facilitated the process of selecting householders for the study. This made the process of selecting the participating communities and households cumbersome and time consuming. Even with the help of two field assistants, considerable time was spent in selecting households for the survey.

Besides, a number of relevant institutions including the National Development Planning Commission, the Ministry of Trade and Industry and the Ministry of Local Government were left out in the interviews that were conducted. With hindsight, information from these institutions could shed more light on the waste problem at the national level and augment the data that was gathered for the analysis. The interviews were also limited to a few key staff of the institutions that participated in the study such as the municipal waste departments, public institutions and the private sector waste companies. Wider involvement of the staff of these institutions including lower level administrative staff would also have given me an opportunity to hear from a much larger and representative audience for the fieldwork which, no doubt, would yield richer and more elaborate data for the research. With hindsight, furthermore, the employment of Geographic Information Systems) GIS would have been useful for

determining optimum locations for waste containers in low-income communities in the cities, the routing of waste collection trucks and siting of waste disposal facilities.

The language barrier was another factor which may have affected the quality of data gathered for the study. Even though English is the official language in Ghana, some respondents in both the household questionnaire survey and the semi-structured interviews (e.g. informal waste collectors and business operators) could not express themselves well in English. Interviews with such respondents were, therefore, conducted in the relevant Ghanaian languages and the responses recorded in English. In spite of my good knowledge of the local languages involved (namely Twi, Ga, Fante and Ahanta), the translation process could still lead to a loss of meaning of what the respondents actually said and thus affect the quality of information obtained.

8.4. Concluding remarks

The current study has shown that the issue of solid waste management has become a monster in Ghanaian cities staring the authorities in the face while they look on rather helplessly. As noted earlier, the problem largely results from the lack of political commitment to address the issue of waste management. This is reflected in government failure to resource municipal authorities to deal with the rather complex issue of waste management. Apart from the acute lack of funds and logistics for the organisation of solid waste management, municipal waste departments in the country also lack well-qualified technical personnel such as planners, engineers, administrators, accountants and researchers to tackle important issues regarding waste management. Besides, lack of the required legal strength to enforce existing by-laws on waste disposal, and to check the rather poor waste-handling attitude of the Ghanaian populace as well as the inability to enforce standards on land use and shelter development within the cities continue to frustrate the efforts of local governments in their attempts to keep the cities clean and safe. The frustrating waste problem, however, has also been caused by poor governance practices in the organisation of waste disposal. Municipal authorities in the country have failed to promote partnership with the waste-producing public and to involve them in the various aspects of waste management including needs assessment, financing, waste collection and final disposal. Besides, the authorities have failed to address the concerns for social and environmental justice in the provision of solid waste disposal services and

the final disposal of solid waste. As a result, the needs and concerns of the poor and powerless segments of the urban population have been overlooked, a situation that creates discontent and fails to secure the co-operation of sections of the urban population and thus frustrate the efforts of the authorities.

In view of the above, the solution to the growing waste problem in the cities will be for both the national and municipal governments to commit themselves to the issue of waste management. This could be done by improving the capacities of municipal governments in the areas of finance, logistics and personnel, as well as providing them with legal support to enforce regulations on waste disposal and other aspects of urban environmental management. The solution to the waste problem also lies in promoting good governance practices and addressing the concerns of social and environmental justice in the organisation of waste management. The urban poor should neither be denied waste collection services nor be made to suffer unduly, the burdens of waste disposal. Besides, the current approach to waste management which regards the waste problem as a technical issue to be solved with funds and logistics alone must give way to an integrated approach which incorporates participation, good governance, social justice and environmental justice as key element of the waste management process.

8.5. Implications for further research

The present study has examined the urban solid waste problem in Ghanaian cities focusing on the solid waste situation in Accra and Sekondi-Takoradi, the constraints to waste management efforts in the country and issues of social and environmental justice in the organisation of solid waste disposal. In the course of the study, however, a number of themes have been identified that critically affect the organisation of solid waste management but which remain under researched. These areas include appropriate strategies and technologies for solid waste management, waste management financing, the governance of waste management, urban land use and housing planning, waste stream studies for data generation, liquid waste disposal and medical waste disposal. These and other aspects of urban development critically impact the planning and organisation of solid waste management and environmental sanitation generally but are beyond the scope of the present study. Full-scale investigation in these areas is therefore recommended to create greater understanding

of urban development issues and pave the way for improved urban environmental management and sustainable urbanisation in Ghana.

