

**REGIONAL INSTITUTE FOR POPULATION STUDIES AT  
THE UNIVERSITY OF GHANA, LEGON**

**HOUSING AND HOUSEHOLD CHARACTERISTICS AND  
PAYMENT FOR SOLID WASTE DISPOSAL IN THE  
GREATER ACCRA REGION, GHANA**

**BY**

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## ACCEPTANCE

Accepted by the Faculty of Social Sciences, University of Ghana, Legon in partial fulfillment of the requirement for the award of Master of Arts in Population Studies.

**Supervisor of thesis**



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Prof. Samuel N.A. Codjoe

**Date**

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## DECLARATION

I, Jones Agyapong Frimpong hereby declare that except for duly cited references, this is the result of my original research under the supervision of Professor Samuel Nii Ardey Codjoe and has neither in part nor in whole been presented for the award of another degree anywhere.

**Jones Agyapong Frimpong** .....

**Date** .....



## DEDICATION

This thesis is dedicated to my sweet wife Patience Oforiwaa Frimpong and my lovely mother Grace Anima Kankam.



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## ABSTRACT

Rapid urbanisation, population growth, introduction of environmentally unfriendly materials like plastics and changing lifestyles have created serious environmental problems in most districts and localities within the Greater Accra Region especially in the area of solid waste disposal, management and financing. This study analyses the factors that influence household's payment for solid waste disposal in the Greater Accra Region of Ghana.

Using the Ghana Living Standard Survey data set, 2006, a total of 1, 257 households were selected for the study. A binary logistic model was employed to estimate household payment for solid waste disposal.

The results indicated that all the variables but the household size had significant influence on respondents' payment for waste disposal at the bivariate level of analyses. However, only type of dwelling, place of residence and wealth quintile were significant at the binary logistic analysis level. The study further revealed that a larger segment of households in the high-wealth quintile bracket subscribe mostly to waste disposal methods that are paid for. The study, therefore, opines the need for increase in budgetary allocations to the various District Assemblies in the region. Subsequently, there is the need for the various District Assemblies to consider adopting an economic funding model by raising fees on high-income households to cover the services of low-income neighborhoods to facilitate broad service coverage.

# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND OF THE STUDY

Events in the 21<sup>st</sup> century clearly indicate that waste in whatever form of classification: solid, liquid or toxic, has become a major consequence of modernization and economic development (Mahamadu, 2011). Waste basically connotes an unavoidable consequence of the consumption and productive activities of man and the generation of these wastes, both domestic and industrial continues to increase globally due to technological advancement, rapid rate of urbanization, increasing population growth rates and growth in human consumption patterns (Aklilu, 2002). Hanley (2001) simply defines waste as almost anything that has served its original intended purpose and is being discarded or stored prior to being discarded, thus, in essence there is no human endeavour that does not result in waste creation. All survival and life-improving activities go with the creation of one type of waste or the other, making waste everyone's business (Oteng-Ababio, 2010). Solid wastes by definition include refuse from households, non-hazardous solid waste from industrial and commercial establishments, refuse from institutions, market waste, yard waste, and street sweepings (Tadesse, 2004).

Economic development and rising living standards globally, have further led to increases in the quantity and complexity of generated waste, whilst industrial diversification and the provision of expanded health-care

facilities have added substantial quantities of industrial hazardous waste and biomedical waste into the waste stream with potentially severe environmental and human health consequences (World Bank, 1999). In general, the developed countries generate much higher quantities of waste per capita compared to the developing countries. In Europe, over 1.8 billion tonnes of waste are generated each year which equals 3.5 tonnes per person. This is mainly made up of waste coming from households, commercial activities, industry, agriculture, construction and demolition projects, mining and quarrying activities and from the generation of energy (Alhassan, 2012). On the income threshold, high-income countries produce between 1.1 kg and 5.0 kg per capita per day; middle-income countries generate between 0.52 kg and 1.0 kg per capita per day, whilst low-income countries have generation rates ranging between 0.45 kg and 0.89 kg per capita per day (Oteng-Ababio, 2010). This buttresses the fact that waste generation increases with increasing development and industrialisation.

The African situation is no different. Many environmental problems are increasing at alarming rates one of which is increasing solid waste generation. According to Regassa et al (2011), solid waste generation in the city of Addis Ababa increased from 482,550 m<sup>3</sup> in 1987 to 787,305 m<sup>3</sup> in 1998 and currently stands at 1,024,010 m<sup>3</sup> per year. This situation in the city of Addis Ababa paints a true picture of what pertains in most developing and especially in many African countries. These increases in waste generation all over Africa, however, do not correspond to adequate waste management initiatives (Sheehan et al., 2006). Between 20 percent and 80 percent of solid waste in African cities is disposed of by dumping in open spaces, water

bodies, and surface drains as a result of inadequate infrastructure (UNEP, 1999).

According to Amoah-Twum (2006), Ghana generates an average daily solid waste of 0.45 kilogram per capita, culminating into about three million tonnes of solid waste annually. This presents a more difficult problem for many cities, towns and villages in Ghana in terms of managing solid waste. The mere volumes and quantities of waste generated is not so much the problem, but the consequences thereafter. The waste management challenge in Ghana and by extension the Greater Accra Region can be described as having reached a crisis point (Anomanyo, 2004). The region is faced with the problem of rapid expansion due to population increase and massive urbanisation and this, no doubt, has brought increasing strain on waste-related infrastructural facilities. One area in which this strain has become obvious is in waste generation, disposal and management where the existing system appears to be incapable of coping with the heap of waste generated on daily basis. The urban areas within the region including Accra, Tema and Ashaiman are experiencing an increased rate of environmental deterioration, with refuse dumped along drainage channels (Oteng-Ababio, 2012).

In 1998, solid waste generated in the capital city, Accra, which is also within the study region was estimated at 765,000 m<sup>3</sup> and that of liquid waste 75,000 m<sup>3</sup>. The total quantity of solid waste collected in the same year in Accra was 669,000 m<sup>3</sup>, implying that around 96,000 m<sup>3</sup> of the waste was unaccounted for. As at December 2002, the total volume of solid waste generated in Accra was between 500 and 1,800 tonnes per day out of which only 1,200 tonnes was disposed on the average (Mahamadu, 2011). Presently,

the tonnage of waste collected is about 1000 - 1200 tonnes and up to 1300 tonnes depending on the season. This trend reflects the general waste generation and collection patterns within the Greater Accra Region.

Critical to solving the waste problem in the region, the principle of paying for solid waste disposal also known as pay as you throw was introduced as a variable rate or unit based pricing charged to customers based on the amount of solid waste they discard. This strategy for pricing local solid waste collection and disposal services is analogous to that used by local utilities for electricity, gas, water, and sanitary sewerage services where customers pay for what they use, except in this case, citizens pay for how much they throw away (Robin Jenkins et al, 2000).

This system has been in operation in Ghana barely a decade and was prompted by the need to tackle the indiscriminate disposal of waste by persuading citizens to pay for solid waste collection and disposal based on the volume of waste discarded. The question that arises then is why adopt this method of financing and abandon reliance on local taxes as the primary funding mechanism, especially when many citizens might conclude that they must now pay for a service previously “free”. There are several purported benefits of payment for solid waste disposal, key amongst them being to reduce solid waste collection and disposal costs for the community, reduce the volume of waste generated by households, and increase the levels of solid waste recycling and composting (Canterbury 1998).

Further, a key component in studying waste generation and payment for waste disposal thereof is the housing characteristic of the household, the individual and household per capita income, the educational level of the

household head, and the size of a given household. This further lends itself to the age, sex and place of residence of a household head in a given household. For example, Van Beukering et al (1999) identified four socio-demographic factors that were of greatest relevance in modelling waste arisings: size of household, a composite variable called ‘family life cycle’, whether or not the head of the household was a male or a female and type of housing tenure. This is because household characteristics including age and family status tend to influence the rate of household formation and waste generation, which in turn, is a key driver of waste disposal and management (GSS 2005, p. 15). Gilbert (2008) notes that rental housing is a vital option and indeed, one in three urban dwellers across the globe (around one billion) are tenants. This dwelling type comes with its difficulties in terms of facilities, especially waste disposal facilities. According to him, even though many factors influence metropolitan solid waste management, population size is an important factor and there exists a positive correlation between city population size, the percentage of waste moved and the rate of households enjoying regular waste collection. This suggests that increasing city size poses a greater problem to solid waste disposal.

## **1.2 Statement of the Problem**

The most challenging issue in most urbanized regions has to do with tackling problems pertaining to waste management. For instance, the Friday, December 13, 1966 edition of the Daily Graphic in a caption “Poor Sanitation threatens lives in Accra” vividly painted a disturbing picture of waste disposal situation in the city. The opening paragraph of the article stated that “Accra is rapidly becoming one big refuse dump. Refuse is thrown almost everywhere

and it is left there to pile up into mounds”. The second paragraph continued that “the drains are not cleaned and some are so sand-logged that they overflow whenever there is little rain” (Mahamadu, 2011). If in 1966 it was said that Accra was becoming a refuse dump, the city has indeed become so in the present time in view of the fact that nothing significant has since been done to correct the factors that led to the problem even then. By extension, Accra vividly provides evidence of what pertains in the entire Greater Accra Region.

The various districts within the region including the Accra Metropolitan Assembly (AMA), Tema Metropolitan Assembly (TMA), Adenta Municipal, Ashaiman Municipal and so forth have made several attempts at addressing the waste menace which is on the rise as a result of high rate of urbanisation in the region. The cities’ by-laws and policies on waste and sanitation seek to address the waste challenge in its entirety on individual basis. The assemblies, among their efforts and strategies, have contracted some waste companies to handle waste collection and have also been implementing the polluter-pays principle to get individuals to pay for waste management services. Furthermore, some effort is being made to educate the public and create some level of awareness to enable members of the public to play a role in reducing waste and handling waste efficiently (Awunyo et al, 2012).

However, the level of achievement of this objective leaves much to be desired as there is the presence of piles of wastes on the streets, market centres, campuses, gutters and homes. Unattended solid wastes are threatening the lives of millions in the region. It has resulted not only in an unpleasant and

often unsafe environment to live or work in but also a potential source of fire hazard. Unattended waste lying around attracts flies, rats, and other creatures that in turn spread diseases in addition to non-negligible economic burden on the residents (Oteng-Ababio, 2012). Since solid wastes ferment, they create conditions favorable to the survival and growth of microbial pathogens which in turn contribute to the creation and spread of variety of diseases. Especially, solid waste dumped directly into water bodies (rivers, ponds, seas, lakes) causes contamination of the water bodies and results in the accumulation of toxic substances in the food chain through the plants and animals that feed on it.

To these effects, there are a number of diseases associated with improper waste handling. Among others, skin and blood infections resulting from direct contact with waste, eye and respiratory infections resulting from exposure to infected dust, different intestinal diseases that result from the bites, infections that are transmitted by flies feeding on the waste, and risk of cancer associated with exposure to hazardous dust wastes (Kosuke, 2005). This is a health hazard for all inhabitants especially for children in deprived neighbourhoods who play on these streets and open grounds contaminated by dirt-bearing refuse or in stagnant pools (Cuentro et al, 1990, p.169). The most pressing environmental health problems today, in terms of deaths and illness worldwide are those associated with poor home and neighbourhood environments in developing countries. According to WHO and the World Bank, environmental improvements at the household and community level could lower the incidence of major killer diseases by up to 40% globally, (World Resources Institute, UNEP, UNDP and World Bank, 1998, p.75). The 1993 World

Development Report which focused on health also estimated that improving household environments could avert the annual loss of almost 80 million 'disability-free' years of human life more than the feasible improvement attributable to all other identified environmental measures combined (McGranahan, Songsore and Kjellen, 1996, pp.111). These health problems have serious implications for the current and future human capital of the region and by extension the whole country and in the long run impacts negatively on economic development.

Indiscriminate disposal of waste which is the most adopted household means of waste disposal in most parts of the region is inextricably linked to health, both physical and mental illness through direct and indirect pathways (Shaw M., 2004). The wealth of any nation is determined to a large extent by the strength of its human resource and the strength of a nation's human capital directly affects its productivity and ability to be competitive with international markets. However, one cannot speak of achieving a strong human capital without improving health of people and promoting health equity. An increasing body of evidence has associated wrongful waste disposal with morbidity from infectious diseases, chronic illnesses, injuries, poor nutrition, and mental disorders. The recent increases in cases of cholera and other related diseases in the region especially within the major cities including Accra and Tema have highlighted the importance of inefficient management of waste. It is also estimated that 60 percent of diseases reported at the out-patients departments of the health institutions in the country are directly linked to poor environmental sanitation ((Post, 1999). Sporadic outbreaks of cholera, typhoid and the endemic nature of malaria including the annual rituals of

flooding in Accra and other cities all point to poor or inadequate waste disposal. It has been noted that inability of the various District Assemblies to maintain the environment through proper waste management systems is one of the threats to massive economic growth. If a more positive attitude to waste management is in place, all the huge sums of money the District Assemblies pay to ensure a certain minimum level of appropriate waste collection and disposal could be put to more productive ventures (Oteng-Ababio, 2012).

In Ghana serious environmental problems arise in and around people's homes, often creating health hazards. Inadequate sanitation and uncollected solid wastes are correlated with urban poverty and lack of environmental services. Many people especially women, children and the elderly, spend much of their time close to the home and as such their health is directly threatened. The health implications resulting from housing conditions and waste disposal cannot be over emphasised since it impacts directly on the human resource of the country through loss of man hours and complete loss of competent human capital through morbidity and mortality. Most District Assemblies in the region channel 50-70 percent of their budget into disposal and management of wastes. In Accra, solid waste haulage alone costs the Assembly GH¢450,000 (US\$237,340) a month, with an extra GH¢240,000 (US\$163,910) spent to maintain dump sites (Oteng-Ababio, 2010a). These huge amounts render the Assemblies financially incapacitated to extensively embark on development projects which further have implications for the development of the Assemblies and the nation at large. If Ghana is to achieve its targets under the United Nations Millennium Development Goals especially (MDG 7, on environmental sustainability) then much needs to be

done in the area of waste management in improving upon the current sanitation and thus the health of the people.

