UNIVERSITY OF CAPE COAST

RESIDENTS' PERCEPTIONS AND ATTITUDES TOWARDS URBAN SOLID WASTE MANAGEMENT IN THE BEREKUM MUNICIPALITY

RICHARD AGYAPONG

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RICHARD AGYAPONG

DISSERTATION SUBMITTED TO THE INSTITUTE FOR DEVELOPMENT STUDIES OF THE FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF CAPE COAST, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF MASTER OF ARTS DEGREE IN ENVIRONMENTAL MANAGEMENT AND POLICY.

2012

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Name: Richard Agyapong

Signature..... Date.....

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Name: Dr. Oheneba Akyeampong

Signature..... Date.....

ABSTRACT

Solid waste management has become a daunting task for local government authorities who seem to lack the capability to deal with the escalating waste situation. Meanwhile, the design and implementation of municipal solid waste management systems require adequate analysis of existing behaviour patterns of key stakeholders, including their attitudes, perceptions, and values. The study therefore sought to investigate residents' perceptions and attitudes towards urban solid waste management in the Berekum Municipality in the Brong Ahafo Region of Ghana.

Questionnaires for the study were administered to 150 randomly selected households in the Berekum Municipality. The study found that residents recognized solid waste management as a major problem confronting the municipality and expected it to deteriorate further in the near future. They attributed this menace to inadequate provision of waste bins and the habit of indiscriminate dumping by residents. It was also found that residents did not currently pay for waste management services rendered to them. They however expressed willingness to pay for improved waste management services. The study therefore recommends adequate supply of containers, intensive public education and enforcement of by-laws on solid waste management, and introduction of user fees for waste management services.

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DEDICATION

This work is dedicated to my twin sons Godson Oheneba Agyapong and Samuel Oheneba Agyapong.

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LIST OF ACRONYMS

MSW	Municipal Solid Waste
NIMBY	Not-In-My-Backyard
OECD	Organisation for Economic Co-operation and Development
SPSS	Statistical Product and Service Solutions
UK	United Kingdom
UNEP	United Nations Environment Programme
USPS	United Nations Postal Service
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

Background to the Study

Waste generation and disposal have accompanied human life since time immemorial. Municipal solid waste collection and disposal are problematic throughout the world. As a result, most city governments are confronted by mounting problems regarding the collection and disposal of solid waste (Raj, 2000). For example, in March 1987, a barge laden with 3,200 tonnes of garbage set out from Islip, New York, in search of a dump. The refuse had been turned away from a landfill in Islip. The barge travelled 10,000 kilometres and stopped at several foreign ports, but found none of them willing to accept its noxious load. The three-month odyssey took the barge to Mexico, Belize, the Bahamas before it returned still fully loaded to New York. The content of the barge was eventually disposed of in high seas. The futile voyage made headlines, giving many North Americans their first inkling of an impending crisis (www.experts.about.com).

Mexico City, the largest city in the world generates some 10,000 tonnes of trash each day. Until recently, most of these torrents of waste were left in giant piles exposed to the wind and rain, as well as rats, flies and other vermin (Pacione, 2005). Manila in the Philippines has at least ten huge open dumps; the most notorious is called "Smokey Mountain" because of the constant smouldering flies. Before the 20thcentury, many cities in Europe drowned in a sea of garbage

with most of their municipal solid waste being dumped into rivers and open sewers. In the United Kingdom, municipal waste services were then poor as rivers like the Rhine and Thames were heavily polluted with waste, they were nothing more than open sewers and also major sources of infectious diseases (Girling, 2005). In the same, way in the United States of America, particularly in California, many local government units and private vendors do not currently have a safe location for the disposal of street waste. Moreover, in many parts of the world, there is no suitable land available for new landfills for the disposal of municipal solid waste. The problems with solid waste disposal have therefore increased dramatically over the past several decades because of population increase. Consequently, ineffective management of urban solid waste result in environmental problems (Elliot, 2005).

In Africa, the situation is not different in that, recent studies have shown that the problem of waste management has become intractable and threatens to undermine the efforts of most city authorities. The city environment of most developing countries is characterised by heaps of garbage, overflowing waste containers, chocked drains, clogged streams and stinking gutters. For example, research suggests that the majority of inhabitants of Nairobi, Kenya had no regard for its beauty and appear to be able to live helplessly amidst a growing mountain of urban waste (Mwanthi & Nyabola, 1997). As a result, sanitary and environmental conditions are deplorable. It is significant to also note that studies in Bamako (Mali) and Ouagadougou (Burkina Faso) have shown that approximately 0.6 to 0.7 kilograms of waste are generated per person per day in

such cities. This amount represents an estimated 600 and 700 tonnes per day for a city population of about one million (Eaton & Hilhorst, 2003). Today, municipal solid waste collection and disposal are particularly problematic in cities in the developing countries. Local governments are usually responsible for the management of solid waste; from the initial phase of waste collection, through transport and treatment to disposal of waste.

Third world cities are faced with an inability to manage solid waste from the point of generation to the point of disposal, thereby transforming these cities into so-called 'garbage' cities (Girling, 2005). The urban solid waste management problem has been linked to rapid urbanization in Africa. With increasing industrialisation and urbanisation, generation of waste now outstrips safe disposal rate especially in most cities in Africa. It is believed that the greater the society's population and material wealth, the greater the amount and variety of waste generated. Thus, as population grows, income rises, and consumption patterns change, the volume of disposable materials continues to rise.

In high-income countries, the problems usually centre on the difficulties and high cost of disposing the large volume of waste generated by households and businesses. On the other hand, in low-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 (Raj, 2000). The reasons for solid waste management problems in Africa include financial difficulties and limitations that lead to a lack of adequate operational budgets, and subsequent lack of technical expertise for solid waste management, planning and operation.

The poor attitudes and perceptions of people towards solid waste have affected the capacity to maintain infrastructure to collect and treat solid waste. General lack of involvement, public awareness and information amongst inhabitants about the importance of proper urban waste management seem to be the main reasons for widespread littering of solid waste in urban places in Africa.

Solid waste management is increasingly becoming a challenge to authorities in most cities and towns in Ghana. This is in view of the fact that human activities produce large volumes of solid waste and so waste disposal constitutes a serious problem, in such places today. Solid waste can take a variety of forms and is generated from a wide range of sources during diverse social, economic and industrial activities. The generation of solid waste is a serious problem in major urban centres in the country. For example, cities like Accra, Kumasi, Takoradi and Tema have grappled with solid waste problems over the years. Accra, the capital city, and Kumasi the second city, generate over 3,000 tonnes of solid waste daily yet, only about 10 percent of the solid waste generated is collected.

For instance, in virtually every urban centre in Ghana, from regional capitals to municipal through district centres and small towns, many people live in neighbourhoods with little or no provision of infrastructure, services and facilities that are essential for good health (Songsore, 2004). Towns are experiencing solid waste management problems largely because of rapid urbanization. Government and municipal assemblies lack the capacity in terms of financial, logistical and human resources to cope with the waste situation. The urban waste crisis can also

be attributed to the lack of political commitment to urban environmental management and environmental injustices being perpetrated against the poor in the delivery of waste collection services and the siting of waste disposal facilities. In the same way, attitudes and perceptions of people within a geographical area towards waste management can also compound the waste management problem in that particular area. Some Ghanaians have a very poor attitude towards environmental sanitation in general, and waste disposal in particular. People are fond of discarding waste indiscriminately. For example, *The Crusading Guide and the Daily Graphic* on August 22nd, 2007 and May 19th, 2008 respectively, commented on the poor waste handling attitude of some Ghanaians. A casual observation in any Ghanaian city will show how pedestrians, motorists, traders, and passengers litter the streets and other public spaces. This translates into the production of very large amounts of solid waste within a concentrated area; hence many urban residents live in unhealthy and life- threatening conditions.

The situation in the Berekum Municipality is not different from other towns and cities in Ghana. There are visible solid waste problems such as accumulation of garbage, waste-clogged drains and water bodies, heavy street litter, and stinking gutters (Plate 1). When it rains, heaps of polythene bags, empty water sachets, and other waste materials can be found all over the streets and backyards of houses. This situation is as a result of the fact that people dump waste into gutters waiting for rain water to convey it. Uncollected waste matter is also found in the streets and around houses resulting in pollution in the municipality.

(a) Roadside waste accumulation in Berekum

(b) Waste dump site near residence

Plate 1: Present day solid waste situation in the Berekum Municipality

Source: Fieldwork, 2011

Statement of problem

The concentration of population and business activities in Ghanaian cities is accompanied by a rapid increase in the volume of solid waste generated through production and consumption activities (Pacione, 2005). Against this background of mounting waste generation, municipal authorities in the country seem unable to provide adequate collection and safe disposal of waste within their jurisdiction. As a result, urban centres in the country are saddled with solid waste management problem which has proven to be intractable and threaten public health and the environment. Municipal solid waste poses a lot of problems to the

environment and human health (Girling, 2005). The Berekum Municipality is faced with solid waste management problems. Some efforts to mitigate these problems include the Urban III project under which the government provided funds for waste-related activities. Other efforts were the provision of waste collection bins, waste receptacles and communal clean-up exercises by residents and organizations such as churches in the municipality, to improve sanitation. Notwithstanding these efforts put in place to manage urban solid waste, the situation continues to pose challenges to city authorities.

Studies on waste management have shown that attitudes and perceptions influence how people deal with waste (Kendie, 1998; Agbola, 1993). For example, Kendie (1998) also argues that population pressure and lack of funding are nothing but convenient excuses used by authorities to justify low investment in the provision of waste disposal facilities. He stresses that the upsurge in waste disposal problems stems from the fact that "attitudes and perceptions towards wastes and the rating of waste disposal issues in peoples' minds and in the scheme of official development plans have not been adequately considered" (p.4). For example, uncollected solid waste can be found in the streets, gutters, and other open spaces in the municipality (see Plate 1). In the light of the above exposition this study sought to examine residents' perceptions and attitudes towards solid waste management in the Berekum Municipality.

Objectives of the study

The main objective of this study was to examine residents' perceptions and attitudes towards solid waste management problem in the Berekum Municipality.

Specifically, the study sought to:

(a) Examine residents' solid waste management practices;

(b) Assess residents' perceptions and attitudes towards waste management problems;

(c) Evaluate residents' willingness to pay for improved waste management services.

Research questions

The following research questions guided the study:

(a) What are the residents' waste management practices in the Berekum Municipality?

(b) What is the nature of residents' perceptions and attitudes towards waste management?

(c) Are residents' willing to pay for improved waste management services?

Significance of the Study

The study was expected to produce outcomes which will inform the inhabitants of Berekum Municipality about the importance of proper waste management to the development of the area. It would also provide the Municipal

Assembly and the traditional council with the necessary data on residents' attitudes towards solid waste management in the municipality so that they would in turn design appropriate policies and educational campaigns towards waste management in the Municipality. Finally, the study will add to existing literature on urban waste management and will also serve as a source of reference for future studies into issues related to solid waste management.

Scope of the study

The study was restricted to the Berekum Municipality and focused on solid waste as well as stakeholders involved in managing it. Other forms of wastes such as liquid were not covered. The constraints of time and logistics prevented a wider coverage in terms of the Brong Ahafo Region and research subjects. Thus, the study concentrated on seven communities from the Berekum Township and 153 respondents, where a detailed investigation was conducted to ensure that many of the key issues that border on solid waste management were brought to light. Hence, institutions and companies that are not engaged in solid waste management did not form part of this study.

Chapter Organisation

The study is organised into five chapters. Chapter One presents the introduction, background to the study, problem statement, objectives of the study, research questions, and the significance of the study. Chapter Two reviews literature on waste characteristics, solid waste management practices, perceptions, attitudes and waste management, willingness-to-pay, challenges of waste

management and the conceptual framework. Chapter Three covers the methodology which included the research design, the target population, the sample and sampling technique, the research instruments, administration of the instruments and data analysis. Chapter Four deals with the results and discussions, while Chapter Five looks at the summary, conclusion and recommendations from the study.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter aims at reviewing some of the related works done by researchers, educationists, organisations and committees on the management of solid waste. The chapter, reviews literature on the following themes: waste characteristics; solid waste management practices; perceptions, attitudes and waste management; willingness-to-pay; challenges of waste management, and the conceptual framework.

Defining waste

The concise definition of the term waste is quite rare in the scholarly literature even though much has been written about the waste management problem. The *Longman Dictionary of Contemporary English* (2008: 1612) defines waste as "the unwanted material or substance that is left after you have used something", whilst the *New Shorter Oxford English Dictionary on Historical Principles* defines it as "the unusable material left over from process of manufacturing, the use of consumer goods etc, or the useless by-products of a process". Waste encompasses those activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal (Momoh & Oladebeye, 2010). Omane (2003) defines waste as any

material considered to be no longer useful and which may be dumped and thrown away. Omane (2003) further explains that solid waste refers mainly to domestic waste (waste from food processing at home, and discarded household items), municipal waste (waste generated in commercial centres), and industrial waste (wood waste, waste from abattoir, food processing industries, and metal scraps from garages). This notion that waste emanates from numerous sources is corroborated by Davies (2008:5) who noted that waste is the unwanted or unusable materials that emanate from numerous sources; industries and agriculture as well as business and households, and can be liquid, solid or gaseous in nature, and hazardous or non-hazardous depending on its location and concentration. Davies (2008) further notes that what some people consider to be waste materials or substances are considered a source of value by others. Illustrating from the views expressed by Palmer (2005), the definition cannot be applicable in a developing country like Ghana. Hence the definition of solid waste to be used for this study is any substance released to the environment because it is unwanted and can have negative consequences or be a nuisance in the environment.