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Appendix 1

Letter of introduction

Dear Sir,

REQUEST FOR INTERVIEW

I am a PhD student of the University of Nottingham carrying out a study on the solid waste situation in this city as part of my research project. As a stakeholder in the waste sector, your views are important in this study and I would be grateful if you could grant me an interview on this important topic.

I would like to assure you that the information you provide in the interview will be treated confidentially and anonymously and will be used solely for the purpose of this research.

If you are able to honour this request, please indicate (on the appointment slip unclosed) your preferred date, time and venue for the interview. Kindly return the slip in the self-addressed and stamped envelop that is enclosed.

Please find attached a copy of the interview guide for the discussion.

Thank you for your assistance.

Anthony Baabereyir

Contacts:

Phone: 0432-22268 / 0244-753 866

E-mail: lgxab3@nottingham.co.uk

Appointment for interview

Name of officer:Institution.....

Position/rank:.....Contact Tel. No:

Preferred date for interview:.....Time:.....Venue:.....

Appendix 2

Interview with officials of municipal waste departments in Accra and Sekondi-Takoradi

Name of City: Accra []

Sekondi-Takoradi []

Designation of officer granting interview.....

Professional background of officer:.....

Job history:.....

Section A: Stakeholders in waste management

1. Which institutions are involved in the organization of waste management in this city and what are their respective roles?

Institutions	Role in waste management
.....
.....
.....

2. Do you find the institutional arrangement for waste management effective?

- Yes []
- No [] Why

3. Is there adequate capacity for waste management in this city?

- Yes []
- No []

Reason for answer:.....

4. What is your own department's role in waste management?

.....

Section B: The waste situation in the city

5. How would you describe the solid waste situation in this city?

.....
.....

6. Has there been a recent study of the waste situation in this city?

- Yes [] when was this done?Who did it

- No [] why?

7. Are you able to determine the following?

- Per capita waste output in the city?
- Total daily waste output for the city?
- Rate of increase in waste output

8. Has the city's waste output been increasing in recent years?

- Yes [] what could be causing the increase?
- No []

9. Can you provide the following information about the city's waste stream?

Major components of the waste stream	% of output	Main sources
1.....
2.....
3.....
4.....
5.....

10. Has the waste mix being changing?

- Yes [] what is changing in it?
- No []

11. Have you made any projections for waste output in the next few years?

- Yes [] what are your projections?.....
- No []

12. Do you think you will be able to cope with the waste situation in the future?

- Yes [] how are you preparing for this?
- No [] why not?

13. Can you briefly describe the arrangements for solid waste collection in this city?

.....

14. Are you able to provide waste collection services in all areas of the city?

- Yes [] (proceed to Q.18)
- No [] why are you unable to do this?

15. Please indicate:

Which areas are served?	Which areas are not service?

--	--

16. What considerations influence your decisions to serve or not to serve an area?

17. How do communities without waste collection service dispose of their waste?

18. What are the arrangements for waste collection in the following areas?
 (See table)

Areas	Method of collection	Freq. of collection	Service provider
High-income areas			
Middle-income areas			
Low-income areas			
Commercial areas			
Institutional premises			

19. What considerations influence the level or quality of service to provide in an area?

20. Is littering a major problem in this city?
 • Yes [] can you please elaborate?
 • No [] (proceed to Q.22)

21. What do you consider to be the reason for littering in the city?

22. Do you have any by-law against littering/indiscriminate disposal of waste?
 • Yes [] what are its provisions?.....
 • No [] (proceed to Q.24)

23. Are you able to enforce the by-law on waste disposal?
 • Yes [] how is it enforced?
 • No [] why are you unable to enforce it?