The health, economic, and environmental impacts of solid wastes are sufficient reasons to compel concerned areas (Institutions) to adopt an integrated and continuing effort to improve solid waste disposal practices. Therefore, preventing excessive solid waste by taking certain preventive measures is a must (Songsore et al, 2003).

Against this background, the study responds to the following questions;

- i. Does housing characteristics determine payment for solid waste disposal?
- ii. What are the effects of selected household characteristics on payment for solid waste disposal?
- iii. What are some of the plausible reasons for these impacts and associations between housing and household characteristics and disposal of solid waste?

### **1.3. Objectives**

The primary objective of the study was to investigate how housing and household characteristics predict payment for solid waste disposal methods in the Greater Accra Region of Ghana;

Specifically, the study:

- i. Describes the housing and household characteristics in the Greater Accra region;

- ii. Assesses how housing characteristics influence payment for solid waste disposal methods;
- iii. Assesses the impact of household characteristics on the payment for solid waste disposal methods;
- iv. Makes recommendation(s) to inform policy.

#### **1.4 Rationale/Justification of the Study**

In the past, attempts to improve waste disposal and management especially in cities have focussed on the technical aspects of different means of collection and disposal (World Bank, 1992). More attention has now been paid to enhancing institutional arrangements for service delivery, with special emphasis on economic incentives to encourage better behaviour that acknowledges the underlying self-interested nature of human beings. These institutional arrangements include privatisation of waste collection services, which previously were largely undertaken by Metropolitan, Municipal and District Assemblies. However, a major problem has been the generally slow pace at which the private sector is developing with respect to the management and disposal of solid waste. For example, after over 10 years of private sector participation in waste management in the region, the private sector has not expanded their operations to include recycling and composting but has restricted their operations to just solid waste collection and landfill disposal (Oteng-Ababio, 2012).

Over the years, Ghana has not enacted any specific waste law that solely controls activities of waste management. However, general regulations and frameworks that embrace issues of waste management include Local

Government Act (1994), Act 462; the Environmental Protection Agency Act (1994), Act 490; the Pesticides Control and Management Act (1996), Act 528; the Environmental Assessment Regulations 1999, (LI 1652); the Environmental Sanitation Policy of Ghana (1999); the Guidelines for the Development and Management of Landfills in Ghana; and the Guidelines for Bio-medical Waste (NDPC, 2008). Despite all these laws in place to direct affairs in the waste management process, they seem not deterrent enough in ensuring clean, safe and healthy environment possibly due to lack of general enforcement and follow-ups.

Further, the literature on economic valuation or payment for improved waste management in Ghana and in the region is rather sketchy. The Government has for about a decade introduced the principle of “polluter pays” whereby industries and households are required to pay fully for the disposal of the waste they generate. It will be very helpful to know the extent to which households are willing to pay and how this will transcend into the larger picture of payment for waste management. The 2011 NDPC report on the implementation of the MDGs clearly indicate that Ghana is way off in its attempt to achieve MDG 7 on environment and sanitation. This makes the study very timely in trying to assess how increases in the coverage of payment for solid waste disposal can help the country to move close to achieving MDG seven (7).

## **1.5 Organisation of the Study**

The study is organized into seven chapters. Chapter one presents the background to the study, the statement of the problem, research questions, the objectives of the study, justification and organisation of the study. Chapter two

presents the review of related literature, the theoretical base of the study, the conceptual framework and definition of variables with Chapter three describing the various methods that were employed in the study which comprise the study population, data sources, research design and sample size and methods of analysis. Chapter four presents the description of housing and household characteristics, whilst chapter five presents the interrelationships between the independent and dependent variables. Chapter six presents the logistic regression analysis of the study. Chapter seven summarises the entire study and further presents conclusions and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

This Chapter reviews the literature as well as relevant works that have been done about the influence of housing and household characteristics in determining payment for solid waste disposal methods. Among the issues covered are; waste generation including the extent of indiscriminate disposal of waste, factors influencing waste generation as well as the willingness to pay for waste disposal services and finally disposal methods of waste.

The indiscriminate disposal of waste is not a new phenomenon the world over and the Greater Accra Region in particular, which persist till date, despite the long realisation of the consequences. According to Allotey (2011) it is safe to say, with regard to solid waste, that the amounts produced by each person every day and everywhere is increasing. This is as a result of social, economic and technological changes. In rural settlements solid waste generated are in modest quantities and therefore do not pose so much problems as in urban areas where the problem associated with waste is predominantly high. As cities grow, the problems caused by solid waste become enormous and Ghana, for that matter Accra, is not an exception. Many reasons can be assigned to the increase in the quantity of waste produced worldwide.

Allotey (2011) notes that the additional weight and volume of solid wastes has created and will continue to create many problems. The rapid urbanisation taking place in many countries uses up vast areas of land for

housing and industrial development. While more refuse is created by these developments, there is a shortage of land for purposes of waste disposal. Oteng-Ababio (2012) acknowledges that there are significant and disturbing changes in the characteristics and composition of wastes. Cost of collection, treatment and disposal is rising year by year and often represents a high proportion of municipal budget. Waste characteristics and per capita generation rates are two important parameters in designing any effective solid waste management programme. The generation rates vary depending on various factors. Normally developed countries produce more solid waste per capita compared to middle income and low income countries (United Nations Centre for Human Settlements, 1994). In order to plan the development of a waste management facility, therefore, the waste manager requires information about the quantities and types of waste that are generated within and around the municipality which may be included in the waste management plan including projected increases in quantities (Rushbrook and Pugh, 1999).

According to Hoornweg and Thomas (1999), population growth is one of the major causes of increase in solid waste volume in many cities. The problem is severe in cities of developing countries where about 0.76 million tons or approximately 2.7 million m<sup>3</sup> of municipal solid waste is produced per day. They further mention that higher living standard results in higher solid waste generation rate and change in waste characteristics. The presence of degradable organic compounds, moisture contents, particle size and composition, density and compressibility are some of the solid waste properties that play a major role in degradation rate in landfills.

Excessive packaging, though nice to the eyes, is as good as buying problems with money. In Ghana today, if you visit the market and buy five (5) items, you are likely to have as many as six (6) packaging materials. Each item is put in a polythene bag and all are then parceled again in a bigger bag. Food items including fufu and soup, oil, and many others are all packaged in plastics which end up in our environment and finally at the landfill site. These plastics are non-degradable materials and are known to remain in the ground for several years and contribute to soil infertility. Solid waste policies in most advanced countries are geared toward reducing waste volumes but this is not so in most developing countries especially Ghana (Hogarh, 2007).

In terms of pricing, Miranda et al (1994) examined 21 smaller cities with unit pricing that the authors admit are not nationally representative. They found out that waste generation decreased by 30% while the amount of tonnes landfilled decreased by an average of 40%, and the mean number of tonnes recycled increased by 126% after these communities adopted unit-pricing programmes. They also found that cities with a completely variable fee structure have a higher average level of reduction in waste landfilled compared to the two cities that had a multi-tier fee structure. The authors noted that they could not control for the effects of other policies or demographic factors on waste generation or recycling behavior because of their small sample size.

Bauer and Miranda (1996) studied 13 larger U.S. cities with unit pricing and found that this policy encouraged greater waste diversion (through recycling), but not necessarily greater waste reduction. While twelve of the cities in their study experienced recycling rates higher than the national

average, they found little evidence to suggest that unit pricing resulted in source reduction behaviour.

Fullerton and Kinnaman (1996) studied the responses to pricing garbage by the bag or container among 75 households in Charlottesville. The city operated a voluntary curbside recycling programme and required residents to purchase a \$.0.80 sticker to affix to each unit of garbage (approximately 32 gallons) set out for collection. Containers without stickers were not collected. The authors counted and weighed bags or cans of garbage and recyclables and found evidence to suggest that people generated somewhat less garbage, by weight, and recycled more after the sticker system was adopted. They also found that waste reduction was greater among households with higher incomes and that married residents were more likely to overstuff garbage receptacles to minimize disposal costs. Only a few residents disposed of waste illegally. They estimated that waste was reduced by 10 percent and concluded that the overall incremental benefit of unit pricing was small.

A study by Awunyo (2012) on urban willingness to pay for waste disposal services in Kumasi identified tenancy/housing arrangements as playing key a role in determining a household's willingness to pay for waste disposal services. Those living in their own houses were found to be more willing to pay for the improvement of waste management as compared to their tenants. This is because the house belongs to the owners and as such the cleanliness or otherwise of the house may have a higher value for their properties.

A study by Vermande and Ngnikam in 1994 in the city of Yaoundé, Cameroon, identified population size as playing a key role in waste generation

and disposal. According to them, there is a positive correlation between city population size, the percentage of waste moved and the rate of households enjoying regular waste collection. This suggests that increasing city size poses a greater problem to the solid waste. In a clinical example about the research in the city of Yaoundé, the statistics showed that the population had grown from 600, 000 thousand people in the 1960s to 1.2 million people in the 1990s. Not only did the quantities of the waste increase from about 300 tons to 1200 tons per day but also the variety.

Another study by Hoornweg and Thomas (1999), identified population growth as one of the major causes of increase in solid waste volume in many cities. The study categorically stated that the problem is severe in cities of developing countries where about 0.76 million tonnes or approximately 2.7 million m<sup>3</sup> of municipal solid waste is produced per day. They further mentioned that higher living standard results in higher solid waste generation rate and change in waste characteristics.

Tadesse et al (2007) undertook a study on the influence of demographic characteristics on waste disposal in Mikelle city, Ethiopia and discovered that demographic factors such as age, education and household size have an insignificant impact over choice of alternative waste disposal means whereas the supply of waste facilities significantly affects waste disposal choices. They further identified that higher income levels invariably decrease the propensity of disposing off waste indiscriminately.

Bisson (2002) in a study on attitudes to waste disposal methods by households discovered that the presence of solid waste disposal by households are influenced by factors such as socio-economic status of the household,

urbanity, supply of waste disposal infrastructure and regulation by the municipal authorities as key factors that influence waste disposal methods.

Rogat (1998), in a study in Santiago, Chile aimed at eliciting factors influencing willingness to pay for waste disposal interviewed one thousand households, half of which were interviewed in the summer season and the rest in winter. The results showed that willingness to pay for waste disposal was found to be affected by income, education, and degree of concern about future generation. Factors such as gender, age and whether individuals suffer from pollution-related diseases or not had lesser influence on the willingness to pay.

Further, a number of studies have identified and confirmed various variables to be influencing one's willingness to pay for waste disposal and management. Yusuf et al (2007), discovered in the state of Oyo, Nigeria that price of the service, age, educational level, household size and household's monthly expenditure affected the willingness to pay for waste management. Also, a survey by Massito in 2009 in residential areas in Dařes-Salaam, Tanzania identified income of the household, the bid value and the size of the household to be influential in determining willingness to pay for garbage collection.

In a separate survey by Rahji and Oloruntoba (2009) also found income, asset owned, education and occupation as defining factors that significantly and positively influence one's willingness to pay for waste management in Ibadan, Nigeria. The authors, however, found the coefficient of age to be negative and significant. Another study by Khattak et al in 2009 amongst urban dwellers in the Peshawar, realized that a household's size, income levels, and higher educational levels greatly determined household's

willingness to pay for better solid waste management. In another study, Ekere et al (2010) also found that in the Lake Victoria crescent region of Uganda, income of the household head, location of the household, gender of the household head, level of environmental concern, and age of the household head were significant in explaining the household's willingness to pay for waste management.

Banga et al (2011) remark that both the decision to pay and the amount households are willing to pay for improved solid waste collection services are influenced by income, education, age, and home ownership. This became evident in a study in Kampala, Uganda which also sought to find out factors influencing choice of waste disposal methods. This was confirmed by Mahanta and Das in 2011 in a similar study. In another study by Amiga in Addis Ababa, Ethiopia, in 2002, a further confirmation was made in the fact that income, time spent in the area, quantity of waste generated, responsibility of solid waste management, education, house ownership, number of children and age are very significant variables in explaining maximum willingness to pay for waste management. Finally, Adepoju and Salimonu (2002) also found in the Osun state, Nigeria that sex, household expenditure and years of education were statistically significant determinants in household's willingness to pay for waste management.

There are various methods for the final disposal of solid waste. Among these are crude dumping on land, barging to sea, incineration and controlled tipping (land filling for the purpose of land reclamation). Allotey (2011), however, maintains that open dumping of solid wastes on land, though considered unsanitary, is still the most common disposal practice, especially in

African countries. There are three generally accepted methods of treatment and disposal of solid waste; landfilling, incineration and recycling. Various hazards are associated with each method of disposal. However, when the necessary precautionary measures are put in place at the planning stage of the process, most of the hazards are minimised if not eliminated completely. The final disposal of solid waste, operation procedures, final cover system, after care, and after use of landfill depend on the waste characteristics.

Landfill is a form of disposal that causes many environmental impacts that are in need of addressing. A major effect of landfills is leachate, a contaminated liquid that percolates through the waste in a landfill and probably the most addressed issue. This contaminated liquid can soak into the ground and cause water contamination according to the Department of Agriculture and Life Sciences at Oklahoma State University, USA. Another effect of landfills is air pollution. Not only can air pollution from landfills contribute to acid rain and greenhouse gases but it can also have an impact on the citizens around it. Soil gas migration can cause a four-fold elevation of risk for bladder cancer and leukaemia among women, reported a study at the New York Health Department's website.

However, controlled landfill is the key to curbing these problems. This practice of controlled landfill is rarely applicable in most developing countries with few exceptions. Most of the cities dispose of their waste in open dumps which lack proper equipment and trained manpower for effective operation (Anomanyo, 2004).

The second form of waste disposal is incineration. This type of disposal releases many air pollutants to include lead, mercury, dioxin, sulfur

dioxide, hydrogen chloride, nitrogen dioxide, and particulate matter according to the Environmental Protection Agency. Gases such as sulfur dioxide and nitrogen dioxide contribute to acid rain and smog. The incinerators mainly contribute to air pollution but the ash left over from burning waste has to be buried in landfills thus contributing to ground pollution too.

The last waste management system is recycling. Recycling consists of processing used or abandoned materials for use in creating new products. This method was created to address issues created from the other two forms of waste management and has a positive impact on the environment. It helps to reduce the amount of waste needed for disposal by making a portion of it available for reuse. The obvious solution to handle solid waste is through recycling. There are many useful products that can be created from the recycling of glass, plastic, paper and many other items. The major factor that should be focused on is the recycling of paper. This is because paper contributes to 40 percent of a landfill's contents. Another aspect of recycling that should be focused on is the pay-as-you-throw program utilized in many cities today. The pay-as-you-throw program directly affects a consumer's wallet by charging for the amount of waste a consumer disposes of.