Waste characteristics

Municipal solid waste differs from country to country in terms of both quantity and quality hence, there is a significant variation of municipal solid waste between a developing country (low income), transitional country (middle income), and a developed country (high income) (Cointreau, 2002). Waste

characteristics vary according to season, income level, population, social behaviour, climate and industrial production, the size of markets for waste materials, the extent of urbanisation and effectiveness of recycling. Cointreau (2002) explains that income and economic growth also have impact on the composition of waste, in that high-income earners consume more packaged products which result in a higher percentage of inorganic materials such as metals, plastics, glass and textiles. A number of criteria are usually employed to characterise solid waste. These include their sources, physical state, material composition and the level of risk associated with waste substances (Davies, 2008). Davies further categorised solid waste into three main groups namely; municipal waste, industrial waste and hazardous waste. But for the purpose of this paper, interest is on non-hazardous municipal solid waste.

Non-hazardous waste does not pose a danger and can be dealt with easily; examples include uncontaminated earth and excavated waste such as bricks, sand, general and concrete slates (UK Environment Council, 2000). All non-hazardous solid waste from a community that requires collection and transport to a processing or disposal site is called refuse or municipal solid waste. Refuse includes garbage and rubbish. Garbage is mostly decomposable food waste but rubbish is mostly dry materials such as glass, paper, cloth, and wood. Cointreau (2002) considers municipal solid waste as including household refuse, non-hazardous solid waste from commercial products and industry, refuse from institutions (including non-pathogenic waste from hospitals), market waste, yard waste and street sweeping. The sources of waste such as residential, commercial,

industrial, municipal services, construction and demolition, and agriculture are based on the fact that waste emanates from different sectors of society (World Bank, 2000). The UK Environment Council (2000) also employed source classification to identify the major sources of waste as municipal sources, commerce and industry, agricultural sources, demolishing, 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.

Moreover, the characteristics of municipal solid waste can further be divided into different categories such as its physical properties. Using the physical state of waste substances, solid waste consists of food waste, paper, plastic, metal and debris. Classifying municipal solid waste into types results in biodegradable and non-biodegradable; 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 (Lapidos, 2007). This type of waste is commonly found in municipal solid waste such as food waste, yard waste and paper. Biodegradable waste materials include human excreta, animal droppings, sewage and slaughter waste. In contrast with biodegradable waste, non-degradable waste, which includes most plastic, metal and ceramics, are waste substances that cannot be broken down by natural processes or living organisms (Lapidos, 2007). Frequently, the material composition of the waste stream is also used to classify waste. An example of

waste classification based on material composition was conducted by the Surrey County, UK in 2002/2003. It explains that the material composition of municipal solid waste depends on the geographical area, the standard of living and economic status of the country, climatic conditions and the type of energy used. Law (2002) sees municipal waste composition as glass, metal waste, plastic, paper and general wet and dry kitchen and household waste. The characteristics of waste discussed above are very important for waste management planning. Such characteristics of waste provide a basis for the development of appropriate waste management practices. Among other things, it provides useful information that enables municipal authorities to organise waste management operations, including the frequency and means of collection and appropriate disposal methods. Developed countries have made great advances in waste data generation and analysis which have enabled them to improve waste management over the years. If quantities generated and composition of the waste stream are lacking, it makes it difficult to organise waste management effectively (Hardoy, 2007).

Solid waste management practices

Waste management is the collection, transportation, processing, recycling or disposal, and monitoring of solid waste material. Municipal solid waste management (MSW) is a complex and multi-disciplinary task, involving a number of impact factors such as economic, technical, environmental and political issues (Chang & Chang, 2001; Chang & Davila, 2007). Many of these factors pose multi-period, multi-layer and multi-objective features that are associated

with uncertainties (Huang, Chan & Zhang, 2008; Nie, 2007). Thus, sound waste management practices regarding economic development, environmental impact, resource conservation and even political consideration are essential for planning municipal waste management. The collection of waste is regarded as the crucial first step in the chain of waste management; it is the labour-intensive phase, and also the most expensive one in the waste management process (Raj, 2000). The solid waste management practice usually relates to materials produced by human activity, and is generally undertaken to reduce their effects on health, the environment or aesthetics. Gbekor (2003) referred to waste management as involving the collection, transportation, treatment, disposal and care for disposal sites. MSW management has evolved from the primary concerns of environmental health protection to encompass human safety, resource conservation and the reduction of, as much as possible, the environmental burdens of waste management (energy consumption, pollution of air, land and water and loss of amenity (McDougall & Hruska, 2001).

It is important to minimise natural resource extraction and consumption by recycling waste materials and conduct waste management effectively in order to curtail the environmental impact of waste disposal and protect ecosystem services for both current and future generations (Millenium Assessment Report, 2005). Improper solid waste disposal has consequences on the health of the general public even though waste generation is mostly a function of individual, social and economic behaviour (Bernstein, 2004; Sood, 2004). According to Girling (2005), the best way to achieve sustainable waste management is to reduce the amount of

waste we produce. Besides where waste is unavoidable, we can encourage re-use and recycling of products to prevent them from getting into the waste stream. But where waste prevention or reduction, re-use, and recycling are economically impossible, waste can be processed to recover energy. Girling (2005:178) subsequently formulated a waste hierarchy model and described it 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". The elements that are most commonly associated with integrated solid waste management are prevention, waste reduction, minimization, re-use of materials and products, material recovery from waste streams, recycling of materials, composting to produce manure, incineration with energy recovery and disposal in landfills in that order of priority (Durban County Council, 2007).

As shown in Figure 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 in the first place and, where this is not possible, 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. According to Girling (2005), the waste hierarchy is a useful guiding principle for waste management planning. Integrated 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 realise that an integrated approach which constantly strives to move up the waste hierarchy can be a useful tool for sustainable waste management

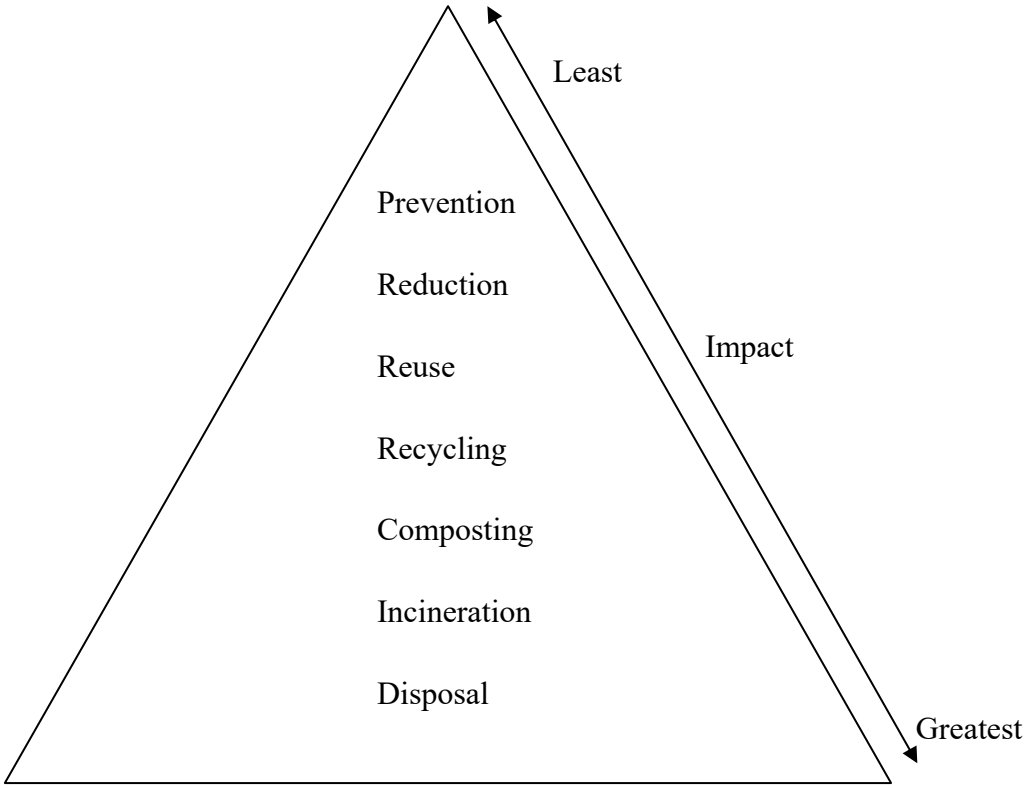

Figure 1: The waste hierarchy

Source: Girling (2005)

The concept of integrated waste management, according to McDougall & Hruska (2001), takes an overall approach and manages waste in an environmentally effective, economically affordable and socially acceptable way. The waste management hierarchy provides a broader look at waste management. The section that follows discusses the elements in the waste management hierarchy with emphasis on their application to solid waste management.

Prevention

According to the United Nations Environment Programme (UNEP) (2009), in 2006, the total amount of MSW generated globally reached 2.02 billion

tones, representing a 7 percent annual increase since 2003. It further estimated that between 2007 and 2011, global generation of municipal waste would rise by 37.3 percent, equivalent to roughly 8 percent increase per year (UNEP, 2009). It is, therefore, prudent to cut down on production and consumption in order to prevent accumulation of urban solid waste.

Reduction

To reduce waste problems in future, reduction in waste generation would be the most important factor (USPS, 2000). Examples of possible reduction at the consumption level include reuse of containers (including bags), better buying habits, and cutting down on the use of disposable products and packaging (USPS, 2000). It also reviews reduction as any action that reduces the volume or toxicity of solid waste prior to its processing and disposal in incinerators or landfills.

Reuse

Reuse is using an item more than once. This includes conventional reuse where the item is used again for the same purpose or function; and new-life reuse where an item is used for a new function.

Recycling

Recycling in the context of solid waste may be defined as the reclamation of material and its reuse which could include repair, re-manufacture and conversion of materials, parts and products (Momoh & Oladebeye, 2010). Recycling has been viewed as a veritable tool in minimizing the amount of household solid waste that enters the dump sites. It also provides the needed raw

materials for industries. According to Momoh & Oladebeye (2010), it has been established that, recycling is the best, efficient and effective method of solid waste management system. It has been shown that with appropriate segregation and recycling systems, significant quantity of waste can be diverted from landfills and converted into resources (UNEP, 2009).

Composting

UNEP (2009) defines composting as a biological decomposition of biodegradable solid waste under controlled, predominantly aerobic, conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in agriculture. Composting makes economic and environmental sense, and recycles up to 40 percent of the domestic waste stream (Des Ligneris, 2000). In the opinion of Zerbock (2003), composting is a low-technology approach to waste reduction. He further says that in developing countries, the average city's municipal waste stream is over 50 percent organic material. Composting is the option that, with few exceptions, best fits within the limited resources available in developing countries. A characteristic that renders composting especially suitable is its adaptability to a broad range of situations (UNEP, 2009).

Incineration

Incineration is a controlled combustion process for burning combustible waste to gases and reducing it to a residue of non-combustible ingredients (Centre for Environment and Development, 2003). During incineration, moisture in the

solid waste gets vaporized, the combustible portion gets oxidised and vaporised, and therefore carbon dioxide, water vapour, ash and non-combustible residue are the end products of incineration (Centre for Environment and Development, 2003). It is considered the most sanitary and economical method available as it produces minimal levels of visible emission and generates electricity as a by-product (Centre for Environment and Development, 2003).

Disposal

Several methods of solid waste management have evolved over the years. These methods, according to the Centre for Environment and Development (2003), vary greatly with types of waste and local conditions. The most common way of disposing municipal solid waste has been burying it, but it causes a lot of environmental problems. According to Hardoy (2007), the final methods of solid waste disposal are the ultimate fate of all solid wastes, whether they are residential, commercial, or industrial.

Perceptions, attitudes and waste management

Perception is the primary process by which human beings obtain knowledge of the world. It involves the actions of our sense organs (sight, hearing, touch, taste, and smell) in responding to external stimulation (Gibson & Tierney, 2006). Attitude is seen as a position of the body; a way of thinking or behaving. Attitude consists of three basic components: perception (emotional impression), cognition (thought) and behavioural tendency to act (Warner, 2006). Warner further explains that perception is emotional response(s) and is/are not

logic and/or rational, whereas cognition is rational thought and behavioural tendency is a tendency to behave in a specific manner, depending also on culture. Warner contends that there is no right or wrong behaviour or attitude except within a certain cultural context. But even within the same culture, our behaviour can be influenced by a number of factors and these develop over time. The World Health Organisation (2006) argues that since cultural beliefs and perceptions, with regards to waste collection, management and disposal vary so widely in different parts of the world, it is not possible to assume that any of the practices that have evolved in relation to waste management can be readily transferred elsewhere.

Perceptions, like attitudes, are influenced by our knowledge, resources, beliefs, values, and norms but can be created without experience and knowledge of the object/person. People's attitudes influence the effective demand for waste collection services. Attitudes may be positively influenced through awareness building campaigns and education about the negative aspects of inadequate waste collection with regard to public health and environmental conditions, and the value of effective disposal. Such education should also inform people of their responsibility as waste generators and of their rights as citizens to adequate solid waste management services (Bernstein, 2004). Thus, the design and implementation of MSW management system require an adequate analysis of existing behaviour of key stakeholders, including their attitudes, perceptions, and values. The underlying attitudes of the urban population are themselves influenced by the social and cultural contexts. Programmes to disseminate knowledge and skills or to improve behaviour patterns and attitudes regarding

waste management are based on sound understanding of the social and cultural characteristics.