24. Are you able to provide enough litterbins in public places?
 • Yes []
 • No [] why?.....(Proceed to Q. 27)

25. How regularly are the litterbins scheduled to be emptied?

26. Are you able to meet this schedule?

- Yes []
- No [] why not?

27. How will you describe public attitude towards waste disposal in this city?

.....

28. Do you carry out public education on waste disposal?

- Yes [] How is it done?
- No []

29. Please indicate how the following public places are cleaned

Place	Schedule for cleaning	Who does the cleaning	Are you able to meet schedule? (yes/no)
Open-air markets Lorry stations Major streets Drains and gutters Other public places			

30. Are you able to determine the quantity of solid waste collected for disposal in a day?

- Yes [] what quantity is collected daily?
- No [] why not?

31. What waste treatment/disposal facilities are operated in the city?

Type of disposal facility	Location(s)	Number operated

32. What considerations influence the siting of waste disposal facilities?

.....

33. Are all the waste disposal sites/facilities approved by the EPA?

- Yes []
- No [] how many are approved?

34. Who maintain(s) the waste disposal facilities?

35. Are you aware of any environmental problems associated with the disposal sites?

- Yes [] what are they?
- No []

36. Have communities around the disposal facilities complained of any nuisances?

- Yes [] what have they complained about?.....
- No []

Section C: Resources, private sector participation and commitment for waste management

Equipment

37. How do you acquire equipment for waste management/who provides them?

38. What equipment do you have for waste management operations?

Equipment type	No. required	No. available	No. in use

39. Are you able to adequately maintain equipment for waste management?
 • Yes []
 • No [] Why?.....

40. Do you consider your equipment adequate for your operations?
 • Yes [] (proceed to Q. 43)
 • No []

41. What is the nature of your equipment problem?/ what equipment do you lack?

42. In your view, how can the equipment problem of the waste sector be solved?

Finance

43. What are your sources of finance?

44. Are you able to acquire adequate funds for your operations?
 • Yes []
 • No []

45. What proportion of the required funds are you able to acquire?

46. Do your service clients pay waste disposal levies?

Who pay(s)?	Rate	Who do not pay and why?

47. Are there any potential sources where you could generate additional funds?

- Yes []

Potential sources	Why are these source not being exploited at the moment?

48. In your view, what could be the solution to the finance problem of the waste sector?

49. Have you received any donor support for waste management in recent years?

Name of donor/organization	Support received (type or amount)	Year

Personnel

50. What categories of staff are employed in the waste department?

Category of staff	No. employed	Are they enough?

51. Is it easy to attract staff to the waste sector?

- Yes []
- No [] Why?

52. Do you have any programmes for staff training?

- Yes [] In what aspect of waste mgt?.....

- No [] why? (proceed to Q53)

Land

53. Are you able to secure enough suitable land for the siting of waste disposal facilities?

- Yes [] (proceed to Q. 55)
- No [] why?.....

54. How do you respond to the problem of land shortage for waste disposal?

.....

55. What do you consider to be the major constraints to waste management in your city?

Constraint	What causes the constraint?	How can it be addressed?

Private sector participation

56. Is the private sector involved in waste management in this city?

- Yes []
- No [] But what role could they play?.....(proceed to Q.66)

57. Can you elaborate?

Nature of private sector involvement (e.g. contracts, franchises)	Aspects of waste management handled by private sector (e.g. collection, recycling, site maintenance)

58. When did private sector involvement start in this city?

59. What prompted the involvement of the private sector in waste management?

.....

60. How many private companies participate in waste management in this city?

61. Which sectors of the city are covered by private sector operations?
(e.g., whole city, residential sector, commercial sector, industrial sector)

.....

62. How are contracts/franchises awarded to private sector participants?

.....
63. What conditions do companies have to meet to qualify for a contract/franchise?
.....

64. Do you have the need to engage more private companies?
• Yes [] how many more?Why haven't you done so?
• No []

65. How would you describe the performance of the private waste companies?
.....

Commitment for waste management

66. Would you say there is adequate commitment to waste management in this city?
• Yes [] How is this shown?.....
• No [] Why?