Considering solid waste (refuse) disposal in Ghana, Cunningham and Cunningham (2002) state that open, unregulated dumps are still the predominant method of waste disposal. Cunningham and Cunningham report that the third world megacities have enormous garbage problems. Solid waste delivery has evolved through various strategies and methods of collection under different political administrations, from local authority led delivery of services to private sector service delivery. Waste collection became a viable

venture from the early 1990s when the German Government supported the Accra Metropolitan Assembly to collect waste from various residential areas and the central business district (Asomani-Boateng, 1994). Collecting, transporting and disposing of Municipal Solid Waste (MSW) present formidable challenges for many third world cities which usually account for 30-50 percent of municipal operational budgets for collecting only 50-80 percent of the refuse generated (Medina, 2002).

The disposal of solid waste has always been an intractable problem throughout Ghana. Landfills in Ghana are primarily open dumps without gas recovery systems. Several landfills are located in ecological or hydrological sensitive areas. They are generally operated below the recommended standards of sanitary practice. Recycling facilities are not common and small incinerators have been provided in most hospitals for disposal of health care and hazardous waste. Open refuse dumps are most commonly located at the perimeter of major urban centres in open lots and wetland areas. The recent proliferation of plastic bags for packaging has seriously aggravated the negative impact of uncontrolled dumping creating very unsightly conditions. Generally, conditions in Ghana are very conducive for composting in terms of the waste composition and weather conditions. However, composting has never flourished as an option for refuse treatment and disposal. The only composting plant now operates for demonstration purposes.

In the Greater Accra Region, just like other regions in the country, responsibility for waste management is the responsibility of Metropolitan, Municipal and District Assemblies (MMDAs). This means that all waste deposited in the public domain is the property of the District Assembly. These

Assemblies are further required to ensure that they make available adequate sites for the present and future storage, treatment and disposal of wastes by identifying, acquiring, demarcating and protecting suitable areas for such purpose (MLG&RD, 1999). The Act of Parliament of the Republic of Ghana (1993), Act 462, Section 10, Subsection 3 (d and e), makes it mandatory for District Assemblies to initiate programmes for the development of basic infrastructure and provide municipal works and services and also be responsible for the development, improvement and management of human settlements and the environment in the district. The selection of a site for developing a landfill is, therefore, one of the most important decisions District Assemblies make in executing their waste management responsibilities. According to Rushbrook and Pugh (1999), the inadequate final disposal of solid waste thrives because of the mistaken belief that it is the cheapest disposal method. Depositing waste along roads and riverbanks or in abandoned quarries and hoping that the waste will go away is both naïve and dangerous.

This review has brought to the fore key determining factors influencing choice of waste disposal methods. These variables included housing types, population size (household size), income levels of households, sex of household head, educational status and so forth. These variables are applied to this study to test for how they influence a household's choice of subscribing to waste disposal methods that are paid for or those that are unpaid for.

## **2.2 Theoretical perspectives**

Global efforts at controlling and handling the menace posed by waste resulted in the development of the concept of the waste hierarchy with its

components emphasizing prevention, reduction, reusing, recovery and recycling and disposal. By hierarchy, waste prevention is the most preferred choice in the management process followed by waste reduction in that order of priority with disposal being the last resort. However, increasing population and urbanization, changes in lifestyle, consumption and financial problems become drivers that seem to down-play the potency and effectiveness of these options especially in the developing countries (Tadesse, 2007). The consequent effect is the generation of large volumes of waste raising issues of concern predominantly in the urban centres where socio-economic activities are at high peaks.

To safely dispose municipal solid waste is to minimize or prevent the danger it poses to environmental media and human health requires efficient application of waste treatment and disposal techniques. The techniques could be employed with or without energy recovery and these methods broadly include recycling (composting in terms of organic portion), incineration and land-filling. Despite the availability of such technical solutions, municipal solid waste still presents major environmental challenges partly due to financial constraints limiting highly engineered practices and lack of technological knowhow; a scenario with evidences clearly manifesting in poor countries. Considering these problems and available technologies, composting stands as the most simple and cost-effective recycling option for intercepting considerable volume of municipal solid organic waste on its way to landfills. The method has been identified to be one of the best opportunities for managing organic wastes (Rahji et. al., 2009). This assertion spells out the principal role that composting plays in a waste volume reduction process.

In view of this, promoting and opting to reintroduce an efficient composting programme to take care of the organic portion of waste as a means of reducing waste volume prior to disposal at landfills contributes significantly not only by saving landfill space required for disposal but also preventing the dangers posed by waste. This calls for support in various forms such as the provision of research studies providing and suggesting meaningful approaches to finding lasting solutions to improve on the existing situation if not solving it completely.

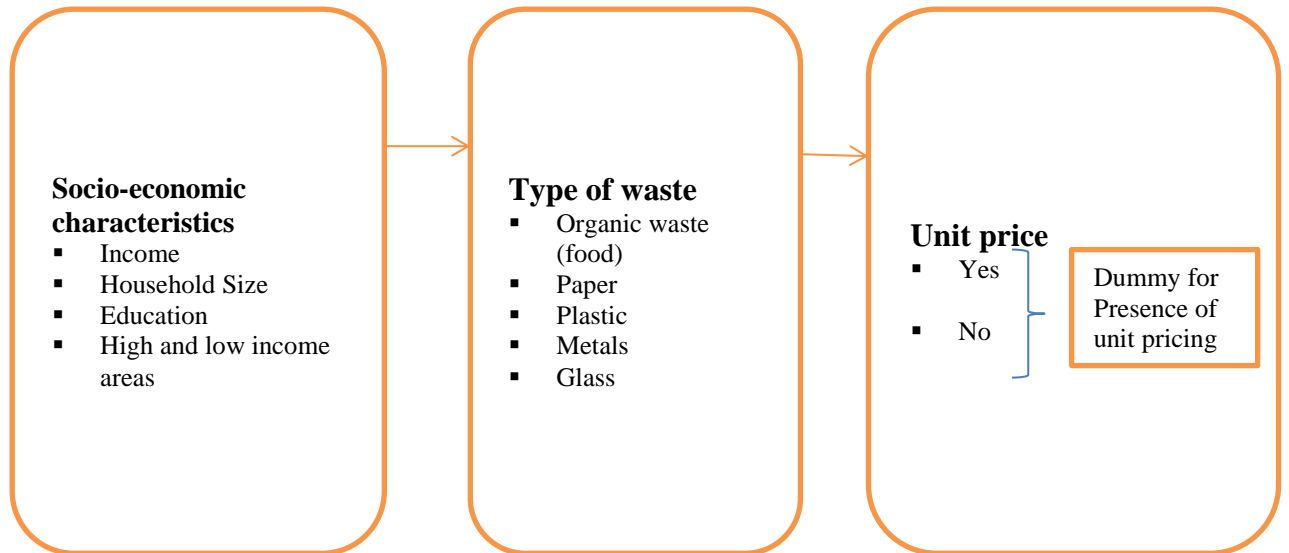
In terms of paying for the waste generated, O'Leary et al. (1999) observes that if the goal is to achieve waste reduction and efficiency, a system of volume-based garbage pricing would be more logical. The theory implicit in a market incentive such as quantity-based fees for waste disposal is that households are required to internalize the full costs of their consumption and waste disposal practices. By contrast, the largely invisible costs paid through local tax levies or flat fees may lead people to generate inefficiently high levels of municipal solid waste because they face a zero price increment for using more collection service. In other words, if households face a marginal or incremental cost of refuse disposal equal to zero, they may dispose of greater than optimal quantities of waste (Jenkins, 1993). Theoretically, households that desire to minimize waste disposal costs in a pay as you throw pricing regime may reduce the amount of waste generated, dump its trash unlawfully, or if such programmes are available, participate in local recycling and yard waste collection programmes. Households also may reduce the amount of waste disposed by reusing certain items or by changing purchasing behaviour. For example, they might buy fewer discretionary items, select products that

have less packaging, or purchase more products that have recyclable packaging. Households also may recycle more of the materials that are included in local collection programmes. Any increase in recycling presumes, of course, that this option is available and that residents find it to be more convenient than disposing of trash through various illegal or undesirable means (Fullerton and Kinnaman, 1996). In a larger context, volume-based fees for solid waste services are just one example of the promising use of economic incentives and market-based environmental policy instruments to encourage behaviours that advance both individual interests and collective policy goals (Stavins, 2000).

### **2.3 Conceptual Framework**

Following the review of related literature in the preceding section, the study adapted a framework (Figure 2.1) developed by Jenkins et al (2000) to analyse determinants of household waste disposal and recycling amongst households residing in Metropolitan areas in the United States of America. Essentially, the framework implies that decisions on waste handling should take into account economic, social and pricing dimensions. The socio-economic aspects may include the household size, income, and place of residence. The pricing consists of how much is paid for each gram of waste generated by a household and whether a household will subscribe to a particular pricing tag or may adopt other forms of waste disposal methods. The integrative aspect lies in the trade-off between these dimensions. For example, in certain situations, a household may prefer paying for waste to be collected and recycled but the economic costs (pricing) involved may prevent the household from using waste collection channels (Jenkins et al, 2000).

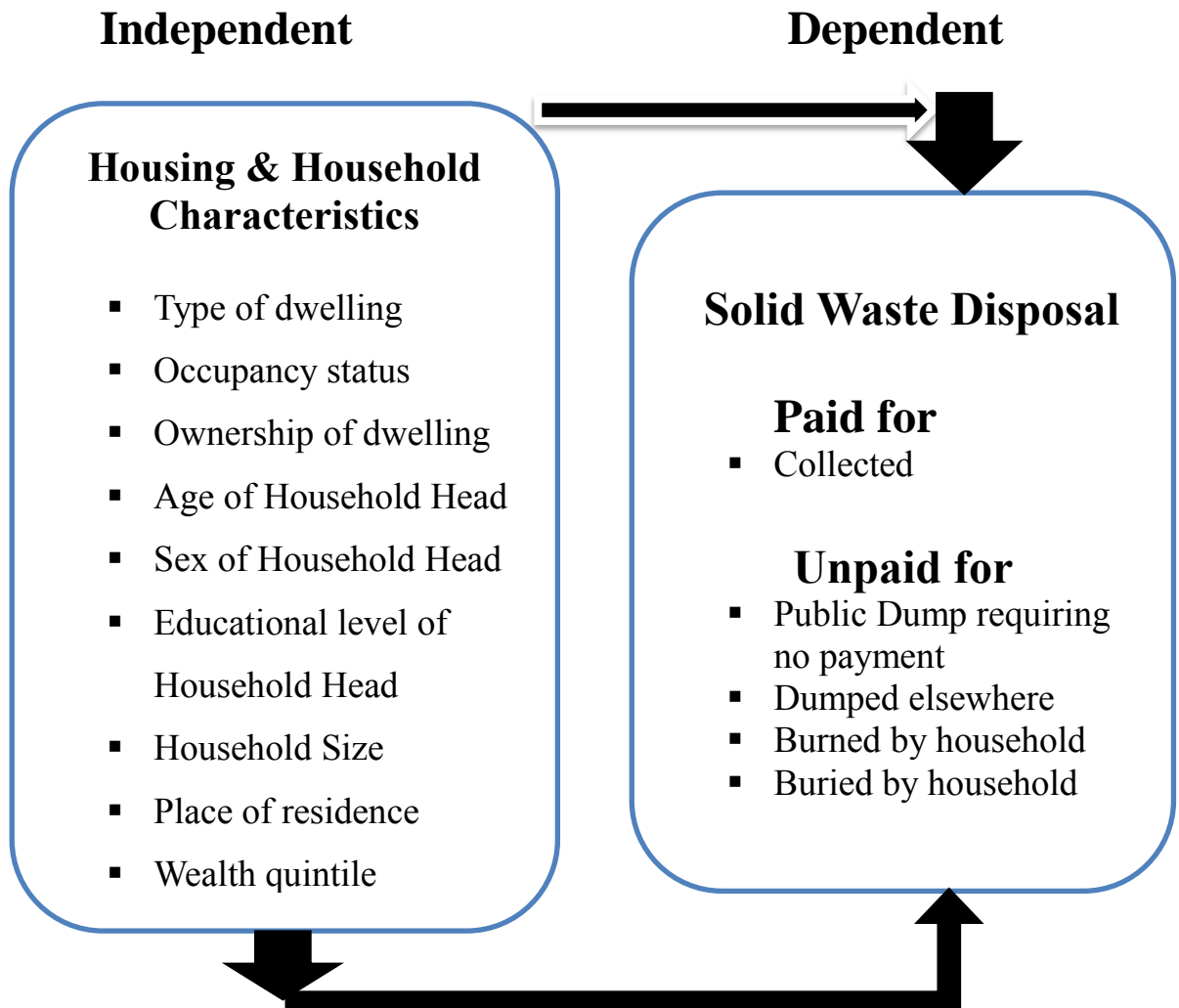
**Figure 2.1 Framework for analysing the determinants of household waste disposal and recycling**



**Source:** Robin R. Jenkins, Salvador A. Martinez, Karen Palmer, and Michael J. Podolsky, (2000).

From the framework by Jenkins et al (2000) in Figure 2.1, the author developed a new framework to show the relationship (link) between housing and household characteristics and payment for solid waste disposal (Figure 2.2).

**Figure 2.2:** Conceptual Framework showing the link between housing and household characteristics and payment for solid waste disposal



**Source:** Adapted from Robin R. Jenkins et al, 2000

This framework modified from Jenkins et al (2000), conceptualises waste disposal methods into categories that give an overview of methods that are paid for and those that are unpaid for. According to the conceptualisation, it is most appropriate to have waste collected and this includes incineration, re-use, recycling, and collection by waste management companies. The services that are not paid for and which cannot often be avoided especially in

developing countries including Ghana comprise; using public dumps that require no payment of money, dumping waste indiscriminately (elsewhere), burned by household and buried by household.