Fast growing, low-income residential communities may comprise considerably diverse social and ethnic groups, and social diversities strongly influence the capability of communities to organise local waste management (Bernstein, 2004). Moreover, people are more concerned about waste when it is at their immediate environs (Klundert & Lardinois, 2005; Bernstein, 2004). Some residents dump waste indiscriminately into open places, drains and gutters, thereby choking the drainage and creating fertile grounds for breeding of mosquitoes. Some commentators blame these negative attitudes on poverty. It is quite understandable that improved incomes allow people to invest more in waste collection (Telfer, 2002). However, without demeaning the poor, one does not have to wait for income improvement before avoiding littering or illegal dumping; practices which have serious health consequences on the health of people.

Perception and Willingness-to-pay

Municipal solid waste management is an integral part of the broad urban and environmental management of a city. To maximize the efficiency and effectiveness of investments in this sub-sector, projects need to be addressed to the full range of solid waste operations and the related environmental, institutional, and financial issues (Bernstein, 2004). Willingness-to-pay for waste management services or facilities is very important to the success of the private sector's participation in the MSW management programme. The willingness to

pay or not to pay could have direct impact (positive or negative) on the reliability and success of any solid waste management strategy (Rahman, Salequzzaman, Bahar, Uddin, Islam, & al Hrun, 2005). The question therefore has to do with the economics of household waste management, especially, in a developing economy like Ghana.

A number of models have been proposed on this issue. One of the models was proposed by Linderhof et al. (2001), who based household waste collection charges on weight-based pricing in Oostzaan, Holland, where the optimal fees for household waste collection was equal to the direct resource costs plus external environmental costs. However, such a pricing system cannot be used in developing countries where the actual volume of household waste arising is not known (Longe & Ukpebor, 2009). Most often, charges for household waste collection by government are based on direct charges of household. The amount to be paid by households for their own waste removal is not based on the volume of the waste generated but rather on the location and type of household.

The perception of one's capability is said to set a limit to what to do and ultimately what can be achieved (Holland & Rosenberg, 2002). The influence of perception which describes how a person views himself or herself and the world around him or her explains that deviance can arise by accepting culturally determined goals without the acceptability of cultural means. In this case it translates into either paying for solid waste management services or the total rejection of its cost recovery methods (Holland & Rosenberg, 2002). The bone of contention here is the fairness of the government's decision on charges which

therefore raises the readiness to pay or not to pay. More importantly, when it is perceived by the people that waste services are paid for through taxes or even considered as a social service to be paid for by the government, they are unwilling to pay for the waste management services rendered to them hence, people's perception on fees and on waste collection services are elemental for its willingness to pay. At this present level of people's perception, unwillingness to pay could lead to illicit burning and dumping and this slight change could tilt the balance to the unfavourable side (Isa et al., 2006). It, therefore, behoves on the authorities to pay keen attention to problems arising from the management of solid waste and the perceptions of the citizens at different socio-economic levels (Rahman et al., 2005).

Challenges of waste management

Rapid urbanisation which occurred in the developed world in the late 19th century and early 20th century is now underway in the developing parts of the world (Ljung & Tannerfeldt, 2006; Songsore, 2004). In Asia, Africa and Latin America, cities are growing rapidly, fuelled by large scale rural-urban migration and natural increase within the cities (Songsore, 2004). Current projections show that most of the world's future population growth will take place in the developing countries with more and more people in the urban areas (Ljung & Tannerfeldt, 2006). The rapid urbanisation which is currently occurring in the developing parts of the world has many positive implications such as economic growth, but it is also accompanied by social, economic and environmental problems. Thus, while cities in these continents 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 worsening solid waste situation which among other problems has become a great challenge to municipal authorities (Hardoy, 2007; Pacione, 2005).

Although the high rate of urbanisation in African countries implies a rapid accumulation of refuse, the social and economic changes that most countries have witnessed since the 1960s have also contributed to increases in waste generated per capita (Onibokun, 2004). In the developing countries, solid waste services have suffered neglect and low prioritisation compared to other municipal services (Poswa, 2000). This problem emanates from the inadequate government financial support on sanitation. Usually, municipal fees do not cover the operational costs of waste management services, and the available funds from the central budget are insufficient to finance adequate services to all segments of the population.

Financial problems undermine proper management of waste, especially, when it requires a high level of knowledge and expertise as in the case of waste separation. For example, financial constraints make it difficult for waste companies to separate and recycle biodegradable and non-biodegradable waste (Ezeronye, 2000). 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 in high costs of collection and struggle with the implementation of sustainable waste management strategies (Pacione, 2005). As a result, most cities in the

developing world are drowning in waste (Chazzan, 2002). Another challenge associated with MSW management is that the latest mechanised infrastructure for collecting and treating solid waste is extremely expensive, and often beyond the reach of developing governments and cities with a very narrow economic base (Raj, 2000). In most cities in the developing world, the poor environmental situation created by the waste situation militates against the achievement of the major objectives of solid waste management which is to protect human health and the environment from the hazards posed by waste (Hardoy, 2007). City authorities face the problem of inadequate land acquisition for waste disposal. Besides, growing land scarcity and stricter environmental standards now make it difficult for many cities to find adequate and suitable disposal sites for the large volumes of waste being generated by the urban populations (Pacione, 2005; Chazzan, 2002).

For some rich countries, a way out of this dilemma is to export waste to poor countries which creates a lot of inconveniences for poor countries. It is estimated that 50 to 80 percent of all waste collected for recycling in economically developed countries end up in developing countries (Basel Action Network, 2008; Coonan, 2007). 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 2,000,000 tonnes of used paper or cardboard and large quantities of steel and redundant electrical goods (Coonan, 2007). Currently, western countries generally rely on landfills to overcome the problem of waste accumulation (Girling, 2005; Pacione, 2005). The landfill seems to have a special attention from

municipal waste managers because it offers a cheap and convenient option for waste disposal compared with other strategies such as recycling, reuse, and energy recovery (Chazzan, 2002). In fact, with the exception of countries like Australia, Denmark and the Netherlands which recycle substantial proportions of their waste, most countries in Europe and North America still dump the bulk of their municipal waste in landfills (Girling, 2005; OECD, 2000). Thus, the current requirement for countries to move up the waste hierarchy 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. This is due to a number of factors, including rising concerns about the pollution effects of landfills, shortage of landfill spaces, and also Not-In-My-Backyard (NIMBY) protest people, who are more concerned about waste when it is at their immediate environs (Bernstein, 2004; Klundert van de, 2000).

Another problem associated with urban solid waste management is inadequate service coverage and operational inefficiencies. While data is generally lacking on the waste sector of especially developing countries, studies suggest that solid waste management is generally characterised by inefficient collection methods, improper maintenance of waste disposal facilities, and insufficient coverage of collection systems and improper disposal of municipal waste (Hardoy, 2007; Pacione, 2005). Unable to provide adequate waste disposal and other environmental services within their entire jurisdiction, municipal authorities in most developing countries tend to concentrate their waste collection

efforts on official and wealthy areas while the poorer areas receive little or no service for waste removal even though waste collection operations are usually funded by public resources (Lohse, 2003). Besides, waste disposal facilities, which are usually poorly maintained, are frequently placed in the neighbourhood of the poor and other vulnerable population groups (Bullard, 2005) which implies the shifting of environmental burden onto the poor. As a result, the waste management problem is more serious in low-income areas (Mensah & Larbi, 2005).

Inefficient institutional arrangements adversely affect urban management in poor countries generally and environmental service delivery in particular (Ogawa, 2005; Zurbrugg, 2002). Tamakloe (2000) 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. 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. Developing countries tend to have several agencies involved in the delivery of solid waste and other municipal services. Ogawa (2005) has consequently argued that there are no clear roles or functions for 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. Ogawa (2005) has therefore observed that lack of coordination among

the relevant urban sector agencies often result in different agencies duplicating one function. He has consequently 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 cost alternatives for solid waste management for the entire city.

There is also the problem of lack of law enforcement. Such rules and regulations regarding solid waste management 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 (Ogawa, 2005). Indifferent attitude of the public towards good sanitation services is a major concern to effective solid waste management in the urban centres. Some residents dump waste indiscriminately into open places, drains and gutters, thereby choking the drainage and creating fertile grounds for breeding of mosquitoes. Some commentators blame these negative attitudes on poverty though it is quite understandable that improved incomes allow people to invest more in waste collection (Telfer, 2002). Bad attitude of residents such as indiscriminate disposal of household waste and littering due to lack of effective environmental health education and service promotion strategy have exacerbated the waste menace. Besides, the absence of intense and sustained public education on the need to pay for sanitary services is the result of poor management of municipal solid waste (Telfer, 2002). .

Pred's Behavioural Matrix

This behavioural matrix model (Figure 1), was propounded by Pred in 1967. The model is about how innovation diffuses or gets down to the people depending on the quality of information available to them. Thus, the readiness of residents to respond to their solid waste management problem depends on the quality and quantity of information available to them. According to the model, a decision-making situation is a function of the quantity and quality of information available in a given set-up (environmental awareness). The model explains that in a given time and space, some individuals may utilize information optimally based on the quality of information they have. They constitute the rational decision makers in economic theory. On the other hand, those without quality information may not be able to make rational decisions. However, others may not have adequate information but make irrational decisions.

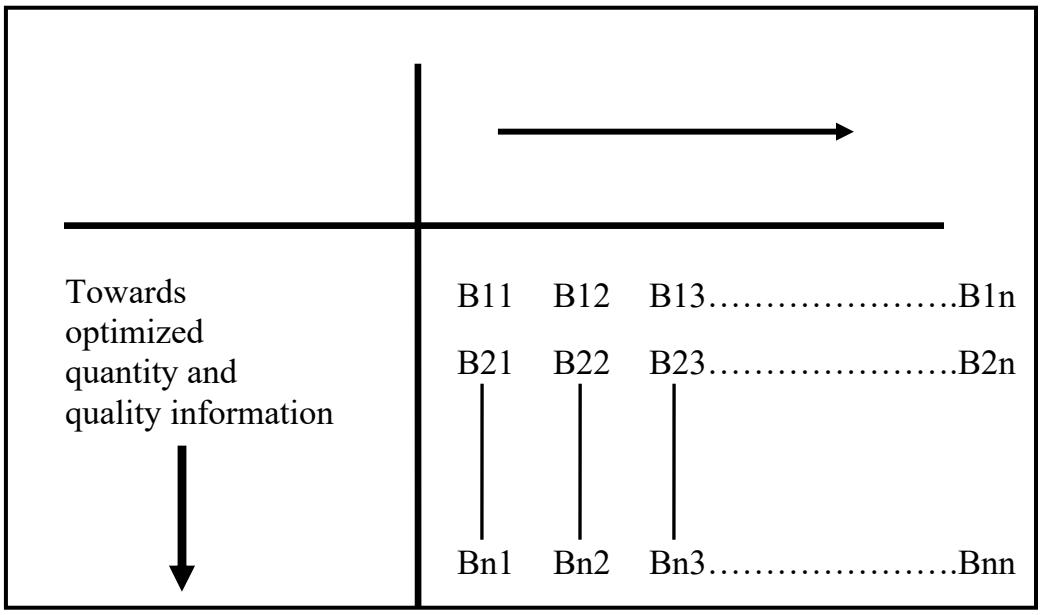

Figure 2: Behavioural Matrix Model

Source: Pred (1967)

The model was adopted to help explain how individuals respond to the solid waste management situation in the Berekum Metropolis. Thus, it helps to understand how households utilize the information/knowledge on hygiene to pursue cleaner surroundings by avoiding indiscriminate dumping and fully participating in efforts to maintain a cleaner environment. However, the behavioural matrix does not spell out other variables that are responsible for the utilization or non-utilisation of the information even if quality information is available. This is where the theory of planned behaviour is relevant to this study.

Conceptual framework

This section discusses the conceptual framework that guided the study. It describes the nature and characteristics of behaviour and perception of people as well as the application of the framework to issues related to waste management.

Theory of planned behaviour

This study is guided by Ajzen's (2002) theory of planned behaviour, which provides a framework for studying human action (Figure 2). According to Ajzen, human behaviour is guided by three kinds of considerations: beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour, subjective norms and perception of behaviour (control beliefs). The

combination of the three considerations (attitudes towards the behaviour, subjective norms and perception of behavioural intentions) guide the individual to form a behavioural intention. As a general rule, the more favourable the attitude and subjective norms, and the greater the perceived control, the stronger should be the person's intention to perform the behaviour in question. Intention is assumed to be the immediate antecedent of behaviour.