67. What do you consider to be the cause of the waste problem in this city?
.....

68. How can waste management be improved in this city?
.....
.....

69. Would you like to make any other comments or ask questions in relation to this discussion?
.....
.....
.....
.....

Thank you for your time and assistance

Appendix 3

Interview with private waste companies

City: Accra [] Sekondi-Takoradi []

Name of company

Designation of officer interviewed:

What has been your employment history?.....

1. When was your waste company started?

2. Is the company a local or foreign one? Local [] Foreign []

3. What motivated you into the waste business?

4. Do you have a standing contract with the city waste department?

- Yes [] what is the duration of this contract?
- No []*

5. What is the procedure for getting a contract?

.....

6. Would you say the contract procedure is transparent and fair?

- Yes []
- No [] why?

7. Did you have to meet any conditions to get a contract? (E.g. possession of equipment etc)

.....
.....

8. Which parts of the city fall within your contract area?

.....

9. What exactly do you do? (E.g. waste collection, management of disposal sites)

.....
.....

10. Would you be able to handle a larger contract than you currently do?

- Yes []. How much more? (e.g. 2x or 3x more)
- No []. Why not?.....

11. What categories of staff work in your company? (e.g. engineers, health inspectors, labourers)

Category of staff	No. employed	No. required

12. Do you find it easy to attract and retain staff?

- Yes []
- No [] why not?

13. What equipment do you have for your contract operations?

Equipment type	No. available	No. operational	No. Required

14. Do you consider your equipment adequate for your contract work?

- Yes []
- No []

15. How do you acquire your equipment?

.....

16. What are your sources of finance?

.....

17. Are you able to mobilize adequate finance to cover your operational costs?

- Yes []
- No []

18. Who are your service clients?

.....

19. What type of service do you provide and how do you charge your clients?

Category of client	Type of service	Frequency of service	Service charges

20. How do you hope to improve your finances?

.....
.....

21. How much waste are you able to collect in a day?kg/.tonnes.

22. Where do you dispose of the waste you collect?

23. Is the disposal site approved by the EPA?

- Yes it is []
- No it isn't []
- Don't know []

24. How is waste treated at the disposal site? (e.g. incinerated, land filled, recycled)

.....

25. Who manages the disposal site?

26. How would you describe environmental conditions at the disposal site?.....

27. Do you know of any environmental problems associated with the disposal site?

- Yes [] what are these problems?
- No []

28. Are you charged for waste disposal at the site?

- Yes [] How are you charged?
- No []

29. Do you have any problems in the operation of your contract/franchise?

- Yes [] What are they?
- No []*

30. How do these constraints/problems affect your operations?

.....
.....

31. What is your own impression about the waste situation in this city?

.....

32. What are the reasons for the current waste crisis in this city?

.....

33. In your view, how can waste management be improved in this city?

.....
.....

34. Would you like make any further comments or ask any questions in relation to this discussion?

.....
.....

Thank you for your time and assistance.

Appendix 4

Interview with official of some public institutions in the urban sector

Name of City: Accra [] Sekondi-Takoradi []

Designation of officer interviewed:.....

Professional background of officer.....

Job history:.....

1. When was your office/department established in this city?

.....

2. What is the mandate of your office/department?

.....

3. Are you adequately resourced to discharge your functions with regard to funds, logistics and personnel?

- Yes []
- No [] what do you lack?

.....

4. How do your functions affect waste management in this city?

.....
.....

Specific to EPA

5. Do you regulate the siting and maintenance of waste disposal facilities?

- Yes []
- No []

6. Are you able to enforce the regulations on waste disposal?

.....
.....

7. What considerations qualify a place as site for a waste disposal facility?

.....
.....