In terms of the waste disposal categorisation, household heads were asked: “how does your household dispose of refuse?” The options available were: collected, public dump, dumped elsewhere, burned by household, and buried by household. Household heads who responded to ‘**collected**’ were asked how much they paid for the collection of their waste. In view of this, all waste that was collected was categorised as paid for methods of solid waste disposal.

From the framework, it is hypothesised that the linkages shown in Figure 2.2 exist between housing and household characteristics and methods of solid waste disposal which is measured as a service that is paid for or unpaid for. The independent variables are expected to influence a household’s payment for solid waste disposal method directly.

A household’s type of dwelling determines whether that particular household will opt for a waste disposal service that requires financial obligations or otherwise. For example, households living in separate houses (bungalows), flats and semi-detached houses will more often than not opt for solid waste disposal services that require a kind of monetary payment compared to households living in compound houses, huts, impoverished homes and tents. Thus, a household’s dwelling type is a determinant of their choice of waste disposal method.

A household's occupancy status (categorised as owning, renting, rent-free and perching) is also a measure of the choice or type of solid waste disposal method a household will adopt. Households living in their own houses might preferably subscribe to services that are collected and paid for rather than burning or burying waste. On the other hand, households that are perching or renting houses more often than not use solid waste disposal methods that require no monetary payments.

Ownership of dwelling in this context depicts houses owned by a relative who is not a household member, private ownership of houses as well as government ownership. As evident in the mismanagement of anything government owned in Ghana, households living in government/public buildings are very much likely to dispose of waste by burning or burring, or disposing waste indiscriminately, thus indicating the link existing between who owns a type of dwelling and the choice of solid waste disposal method.

Age is a demographic variable which has been found to have an influence on the choice of solid waste disposal method. Generally, the older the household head, the higher the probability of opting for services that are paid for. This is due to the general belief that older people behave more responsibly and are expected to dispose of waste in a manner that fits responsibility.

Males in the Ghanaian society are usually the heads of household and also the bread winners of households. This puts men in a much better position financially than their female counterparts and as such are very much likely to

go for waste disposal services that require payments even though the financial gap is closing up.

The educational level of a household head is a key variable which has the potential to affect choices of individuals. Education has been known to be an empowering tool for people at both the household and society levels. A higher education level affords a household head a greater knowledge of proper waste disposal methods resulting in good health status. Furthermore, an educated household head is more likely to secure a well-paying job, meaning more money and as such are more likely to subscribe to waste disposal services that are paid for compared to household heads who are not educated.

The household size depicts the number of members within a given household. This variable plays a key role in determining payment for solid waste disposal method since the numbers determine the extent of pressure on household resources. A smaller household size is very much likely to save a portion of available resources and as such might have the well withal to subscribe to waste services that are paid for.

The type of place of residence in which a household resides (urban or rural) is included in the framework because it determines availability and access to waste disposal services and resources. The place of residence may also have an impact on choice of waste disposal method if adherence to social norms on cleanliness is strong.

Finally, the wealth quintile of a household head determines financial access to waste disposal services. It may also influence the choice of method a household head would subscribe to.

## 2.4 Hypotheses

- i. Households living in separate houses are more likely to subscribe to waste disposal methods that are paid for compared to households living in impoverished homes;
- ii. Households whose occupancy status is ‘perching’ are less likely to subscribe to waste disposal methods that are paid for compared to households who own their own houses;
- iii. Households in the richest wealth quintile are more likely to subscribe to solid waste disposal methods that are paid for compared to those in the poorest wealth quintile.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter presents detailed research methods and design (techniques) that were employed in the study. The outline involves the background of the study area and justification of the choice of the study area, research design, sources of data, population sample, data processing and analyses. The fifth round of the Ghana Living Standards Survey, like the previous rounds, was designed to provide regional level indicators. A regionally representative sample of households was therefore selected in order to achieve the survey objectives.

#### **3.2 The Study Area**

The Greater Accra Region is the smallest of Ghana's 10 administrative regions in terms of area, occupying a total land surface of 3,245 square kilometres or 1.4 percent of the total land area of Ghana. In terms of population, however, it is the second most populated region, after the Ashanti Region, with a population of 2,905,726 in 2000; 4,010,054 in 2010 accounting for 16.3 percent of Ghana's total population (GSS, 2010). The Greater Accra Region currently harbors the seat of government in Accra. The region is also divided into 14 districts comprising; Accra Metropolitan Area, Tema

Metropolitan Area, Adentan Municipal, Ashaiman Municipal, Dangme East, Dangme West, Ga Central, Ga East, Ga South Municipal, Kpone Katamanso, La Dade-Kotopon Municipal, La-Nkwantanang-Madina, Ledzokuku-Krowor Municipal, Ningo/ Prampam and Ada District.

### **3.2.1 Justification for the choice of the study area**

Regional analysis of the country shows that Greater Accra has remained the most densely populated region in the country since 1960. The population density has increased from 167 persons in 1960 to 441 persons in 1984 and to 895.5 persons per square kilometre in 2000. Currently, the Greater Accra Region is still the most densely populated region with a density of approximately 1,236 persons per square kilometre and this is, in part, a reflection of migratory movements to the region (GSS, 2010). The densely populated nature of the region is brought into sharp focus when it is compared with the other regions and this account for the choice of the region as the study area.

Secondly, the region is the most urbanised in the country (GSS, 2010). Urbanisation has been described as one of the most significant processes, which has affected the human society since the last century (UNFPA 2007). Rapid urbanisation characterized by city expansion and urban sprawl is a major feature of the region and much of the growth of the region especially Accra and Tema can be attributed to in-migration. For instance, a 2002 GSS report notes that several localities adjoining the Accra Metropolitan Area which were rural in 1984 have now attained urban status, mainly as a result of the spillover of growth of the Accra Metropolitan Area (GSS 2002). Despite

the numerous challenges faced by the region, it still continues to attract residents, particularly rural-urban migrants simply because the region is still perceived as a better proposition than other regions. Already evident in urban areas of the region are the effects of rapid urbanisation manifested in socio-economic, environmental and institutional challenges for residents and local authorities (Yankson et al, 2006).

Thirdly, the state of sanitation in the region especially in Accra is currently very unsatisfactory since it is characterised by choked drains, indiscriminate waste disposal and uncollected refuse in central waste containers and so forth. Also, most waste management companies are located within the region. For example, Accra alone has been delimited into six waste collection zones. These zones are awarded to waste collection companies for fees, which are charged according to specific contractual agreement they have with the City Authority. In low-income areas, the central container system is in operation. Containers are placed at designated points for households to dislodge their domestic waste for on-ward carriage to final waste disposal and incineration sites. The other system, door-to-door collection, is prominent in affluent areas of Accra, Tema, Ashaiman, Adentan and so forth. The companies charge fees from households for services rendered on monthly or fortnightly in respective contractual arrangements between the contractor and clients.

### **3.3 Sources of data and study design**

The study uses a secondary source of data from the 5<sup>th</sup> Round of the Ghana Living Standard Survey (GLSS 5). The GLSS 5 is a nation-wide survey

which collected detailed information on topics, including demographic characteristics of the population, education, health, employment and time use, migration, housing conditions and household agriculture. It also introduced a special module on Non-Farm Household Enterprises. The overall sample size was eight thousand, six-hundred and eighty seven (8,687) households. Out of this figure, the study used 1,257 households representing the number of households in the Greater Accra Region. Other secondary sources of data including published articles, and books were used.

### **3.3.1 Description of variables**

**Household:** A household was defined as a person or a group of persons, who lived together in the same house or compound and shared the same house-keeping arrangements. In general, a household consisted of a man, his wife, children and some other relatives or a house help who may be living with them but might not necessarily be related by blood or marriage.

**Head of Household:** The household head was defined as a male or female member of the household recognised as such by the other household members. The head of household is generally the person who has economic and social responsibility for the household. All relationships are defined with reference to the head.

#### **3.3.1.1 Main Independent variables**

**Type of dwelling:** The UN recommended definition of a house as “a structurally separate and independent place of abode such that a person or group of persons can isolate themselves from the hazards of climate such as

storms and the sun” was adopted (UN-HABITAT, 1994). Respondents were asked “In what type of dwelling does the household live? The responses were: Separate House (Bungalow), Semi-detached houses, Flat/Apartments, Compound Houses, Several Huts in the same compound, Several Huts/Buildings on different compounds and tents/Impoverished Homes”.

**Occupancy status:** The respondents were asked “what is your present occupancy status? The options were: Owning, Renting, Rent-free, and Perching. Owning referred to households living in their own built or purchased house whilst renting pertains to paying for accommodation. Rent-free meant no rent is paid either in cash or kind. Perching means a temporary accommodation.

**Ownership of dwelling:** Who owns this dwelling was the question used in assessing this variable? Respondents had the following categories of responses to choose from; Dwelling owned by relatives who are not members of the household; private individual; private employer; private agency and public/government ownership.

### 3.3.1.2 Other Independent variables

**Age of Household Head:** This represents the age of the household head. The variable age was examined with the question “how old were you at your last birthday?” The lowest age of a household head in the data set was 15 years and the highest age was 99 years. These were re-categorised into 5-year age groups beginning with the least.

**Level of Education of Household Head:** This variable is taken to capture the level of understanding of the respondent about the desirability of proper management of solid waste. Level of education refers to the highest level of formal school that a person ever attended or was attending. Respondents were asked “what is the highest level of school you attended: no education, primary, middle school, senior high, training college, polytechnic, and university.

**Household Size:** The household size represented the number of people within a single household. The least number was one (1) household member and the highest was twenty-nine (29).

**Place of residence:** The respondents had no hand in determining whether where they lived was a rural or urban place. This was predetermined at the sampling stage. Therefore the place of residence of each respondent, according to the household questionnaire, was assigned as living in urban or rural area.

**Wealth Quintile:** Wealth quintile here represents a measure of economic status. It presents household income limits by quintile and further presents a more permanent status than does either income or consumption. Based on various statistics recorded for each household, each household was placed in a wealth quintile of Poorest, Poorer, Middle, Richer or Richest. This quintile distribution of the wealth status of each household was adopted for this study. This variable was used as a measure of the household’s economic status. Studies have shown that as the economic condition of a household improves, so does their ability to pay for services.

**Waste disposal:** Household heads were asked: “how does your household dispose of refuse?” The options available were: collected, public dump, dumped elsewhere, burned by household, and buried by household. Household heads who responded to ‘**collected**’ were asked how much they paid for the collection of their waste. In view of this, all waste that was collected was classified as paid for methods of solid waste disposal.

### **3.3.2 Data Processing and Analysis**

The computer software programme, Statistical Package for Social Sciences (SPSS) version 17 and Microsoft Excel version 2010 were used in data sorting, re-categorisation of variables and further in the generation of tables, graphs, charts and models.

### **3.3.3 Unit of Analysis**

The unit of analysis was the household. The Ghana Statistical Service definition of a household being “a person or a group of persons, who lived together in the same house or compound and shared the same house-keeping arrangements” was adopted (GSS, 2010).

### **3.3.4 Methods of Analysis**

Univariate level analysis using simple frequencies, tables and charts was extensively used. This was followed by the bivariate level of analysis which involved cross tabulations amongst the various independent and dependent variables. The Binary Logistic Regression model was also used to model household heads’ decision to pay for improved waste disposal services

or not to pay. The model was adopted because of its ability to deal with a dichotomous dependent variable and a well-established theoretical background. The binary model provides information only with respect to the household heads' decision to pay for improved solid waste disposal services or not to pay, but not on the amount of money they are willing to pay.

#### **3.4. Limitations of the study**

This study could not have been completed without some difficulties which affected the smooth running of the study. These included the fact that:

The survey did not provide district level data that could have made localised analysis possible. This led to the choice of the Greater Accra Region as the study area since it had the largest share in terms of access to solid waste disposal facilities.

There were also wide disparities in terms of access to solid waste disposal facilities amongst households living in the urban centres and those living in the rural communities. This might have skewed payment for solid waste disposal in favour of households living in urban centre. However, this was to bring to the fore the seriousness of virtually non-available solid waste disposal services in the rural areas.

The data set did not also make it possible to look at other waste disposal methods like recycling other than just collection of waste at the household level.

## **CHAPTER FOUR**

### **HOUSING AND HOUSEHOLD CHARACTERISTICS**

#### **4.1 INTRODUCTION**

The chapter responds to the first objective of the study which was to describe housing and household characteristics in the Greater Accra Region of Ghana. It further provides detailed analysis of individual variables including selected housing characteristics as well as household variables. The understanding of such variables provides a basis to understand the interrelationships between the independent and dependent variables.

#### **4.2 Housing and Household characteristics**

##### **4.2.1 Type of dwelling**

Table 4.1 indicates that more households reside in compound houses in the region than any other dwelling type and this account for 52.3 percent of the entire type of dwelling. This result confirms the 2010 Population and Housing Census findings that 51.5 percent of households in the country reside in compound houses. Rooms (other types) accounted for 20 percent whilst separate houses accounted for 8.6 percent. Also, 7.6 percent of households live in semi-detached homes whilst 5.1 percent of households stay in buildings on same compound/several huts. Flats/apartments, buildings on different

compounds and impoverished homes account for 1.7, 0.9 and 3.8 percent respectively of the dwellings used households. Compound houses and other types of houses represent over two-thirds of the entire type of dwellings occupied by households in the Greater Accra Region of Ghana.