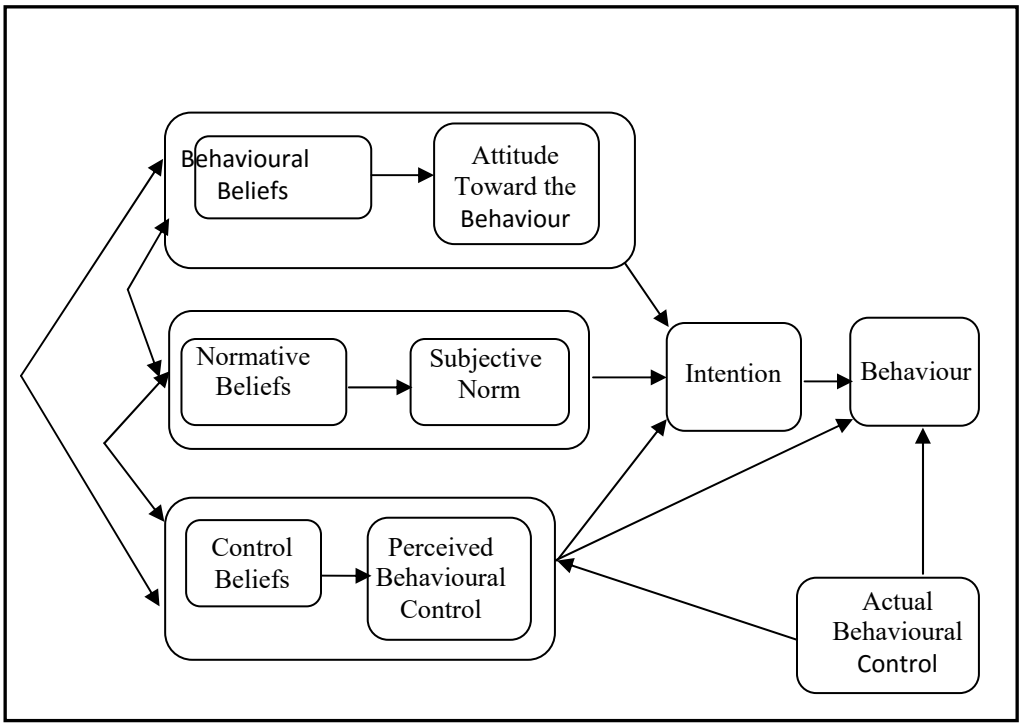

Figure 3: Theory of Planned Behaviour

Source: Ajzen (2002)

The theory of planned behaviour is useful to this study because perceptions, like behaviour, are influenced by our knowledge, beliefs, values, and norms and can be formed without experience and knowledge of the person. The

more adequate knowledge we have on sanitation, the clearer our opinion tends to be, and the stronger our (feelings) perception. In the same way, being informed about an issue is even more likely to influence behaviour when knowledge is gained from firsthand experience (Fazio & Zama, 1981 cited in Mariwah et al, 2010). One study found that knowledge helps us to promote behaviour consistent with beliefs and feelings (Wortman et al., 1992, cited in Mariwah et al. 2010).

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents the research methods used for the study and it covers the target population, the sample and sampling technique, the research instruments, the administration of the instruments and analysis of data.

Study area

The Berekum Municipality came into existence as a semi-autonomous spatial unit by virtue of the decentralization policy adopted by the Government of Ghana in 1988. It is in the Brong Ahafo Region of Ghana and covers a land area of about 1,635km^2. The Municipality shares boundaries with Wenchi Municipality and Jaman South District to the north and northwest respectively, Dormaa Municipality to the west and Sunyani Municipality to the east. Berekum, the municipal capital is about 32km away from Sunyani, the BrongAhafo Regional capital. Major communities of the municipality include Jinijini, Kato, Biadan, Mpatapo, Ahenboboano, Amangoase, Mpatasie, Amankokoaa, Senase, Koraso and Benkasa (Figure 3). The present population of the municipality is about 93,235 out of which about 40 percent live in the rural areas and about 60 percent live in the urban centres (Ghana Statistical Service, 2010). The Berekum

Township was selected on the basis of its population size, economic activities and the amount of waste they generate.

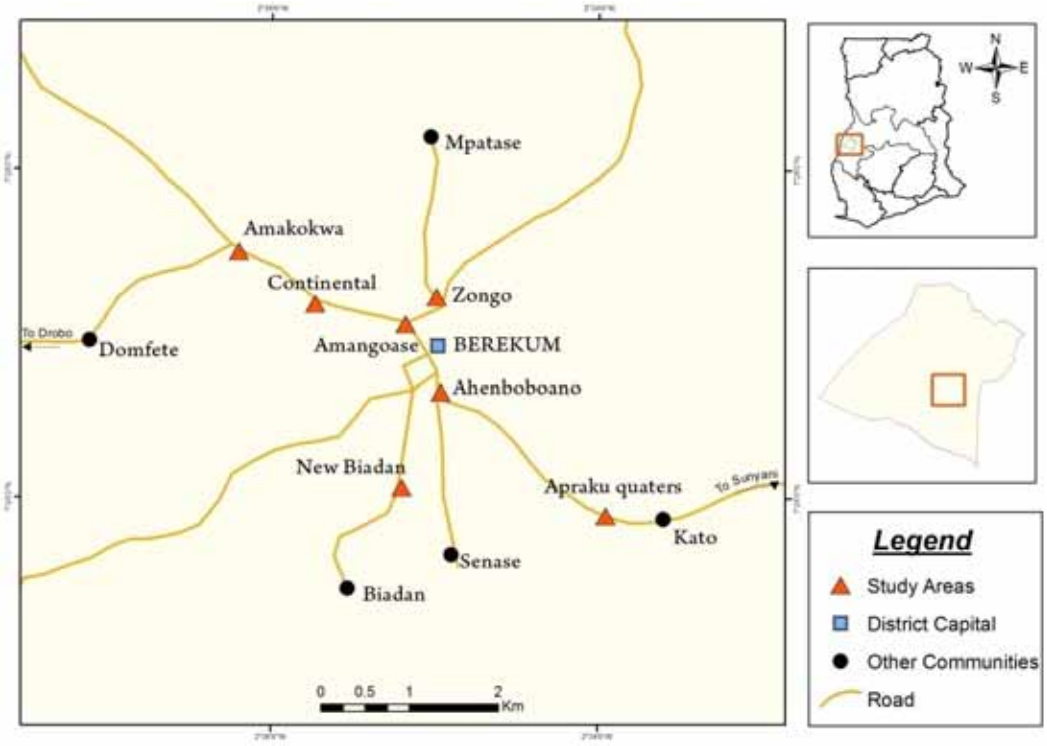

Figure 4: Map of Berekum Township

Source: Cartography Unit, Department of Geography and Regional Planning, UCC (2011).

Research design

The study employed the mixed method approach which involves the triangulation of qualitative and quantitative data collection concurrently. Triangulation deals with collecting and analysing both quantitative and qualitative data in a single study (Creswell, 2003). Problems usually associated with research

that relies solely on one theory, single method and single data set are avoided when triangulation is employed (Neuman, 2003). Hence, the questionnaire (quantitative data collection instrument) and in-depth interview and observation (qualitative instruments) were used to collect data from the field. This enabled the researcher to obtain information from a section of residents of Berekum Municipality and the key informants. In line with the mixed method approach, the study used the descriptive design. Descriptive research design is a scientific method which involves observing and describing the situation of a subject without influencing it in any way. Neuman (2003) views descriptive design as representing 'a picture of the specific details of a situation, social setting or relationship'. Descriptive designs are designed to gain more information about a particular characteristic within a particular field of study.

The descriptive design has been criticised for being narrow in scope and limiting analysis of events, concepts and theories to only what they are without exploring their in-depth components (Creswell, 2003). Notwithstanding the criticism labelled against descriptive design, the method was found to be most appropriate for the study. This is largely due to the fact that the design is considered to be relatively easy to conduct because data are fairly easy to obtain and interprete by the use of simple descriptive statistics (Sarantakos, 2006). In addition, the method provides a clear description of events and tries to explain peoples' perceptions and behaviour on the basis of data collected.

Sources of data

Both primary and secondary sources of data were collected for this study. The administration of questionnaires, in-depth interviews and observation formed the basis of the primary data. The secondary sources of data included data from journals, the internet, reports and documents from the District Assembly and Ministry of Local Government and Rural Development.

Target Population

The target population of the study comprised household respondents from the Berekum Township. The Environmental Health Department, opinion leaders such as Chiefs, Assembly Members and waste management companies were included as key informants. The inclusion of key informants was necessitated by the major role they played as stakeholders in ensuring a clean environment in the municipality.

Sample and sampling technique

The Fisher's formula for the determination of sample size, as shown below was first used to estimate the number of respondents to be interviewed. This formula was deemed appropriate as respondents were to be selected using a probability sampling method

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n = sample size

z = the standard normal deviation set at 1.96 which corresponds to the 95 percent confidence interval

p = the proportion in the target population estimated to have a particular characteristics

q =1.0-p

d = degree of accuracy set at 0.05.

For the purpose of this study;

z = 1.96, most social science studies adopt the 95 percent confidence level based on the fact that, most studies involve social being and as a result, there is the possibility of errors occurring in the course of the study.

p=0.9 because the Waste Management Department of the municipality asserts that about 90 percent of the areas in the town are either covered by the Waste Management Department or the Zoom Lion.

q=1.0-0.9= 0.1

d=0.05

Substituting these into the formula,

$$n = \frac{(1.96)^2(0.90)(0.01)}{(0.05)^2}$$

$$n = \frac{(3.84)(0.09)}{0.0025}$$

$$n = \frac{(0.3456)}{0.0025}$$

n= 138.24

The calculated value ‘n’ shows that 138.24 respondents were selected for the study. This figure was adequate because according to Hair, Anderson and Tatham (1987), a sample size of at least 100 is recommended to conduct a test of statistical significance. Meanwhile, 10 percent of the estimate was added to cater for non-respondent and unanswered questionnaire. A personal communication with the District Planning Officer indicated that about 50 percent of the area (communities) constitutes low income whilst one third is middle income and about 10 percent high income. Consequently, the sample was selected through the following procedure. Eighty respondents were selected from the lower income group, 50 from the middle income group and 20 from the high income group. After this, simple random sampling procedure was used to select respondents from each group. In addition, three key informants were purposively selected; one opinion leader, one from the Environmental Health Department of the municipality and one from the private waste management companies and this brought the total sample size to 153. The key informants were selected because they are directly involved in the decision making process of the municipality and thus can influence decision on solid waste management in the municipality. The classification of the study area into high income, middle income and low income zones was based on the waste management service delivery in the municipality. It also deemed necessary in order to be able compare the willingness to pay of respondents from the income zones to find out if there was a significant difference that could affect the payment of solid waste fees if they were to be levied. Even

though the selected communities had mixed (low, middle and high income) residents, the selection of the areas was done in such a way that the selected areas fairly represented the characteristics of either a high, middle or low income residential status.

Research instruments

Questionnaires, in-depth interview guide and observation were used to collect the necessary data. Questionnaires were designed and administered to the household respondents to solicit relevant information about residents' attitudes, and perceptions towards domestic solid waste management in the municipality. Those who could read and write were allowed to respond to the questionnaire. The in-depth interview guide was administered to the key informants such as Assemblymen, Environmental Health Officers, Chiefs, officials of Zoom Lion and opinion leaders. This was based on their level of expertise and the role they played in ensuring a cleaner environment in the Berekum Municipality. The observation involved the researcher observing the nature, form and ways in which solid waste was handled by residents in the communities as well as the status of waste management facilities and dump sites.

Administration of instruments

The researcher embarked on a reconnaissance survey to the study area before the actual field work. The initial visit provided the opportunity for the researcher to seek permission from the opinion leaders, familiarize himself with

the respondents, and also observe the situation on the ground. After the visit, the questionnaires and the in-depth interview guide were administered for the collection of primary data for the study. The observation was done alongside the collection of primary data.

Some residents showed disinterest and reluctance in participating in the study because they perceived the researcher as somebody coming from the Berekum Municipal Assembly. But the objectives and the purpose of the research were explained to such respondents after which they participated.

Data Analysis

The data collected from the field survey were edited in order to ensure consistency of responses. The completed questionnaires were then coded and fed into a computer. The Statistical Product and Service Solutions (SPSS, version 16.0) software programme was used to analyse the data. Responses from the in-depth interview guide were categorised into appropriate themes and analysed manually. Pictures taken during the observation were used to illustrate some of the key issues arising from the questionnaire survey and the interviews.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the findings of the study and situates them in the context of the theoretical framework. The findings are presented under the following sub-headings: demographic characteristics of respondents, household solid waste management practices, residents' attitudes and perceptions, residents' willingness-to-pay and institutional arrangement for solid waste management in the study area, Berekum Municipality.

Demographic characteristics of respondents

Demographic characteristics of respondent that have bearing on the study were sought, including sex, age, community of residence, level of education and income of respondents. The age of respondents ranged from 20 to 60 years with the mean age being 36.7 (Table 1). Males dominated in the age cohorts 20-25 and 41-45. However, the number of females exceeded that of males in the other age cohorts. Out of the 150 respondents, females constituted the majority 111 (74%) as against 39 (26%) males. Females were targeted for the study because they were more responsible for household waste and environmental management.

Table 1: Age-sex distribution of respondents

	Sex (%)		Total	
Age (years)	Male	Female	Freq.	%
21-25	5.3	6.0	17	11.3
26-30	2.0	12.0	21	14.0
31-35	4.7	13.3	27	18.0
36-40	5.3	21.4	40	26.7
41-45	2.3	7.7	22	10.0
46-50	1.3	6.7	12	8.0
51-55	3.0	3.7	6	6.7
56-60	2.3	3.0	5	5.3
Total %	26.2	73.8		100
n	39	111	150	

Source: Fieldwork, 2011

From Table 1, respondents within the age cohort 36-40 constituted the highest percentage (26.7%), followed by those within 31-35 and 26-30 years (18% and 14% respectively). In order to find out how respondents' waste management behaviours were influenced by the community in which they lived, respondents were asked to indicate their residential communities (Figure 4). Respondents' community of residence was based on the population size of the communities and as a result, 21.3 percent of the respondents were selected from Zongo because it was the largest community, followed by Amangoase (18.0%), New Biadan (16.0%), Amankokwaa (14.0%), Apraku Quarters (11.3), Ahenboboano (10.7%), and Continental (8.7%) in that order. Further, the

communities were classified according to income levels. The high-income communities were Apraku Quarters and Continental; middle-income included New Biadan, and Ahenboboano, while the low-income consisted of Zongo, Amankokwaa and Amangoase.