8. Have you approved the siting of any waste disposal facilities in this city?

- Yes [] which ones have you approved?.....
- No [] why:

9. Are you satisfied with the maintenance of waste disposal facilities in this city?
- Yes []
 - No [] why?.....

Specific to T&CPD and LC

10. Is your department involved in the siting of waste disposal facilities?
- Yes [] How are you involved?
 - No [] (stop interview)

11. What factors do you consider when siting a waste disposal facility?

12. Do the existing waste disposal facilities meet the siting requirement?
- Yes []
 - No []

Specific to DfUR

13. Which parts of the city do you consider to have:
- Good roads?:.....
 - Bad roads?:.....

14. Why is the road quality poor in some parts of the city?

15. How does road quality affect the organization of waste management in the city?

All Institutions

16. What do you consider to be the cause of the poor solid waste situation in this city?

17. Would you like to make any further comments or ask a question with regard to what we have just discussed?

Appendix 5

Interview with private waste collectors

City: Accra [] Sekondi-Takoradi []

1. How long have you worked as a waste collector?(years/months)

2. What equipment/tools do you work with?
.....

3. Who are your clients and how do you charge for your service

Clients	How often do you collect their waste?	How do you charge?

4. Where do you dispose of the waste you collect from your clients?.....

5. Are you charged where you dispose of your collection?

- Yes [] How much do you pay?How often do you pay?
Who do you pay to?.....(proceed to Q. 7)
- No []

6. Will you be willing to pay if asked to?

- Yes [] why will you?
- No [] why not?

7. About how much do you earn on a working day? GH¢.....

8. Would you like to be employed by the city waste department to do this same work?

- Yes, I would [] why?
- No, I wouldn't [] why not?

9. Are you a native of this city?

- Yes []
- No [] where do you originally come from?.....

10. What motivated you into this work?

11. Do you have anything else to say about your work or a question to ask with regard to this discussion?

.....
.....

Thank you for your time and assistance

Appendix 6

Interview with residents of communities around waste disposal facilities

City: Accra [] Sekondi-Takoradi []

Name of suburb:

1. How long have you lived in this community?

3. What do you consider to be the major problems affecting this community?
.....
.....

4. Do you have any concerns about the siting and maintenance of the waste disposal facility in your community?
• Yes [] what are your concerns?
• No []

5. Does the waste disposal facility pose any nuisance to the residents of this community?
• Yes [] what nuisance(s) does it cause?
• No [] (**go to 13**)

7. How does the nuisance(s) affect the community?
.....
.....

8. As residents, have you collectively complained about conditions at the facility to the municipal authorities or the EPA?
• Yes []
• No [] why?.....

10. What was the complaint about?
.....

11. How did the authorities respond to your concerns?
.....
.....

12. What do you think should be done about the waste disposal facility?
.....

13. Do you have any other comments or questions with regard to what we have discussed?

.....
.....
Thank you for your time and assistance

Appendix 7

Interview with staff at waste disposal facilities

City: Accra [] Sekondi-Takoradi []

1. When did waste disposal start at this facility?
2. Which agency is responsible for maintenance of the disposal site?.....
3. Who bring waste here for disposal?
4. About how much waste is brought here in a day?
5. What types of waste are brought here? (e.g. household, commercial)
.....
6. What do you do with the waste you receive? (e.g. composting, recycling, land filling)
.....

7. What equipment do you have here for operations? (Use table)

Equipment type	Number required	Number available	Number operational

8. Do you consider the equipment adequate for your operations?
 - Yes []
 - No []

9. How many people work at this facility? (Use table)

Categories of staff	No. required at site	No. employed at site

10. Do you charge those who bring waste here for disposal?
 - Yes []
 - No [] why not?.....(proceed to Q.14).

11. How do you charge them/ how do you determine the charge? (e.g. by weight or per trip)

.....

12. Do you consider environmental conditions at the facility to be satisfactory?

- Yes []
- No [] why not?

13. Do you know of any nuisances or environmental problems associated with this facility?

- Yes [] what are they?
- No []

14. Have residents of the host communities ever complained of any nuisance from the facilities?

- Yes [] what about?
- No []

15. How do you respond to their complaints?

.....
.....

16. Do you have any problems or difficulties in managing this facility?

- Yes [] what are they?.....
- No []

17. Do you have any further comments or questions regarding this discussion?

.....
.....