**Table 4.1: Percentage of households by type of dwelling, Greater Accra Region**

Type of dwelling	Frequency	Percentage
Separate House (Bungalow)	108	8.6
Semi-detached House	96	7.6
Flat/Apartment	21	1.7
Compound House	658	52.3
Rooms (other type)	251	20.0
Several Huts/Buildings (SCP.)	64	5.1
Several Huts/Buildings (DCP.)	11	0.9
Tents/Impoverished homes	48	3.8
<b>Total</b>	<b>1257</b>	<b>100.0</b>

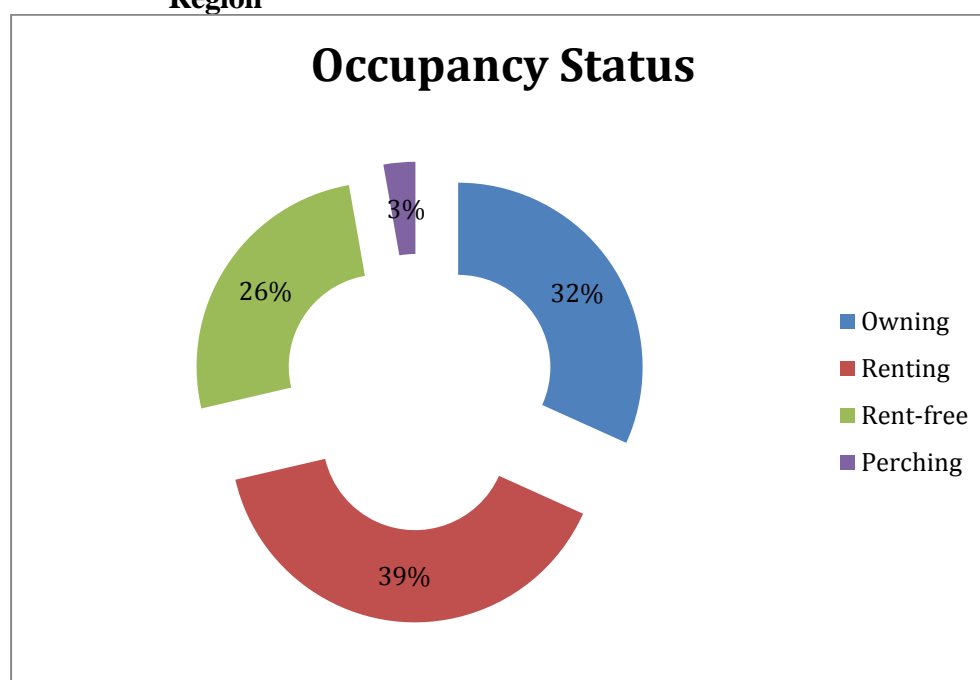
**Source: Computed from GLSS 5 data, 2006**

#### 4.2.2 Occupancy status

As shown in Figure 4.1, there are more households occupying rented apartments/houses in the Greater Accra Region compared to other occupancy statuses. This accounted for 39 percent and was an expected result since there are very limited or virtually non-existent housing schemes that enable households to secure their own dwellings. Households occupying their own houses also accounted for 32 percent of the entire responses and this deviates

from the national average of 47.2 percent as presented in the 2010 Census Report. Households living in rent-free houses accounted for 26 percent whilst only three percent of households were living in temporary dwellings (perching).

**Figure 4.1: Percentage of households by occupancy status, Greater Accra Region**



Source: Computed from GLSS 5 data, 2006

#### 4.2.3 Ownership of dwelling

Table 4.2 shows that 44.4 percent of households live in houses owned by private individuals whilst 32.7 percent of households in the Greater Accra Region reside in apartments owned by relatives who are not part of the household. Households living in homes provided by private employers, private agencies and government owned flats account for 9.1; 4.1 and 9.7 percent respectively. This result indicates that over half of the households in the region

live in either houses owned by private individuals or relatives who are not part of the household. The result for households living in privately owned houses was expected since there are more compound houses in the region than any other type of dwelling (GSS, 2010).

**Table 4.2: Percentage of households by ownership of dwelling, Greater Accra Region**

Ownership of dwelling	Frequency	Percentage
Relative not household member	411	32.7
Private Individual	558	44.4
Private Employer	115	9.1
Private Agency	52	4.1
Public/Gov't ownership	121	9.7
<b>Total</b>	<b>1257</b>	<b>100.0</b>

**Source: Computed GLSS 5 data, 2006**

#### 4.2.4 Age of household head

Thirty six percent of household heads were found to be 50 years and above. This result was expected since household headship in most families in the region and in Ghana as a whole is a preserve for older individuals. Household heads age 25 – 29 and 30 – 34 account for 11.3 and 11.1 percent respectively. The results in Table 4.3 shows a particular trend that household heads in the region mostly fall within age categories 25 – 49. Age category 15 – 19 represents 0.7 percent of the total percentage and further lends itself as the lowest age group with the least number of household heads. This further

confirms the fact that household headship is solely the responsibility of older household members. Household heads age 20 – 24 also accounted for 5.6 percent of the total number of household heads in the survey.

**Table 4.3: Percentage of household heads by age, Greater Accra Region**

Age of Household Head	Frequency	Percentage
15 - 19	9	0.7
20 - 24	70	5.6
25 - 29	142	11.3
30 - 34	140	11.1
35 - 39	148	11.8
40 – 44	152	12.1
45 – 49	141	11.2
50+	455	36.2
<b>Total</b>	<b>1257</b>	<b>100.0</b>

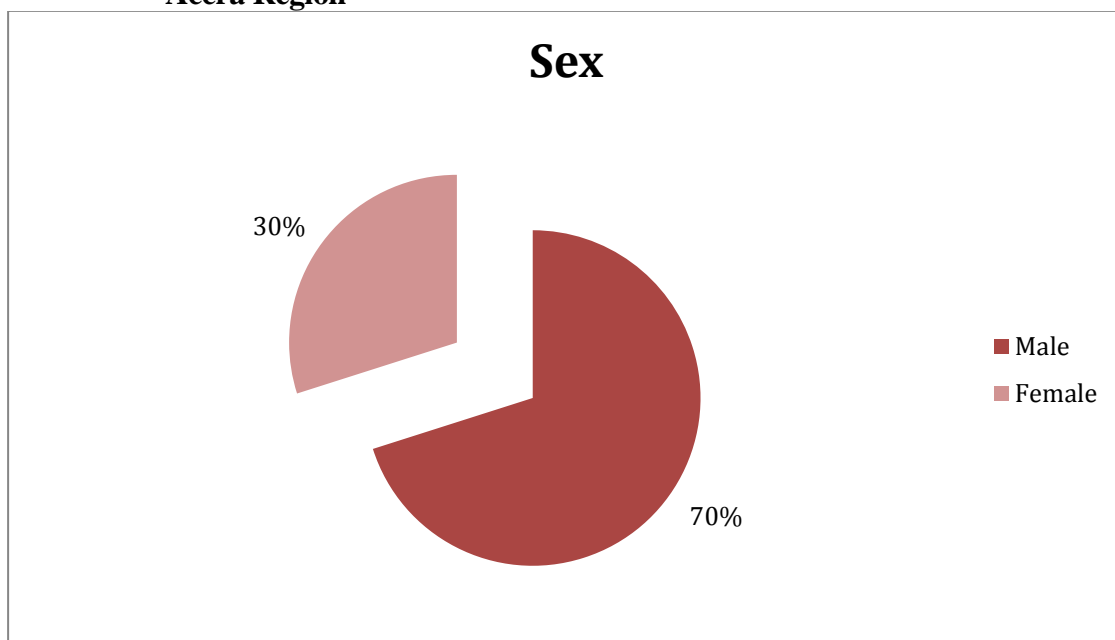
**Source: Computed from GLSS 5 data, 2006**

#### 4.2.5 Sex of household head

Most households (70 percent) were headed by males whilst 30 percent of them were headed by females (Figure 4.2). This confirms the fact that there are still more men than women serving as household heads even though the number of female-headed households continue to increase gradually whilst the proportion of male-headed households also continues to dwindle. These percentages are quite close to the national average of 65.3 percent of

households headed by males with female-headed households constituting 34.7 percent (GSS, 2010).

**Figure. 4.2: Percentage of households by sex of household head, Greater Accra Region**



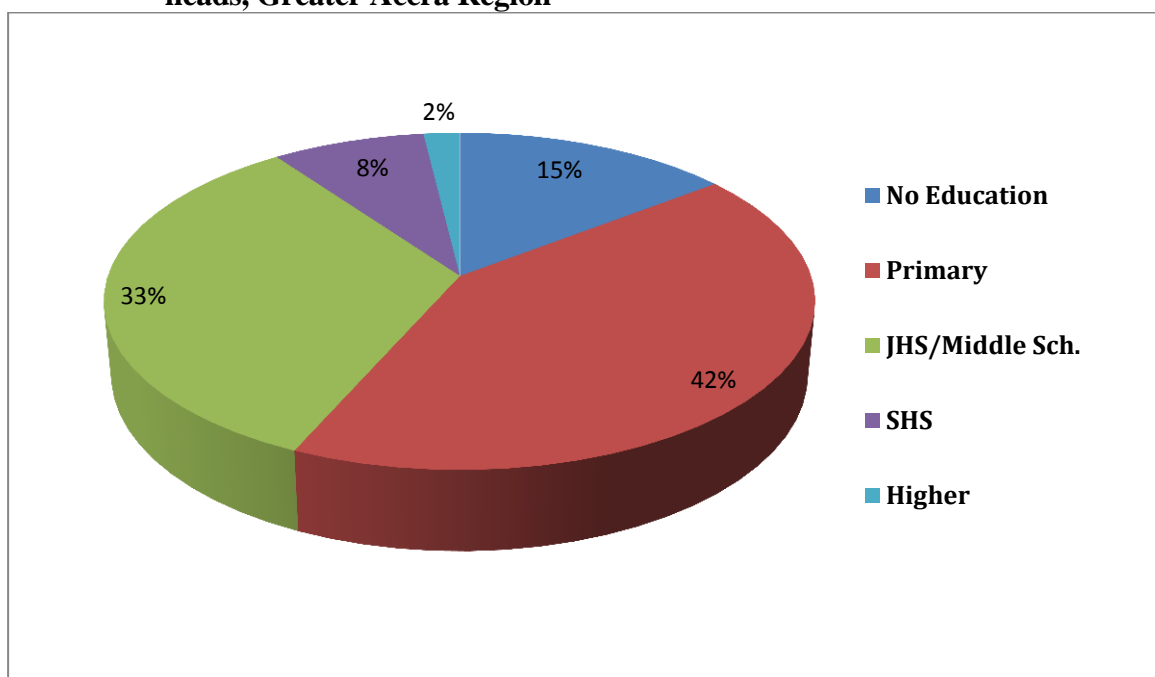
**Source: Computed from GLSS 5 data, 2006**

#### **4.2.6 Educational level of household head**

The educational background of respondents in Figure 4.3 shows that 15 percent of the respondents had no formal education whilst 42 percent had at least primary level of education. Also, 33 percent had had Junior High School/Middle School education, with 8 percent of the respondents having had Senior High education. This result depicts the fact that basic level of education (Primary to JHS) constitutes about two-thirds of overall educational attainment and further confirms the true educational trend in a typical region in a developing country. Those with higher levels of education (above SHS) accounted for the remaining two percent of the total number of household

heads. This result was not expected considering the number of higher institutions of learning found in the region. The region accounts for more than 50 percent of all institutions above senior high education.

**Figure 4.3: Percentage of households by educational level of household heads, Greater Accra Region**



Source: Computed from GLSS 5 data, 2006

#### 4.2.7 Household Size

The household size from Table 4.3 basically indicates that single household size is the most common household size in the region. It accounts for 27 percent of all the responses. This could be due to the highly urbanised and modernised nature of most cities and towns in the region where standard of living is very high. Household sizes ranging between 6 and 9 also show an inverse trend where the total percentage declines as the household size increases and they represented 9.3, 6.5, 2.9 and 2.8 percent respectively. This

further confirms the fact that people are gradually moving away from the preference for large family sizes as used to be the case in the region where children were seen as sources of wealth, prestige and security against old age (Awusabo et al, 2003). The household sizes above 9 were quite insignificant as it accounted for only 2.2 percent of the total responses.

**Table 4.4: Percentage of households by size, Greater Accra Region**

Household Size	Frequency	Percent
1	340	27.0
2	160	12.7
3	161	12.8
4	155	12.3
5	145	11.5
6	117	9.3
7	82	6.5
8	36	2.9
9	35	2.8
10+	26	2.2
<b>Total</b>	<b>1257</b>	<b>100</b>

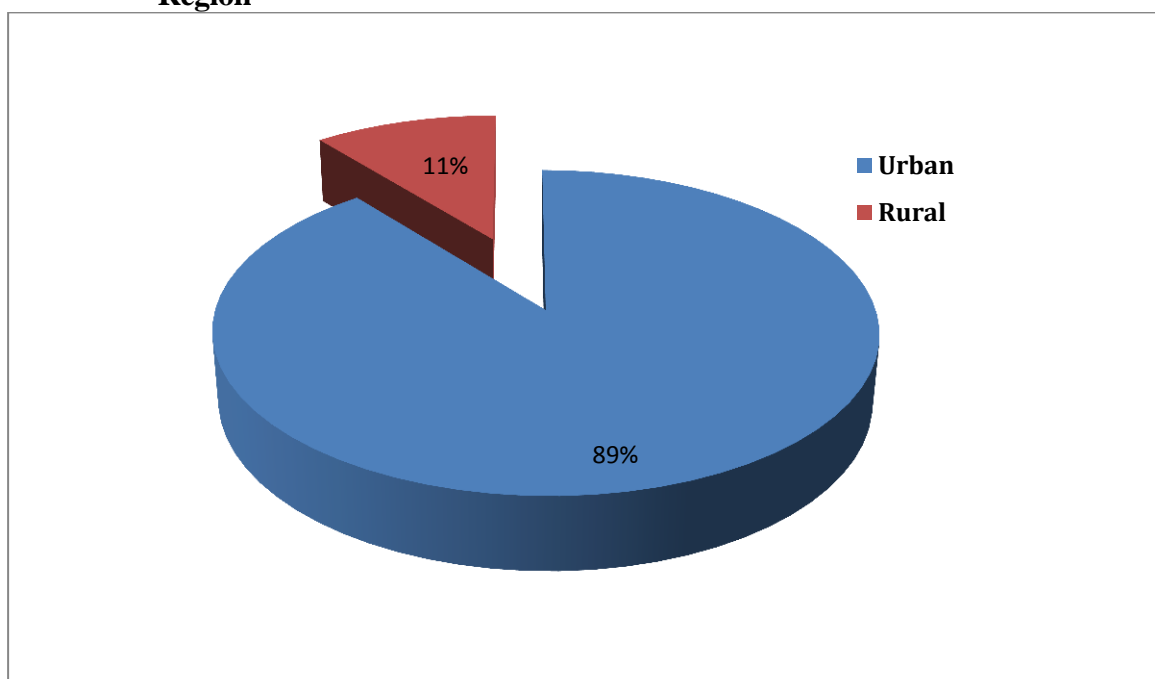
**Source: Computed from GLSS 5 data, 2006**

#### 4.2.8 Place of Residence

The distribution of place of residence from Figure 4.4 shows that there are more households in urban areas than in rural areas within the region. Households living in urban centres account for 89 percent of the total with households in rural areas accounting for only 11 percent. This result was very much expected since the region even though is the smallest in the country, is the most urbanised (GSS, 2010) and this confirms the basis (urbanisation) for

the choice of the region for the current study. However, the national averages for both urban and rural households are quite close with urban households accounting for 50.9 percent whilst the rural households account for 49.1 percent (GSS, 2010). Households in urban localities are expected to increase further as a result of the increasing rate of urbanisation (Songsore et al, 2003).

