

*Full Length Research Paper*

# **Solid waste management in urban communities in Ghana: A case study of the Kumasi metropolis**

**Paul Sarfo-Mensah\*, Kwaku Obeng-Okrah, Albert Abraham Arhin,  
Theophilus Kwarteng Amaning and Richard Tetteh Oblitei**

Bureau of Integrated Rural Development (BIRD), Kwame Nkrumah University of Science and Technology, Kumasi,  
Ghana.

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Globally, solid waste management has in recent times attracted massive attention, and one of the commonly cited areas is the sprawling cities and urban communities, where plastics and other solid waste have become major management challenge. In Ghana, solid waste management has become a major problem, particularly in urban settlements. The overall objective of the study was to investigate the key factors that underlie the effective urban solid waste management systems in Kumasi, the capital of the Ashanti region, and the second largest city in Ghana. In achieving the study objectives, exploratory and qualitative methods of research were adopted both in data collection and analysis. This comprised review of relevant literature, key informant interviews and observations. Results of the study showed that there was an inadequate budgetary allocation to manage solid waste in the Kumasi Metropolis. A deeper assessment of the situation further showed that bad attitude and the breakdown of sanctions for non-compliance with local authorities' solid waste management by-laws by citizens were important contributory factors. The study concludes that ineffective solid waste management systems have become a major challenge facing city authorities. This challenge must be addressed holistically because solid waste management is a multi-dimensional issue. The study recommends increased public education and awareness creation on the negative implications of indiscriminate waste generation and disposal on human and environmental health by urban and communal (chiefs/assemblymen) authorities for attitudinal change.

**Key words:** Community engagement, local attitudes, environmental management, non-compliance, sanctions.

## **INTRODUCTION**

It is very distasteful, and perhaps shameful, that Ghana, a prominent member of the Economic Community of West African States (ECOWAS), has recently been

ranked among the dirtiest counties in the world (UNEP, 2018). With this unpleasant accolade, it was the assumption of many environmentalists in the country that

\*Corresponding author. E-mail: [psarfomensah@gmail.com](mailto:psarfomensah@gmail.com).

at the very least the Metropolitan, Municipal and District Assemblies (MMDAs), which are the decentralized government authorities at the local and community levels, would facilitate a transformational process to improve the situation. However, a comprehensive solution continues to elude the assemblies as most of them still grapple with basic solid waste management problems. It was also the expectation that they would take waste management very seriously; surprisingly, this has not been the case. Most MMDAs have been unable to appreciate and prioritize the key factors that underlie their inability to adequately manage solid waste. The situation in urban communities is getting worse because of rapid urbanization and associated increased consumption patterns. According to IPA (2014), this challenge is grounded in a report which states that the world is becoming more urbanized and developed, and with populations rapidly increasing each year, and with consumption reaching historic levels. An inevitable natural consequence of this growing consumption trend is the rapid increase in the amount of solid waste produced.