Thank you for your time and assistance

3. In the table below, please indicate with a tick (√) the type of waste collection service available to your household.

Waste collection service	(√)	Question to proceed to
Home collection		
Roadside collection		
Truck visit		
Communal container		Proceed to Q. 6
Waste dump		Proceed to Q. 10
Other (Please indicate).....		Proceed to Q. 14

4. In the table below, please indicate your service provider and frequency of the service.

Service provider	Frequency of service

5. Is your service provider able to keep to the agreed schedule for waste collection?

- Yes []
- No [] What do you do with your waste then?

.....

Proceed to Q.17

6. Is the waste container close to your home or other homes in the neighbourhood?

- Yes [] how close?(e.g. distance in meters)
- No []

7. Is the waste container emptied regularly?

- Yes [] how regularly is it emptied?.....
- No [] Do you know why?
 - Yes [] state reason:.....
 - No []

8. How will you describe the sanitation situation around the waste container?

- Very satisfactory []
- Satisfactory []
- Poor []
- Very poor []

9. Do you suffer any nuisance from the waste container site?

- Yes what do you suffer from?.....
- No

Proceed to Q.17

10. Is the waste dump close to your home or other homes?

- Yes how close is it to the nearest homes?.....(e.g. distance in meters)
- No

11. Is the waste dump maintained (e.g. is the waste regularly removed or burned)

- Yes who maintains it?
- No

12. Do you suffer any nuisance associated with the waste dump?

- Yes what do you suffer from?.....
- No

13. How will you describe the sanitation situation at the waste dump?

- Very satisfactory
- Satisfactory
- Poor
- Very poor

Proceed to Q.17

14. Please indicate how you dispose of your waste

- Burning
- In the bush/ roadside/ drain specify:.....
- Burying
- Other method specify:.....

15. Why do you dispose of your waste by this method?

- I have no waste collection service
- I cannot afford service fee
- Other reason (please indicate)

16. Do you know of any environmental problems associated with your method of waste disposal?

- Yes what are they?.....
- No

17. Do you find your waste disposal arrangement convenient?

- Yes
- No . Why is it not convenient?.....

18. How will you describe the general waste situation in your neighbourhood?

- Very satisfactory
- Satisfactory

- Poor []
- Very poor []

19. Do you pay for your waste disposal service?

- Yes. []
- No. [] Are you willing to pay for your waste disposal service?
 - Yes [] why? (Go to Q.21)
 - No [] why? (Go to Q. 21)

20. In the table below, please indicate how you pay for your waste collection service

How often do you pay?	How much do you pay?	Who do you pay to?	Is it affordable?

Proceed to Q.23

21. Are willing to pay for waste disposal services?

- Yes []
- No []

22. How much are you willing to pay each month for the following types of service?

Weekly home collection	Weekly roadside collection	Regular block or communal container service
GHC	GHC	GHC

23. Do you think all households/businesses in this city should pay for waste disposal?

- Yes [] why do you think so?.....
- No [] Why do you think so?.....
 - Who should pay?.....
 - Who should not pay?

24. How will you describe the quality of waste disposal service you receive?

- Very satisfactory []
- Satisfactory []
- Poor []
- Very poor []

25. Do you and your neighbours ever discuss the waste situation in this neighbourhood?

- Yes [] what have you?
- No [] why don't you?

26. In you were to compare with other communities or suburbs in this city, would you say your community receives a fair share of resources for waste disposal?

- Yes []

- No []. Why?.....

27. How would you rank environmental sanitation in your community in relation to others in the city?

- One of the cleanest neighbourhoods
- Averagely clean
- Dirty
- One of the dirtiest communities in the city

28. In your view, how can waste disposal be improved in your community?

.....

29. Would you like to ask any question or make some further comments with regard to what we have just discussed?

.....