**Figure 4.4: Percentage of households by place of residence, Greater Accra Region**



**Source: Computed from GLSS 5 data, 2006**

#### **4.2.9 Wealth Quintiles of Households**

As shown in Table 4.5, the proportion of those in the richest quintile accounted for 45.9 percent of the total responses with households in the richer category accounting for 23.9 percent. The richest and richer quintiles account for over 50 percent of the households. This was not quite expected since poverty levels in the region are very substantial despite the highly urbanised nature of the region (GLSS, 2006). This could partly be explained by the fact

that the national capital happens to be in the region. Households in the middle quintile were 15.8 percent whilst the poorer and poorest quintiles accounted for 9.7 percent and 4.7 percent respectively. These results quite deviate from what actually pertains in the region where there are more people within the poorer and poorest categories compared to those within the richest and richer quintiles (GLSS, 2006).

**Table 4.5: Percentage of households by wealth quintile, Greater Accra Region**

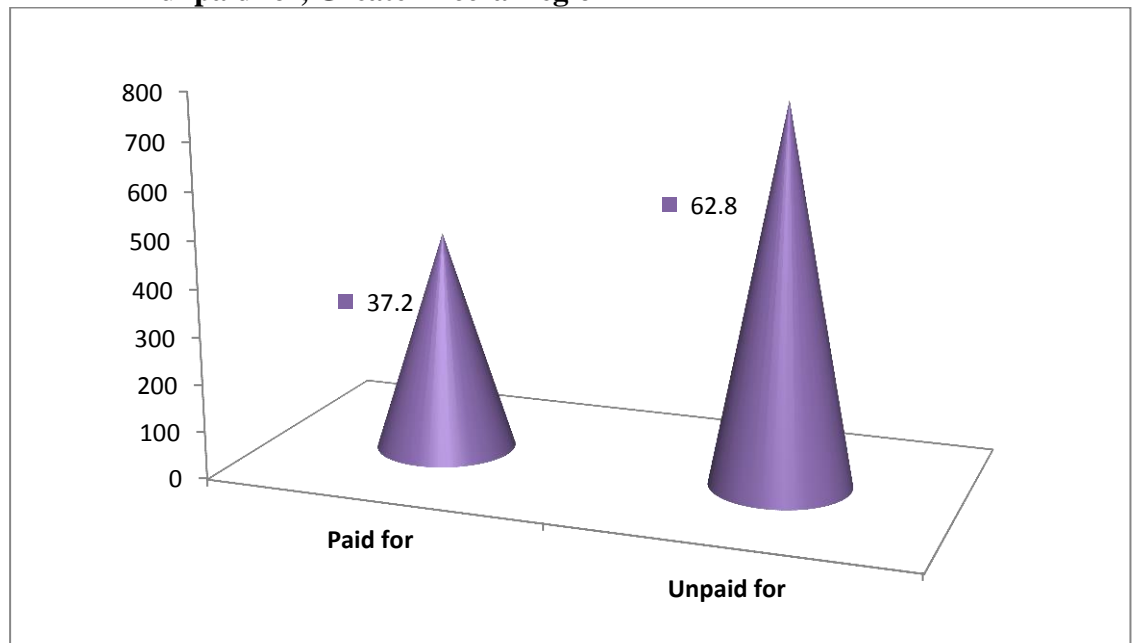
<b>Wealth quintile</b>	<b>Frequency</b>	<b>Percent</b>
Poorest	59	4.7
Poorer	122	9.7
Middle	198	15.8
Richer	301	23.9
Richest	577	45.9
<b>Total</b>	<b>1257</b>	<b>100.0</b>

**Source: Computed from GLSS 5 data, 2006**

#### **4.2.10 Payment for solid waste disposal**

The data on solid waste disposal services that are paid for and those that are unpaid for show that majority of households (62.8 percent) subscribe to waste disposal methods that require no monetary obligations whilst households that subscribe to waste disposal methods that require payment account for 37.2 percent (Figure 4.4). This result depicts the actual situation on the ground, where waste is disposed of indiscriminately in most parts of the region especially in Accra and Tema (Anomanyo, 2004).

**Figure 4.5: Percentage of solid waste disposal that is paid for or unpaid for, Greater Accra Region**



**Source: Computed from GLSS 5 data, 2006**

### **4.3 Conclusion**

The analyses in this chapter showed that most households in the region reside in compound houses than any other dwelling type (52.3 percent). Further, there were more households occupying rented apartments/houses in the Greater Accra Region compared to other occupancy statuses and this also accounted for 39 percent. The analysis also showed that over 50 percent of households in the region live in either houses owned by private individuals or relatives who were not part of the household. Thirty six percent of household heads were found to be 50 years and above and this confirmed the fact that household headship is solely the responsibility of older household members whilst 70 percent of households were headed by males with the remaining 30 percent headed by females.

With reference to education, the result showed that basic level of education (Primary to JHS) constitutes about two-thirds of overall educational attainment in the region with just two percent in higher levels of education despite the presence of major institutions of higher learning in the region. The analysis also showed that about 90 percent of households in the Greater Accra Region lived in urban areas.

## **CHAPTER FIVE**

### **HOUSING AND HOUSEHOLD CHARACTERISTICS AND PAYMENT FOR SOLID WASTE DISPOSAL**

#### **5.1 INTRODUCTION**

This chapter presents the analysis on the relationships between the individual independent variables and the dependent variable. Thus, it presents the associations between housing and household characteristics against payment for solid waste disposal methods. The chapter further responds to the second and third objectives of the study. It employs the Chi-square statistical method in determining whether there is an association between variables or not.

#### **5.2 Type of dwelling and payment for solid waste disposal**

Table 5.1 shows that 62.8 percent of households subscribe to solid waste disposal services that are unpaid for compared to 37.2 percent of households that use waste disposal services that are paid for. This indicates that more households in the region prefer to use waste disposal methods that require no financial obligations. Further, households living in separate houses/bungalows subscribe to services that require payment (52 percent) than methods that are not paid for (48 percent). This result was expected since households living in separate houses are likely to be more educated and as such well informed and might have the financial backing to opt for methods

that are paid for. Households living in semi-detached homes also subscribe more to methods that are paid for (55.8 percent) than methods that are unpaid for (44.2 percent) whilst households living in flats account for the highest number of households subscribing to services that are paid for (74.6 percent) than method that are unpaid for (25.4 percent). The result in the first three types of dwelling was expected since such types usually have access to waste disposal services and facilities.

On the other hand, households living in compound houses tend to patronize waste disposal methods that are unpaid for (64.6 percent) than the methods that require payment. Households living in other types of dwelling accounted for the highest number of responses that use waste disposal methods that are unpaid for (83.8 percent) compared to 16.2 percent that use methods that are paid for. This might be because these other households do not usually have access to waste disposal services and facilities and even if they do might not have the financial ability to use them.

The table depicts a relationship between type of dwelling unit and payment of solid waste disposal method and is statistically significant at the 90 percent, 95 percent and 99 percent levels. This is due to the fact that the p-value is lower than the calculated value of 1.506. This result confirms a study by Awunyo et al (2012) that housing arrangements are significantly related to choices in waste disposal methods.

**Table 5.1: Percentage of households by type of dwelling and payment for solid waste disposal, Greater Accra Region**

Type of dwelling	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
Separate house (Bungalow)	98	52.0	48.0
Semi-detached house	86	55.8	44.2
Flat/Apartment	114	74.6	25.4
Compound house	618	35.4	64.6
Rooms (other type)	241	16.2	83.8
Several Huts/building	55	20.4	79.6
Tents/Impoverished homes	45	28.9	71.1
<b>Total</b>	<b>1257</b>	<b>37.2</b>	<b>62.8</b>

Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 1.503      P-value = 0.000

### 5.3 Occupancy status and payment for solid waste disposal

Table 5.2 shows that 66.9 percent and 33.1 percent of households living in their own homes subscribe to waste disposal methods that are respectively unpaid and paid for. This result was not expected since households living in their own houses were expected to be more concerned about keeping their properties clean and as such were expected to subscribe more to services that are collected and paid for. This is not consistent with the conclusion drawn by Awunyo et al (2012) that households living in their own houses will be more responsible in terms of waste disposal than those living in

homes they do not owe. Further, households living in rented apartments accounted for 59 percent of households that use methods that are unpaid for as against 41 percent of households that subscribe to services that are collected and paid for whilst 62.5 percent of households living in rent-free houses use solid waste disposal methods that unpaid for as against 37.5 percent of households that use methods that are paid for. About 75 percent of households living in temporary apartments (perching) subscribed to methods that are unpaid for against 25.7 percent of households that subscribed to methods that are paid for.

The table further indicates that there is an association between the occupancy status of a household and choice of waste disposal method and is significant at both 90 percent and 95 percent levels. This association confirms a study by (Benneh, Songsore and Nabila in 1993) on how housing occupancy status influences a household's choice patterns.

**Table 5.2: Percentage of households by occupancy status and payment for solid waste disposal, Greater Accra Region**

Occupancy status	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
Owning	399	33.1	66.9
Renting	498	41.0	59.0
Rent-free	325	37.5	62.5
Perching	35	25.7	74.3
<b>Total</b>	<b>1257</b>	<b>37.2</b>	<b>62.8</b>

Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 7.911      P-value = 0.048

#### **5.4 Ownership of dwelling and payment for solid waste disposal**

From Table 5.3, 34.1 percent of households living in houses owned by relatives subscribed to waste disposal services that are paid for as against 65.9 percent that subscribed to methods that are unpaid for. Furthermore, 39.4 percent of households living in homes belonging to private individuals use waste disposal methods that are paid for compared to 60.6 percent of households that opt for methods that are unpaid for. Households living in homes owned by private employers accounted for 49.6 percent in terms of subscription to waste disposal methods that are paid for whilst 50.4 of such households subscribed to methods that required no payment. On the other hand, households that lived in government owned apartments had 61.2 percent of the households using services that are paid for against 38.8 percent of households opting for methods that are not paid for which could be attributed to accessibility to waste disposal services.

The table also shows that there is an association between ownership of dwelling and choice of solid waste disposal method and is significant at all the three levels (90 percent, 95 percent and 99 percent). This also confirms a study by Oteng-Ababio, (2012) which indicated that the choice of a household to dispose of waste using a particular method is to a large extent influenced by ownership of dwelling unit.

**Table 5.3: Percentage of households by ownership of dwelling and payment for solid waste disposal, Greater Accra Region**

Ownership of dwelling	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
Relative not Household Member	411	34.1	65.9
Private Individual	558	39.4	60.6
Private employer	115	49.6	50.4
Private agency	52	57.7	42.3
Public/Gov't ownership	121	61.2	38.8
<b>Total</b>	<b>1257</b>	<b>40.8</b>	<b>59.2</b>

Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 42.678      P-value = 0.000

### 5.5 Age of Household head and payment for solid waste disposal

From the Table 5.4, it is evident that only household heads within age category 15–19 had a higher percentage (55.6 percent) in terms of households that subscribe to waste disposal services that are paid for as against 44.4 percent for methods that are unpaid for. All the other age brackets have more household heads subscribing to waste disposal methods that are unpaid for as against services that are paid for. Further, household heads within age category 45–49 accounted for the highest age group that subscribed to services that are unpaid for (70.2 percent). This was not expected because those within this age bracket are expected to be inclined to environmental cleanliness and as such were expected to use methods that required their waste being collected. Household heads 50 years and above accounted for 61.8 percent in

terms of heads that subscribed to methods that are unpaid for whilst methods that are paid for accounted for 38.2 percent.

This result is inconsistent with the results from a study by Dodson et al (2012) which explained the fact that as people get older, they tend to understand the need for a clean environment. However, the result supports a research by (Oteng-Ababio, 2012) which concludes that increases in age does not lead to opting for waste disposal methods that are collected and paid for. The data further indicate that there is a statistically significant association between age of a household head and payment for solid waste disposal method and is also statistically significant at all levels. This further confirms a study by Adepoju (2002) that age of an individual influences decisions when it comes to solid waste disposal methods.