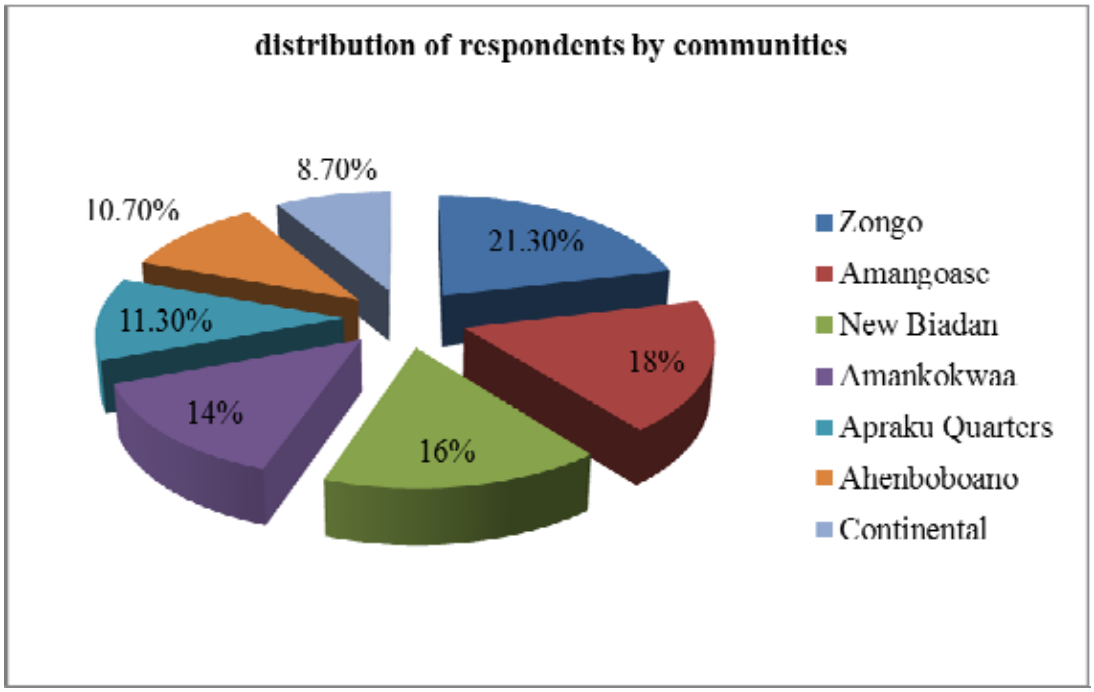

Figure 5: Respondents' community of residence

Source: Fieldwork, 2011

Education is a vital tool for developing any nation, community as well as the individual. Table 2 presents the educational levels of respondents. It is noted that about 85 percent of the respondents had some form of formal education. A sizeable proportion 42 percent of them had basic education, whereas 14 percent had secondary/vocational/technical education.

Table 2: Level of education of respondents by sex

	Sex %		Total	
Level of education	Male	Female	Freq.	%
None	0.0	14.7	22	14.7
Basic	7.3	34.7	63	42.0
Sec/voc/tech	0.0	14.0	21	14.0
Post sec/ non tertiary	4.0	5.3	14	9.3
Tertiary	14.7	5.3	30	20.0
Total %	26.0	74.0		100
n	39	111	150	

Source: Fieldwork, 2011

All the respondents who had no formal education were females (Table 2). However, there were more educated females at the basic level than males which confirm the 2008 Ghana Living Standards Survey Report (Round 5) that more females had education at the basic level (Ghana Statistical Service, 2010). With regard to the marital status of the respondents, the study showed that the majority (80.7%) of the respondents were married. It is indicative that none of the respondent was widowed, divorced or separated. The monthly income distribution of the respondents was also considered in the study and the results presented in Figure 5. From Figure 4, 36 percent of the respondents earned less than GH¢50 a month while a third earned between GH¢50 and GH¢100. Only 12.7 percent of the respondents earned GH¢400 and above. The monthly income of the majority of the respondents (less than GH¢50) is lower than the regional average

(GH¢54.30) but higher than the national average of GH¢47.40 (Ghana Statistical Service, 2010).

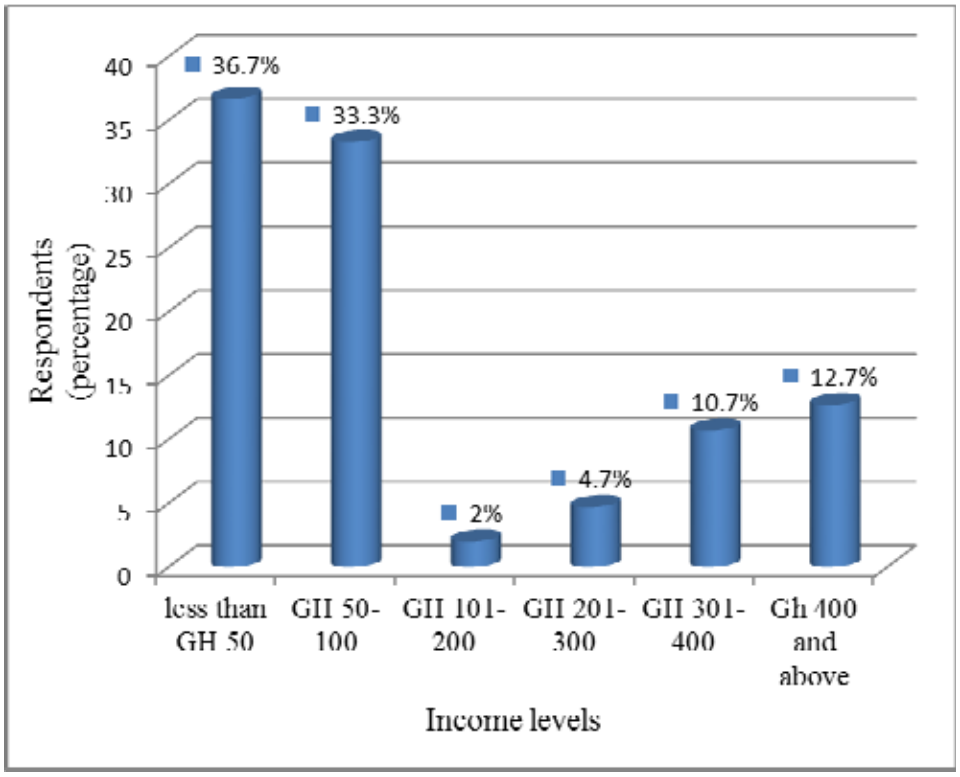

Figure 6: Monthly income distribution of respondents

Source: Fieldwork, 2011

Household solid waste management practices

Respondents were asked to indicate the amount of waste they generated in a day (using bucket size 34 litres). The majority of the respondents (56%) generated half a bucket but 26.7 percent generated a bucket full per day. Only 0.7 percent of the respondents' generated more than one bucket while 11.3 percent and 5.3 percent generated a quarter and three quarter of a bucket respectively. The different types of waste in the municipality also necessitated the study to find out

which type of waste is mostly generated in the communities. The results are shown in Table 3.

Table 3: Type of waste generated most by residents

Type of waste	Income Zone (%)			Total	
	High Income	Middle Income	Low Income	Freq.	%
Food waste	17.3	20.0	43.3	121	80.6
Rubbish	0.0	1.4	0.0	2	1.4
Plastic waste	2.7	5.3	10.0	27	18.0
Total	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

It emerged that food waste dominated in all the communities (80.6%); plastic waste followed with 18 percent and only 1.4 percent indicated rubbish. The question of how best residents managed solid waste in their homes was considered and respondents were asked to specify which container was used to store waste in the household. The majority (89.3%) of the respondents said plastic container while 1.3 percent said they used metal container.

Frequency of waste disposal by residents was a major variable in the study. It was enquired from the respondents as to how many times their container was usually taken away to be emptied. A greater portion of the respondents emptied their container once a day (87.3%). Those who emptied their container twice a day and once a week constituted 6.7 percent and 2.7 percent respectively,

while 3.3 percent indicated once every three days. Meanwhile, 43.3 percent of the respondents said the container was emptied by any child between the ages of 13 to 18 years (Plate 2).

(a) **(b)**

Plate 2: Children walking about 2 kilometres to dispose of waste
Source: Fieldwork, 2011

The final disposal site for solid waste is very important in waste management consequently, respondents were asked to indicate where the container was taken to be emptied (Table 4). From the table, 58.7 percent emptied their container in a communal container in the neighbourhood, 31.3 percent emptied in open dump in the neighbourhood while 6.0 percent and 40.0 percent emptied theirs in a larger container in the same building and container placed by the road side respectively.

Table 4: Where household waste container is taken to be emptied

Where container is emptied	Frequency	Percentage
Container placed by the road	6	4.0
Larger container in the same building	9	6.0
Communal container in the neighbourhood	88	58.7
Open dump in the neighbourhood	47	31.3
Total	150	100

Source Fieldwork, 2011

Moreover, it was found that more than half of the residents (57.4%) spent 5 to 10 minutes to dispose of household solid waste, while 34.0% spent less than 5 minutes to dispose of their waste (Table 5). Only 8.6 percent spent more than 10 minutes to get to a refuse dump. However, it was observed that the majority of the respondents who spent more minutes to get to the refuse dump site were from the low-income communities. This confirms the finding by (Lohse, 2003) that 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 by public resources.

Table 5: Time taken by residents to get to dump sites by status of place of residence

Minutes	Income Zone				
	High Income	Middle Income	Low Income	Total Freq.	%
Less than 5 minutes	13.3	8.7	12.0	51	34.0
5-10 minutes	6.7	14.7	36.0	86	57.4
11-15 minutes	0.0	2.0	3.3	8	5.3
16-20 minutes	0.0	0.0	0.7	1	0.7
21-25 minutes	0.0	1.3	1.3	4	2.6
Total %	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

The study sought to find out where the collected waste is taken to for final disposal and from the majority of the respondents (91.3%), the collected waste was disposed of at a designated dump site. Only 1.3 percent indicated landfill site while 6.7 percent did not know the final disposal site.

Residents' attitudes and perceptions

Perception involves the action of our sense organs (sight, hearing, touch, taste, and smell) in responding to external stimulation (Gibson, 2006). The Theory of Planned Behaviour describes behavioural beliefs as the likely outcomes of the behaviour and the evaluations of these outcomes (Ajzen, 2002). The issue of what is a problem varies from person to person hence, respondents were asked to indicate the most serious environmental problem from a list of social and

environmental issues in their locality. The most serious environmental problem to most of the respondents was that of solid waste disposal (40.2%) followed by water scarcity (26.4%). A greater number of respondents indicated that solid waste is a major environmental problem in their communities and this supports Chazzan's (2002) finding that most cities in the developing world are drowning in waste (Table 6).

Table 6: Respondents' perspective on most serious environmental problems

Most serious problem	Income Zone High income	Middle income	Low income	Total Freq.	%
Solid waste	8.0	14.7	17.5	70	40.2
Drinking water	4.4	8.7	13.3	41	26.4
Toilet	3.2	6.1	8.0	21	17.3
Noise	1.4	2.7	3.3	8	7.4
Air pollution	0.7	1.3	3.5	6	5.5
Liquid waste	0.2	1.0	2.0	4	3.2
Total %	17.9	34.5	47.6		100
n	30	40	80	150	

Source: Fieldwork, 2011

However, it was observed that the solid waste problem was more paramount in the middle and low-income communities. This confirms the finding by Mensa & Larbi (2005) that the waste management problem was more serious in low-income residential areas. Meanwhile, officials of the Municipal Environmental Office and the private solid waste companies estimated that about 18 containers (1,800 tonnes) of waste were lifted in a day but could however, not

estimate the amount generated in the respective communities. The opinion leaders including assemblymen who were interviewed pointed out that open burning and indiscriminate dumping in the gutters and in the streets as well as open public places were common in low-income communities. For example, one of the assembly members stated:

> *The people are the biggest problem when it comes to waste management in the municipality because they sweep and dispose the waste into gutters and also in open public places. Even at the refuse dump sites, wastes are dumped indiscriminately. There are about five sachet water producers in the municipality but they also do not provide litter bins and as a result, sachet water bags can be found all over the place.*

Table 7: Communities' perspective on serious nature of the problem

Seriousness of the waste problem	Income High Income	Middle Income	Zone Low Income	Total Freq.	%
Extremely serious	8.7	4.7	22.7	54	36.1
Quite serious	8.7	20.7	28.7	87	58.1
Slightly serious	2.0	0.0	0.0	3	2.0
Not at all serious	0.0	0.0	1.2	2	1.2
Don't know	0.6	1.3	0.7	4	2.6
Total %	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

The seriousness of the solid waste management problem in the municipality was also ascertained from household residents and the results are presented in Table 7 and Plate 3

(a)

(b)

(c)

(d)

Plate 3: Seriousness of the waste problem in the Berekum Municipality

Source: Fieldwork, 2011

From the table, 58.1 percent of the respondents saw the problem to be quite serious, 36.1 percent saw it as extremely serious while 2.6 percent of them did not know how serious the problem in the municipality was. The seriousness of the problem was more pronounced in low-income areas. An attempt was made to ascertain the reasons for the solid waste problem in the study area. Respondents were therefore, asked to indicate the reasons that could have contributed to the solid waste problem in their communities. The results, as presented in Table 8, show that more than half (52.7%) of the respondents found inadequate bins in their respective communities as the main cause of the reasons for the solid waste problem.