30. What is the highest educational attainment of your household head?

- Tertiary (University/Polytechnic) []
- Secondary (College, SSCE) []
- Primary []
- No formal education []

31. What is the employment status of your household head?

- Employed []
- Self-employed []
- Unemployed []

Thank you for your time and assistance

Appendix 9

Semi-structured questionnaire for businesses and institutions

CITY: Accra [] Takoradi []

1. Name of business/institution: Location:.....
2. About how much waste do you generate in a day? (in kg or other measure:)
3. What are the major items of waste you commonly generate?
.....
4. Do you have a waste collection service?
 - Yes []
 - No [] (proceed to Q.12)
6. Who is your waste collection service provider?
7. How often is your waste collected by your service provider?
8. Do you find your waste collection service satisfactory?
 - Yes []
 - No [] Why not?.....
9. How do you store your waste before collection/disposal?.....
10. Do you pay for your waste collection service?
 - Yes []
 - No []
11. How much do you pay? How often do you pay?.....
12. How do you dispose of your waste?
13. Do you need a waste collection service?
 - Yes []
 - No [] why?(proceed to Q. 21)
14. How regularly will you want such a service?
15. Will you be willing to pay for the waste collection service if it is provided?
 - Yes []
 - No [] why not?(go to 20).
26. How much will you be willing to pay for the service?.....(refer Q.14).
21. Are you happy with the waste situation in your surroundings?
 - Yes []
 - No [] Why not?.....
22. In your view, how can waste disposal be improved in this city?

.....
.....
23. Do you have any further comments or questions regarding this discussion?
.....
.....
.....

Thank you for your time and assistance

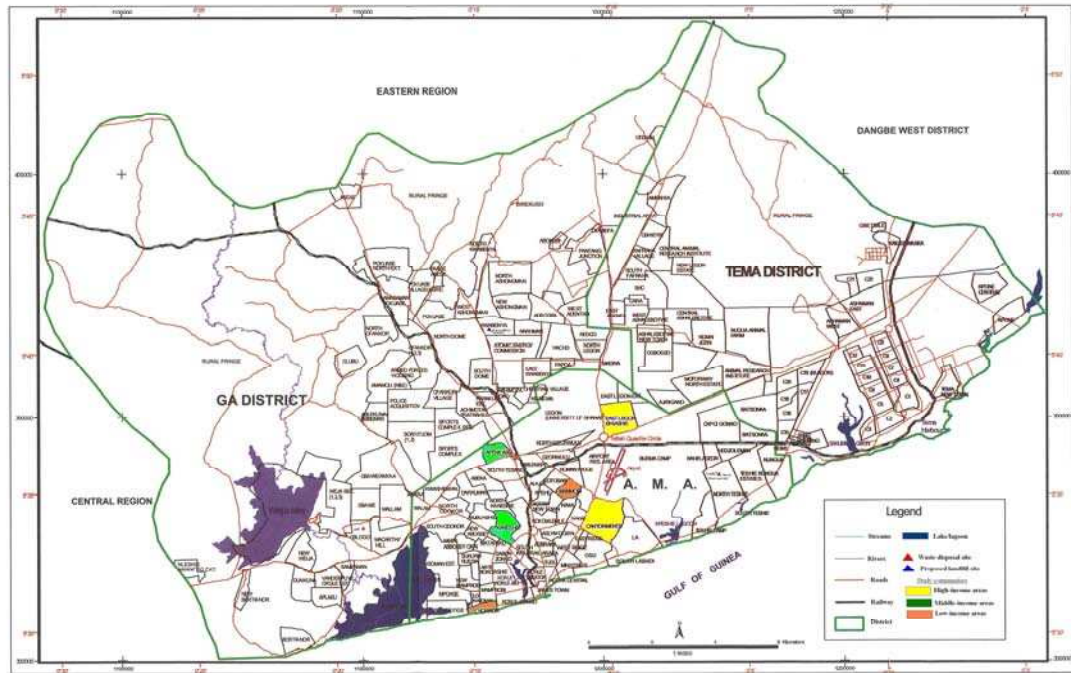
Appendix 10

Ghana: Location of study areas



Appendix 11

The Greater Accra Metropolitan Area (GAMA): Location of study communities and waste disposal facilities



Source: Adapted from Songsore *et al.*, 2005.