**Table 5.4: Percentage of households by age of household head and payment for solid waste disposal, Greater Accra Region**

Age of HHH	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
15 - 19	9	55.6	44.4
20 - 24	70	41.4	58.6
25 - 29	142	34.5	65.5
30 – 34	140	37.1	62.9
35 – 39	148	34.5	65.5
40 – 44	152	42.8	57.2
45 – 49	141	29.8	70.2
50+	455	38.2	61.8
<b>Total</b>	<b>1257</b>	<b>37.2</b>	<b>62.8</b>

Source: Computed from GLSS 5 data, 2006

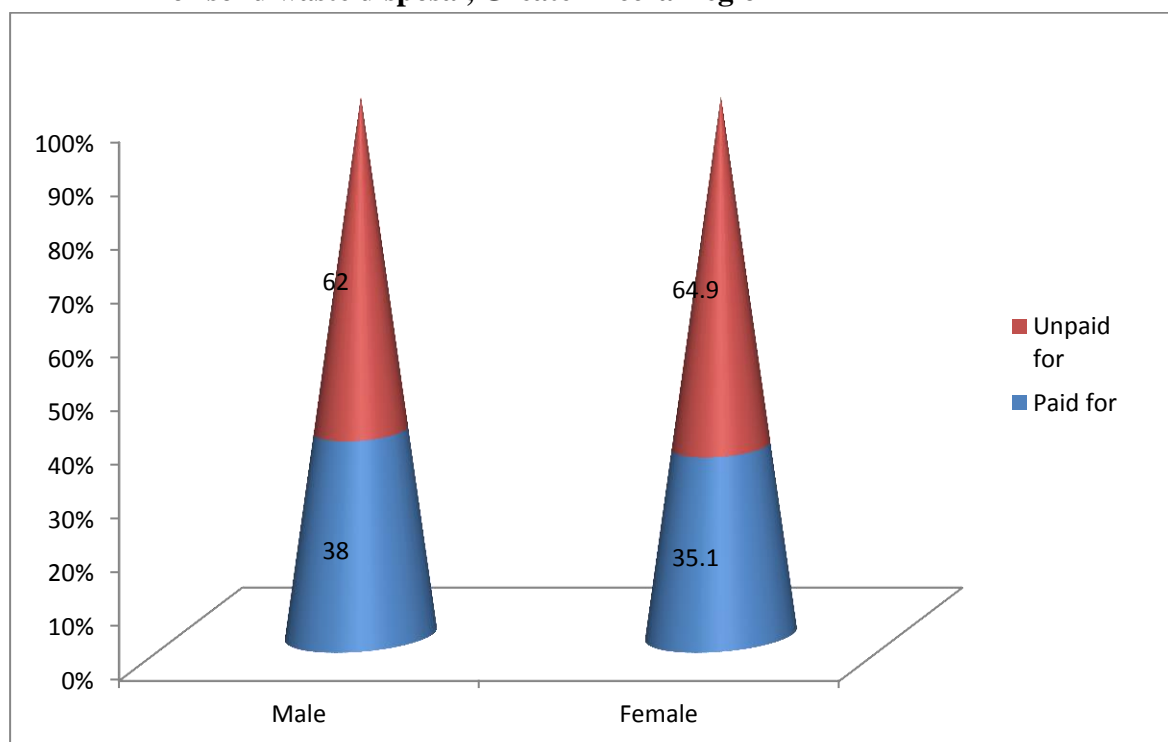
$\chi^2$ : 8.295      P-value = 0.007

## **5.6 Sex of Household head and payment for solid waste disposal**

Figure 5.1 shows that male headed households subscribe more to solid waste disposal methods that are unpaid for (62 percent) compared to waste disposal services that are paid for (38 percent). On the same pedestal, female headed households also subscribe more to waste disposal services that are unpaid for 64.9 as against 53.1 percent in terms of waste disposal services that are paid for. At a broader perspective, male headed households subscribe more to methods that are paid for as against their female counterparts. This view is supported by a study carried out by Muller and Sheinberg (1999) which concluded that women do not always have equal input into the allocation of household finances and even though women might be willing to spend scarce household resources on waste disposal, the man might not agree.

Dagne-Hagos et al (2012) in a study on willingness of households to pay for waste disposal services concluded that the sex of household head does play a role in determining choice of waste disposal methods and this is consistent with the results of this study. The sex of household heads is statistically significant at the 95 percent level in determining the choice of solid waste disposal method.

**Figure 5.1: Percentage of households by sex of household head and payment for solid waste disposal, Greater Accra Region**



Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 0.961

P : 0.027

### 5.7 Educational level of household head and payment for solid waste disposal

The educational level of an individual provides an avenue for informed decision making on any issue of concern. Table 5.5 indicates that household heads with SHS and higher levels of education subscribe least to waste disposal services that are not paid for as against those with lower levels of education. This result confirms a study by Pacey (1990) that formal education, especially for women is a pre-requisite for change in sanitation behavior including choice of waste disposal methods. Furthermore, household heads with Primary level of education had the highest percentage in terms of those

who subscribe to solid waste disposal methods that are not paid for (62.2 percent). On the same threshold, households with Primary level of education recorded the lowest percentage (37.8 percent) in terms of subscription to waste disposal services that are paid for.

The results depict that education is statistically significant, meaning there is an association between educational level of a household head and payment for solid waste disposal method at the 90 percent and 95 percent levels of significance. This confirms a study by Tadesse (2007) who found out that education does play a key role in influencing an individual's decision making on waste disposal choices.

**Table 5.5: Percentage of households heads by educational level and payment for solid waste disposal, Greater Accra Region.**

Educational level of HHH	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
No education	233	39.1	60.9
Primary	429	37.8	62.2
JHS/Middle	437	41.2	58.8
SHS	106	44.3	55.7
Higher	52	44.2	55.8
<b>Total</b>	<b>1257</b>	<b>40.0</b>	<b>60.0</b>

Source: Computed from GLSS 5 data, 2006

$\chi^2 : 3.895$       **P: 0.020**

## **5.8 Household size and payment for solid waste disposal**

The number of members of a given household is a key determinant of consumption patterns and hence generation of waste. Table 5.6 indicates that household size six (6) had the highest disposal rate in terms of methods that are unpaid for and this is represented by 72.6 percent as against 27.4 percent in terms of subscription to methods that are paid for. On the other hand, single households accounted for 38.8 percent (paid for) methods compared to 61.2 percent of unpaid for methods. This result was not expected since single households are usually able to save much financial resources and as such was expected to patronise services that are collected and paid for. On the other hand, households with sizes 10+ also accounted for 30.8 percent (paid for) methods as against 69.2 percent representing methods that are not paid for.

This variable was not statistically significant at any level, meaning there is no degree of relationship between the size of a household and the payment for solid waste disposal method.

**Table 5.6: Percentage of households by household size and payment for solid waste disposal, Greater Accra Region**

Household size	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
One (1)	340	38.8	61.2
Two (2)	160	36.9	63.1
Three (3)	161	42.2	57.8
Four (4)	155	40.6	59.4
Five (5)	145	35.2	64.8
Six (6)	117	27.4	72.6
Seven (7)	82	35.4	64.6
Eight (8)	36	36.1	63.9
Nine (9)	35	34.3	65.7
Ten (10) +	26	30.8	69.2
<b>Total</b>	<b>1257</b>	<b>37.2</b>	<b>62.8</b>

Source: Computed from GLSS 5 data, 2006

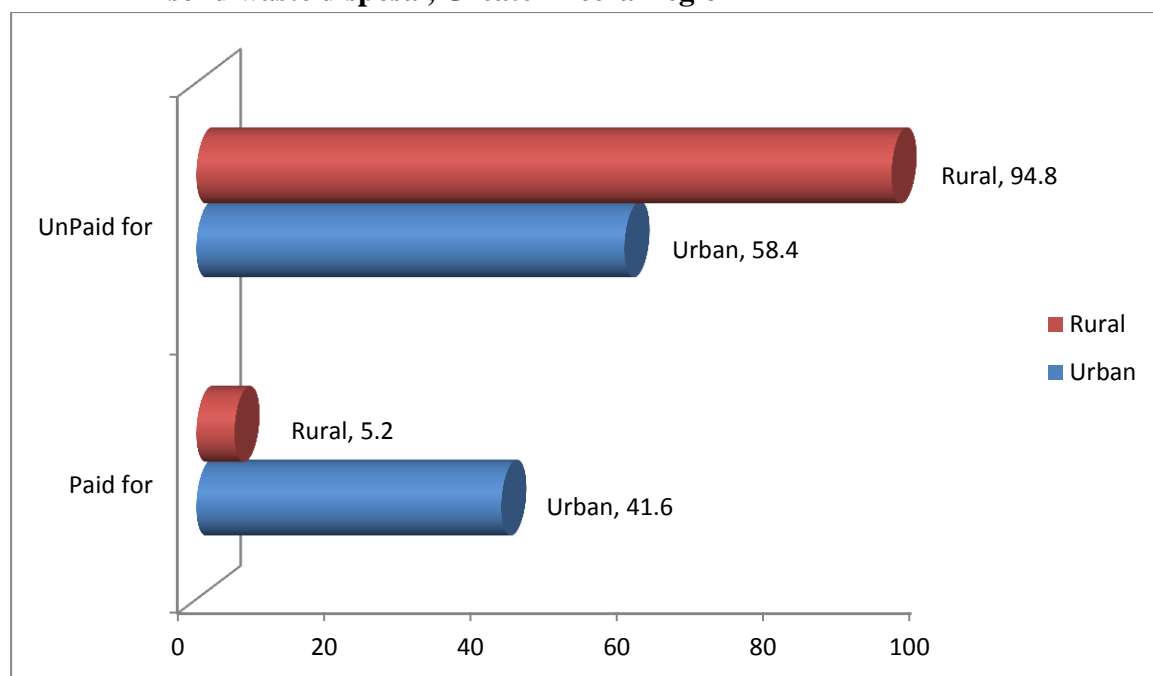
$\chi^2$ : 8.767 P: 0.459

### 5.9 Place of residence and payment for solid waste disposal

Figure 5.2 indicates that households in rural areas within the region subscribe mostly to waste disposal methods that are unpaid for and this is represented 94.8 percent of the responses. This further means that rural households in the Greater Accra Region virtually do not use any solid waste disposal method that requires collection and payment of money. On the other hand, 58.4 percent of households in urban areas subscribed to waste disposal

methods that are not paid for. This result was very much expected bearing in mind the wide disparities in terms of access to waste disposal services that are collected and paid for. These services are very much present in the urban centres of the region but are scarcely present in the rural communities. In this case, households in rural areas might be willing to adopt the services that are paid for but might not have access to these services. The reverse is also true wherein rural communities patronize waste disposal methods that are not paid for compared to households in urban centres. The Chi-square test indicates an association between place of residence and choice of waste disposal methods at all levels of significance, thus, further confirming that place of residence is indeed a key indicator in the choice of solid waste disposal methods.

**Figure 5.2: Percentage of households by place of residence and payment for solid waste disposal, Greater Accra Region**



Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 89.406    P: 0.000

### **5.10 Wealth Quintile and payment for solid waste disposal**

The wealth status of a household determines the household's ability to patronize solid waste disposal services that are paid for or otherwise. Table 5.7 indicates that the higher a household's level on the wealth ladder, the higher the possibility of subscribing to waste disposal services that are paid for and vice versa. Households in the richest wealth quintile account for 47.5 of subscription to methods that are paid for as against 52.5 percent in terms of use of waste disposal methods that are unpaid for. Households in the richer, middle, and poorer quintiles account for 34.2 percent, with 29.3 percent and 21.3 percent respectively for methods that are paid for. This result is supported by a study conducted by Awunyo et al (2012) that the wealth status of an individual or a household indeed influences choices when it comes to solid waste disposal methods. On the other hand, households in the poorest quintile account for the highest percentage in terms of methods that are unpaid for (89.8 percent) as against 10.2 percent for methods that are paid for.

The table also shows a relationship between wealth index and choices for disposing of solid waste. Further, the relationship between these two variables is significant at the 90 percent, 95 percent and 99 percent levels.

**Table 5.7: Percentage of households by wealth quintile and payment for solid waste disposal, Greater Accra Region**

Wealth quintile	Payment for solid waste disposal		
	Frequency	Paid for	Unpaid for
Poorest	59	10.2	89.8
Poorer	122	21.3	78.7
Middle	198	29.3	70.7
Richer	301	34.2	65.8
Richest	577	47.5	52.5
<b>Total</b>	<b>1257</b>	<b>37.2</b>	<b>62.8</b>

Source: Computed from GLSS 5 data, 2006

$\chi^2$  : 3.603      P: 0.000

### 5.11 Conclusion

The analyses showed that there are more households that subscribe to solid waste disposal services that are unpaid for compared to households that use waste disposal services that are paid for in the Greater Accra Region. Further, households living in flats had the highest number of households subscribing to methods that are paid for (74.6 percent). Generally, households that lived in their own homes subscribed more to waste disposal methods that are paid for. In terms of ownership, 61.2 percent of households that lived in government owned apartments used waste disposal services that are paid for whilst household heads within age category 15 – 19 had a higher percentage (55.6 percent) in terms of households that subscribe to waste disposal methods

that are paid for. The findings further showed that more households in urban areas (58.4 percent) use waste disposal methods that are paid for.

## CHAPTER SIX

### DETERMINANTS OF PAYMENT FOR SOLID WASTE DISPOSAL

#### 6.1 INTRODUCTION

Payment for solid waste disposal methods is affected by a number of housing and household characteristics which were extensively discussed in the preceding chapter. The results observed in the bivariate analysis may be influenced by other uncontrolled factors, thus making it difficult to identify the relative importance of the variables considered. As a result, the multivariate analysis was employed to help determine the exact extent, net effect, strength and impact of each independent variable on the dependent variable. The binary logistic regression model was used because the responses for the dependent variable assumed a 'Yes' or 'No' answer. For each independent variable, one sub-category was selected as the reference category. The logistic regression analysis then estimates the co-efficients of the other categories.

The findings are presented in odds ratios which express the magnitude of the effect of each category on the payment for waste disposal relative to the reference category. In analysing the results of the logistic regression, the odds ratios (Expected  $\beta$ ) were used to explain how the variables deviate from the reference category of the independent variables (predictors) and vice versa. A positive  $\beta$ -coefficient shows the likely increase payment for solid waste disposal method in relation to the reference category whilst a negative  $\beta$ -

coefficient shows the likelihood decrease in payment for solid waste disposal methods. The variables were tested at the 95 percent (0.05) significance level suggesting that any variable being considered is significant if its significance value (P-value) is less than 0.05 and not significant if the P-value is greater than 0.05.

## **6.2 Determinants of payment for solid waste disposal**

The explanatory variables entered in the model were; type of dwelling, occupancy status, ownership of dwelling, age of household head, sex of household head, educational level of household head, place of residence and wealth quintile. However, household size was not included in the model because it was not significant at the bivariate level. The results of the estimated parameters are shown in Table 6.1.

At the 95 percent (0.05) significance level, the analysis shows that out of the eight independent variables that were included in the model, only type of dwelling, place of residence and wealth quintile were found to be the most important predictors that have a highly positive effect in predicting payment for solid waste disposal.

As can be observed in Table 6.1, households living in semi-detached houses are 0.404 times more likely to pay for solid waste disposal methods than households living in separate houses. Households living in flats/apartments are 0.108 times more likely to subscribe to solid waste disposal methods that are paid for than households living in separate houses. On the other hand, households living in compound houses are 0.807 times less likely to use waste disposal methods that are paid for whilst households living

in tents/impooverished homes are 0.262 times less likely to use solid waste disposal methods that are paid for compared to households living in separate houses. This result confirms the hypothesis that households living in separate houses are more likely to use solid waste disposal methods that are paid for than those living in impooverished homes. The result further confirms studies conducted in Ghana by Awunyo et al (2012) and Oteng-Ababio, (2012) that households living in bungalows more often subscribe to solid waste disposal methods that require their waste being collected and paid for. This might also be explained by accessibility of such dwelling types to waste disposal facilities and services.