Table 8: Reasons for the solid waste problem

Reasons for the waste problem	Income Zone			Total	
	High income	Middle Income	Low Income	Freq.	%
Inadequate bins	11.3	14.7	26.7	79	52.7
Long distance	8.7	10.0	25.3	66	44.0
No dump site	0.0	2.0	0.0	3	2.0
Don't know	0.0	0.0	1.3	2	1.3
Total %	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

Also, 44 percent of the respondents identified long distances to dumping sites as a factor that contributed to the solid waste problem while 2.0 percent

mentioned the absence of dump site. Again, inadequate bins and long distance were more common in low-income areas. However, 1.3 percent of the respondents could not readily tell the reason for the solid waste problem in their communities. The reasons given as the major factors for the solid waste problem is a clear vindication of study findings in the literature that in developing countries, solid waste services have suffered neglect and low prioritization compared to other municipal services (Poswa, 2000). Meanwhile, an official from the Zoom Lion Company reiterated that:

> *People dump waste at unauthorised places as a result of political reasons because some people decide to litter waste just to make the government in power unpopular. The attitude of people is also a factor because people intentionally litter waste on the false assumption that if they don't litter waste Zoom Lion will not have work to do. Lack of education on proper waste disposal and management is also a major contributory factor and we don't have enough money to regularly go on the radio to educate people.*

To identify the major factors responsible for the solid waste problem in the municipality, some key informants were also interviewed. There was no consensus on the issue, but the most prominent problems that emerged were inadequate funding and logistics, a situation which is supported by Poswa (2000) that solid waste problem emanates from the inadequate government financial support on sanitation. Other problems such as poor attitudes of people, lack of

education, political influence, inadequate waste companies and improper maintenance of waste disposal facilities were also enumerated. This is in accordance with the assertions by Hardoy (2007) and Pacione (2005).

A remark by one of the municipal environmental officers on the reasons for the solid waste problem in the municipality is worth mentioning in this respect:

> *The waste management problem is more serious in the municipality because the only private company responsible for collection and disposal of waste does not have enough facilities. The Municipal Assembly which is supposed to liaise with Zoom Lion also has only two vehicles which are not properly maintained; they break down all the time. Also long distance traversed laziness, poor attitude of people, disposal of waste by children under 12 years and inadequate waste companies are all causes of the problem.*

Having known the seriousness of the problem and the causes, the study further investigated the communities' expectations of the nature of solid waste management problems in the next five years. Table 9 gives details of the expectations of respondents in the various communities. From Table 9, it can be inferred that the majority (81.3%) of the respondents expected that in the next five years the problem of solid waste is going to deteriorate even further. However, the higher level of expectation of the solid waste problem by residents in the low

income communities (46%) is in conformity with the assertion by Bernstein (2004) that fast growing low-income residential communities may comprise considerably diverse social and ethnic groups, and social diversity strongly influences the capability of communities to organise local waste management. Again, 15.3% of the respondents envisaged that the problem of solid waste was going to be quite serious.

Table 9: Expectation of the solid waste problem in the next five years

	Income Zone				
Expectation of the Management problem	High income	Middle Income	Low Income	Total Freq.	%
Get more serious	14.7	20.7	46.0	122	81.4
Get serious	5.3	4.7	5.3	23	15.3
Remain the same	0.0	1.3	0.0	2	1.3
Don't know	0.0	0.0	2.0	3	2.0
Total %	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

Further, as respondents expected the solid waste problem to worsen in future, they were asked to show how concerned they were in dealing with the solid waste problem. About 73 percent said they were "concerned" while 26.7 percent also said they were "very concerned". Meanwhile, in order to know respondents opinion on effective ways of waste management, they were asked to indicate from options which waste management practice will be suitable to the municipality. It can be observed from Table 10 that among the options, over 9 out

of 10 respondents (95.3%) mentioned communal containers in the neighbourhoods as a suitable option. Other management practices such as land filling and open burning were not preferred by the respondents since the majority 65.3 percent and 67.3 percent respectively saw them as "unsuitable" or "very unsuitable".

Table 10: Residents opinion on most suitable waste management options

Favourable options %	V S	S	N	US	VUS
Communal container in the neighbourhood	50	45.3	0.0	3.3	1.3
Pay as you dump	4.0	62.7	1.3	24.7	7.3
Community dump sites	2.7	6.0	0.0	76.0	15.3
Land filling	6.7	7.3	0.3	65.3	20.0
Open burning	0.0	3.3	0.0	29.3	67.3

Key: VS= Very Suitable, S= Suitable, N= None of the options, US= Unsuitable, VUS= Very Unsuitable

Source: Fieldwork, 2011

In addition, community dump sites were also seen as "unsuitable" practice for waste management in the municipality. A greater proportion of the respondents, (62.7%), preferred pay-as-you-dump programme as a suitable option for waste management in the municipality. However, observation by this researcher indicated that this programme could be an appropriate measure to regulate the volume of waste generated by residents. In contrast, The World

Health Organisation (2006) argues that since cultural beliefs and perceptions, with regards to waste collection, management and disposal vary so widely in different parts of the world, it is not possible to assume that any of the practices that have evolved in relation to waste management can be readily transferred elsewhere. Therefore, the next section of the study focussed on willingness to pay for waste management services.

Residents' willingness to pay

Willingness to pay for waste management services is important to both private and public sector participation in the municipal solid waste management programme. The willingness-to-pay or not-to-pay could have direct impact (positive or negative) on the reliability and success of any solid waste management strategy (Rahman et al., 2005). Therefore, respondents were asked to indicate whether waste collection services were provided in their locality; while 92% said "yes" only 8% said "no". However, the majority (98%) showed that they do not pay for the services rendered to them. Meanwhile, the 2% who said they paid for the service could not indicate the exact amount they pay; hence, it was a clear indication that actually, the residents enjoy free service. It can be seen from Table 11 that a greater proportion (69.3%) of the respondents was willing to pay for improved services. For the respondents who were willing to pay for improved services, (19.3%), (17.3%) and (32.7%) were in the high income, middle income and low income zones respectively. This is in line with what Ajzen's (2002) position, that, the more adequate knowledge we have on

sanitation, the clearer our opinion tends to be, and the stronger our feelings or perception. In the same way, being informed about an issue is even more likely to influence behaviour when knowledge is gained from firsthand experience (Fazio and Zama, 1981 cited in Mariwah et al, 2010).

Table 11: Residents willingness-to-pay for improved services

Position	Income Zone High Income	Middle Income	Low Income	Total Freq.	%
Willing to pay	11.3	17.3	32.7	104	61.3
Not willing to pay	8.7	9.3	20.7	46	38.7
Total %	20.0	26.6	53.4		100
n	30	40	80	150	

Source: Fieldwork, 2011

However, 38.7 percent of the respondents in the current study expressed their unwillingness to pay for improved services. The study therefore attempted to solicit the reasons why some residents were not willing to pay for improved services. From Table 12, a greater proportion, (37.1%), were not willing to pay because their incomes were low while 21.4 percent were of the view that they were not working, and also it is the responsibility of government. About (20.1%) of the respondents who were also unwilling to pay indicated that they paid taxes. Analysis of residents' willingness to pay for improved services helps to establish the actual behavioural control of residents. This is exemplified in the Theory of Planned Behaviour, the conceptual framework for this study where the

combination of the three considerations (attitude towards the behaviour, subjective norms and perception of behavioural intention) were found to guide the individual to form a behavioural intention (Ajzen, 2002).

Table 12: Reasons for residents' unwillingness-to-pay for improved services

Reason for unwillingness to pay	Income Zone High Income	Middle Income	Low Income	Total Freq.	%
My income is low	0.0	17.0	20.1	55	37.1
I am not working	0.0	6.3	15.1	32	21.4
It is the responsibility of government	0.0	10.2	11.2	32	21.4
I pay taxes	6.1	7.0	7.0	31	20.1
Total %	6.1	40.5	53.4		100
n	30	40	80	150	

Source: Fieldwork, 2011

The study further sought to find out the level of satisfaction of residents who enjoyed waste collection services (Table 13). It can be seen from the table that over two thirds (68.6%) of the respondents were satisfied with waste collection services rendered to them in their various communities. Over 15 percent, 18 percent and 35 percent were satisfied with the waste collection services in the high income, middle income and low income communities respectively. More people (35.3%) in the low income areas were satisfied compared with the other areas.

Table 13: Residents level of satisfaction with waste collection services

Level of satisfaction	Income Zone				
	High Income	Middle Income	Low Income	Total Freq.	%
Very satisfied	0.7	0.7	1.3	4	2.7
Satisfied	15.3	18.0	35.3	103	68.6
Uncertain/undecided	0.0	0.0	1.3	2	1.3
Unsatisfied	3.3	6.0	14.7	36	24.0
Very Unsatisfied	0.7	2.0	0.7	5	3.4
Total %	20.0	26.7	53.3		100
n	30	40	80	150	

Source: Fieldwork, 2011

On the contrary, only 24% of the respondents were not satisfied with the waste collection services rendered to them in the communities. Nevertheless, respondents maintained that the service should continue but in a more improved manner. About (3%) were “very unsatisfied” while (1.3%) remained uncertain with regard to the waste collection services rendered to them.

CHPTEER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary and conclusions from the study as well as recommendations to help improve the waste management situation in the Berekum Municipality.

Summary of findings

The study set out to examine residents' perceptions and attitudes towards solid waste management problem in the Berekum Municipality. The study employed the descriptive research design. The purposive sampling and the simple random sampling procedure were used to select the sample. The sample was made up of 150 household respondent and 3 key informants. Questionnaires, in-depth interview guide and observation were used to collect the necessary data. The data collected from the field survey were edited in order to ensure consistency of responses and the Statistical Product and Service Solutions (SPSS, version 16.0) software programme was used to analyse the data. Percentages, frequencies, and charts were used to present the data.

With regard to the demographic characteristics of respondents, nearly half of the respondents (49.3%) were within the age cohort 36-40 and the majority of

them were married (80.7%). Forty two percent have had basic education and therefore had scanty knowledge on waste management

With respect to household waste generation, (56%) generated half a bucket full of waste a day. The dominant types of waste generated in the municipality were food and plastics hence, management of solid waste among residents was problematic.

A greater proportion (87.3%) emptied their container once a day. Containers were emptied by children between the ages of 13 and 18 in most (43.2%) of the households. More than half (57.3%) of the respondents walked between one and two kilometres to dispose of their waste and as a result of the long distance, people disposed of waste indiscriminately.

Solid waste was noted to be the most serious environmental problem in the municipality (40.2%). The main cause of the solid waste problem was inadequate collection bins in the communities. Poor attitude of people, lack of public education, political influence, inadequate waste companies and improper maintenance of waste facilities were also enumerated as reasons for the waste problem.

In terms of residents' perception, the solid waste problem was expected to be more serious in the next five years (81.3%), notwithstanding the fact that the majority (68.7%) of residents were satisfied with the services currently rendered to them. Concerning the willingness to pay for improved services, over (69%) of residents were willing to pay for improved services even though, most of them earned just about GH¢100 a month.

Conclusions

The following conclusions could be drawn based on the findings of the study:

1. The Berekum Municipality faces solid waste management problems due to inadequate collection bins, poor attitude of people, lack of public education, political influence, inadequate waste companies and improper maintenance of waste facilities. As a result, waste generation surpasses the capacity of the waste management companies for waste collection and disposal.
2. People who walked long distances to dispose of waste because of inadequate bins and dump sites, especially in the middle and low income communities, were mainly children. This resulted in indiscriminate dumping on the streets, open spaces, gutters and nearby bushes.
3. Residents expected the solid waste problem to get worse in the next five years considering the time they spent on disposal at the moment.
4. Even though residents do not currently pay for waste management services, they are willing to pay for improved services.

Recommendations

Based on the findings of the study, the following measures are recommended for improved waste management:

1. More collection bins should be provided by Zoom Lion and the Berekum Municipal Assembly for residents in the municipality. The low and middle income communities should be supplied enough containers to avoid indiscriminate dumping of waste in gutters, open spaces, streets and nearby bushes.

2. The waste management institutions should collect waste regularly in order to avoid indiscriminate dumping. Waste disposal by the Assembly and Zoom Lion company should be at least three times a week in all the communities. The Assembly should also monitor regularly the collection of waste in order to keep the municipality clean to prevent any outbreak of communicable diseases such as cholera and typhoid.

3. To ensure effective and efficient waste management in the municipality, waste management institutions should be adequately resourced by the government through the Assembly. The Waste Management Department of the Assembly should liaise with other corporate bodies and financial institutions to solicit funds in order to support the waste management companies in the municipality. The Assembly should repair all broken down vehicles and rent them to Zoom Lion due to the rate at which the municipality is growing. There should be other waste management

companies to compete with Zoom Lion, the only waste management company currently in the municipality to make them effective.

4. There should be public education on proper ways of waste disposal in the municipality to sensitize the general public on the implications of a healthy environment and the need to keep their communities clean. The education could be done by Zoom Lion and the Environmental Health Department of the Berekum Municipality through the FM stations, schools, churches and in the mosques. Moreover, sachet water producers, financial institutions and individuals should be made aware of the negative implications of waste in the municipality and the need to sponsor the educational programme.

5. The Berekum Municipal Assembly should improve upon its revenue mobilization efforts in order to enable it generate more revenue from its own internal sources. The Assembly should prioritise the allocation of financial resources for the acquisition of equipment and maintenance schedule that will also sustain the provision of efficient waste management delivery services to meet the demands of residents in the municipality.

6. There should also be an introduction of user charges so that residents pay for the waste they generate. As residents are willing to pay for improved services, the user charges should take the form of pay-as-you-dump. This would control the rate at which residents generate waste in the municipality.

Areas for further research

The current study focused on residents' attitudes and perceptions towards urban solid waste management in the Berekum Municipality. Further studies can be undertaken to look at appropriate strategies and technologies for urban solid waste management in the Berekum Municipality. Detailed study in willingness to pay can also be undertaken and full investigation in these areas can pave way to create greater understanding of urban waste management and environmental sustainability.

REFERENCES

Agbola, T. (1993). Environmental education in Nigeria schools. In W.L. Filho (ed) *Environmental education in Commonwealth, the commonwealth of learning, chapter2* (pp. 52). Vancouver.

Ajzen, I. (2002). Perceived behavioural control, self-efficient, locus of control, and the theory of planned behaviour. *Journal of Applied Social Psychology*, 32: 665-683.

Basel Action Network (BAN) (2008). *Turn back the toxic tide*. Accessed at: http://www.ban.org/index.htlm on 23/12/07.

Beinstein, J. (2004). *Social assessment and public participation in municipal solid waste management.* London: Urban Environment Thematic Group.

Bullard, R.D. (2005). *The quest for environmental justice: Human rights and the politics of pollution*. San Francisco: Sierra Club Books.

Cartographic Unit, Department of Geography and Regional Planning (2011). *Map of the study area.* University of cape Coast.

Centre for Environment and Development (2003). *Study of the attitude and perception of community towards solid waste management – a case study of Thiruvananthapuram city*. Unpublished Master thesis, Centre for Environment and Development. Kerala research programme on local level development.

Chang, N.B. and Chang, Y.H. (2001). Optimal shipping strategy of solid waste streams with respect to throughput and energy recovery goals of incineration facilities. *Civil Engineering and Environmental Systems*, 18,

193-214.

Chang, N.B. and Davila, E. (2007). Minimax regret optimization analysis for regional solid waste management systems. *Waste management*, 27, 820-832.

Chazzan, D. (2002). *A World drowning in litter,* BBC News Online. Accessed at http://news.bbc.co.uk/world/Europe on 12/05/08

Cointreau, S. J. (2002). Declaration of principles for sustainable and integrated solid waste management. Accessed at: http://web.worldbank.org.on17/06/07.

Coonan, C. (2007). *Sent from Britain: Our waste, pollution and a poisoned sky.*The independent. Friday 26th, January, 2007.

Creswell, J.W. (2003). *Research design: Qualitative, quantitative and mixed methods approaches* (2nd Ed). Thousand Oaks: Sage.

Crusading Guide. (August 22, 2007). *Ministry of Defence fails to pay compensation for Apremdo land.* Accra. Crusading Guide.

Daily Graphic.(July 23rd, 2008). *Polluter-Pays-Principle is good*. Accessed at: http://www.graphicghana.com.on19/05/08.

Davies, A.R. (2008). *The geographies of garbage governance: Interventions, interactions and outcomes*. London: Ashgate.

Des-Ligneris, J. (2000). Composting. *Biennial Conference and Exhibition, l2*, 239-246.

Durban County Council (2007). Green paper on solid waste management. Durban Metropolitan Area: Rapid Action Programme.

Eaton, D. and Hilhorst, T.H., (2003). *A solid case for improving waste reuse in Mali and Burkina Faso*. Mali:Development Research Reporting Service.

Elliot, J. A. (200). An Introduction to Sustainable Development. Third Edition New York, Routledge

Ezeronye, O.U. (2000). *Solid waste management in the tropics. A case study of the Nigeria urban environment*. Unpublished Master thesis, Federal University of Agriculture. Abia State.

Gbekor, A. (2003). Domestic waste management. *Ghana Environmental Protection Agency (EPA) Newsletter,* 47(5), 12-17.

Ghana Statistical Service (2011). *2010 Population and housing census report:* Accra, Ghana Statistical Service.

Gibson, K. and Tierney, J.K. (2006). Electrical waste management and disposal: issues and alternatives. *Environmental Claims Journal, 18,* 321-332.

Girling, R. (2005*). Rubbish! Dirt on our hands and crisis ahead*. London: Transworld Publishers Ltd.

Hair, J., Anderson, R., and Tatham, R. (2006). Multivariate Data Analysis (6th edition). Upper Saddle River, NJ: Prentice-Hall.

Hardoy, J.E. (2007). *Environmental problems in an urbanising world*. London: Earthscan.

Holland, C.I. and Rosenberg, M.J. (2002). *Attitude organisation and Change*.New Haven: Yale University Press.

Huang, G.H., Chan, C.H. and Zhang, X.D. (2008). Applications of artificial intelligence to energy and environmental systems analysis under

uncertainty (Guest Editors' Introduction). *International Software Engineering and Knowledge Engineering,* 18(4), 439-441.

Isa, M.H., Asaari, F.A.H., Ramli, N.A., Ahamad, S. and Siew, T.S., (2006). Solid waste collection and recycling in Nibong, Tebal, Penang, Malaysia: a case study. *Waste Management and Research.* 23(6): 565-570.

Kendie, S.B. (1998). Do attitudes matter? Waste disposal and wetland pollution in the Cape Coast municipality of Ghana. Malaysian Journal of Tropical Geography, 29(2), 69-81 University of Bradford, England.

Krathwohl, R. D., (2009), Methods of Educational and Social Science Research (3rd ed). Waveland Press: IL, Long Grove.

Klundert, A. and Lardinois, I. (2005). *Community and private (formal and informal) sector involvement in municipal solid waste management in developing countries.* Background Paper for the UMP Workshop inIttingen, 10-12 April 1995. WASTE, The Netherlands. Accessed at:http://www,ecosan,nl/content/download/349/2910/file/CP_iswm_1995pdf. on 17/06/07.

Klundert-van de, A. (2000). *The sustainability of alliances between stakeholders in waste management*. A draft working paper for UWEP/CWP, 30 May, 2000.

Lapidos, J. (2007). *Will my plastic bag still be here in 2507?. How scientists figure out how long it takes for your trash to decompose*. Accessed at: http://www.slate.com/id/2169287/nav/navoa/.on 04/07/11

Law, S. (2002). *A survey of household waste generation.* International waste

management Congress and Exhibition, 30th September – 4th October, Durban, South Africa.

Linderhof, V., Kooreman, P., Allers, M. and Wiersman, D., (2001). Weight-based pricing in the collection of household waste: the Oostzaan case. *Resources and Energy Economics,* 23: 359-371.

Ljung, P. and Tannnerfledt, G, (2006).*More urban, less poor*. London, Earthscan.

Lohse, U. (2003). Improving municipal finance – A global challenge. Accessed at: http://www.unhabitat.org/hd/hdv9n1. on 12/09/11.

Longe, E.O. and Ukpebor, E.F. (2009). Survey of household waste generation and composition in Ojo Local Government Area, Lagos State, Nigeria. *International Journal of Geo-technology & Environment, 1* (1): 41-54.

Longman Dictionary of Contemporary English (2008). London: Longman Publishers.

Mariwah, S., Kendie, S.B., Dei, A. L. (2010). *Urban solid waste governance in the Shama-Ahanta East Metroplitan area.* Unpublished PhD thesis. Department of Geography and Regional Planning, University of Cape Coast.

McDoughall, F.R. and Hruska, J.P. (2001). The use of life cycle inventory tools to support an integrated approach to solid waste management. *Waste Management and Research* 18, 590-594.

Mensah, A. and Larbi, E. (2005). *Solid waste disposal in Ghana*. Accra, Ghana Accessed at: http://www.trend.wastsan.net. on 24/05/2011.

Millennium Assessment Report (2005). *Living beyond our means: Natural*

assets and human well-being. Accessed at: http://www .milleniumassessment.org/en/Reports.aspx. on 02/11/11.

Momoh, J.J. and Oladebeye, D.H. (2010). Assessment of awareness, attitude and willingness of people to participate in household solid waste recycling programme in Ado-Eketi, Nigeria. *Journal of Applied Sciences in Environmental Sanitation,* 3(2), 127-135.

Mwanthi, M.A. and Nyabola, L.D. (1997). Solid Waste Management in Nairobi City: knowledge and attitude, journal of Environmental Health. 60, 23-30

Neuman, L.W. (2003). *Social research methods: Qualitative and quantitative approaches* (4th Ed). London: Allyn and Bacon.

Nie, X.H. (2007). A Hybrid interval-parameter fuzzy robust programme approach for waste management planning under uncertainty. *Journal of Environmental Management,* 84, 1-11.

Ogawa, H. (2005). *Sustainable solid waste management in developing countries.* W.H.O. Western Pacific Regional Environmental Health Centre (EHC). Kuala Lampur, Malaysia. Accessed at: http://www. gdrc.org/eem/waste/swm-fogawa1.htm. on 13/12/11

Omane, P. (2003). Waste disposal and management in the peri-urban areas of Kuman. *Journal of Waste Management,* 3, 12-19.

Onibokun, A. G. (Ed), (2004). Managing the monster: urban waste and governance in Africa. Canada, International Development Research Centre (IDRC).www.idrc.ca/publication/onlinebooks. on 20/11/06

Organisation for Economic Co-operation and Development (OECD) (2000).

Environmental Performance Review (1st Cycle). Conclusions and Recommendations. Accessed at: http://www.oecd .org/dataoecd/ 19/56/2432829.pdf. on 04/02/11

Pacione, M. (2005). *Urban geography, a global perspective* (2nd Ed). London and New York: Taylor & Francis Group.

Palmer, P. (2005). *Definition of waste.* Accessed at: http://www.interleaves.org/recycling/wastedef.htlm. on 20/08/11

Poswa, T.T. (2000). *A holistic investigation into the effect of social and demographic factors in the planning of a domestic solid waste management system in urban areas.*Cape Town: Kindle Group.

Pred, A. (1967) *Behaviour and location*. London, Royal University of London

Rahman, M., Salequzzaman, Md., Bahar, M., Uddin, N., Islam, A. and al Hrun, A.Y., (2005). *People's perception of the existing solid waste management of Khulna City Corporation (KCC) Area: A case study of participatory management.* Centre for Advanced Studies, Bangladesh.

Raj, S.C. (2000). *An overview of solid waste management in Pacific Island Countries.* Biennial Conference and Exhibition 5-7 September. Somerset West, Cape Town, South Africa.

Sarantakos, S., (2006), Social Research (3rd Ed). London: Macmillan Press Ltd.

Songore, J. (2004). *Urbanisation and health in Africa*: *Exploring the Interconnections between poverty, inequality and the burden of diseases*. Accra, Ghana Universities Press.

Sood, D. (2004). *Solid waste management study for Freetown, Sierra Leone*.

Accessed at:http://www.surreywasteinfo/communities/action. on 12/07/2011.

Tamakloe, W. (2008). State of Ghana's environment: Challenges, compliance and enforcement. *Journal of Waste Management*. 4, 17-21.

Tannerfeldt, G. and Ljung, P. (2006). *More urban, less poor: An introduction tourban development and management*. London, Earthscan

Telfer, D. (2002). *Tourism and development: Change and challenge of Tourism in Kenya*. Leiden: Ashgate.

The New Shorter Oxford English Dictionary (2007). Sixth Edition. Oxford University Press.

United Kingdom (UK) Environment Council, (2000). The wasteguide: Stakeholders'guide to sustainable waste management. London Environment Council.

United Nations Environmental Programme (UNEP) (2009). Developing integrated solidwaste management plan: Training manual (2).Osaka/Shiga, Japan.

United States Postal Service (USPS) (2000). Solid waste management plan in Timphu City. Bhutan: Urban Sector Programme support secretariat.

Warner, W.S. (2006).*Cultural influences that affect the acceptance of compost toilets, psychology, religion and gender*. Norway: Jordforsk Centre for Soil and Environmental Research

World Bank (2000). *What a waste! solid waste management in Asia*. Accessed at: http://www.bvsde.paho.org/bvdsacd/cd48/wasteasia.

pdf. on 23/05/07

World Health Organisation (WHO) (2006).Guidelines for the safe use of waste water, and excreta. Geneva: World Health Organisation.

Wortman, C.B., Laftus, E.F., Marshall, M.E., (1992). *Psychology.* New York USA: McGraw-Hill, Inc.

Zerbock, O. (2003). *Urban solid waste management: Waste reduction in developing nations*. Accessed at www.cee.mtu.edu.on 18/092011.

Zurbrugg, C. (2002). Solid waste management in developing countries. Accessed at: http://www.sandec.ch/SolidWaste/ Document/04-SW-Management/Basics_of_SWM.pdf. on 12/02/11

APPENDICES

APPENDIX 1

UNVERSITY OF CAPE COAST

INSTITUTE FOR DEVELOPMENT STUDIES

"Residents perceptions and attitudes towards urban solid waste management in the Berekum Municipality".

Sir/Madam,

QUESTIONNAIRE FOR HOUSEHOLDS

This research is being undertaken to seek your views on residents' perceptions and attitudes towards urban solid waste disposal and management in the municipality. I shall be grateful if you participated in the research by answering the following questions and any information provided would be treated as confidential as possible. Thank you. Richard Agyapong. (MA Environmental Management and Policy).

SECTION A: demographic characteristics of respondents

INSTRUCTION: Please tick [√] or respond appropriately.

1. Sex (a) Male [ ] (b) Female [ ]
2. Age? (a) Less than 19 years [ ] (b) 20 – 25 years [ ] (c) 26 – 30 year [ ] (d) 31 – 35 years [ ] (e) 36 – 40 year [ ]
   (f) 41 – 45 [ ] (g) 46 – 50 [ ]
   (h) 51- 55 years [ ] (i) 56 – 60 year [ ] (j) 61 and above [ ]
3. Indicate the community in which you live? (a) Apraku quarters [ ](b) Continental [ ]

(c) New Biadan [ ] (d) Ahenboboano [ ] (e) Amangoase [ ] (f) Amankokwaa [ ]

4. For how long have you live in this neighbourhood?

   (a) Less than 1 year [ ] (b) 1 – 5 years [ ] (c) 6 – 10 years [ ]

   (d) 11 – 15 years [ ]

   (e) 16 – 20 years [ ] (f) 21 years and above [ ]

5. Please indicate your highest level of education?

   (a) None [ ] (b) Primary/ Middle/Junior high [ ]

   (c) Secondary/Voc/technical [ ] (d) Post secondary/tertiary

   (Non Tertiary) [ ](e) Tertiary [ ]

6. Occupational status? (a)Unemployed [ ] (b) Farmer [ ] (c) Trader [ ] (d) Artisan [ ] (e) Civil /public servant [(f) Housewife [ ] (g) Retiree [ ]

   Others specify.....