In the case of occupancy status, households occupying rented houses are 0.716 times less likely to use solid waste disposal methods that are paid for compared to those owning their houses whilst households living in rent-free houses are 0.707 times more likely to use methods that are paid for than households owning their houses. However, perching households are 0.148 times less likely to subscribe to solid waste disposal methods that are paid for than households having their own homes. This result confirms the hypothesis that households whose occupancy status is perching are less likely to use solid waste disposal methods that are paid for than household owning houses. This further confirms a study by Benneh et al, (1993).

Ownership of dwelling revealed that households living in houses owned by private individuals are 0.375 times more likely to use methods that are paid for than households living in houses owned by relatives who are not members of the household. Also, households living in houses owned by

private employers, private agencies and governments respectively are 0.987 and 0.333 times more likely to use solid waste disposal methods that are paid for than households living in houses owned by relatives. Households living in government apartments were also 0.243 times more likely to pay for solid waste disposal and this could be due to the fact that such apartments have access to solid waste facilities.

As is observed in Table 6.1, household heads in age group 20 – 24, 25–29 and 30 – 34 are 2.147, 1.170 and 1.024 times as likely to subscribe to solid waste disposal methods that are paid as against their younger counterparts in the age group 15 – 19. On the other hand, household heads in age categories 50+ are 0.049 times less likely to use solid waste disposal methods that are paid for compared to those in age group 15 – 19. However, household heads in age group 45 – 49 are 0.869 times more likely to use methods that are paid for than those in the youngest age bracket. The findings suggest that in the Greater Accra Region of Ghana, older household heads, especially those in their prime do not use waste disposal methods that are paid for but are rather more prone to use waste disposal methods that are not collected and as such are not paid for.

Female headed households were found to be 0.038 times less likely to use solid waste disposal methods that are paid for than the male headed household heads. This finding is supported by a study carried out by Muller and Sheinberg (1999) that found sex to be a significant determinant in predicting payment for waste discarded.

The analysis further shows that a rise in educational level increases the effect of payment for solid waste disposal methods. Household heads with Primary education, Junior High/Middle level, Senior High and Higher educational levels respectively are 60 percent, 69 percent, 79 percent and 98 percent more likely to use solid waste disposal methods that are paid for compared to household heads with no formal education. In terms of household size, the study showed that two and three household sizes were respectively 0.209 and 0.188 times less likely to pay for solid waste disposal compared to single households.

The place of residence of a household was found to be one of the most significant factors that significantly determine payment for solid waste disposal methods in the Greater Accra Region of Ghana. Households living in urban areas are about 7-times more likely to subscribe to solid waste disposal methods that are paid for than households living in rural centres. This finding might be due to access to solid waste facilities in the urban centres within the region. This further confirms the result at the bivariate level where subscription to solid waste disposal methods that are paid for was virtually non-existent in the rural areas.

Wealth quintile of household is also found to have significant effect on payment for solid waste disposal method. As shown in Table 6.1, odds ratio of payment for waste disposal methods consistently increases with increase in wealth status. Household heads in the Poorer, Middle, Richer and Richest wealth quintiles are 18 percent, 39 percent, 42 percent and 64 percent respectively more likely to use solid waste disposal methods that are paid for than household heads in the Poorest wealth quintile. The findings validate the

hypothesis that households in the richest wealth quintile are more likely to subscribe to solid waste disposal methods that are paid for compared to household heads in the poorest wealth quintile. This result further confirms findings by Adepoju, (2002), Amiga, (2002), Mahanta et al, (2011) and Awunyo et al, (2012).

In all, the model recorded a Nagelkerke R-squared value of 0.289, representing 29 percent. This indicates that 29 percent of the variation in payment for solid waste disposal methods is explained by housing and household characteristics (independent variables) whilst the remaining 71 percent might be explained by factors other than housing and household characteristics. These other factors could be socio-cultural, administrative or political.

**Table 6.1: Binary Logistic Regression parameter estimates on payment for solid waste disposal**

<b>Independent Variables</b>	<b><math>\beta</math></b>	<b>Std. Error (<math>\beta</math>)</b>	<b>Significance</b>	<b>Exp. (<math>\beta</math>)</b>
<b>Constant</b>	-20.851	2.827	0.999	0.000
<b>Type of dwelling</b>				
Separate house (Bungalow) (RC)			0.000	1.000
Semi-detached House	2.241	1.085	0.025	1.404
Flat/Apartment	2.408	1.087	0.014	1.108
Compound House	-3.054	1.079	0.003	0.193
Huts/Buildings (Same comp.)	-2.007	1.066	0.054	0.437
Huts/Building (Different comp.)	-1.384	1.073	0.365	0.989
Tents/Impoverished Home	-1.556	1.132	0.094	0.738
<b>Occupancy Status</b>				
Owning (RC)			0.102	1.000
Renting	-0.250	0.503	0.620	0.284
Rent-free	0.535	0.495	0.280	1.707
Perching	-0.616	0.494	0.212	0.852
<b>Ownership of dwelling</b>				
Relative not HH member (RC)			0.001	1.000
Private Individual	0.554	0.125	0.001	1.375
Private employer	0.324	1.363	0.010	1.987
Private agency	0.143	0.764	0.224	1.333
Government ownership	0.723	0.225	0.113	1.243
<b>Age Household head</b>				
15 – 19 (RC)			0.484	1.000
20 - 24	0.764	1.293	0.557	2.147
25 - 29	0.157	0.452	0.729	1.170
30 - 34	0.023	0.328	0.943	1.024
35 – 39	-0.243	0.323	0.452	0.785
40 - 44	-0.008	0.322	0.980	0.008
45 – 49	0.626	0.306	0.041	1.869
50+	-0.050	0.320	0.875	0.951
<b>Sex</b>				
Males (RC)				1.000
Females	-0.038	0.129	0.765	0.962
<b>Education</b>				
No Education (RC)			0.233	1.000
Primary	0.519	0.443	0.024	1.595
JHS/Middle	0.376	0.417	0.367	1.686
SHS	0.229	0.417	0.583	1.795
Higher	0.018	0.441	0.968	1.982
<b>Household Size</b>				
One (RC)			0.851	
Two	-0.234	0.698	0.737	0.791
Three	-0.208	0.715	0.771	0.812
Four	0.142	0.722	0.844	1.153

Five	0.133	0.711	0.851	1.143
Six	-0.406	0.715	0.570	0.666
Seven	-0.486	0.753	0.518	0.615
Eight	-0.082	0.757	0.914	0.922
Nine	-0.135	0.848	0.874	0.874
Ten and above	-0.135	.0949	0.887	0.874
<b>Place of residence</b>				
Urban	20.390	0.278	0.000	7.506
Rural (RC)				1.000
<b>Wealth Quintile</b>				
Poorest (RC)			0.031	1.000
Poorer	1.708	0.428	0.000	1.181
Middle	0.942	0.246	0.000	1.390
Richer	0.863	0.193	0.000	1.422
Richest	0.448	0.148	0.002	1.639

Source: Computed from GLSS 5 data, 2006

Nagelkerke R square = .287    RC = Reference category    P<0.05

### 6.3 Conclusion

The binary logistic analysis showed that out of the eight independent variables that were included in the model, only type of dwelling, place of residence and wealth quintile were important predictors in determining payment for solid waste disposal methods. The regression analysis indicated that the explanatory variables explained 29 percent of the variations in payment for solid waste disposal methods.

## **CHAPTER SEVEN**

### **SUMMARY, POLICY IMPLICATIONS AND CONCLUSION**

#### **7.1 INTRODUCTION**

Payment for the collection of solid waste is been in operation for over a decade in the Greater Accra Region of Ghana and this has been found to be susceptible to a number of housing and household characteristics. In this regard, the study was to investigate the impact of housing and household characteristics on payment for solid waste disposal methods at the household level within the region. The variables selected based on literature reviewed included; dwelling type, occupancy status, ownership of dwelling, age, sex and educational level of household head, household size, place of residence and wealth quintile. The study utilised the Ghana Living Standard Survey round 5 (GLSS 5, 2007) dataset to assess trends and patterns in housing and household characteristics in the region and further examined how these trends and patterns influence payment for solid waste disposal methods. Adapting the framework developed by Jenkins et al (2000) to analyse the determinants of household waste disposal and recycling amongst households residing in Metropolitan areas, a framework for the study was developed on the premise that interaction of selected housing and household variables will influence payment for solid waste disposal. The study hypothesised that households living in separate houses are more likely to subscribe to waste disposal

methods that are paid for compared to households living in impoverished homes; households whose occupancy status is perching are less likely to subscribe to waste disposal methods that are paid for; and households in the richest wealth quintile are more likely subscribe to solid waste disposal methods that are paid for compared to those in the poorest wealth quintile.

## **7.2 Summary of Main Findings**

At the univariate level of analysis, the housing and household characteristics revealed that most households in the region reside in compound houses than any other dwelling type and this accounted for 52.3 percent. Further, there were more households occupying rented apartments/houses in the Greater Accra Region compared to other occupancy statuses and this also accounted for 39 percent. The analysis showed that over 50 percent of households in the region live in either houses owned by private individuals or relatives who were not part of the household. Thirty six (36 percent) of household heads were found to be 50 years and above and this confirmed the fact that household headship is solely the responsibility of older household members whilst 70 percent of households were headed by males with the remaining 30 percent headed by females.

In terms of education, the result showed that basic level of education (Primary to JHS) constitutes about two-thirds of overall educational attainment in the region with just two percent in higher levels of education despite the presence of major institutions of higher learning in the region. With reference to size, it was evident that single-member households are the most common household size in the region. Households living in urban centres

accounted for 89 percent with households in rural areas accounting for 11 percent. In terms of wealth status, the proportion of the richest and richer quintiles accounted for over 50 percent of the entire responses.

At the bivariate level, there are more households that subscribe to solid waste disposal services that are unpaid for compared to households that use waste disposal services that are paid for whilst households living in flats had the highest number of households subscribing to methods that are paid for (74.6 percent). Generally, households that lived in their own homes subscribed more to waste disposal methods that are paid for. In terms of ownership, households that lived in government owned apartments had 61.2 percent of the households using services that are paid for whilst household heads within age category 15 – 19 had a higher percentage (55.6 percent) in terms of households that subscribe to waste disposal methods that are paid for with male-headed households subscribing more to solid waste disposal methods that are paid for. At the educational level household heads with SHS and higher levels of education subscribe more to waste disposal services that are paid for. The findings further showed that households in urban areas accounted for 58.4 percent in terms of methods that are paid for. On the other hand, it was evident that the higher the wealth status of a household, the higher the subscription to waste disposal methods that are paid for.

Findings from the binary logistic model showed that out of the eight independent variables that were included in the model, only type of dwelling, place of residence and wealth quintile were the most important predictors in determining payment for solid waste disposal methods. The regression analysis indicated that the explanatory variables explained 29 percent of the

variations in payment for solid waste disposal methods. The findings validated the hypotheses of the study.

### **7.3 Policy Implications**

The findings of this analysis have important policy implications for payment of solid waste disposal. The following recommendations are made:

The study has showed type of dwelling to be very significant in predicting payment for solid waste disposal. This clearly indicates the need for the country to initiate schemes that will enable individuals to own their own homes since this type of dwelling is seen to lend itself to payment for solid waste disposal. This also calls for the draft housing policy to be adopted so as to streamline housing development into all aspects of our development.

Results from the study have further showed that place of residence is very significant in determining payment for solid waste disposal methods. In increasing the number of households that subscribe to solid waste disposal methods that are collected and paid for, there would be the need for increased government-private partnership in providing facilities like dust bins. However, a critical analysis of these challenges reveals a fundamental cause which is skewed towards a governance difficulty rather than attitudinal challenges. For example, policies relating to the adaptation of institutional arrangements and the purchasing of transportation equipment are developed in the absence of both the private sector and public participation. Such unilateral decisions ignore the realities of local conditions, as in the case of the failure to acknowledge the operations of the Kaya bola (Oteng-Ababio, 2010). The authorities have also failed to implement the necessary by-laws to make

compliance with policies enforceable. For example, citizens in poor neighborhoods may simply refuse to pay for waste services and begin to dump waste indiscriminately, creating financial challenges for service providers who will then be compelled to downgrade the quality of service.

The results have further shown that the wealth status of a household significantly influences payment for solid waste disposal methods. This calls for increase in budgetary allocations to the various District Assemblies in the region. Subsequently, the Assemblies may do well to consider adopting an economic funding model by raising fees on high-income households (areas) to cover the services of low-income neighborhoods so as to facilitate broad service coverage.

A more acceptable and safer means of waste disposal needs to be introduced. To cope with the present and future challenges of waste management, the Assemblies will need to play a role in creating a culture of waste reduction supported at the community level. The development and importation of technology that will improve the long term sanitation environment will, however, have to be facilitated at the national level.

In addition, more conscious efforts should be made to include community participation in curbing the waste menace since it is vital for all actions geared towards adopting appropriate waste disposal methods. Literature has shown a number of examples of projects that have yielded sustainable results from community organizing efforts. One of the most successful examples is the Orangi Pilot Project 42 in which residents of Karachi Pakistan slums were given the capacity to participate effectively in the creation (purely community financed and constructed) of their own sewage

system. It is therefore crucial to create and access a locally-made method through small scale pilot projects, and published studies to help determine if similar initiatives are applicable to the waste collection and disposal in Greater Accra Region.

#### **7.4 Conclusion**

Generally, this study has demonstrated that payment for solid waste disposal methods is quite low in the Greater Accra Region even in the urban areas and virtually non-existent in the rural areas. The findings show that disposing of solid waste indiscriminately, burning waste, burying waste and using public dumps that require no payment are the dominant solid waste disposal methods in the region. The result clearly shows that the present situation leaves much to be desired. Faced with rapid population growth and changing production and consumption patterns, the authorities in the various Metropolitan, Municipal and District Assemblies in the region are seriously challenged to implement the infrastructure necessary to keep pace with the ever increasing amount of waste and the changing waste types. Although the waste collection rate has improved over the past decade due to greater private sector participation, waste services and facilities in rural parts of the region are very much inadequate. Many factors might jointly account for this inadequacy and this might comprise: institutional weaknesses, inadequate financing, lack of clearly-defined roles of stakeholders and the inappropriate attitude of officials and residents (Oteng-Ababio, 2012).

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