7. Marital status? (a) Single [ ] (b) Married [ ] (c) Divorced [ ] (d) Separated [ ] (e)Widowed [ ]

8. What is the size of your household? (Number of persons in household)

   (a) Below 3 (b) 4 (c) 5 (d) 6 (e) 7 (f) 8 (g) 9 (h) 10

9. Which of the following income brackets per month will you place yourself?

   (a) Less than GH 50 [ ] (b) GH 50 – 100 [ ] (c) GH 101 – 200 [ ]

   (d) GH 201 – 300 [ ] (e) GH 301 – 400 [ ] (F) GH 401 and above [ ]

Section B: Household solid waste management practices

10. How much waste do you generate in a day (bucket size 34)? (a) ¼ [

    (b) ½ [ ] (c) ¾ [ ] (d) 1 [ ] (e) More than one [ ]

Others specify.....

11. Which of the following types of waste do you generate most in your home? (a) Food wastes [ ] (b) Rubbish [ ] (c) Ashes [ ] (d) Plastic waste [ ]

Others specify: .....

12. Which container does your household use for storing solid waste? (a) Metal container [ ] (b) Plastic container [ ] (c) Carton container [(d) Plastic bag [ ] (e) We do not have a container [ ]

Others specify…….....

13. How many times is your container usually taken out to be emptied? (a) Once a day [ ](b) Twice a day [ ] (c) Once every three days [ ] (d) Once a week [ ] (e) Twice a week [ ]

14. Who usually takes the container with its waste contents out to be emptied? (a)Any male adult [ ] (b) Any female adult [ ] (c) Any child between the ages of 13 and 18 [ ] (e) Any child between the ages of 6 and 12 [ ]

Others specify…….....

15. Where is your container taken to be emptied? (a) Container placed beside the road [ ] (b)Larger container in the same building [ ] (c) Communal container in the neighbourhood [ ] (d)Open dump in the neighbourhood[ ] (e) Final disposal site [ ]

16. If your container is emptied into a communal container in the neighbourhood, how often is that container emptied? (a) Once a week [ ] (b) twice a week [ ] (c) Once every two weeks [ ] (d) Once every three weeks [ ] (e) Once every month [ ] (f) Don't know [ ]

Others specify.....

17. How many minutes does it take you to get to the dump site? (a)Less than 5 minutes [ ] (b) 5 – 10 minutes [ ] (c) 11 – 15 minutes [ ] (d) 16 – 20 minutes [ ] (e) 21 – 25 minutes [ ] (f) More than 25 minutes [ ]

18. If your container is emptied onto an open waste in the neighbourhood, how often is that pile removed? (a)Daily [ ] (b) Once a week [ ] (c) Twice a week [ ] (d) Three times a week [ ] (e) Once a month [ ] (f) Don't know [ ]

Others specify.....

19. Who collects the waste from the communal container, or pile?

(a) Local government [ ] (b) Municipal Assembly [ ]

(c) Neighbourhood group [ ] (d) Private company [ ] (e) Don't know [ ]

Others specify.....

20. Where is the collected waste taken to for a final disposal when it leaves your neighbourhood? (a) Designated dump site [ ] (b) Open bush [ ] (c) Landfill site [ ] (d) Don't know [ ]

Others specify.....

21. Are you concerned about whether the final disposal site is environmentally safe and acceptable? (a)Very concerned [ ] (b) Concerned [ ] (c) Not concerned [ ] (d) Not at all concerned [ ]

22. In your own view, what four ways do you suggest to be the most effective way of managing solid waste in your area? (a)…….....

(b)..... (c)..... (d).....

Section C: Residents' perceptions and attitudes

23. What is the most serious environmental problem in your community? (a) Toilet [ ] (b) Noise [ ] (c) Pollution [ ] (d) Water [ ] (e) Solid waste [ ] (f) Liquid waste [ ]

Others specify.....

24. Do you consider solid waste as a serious problem in your community?

(a) Yes [ ] (b) No [ ]

25. If yes, how serious is it? (a) Extremely serious [ ] (b) Quite serious [ ] (c) Slightly serious [ ] (d) Not at all serious [ ] (e) Don't know

26. How do you expect the waste management problem to be in the next five years? (a)More serious [ ] (b) Quite serious [ ] (c) The same [ ] (d) Less serious [ ] (e) Don't know/no option [ ]

27. How concerned are you in dealing with the solid waste problem? (a) Very concerned [ ](b) Concerned [ ] (c) Not concerned [ ] (d) Not at all concerned [ ]

28. How favourable are the following waste management options? Please circle the number that corresponds to your opinion.

Key: VUS=Very Unsuitable, US=Unsuitable, N=Non of the options, S=Suitable, VS=Very Suitable

Options	VUS	US	N	S	VS
Open burning	1	2	3	4	5
Land filling	1	2	3	4	5
Community dump sites	1	2	3	4	5
Pay as you dump programme	1	2	3	4	5
Communal container	1	2	3	4	5

29. Why do some people in your locality dispose of waste at unauthorized places? (a) Inadequate bins [ ] (b) No dump sites [ ] (c) Long distance from dump sites [ ] (d) Don't know [ ] Others specify.....

30. What sanctions are given to people who throw waste indiscriminately in the municipality? (a) Fine [ ] (b) Imprisonment [ ] (c) Both fine and imprisonment [ ] (d) Don't know [ ]

Others specify.....

31. Do you organise clean-up exercise in your community? (a) Yes[ ] (b) No [ ]

32. If yes, how frequent is community clean-up exercise organised in your locality? (a) Very frequent [ ] (b) Frequent [ ] (c) Not frequent [ ] (d) Not very frequent [ ]

33. How involved are you during clean-up exercise? (a) High [ ] (b) Moderate[ ] (c) Low[ ]

34. Do most residents in your locality participate in community clean-up exercise? (a)Yes [ ] (b) No [ ]

Section D: Residents' willingness-to-pay

35. Are you provided with waste collection services in your locality? (a) Yes [ ] (b) No [ ]

36. For how many years has this type of waste collection service been provided to your household? (a) Less than one year [ ] (b) 1-2 years [ ] (c) 2-3 years [ ] (d) 3-4 years [ ] (e) Don't know [ ]

Others specify.....

37. Do you pay for the waste services provided to you? (a)Yes [ ] (b) No [ ]

38. If yes, how much do you pay?.....

39. What is your level of satisfaction with the waste collection services rendered to you? (a)Very unsatisfied[ ] (b) Unsatisfied [ ] (c) uncertain/undecided [ ] (d) Satisfied [ ](e) Very satisfied [ ]

40. If you are not satisfied with the service, would you state your primary reason? (a) Collection not frequent[ ] (b) inadequate collection bins [ ] (c)Poor attitude of workers [ ] (d) smaller size of collection bins [ ]

(e) Long distance between my house and disposal site [ ]

Others specify.....

41. Do you want the services to continue? (a) Yes [ ] (b) No [ ]

42. Are you willing to pay some high amounts for improved services render to you? (a) Yes [ ] (b) No [ ]

43. How much are you willing to pay in addition to the present amount? Please state.....

44. If you are not willing to pay what is your reason? (a) I am not working [ ] (b) I pay tax [ ] (c) My income is less [ ] (d) I don't see the need [ ] (e) It is the responsibility of government[ ]

Others specify.....

APPENDIX 2

UNIVERSITY OF CAPE COAST

INSTITUTE FOR DEVELOPMENT STUDIES

MODERATOR'S GUIDE FOR INDEPTH INTERVIEW OF KEY INFORMANTS

"Residents attitudes and perceptions towards urban solid waste management in the Berekum Municipality".

OFFICIALS OF WASTE MANAGEMENT DEPARTMENT OF THE BEREKUM MUNICIPAL ASSEMBLY

Date of interview……..

Place of interview…….....

Respondent's gender…….....

Respondent's position/title…….....

This study is being undertaken to seek your views on resident's attitudes and perceptions towards urban solid waste disposal and management in the municipality. Any information provided would be treated as confidential as possible. I shall be grateful if you participated in the research by answering the following questions as frankly and openly as you can. Thank you. Richard Agyapong. (MA Environmental Management and Policy).

1. What is the most serious environmental problem in the municipality?
2. Do you consider solid waste as a serious problem? Please explain
3. Which institutions are involved in the solid waste management in the municipality?
4. What kind of waste is mostly generated by residents?

5. Are you able to determine the amount of waste generated in a day? Please explain.
6. What is your own department's role in waste management?
7. How do you presently perceive the magnitude solid of waste management problem in the municipality?
8. Why do people throw waste indiscriminately in the municipality?
9. Is poor attitude a major problem in waste management in the municipality?
10. How are you dealing with it?
11. How often do you carry out public education on waste disposal and management?
12. Which areas do you provide waste collection services?
13. What considerations influence your decision to serve or not to serve an area?
14. How will you describe public attitude towards waste management in the municipality?
15. Is there existence of by-laws for waste management?
16. What are the levels of enforcement for the by-laws?
17. Have communities around the disposal facilities complained of any nuisances? Please explain
18. What measures have you put in place to deal with the situation?
19. Do residents pay for the waste management services rendered to them? Please explain
20. Would you like to make any other comments or ask questions in relation to this discussion?

INTERVIEW GUIDE FOR PRIVATE WASTE COMPANIES

Date of interview…….

Place of interview……

Gender of respondent……

Position/title of respondent……

This research is being undertaken to seek your views on resident's attitudes and perceptions towards urban solid waste disposal and management in the municipality. Any information provided would be treated as confidential as possible. I shall be grateful if you participated in this research by answering the following questions as frankly and openly as you can. Thank you. Richard Agyapong. (MA Environmental Management and Policy).

1. Do you consider solid waste as a serious problem? Please explain
2. What kind of waste is mostly generated by residents?
3. What is your level of involvement in the management of solid waste in the municipality?
4. Are you able to determine the amount of waste generated in a day? Please explain.
5. How will you describe public attitude towards waste disposal in this city?
6. How do you presently perceive the magnitude of solid waste management problem in the municipality?
7. Why do people throw waste indiscriminately in the municipality?
8. How does poor attitude of people affect your operations in solid waste management in the municipality?
9. How are you dealing with it?

10. What do you consider to be the reason for people's habit of littering waste in the city?
11. How often do you carry out public education on waste disposal and management?
12. Which areas do you provide waste collection services?
13. What considerations influence your decision to serve or not to serve an area?
14. How do you acquire equipment for waste management and who provides them?
15. What equipment do you have for waste management operations?
16. What equipment do you lack? Please explain
17. What proportion of the required funds are you able to acquire?
18. What are the potential sources where you could generate additional funds?
19. What categories of staff are employed in the waste department?
20. Would you like to make any other comments or ask questions in relation to this discussion?

INTERVIEW GUIDE FOR CHIEFS AND ASSEMBLY MEMBERS OF THE BEREKUM MUNICIPALITY

Date of interview…….....

Place of interview…….....

Gender of respondent…….....

Position/title of respondent…….....

This study is being undertaken to seek your views on resident's attitudes and perceptions towards urban solid waste disposal and management in the municipality. Any information provided would be treated as confidential as possible. I shall be grateful if you participated in this research by answering the following questions as frankly and openly as you can. Thank you. Richard Agyapong. (MA Environmental Management and Policy).

Section A: Background information

1. Name of Community.....

2. Position/Status.....

3. Sex: Male [ ] Female [ ]

4. Level of education? (a) No formal education [ ] (b) Basic education [ ]

(c) Secondary/voc/ tech education [ ] (d) Tertiary education [ ]

5. Occupation.....

6. Marital status? (a) Single [ ] (b) Married [ ] (c) Divorced [ ] (d) Separated [ ]

(e) Widowed [ ]

7. For how long have you lived in this community? (a) Less than 4 years [ ]

(b) 5 – 9 years [ ] (c) 10 – 14 years [ ] (d) 15 – 19 years [ ]

(e) 20 and above [ ]

8. Is the private sector involved in solid waste management in this city?

(a) Yes [ ] (b) No [ ]

9. If yes, what aspect of the waste management is handled by private sector? (a) Collection only [ ] (b) Recycling only [ ] (c) Site maintenance only [ ] (d) Collection and recycling [ ]

(e) Collection and site maintenance [ ] (f) Recycling and site maintenance [ ] (g)Collection, recycling and site maintenance [ ]

10. Which areas of the city are covered by private sector operations? (a) Whole cite [ ] (b) High income areas [ ] (c) Middle income areas [ ] (d) Low income areas [ ] (e) Public commercial areas

11. What do you consider to be the major constraints to waste management in the city?

12. How would you describe the performance of the private waste companies?

13. Would you say there is adequate commitment by residents to waste management in this city? Please explain

14. Is poor attitudes of people the cause of waste problem in this city? Please explain

15. What are you doing to deal with the problem?

16. How do you presently perceive the magnitude of the waste management problem in your community?

17. What do you consider to be the reason for people's habit of littering waste in the city?

18. How can waste management be improved in this city?

19. How satisfied are you with the waste management services provided by the assembly and the waste management companies?

20. Would you like to make any other comments or ask questions in relation to this discussion?