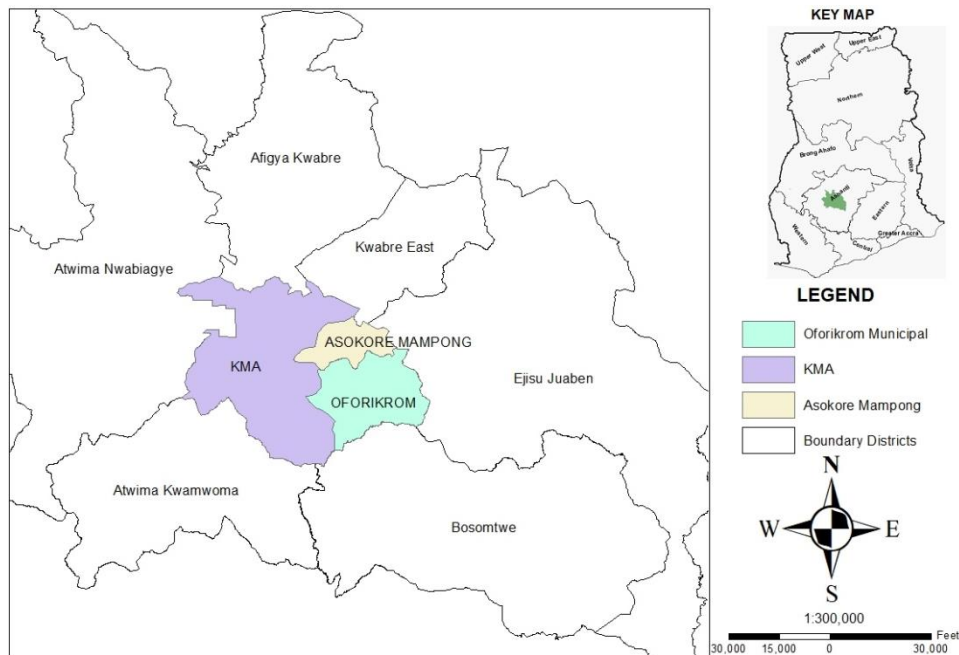
Also, studies have shown that Ghana, like many African and developing countries, is facing enormous challenges in the fight against waste management in urban communities (Selin, 2013a). Solid waste management continues to present major challenges to (MMDAs). The country's growing population, increasing urbanization and economic growth and its attendant consumption patterns have combined to worsen the weak waste management systems at the local level (Songsore and McGranaham, 1993; Owusu-Sekyere et al., 2013; Anomanyo, 2004). According to Mensah and Larbi (2005), the average solid waste generation in Ghana per person is estimated at 0.47 kg/day giving a combined total of about 12,710 t of waste per day based on the current national population which is estimated at 27,043,093. It is further estimated that only about 10% of the total solid wastes generated throughout the country are properly disposed of (Mensah and Larbi, 2005). Available statistics indicate that the two major cities of Accra and Kumasi in particular, generate over 4,500 t of solid waste daily, which makes it extremely difficult for Waste Management Departments (WMD) of the assemblies to cope with the situation of collection of this huge volume of solid waste. In the case of Accra for example, the Environmental Protection Agency (2014) reports that 2800 MT of municipal solid waste is generated per day and approximately 2,200 t is collected leaving a backlog of 600 t in the streets, open drains and water bodies which eventually results in flooding during raining season and filthy environment. Generally, a large proportion, in the range of 30 to 50% of solid waste generated by residents is never collected. It is, therefore, apparent that the capacity of the MMDAs, which are responsible for the disposal of generated waste, are overwhelmed by the continuous increase of solid waste in the urban settlements.

An inevitable consequence of more consumption is the rapid increase in the amount of solid waste that is produced. It has become very common, therefore, that urban cities, particularly business district, bus and taxi terminals and low class residential areas, are characterized by sights of heaps of solid waste. Generally, there is seemingly low capacity of waste management expertise (Ampofo et al., 2016) weak institutional capacity (Mensah and Larbi, 2005), lack of practical know-how and adequate logistics/infrastructure to efficiently deal with the disposal of the ever-increasing volume of waste. What is much more worrisome is that MMDAs have been unable to appreciate and prioritize the key factors that underlie their inability to adequately manage solid waste. Therefore, this study examined the key factors that underlie solid waste management in the urban areas in Ghana using Kumasi, the Ashanti regional capital and the second largest city of Ghana, as a case study.

### Study context

Most discourses on solid waste management in Ghana have underlined the seemingly break down of structures at the local government level that is mandated to deal with solid waste management (Selin, 2013b). This is premised on the factor that major cities and towns in the country are spilling with solid waste with its accompanying stench, polluting the air within the immediate vicinity and the environment beyond (Yoada et al., 2014). However, this indiscriminate disposal of solid waste has raised national debates and conversations that have not been able to identify factors underlying the poor waste management systems in the Kumasi metropolis. Authorities at the decentralized local government level have assigned inadequate budgetary resources as the major reason for their inability to address the situation. Indeed, inadequate financial resources may be a contributory factor as capital mobilization by the local authorities remains a major problem which has stalled socio-economic development of many cities and towns in Ghana (Boadi and Kuitunen, 2003). But others have argued that the human factor or local people's attitude towards solid waste management is the core problem (Fagariba and Song, 2016). They further suggest that the breakdown of sanctions for non-compliance with local solid waste management by-laws underpins the local authorities' inability to salvage the situation.

Other narratives and arguments have emphasized privatization of waste collection and disposal as one of the promising solutions to the mounting institutional constraints to waste management in urban areas including the Kumasi city (Oteng-Ababio, 2012). It is argued that the involvement of the private sector in waste collection, waste diversion programs could be better explored in collaborations with the informal sector



**Figure 1.** Map of the study area.

involved in waste recycling in the city. Indeed, findings from a study on municipal solid waste management system in Kumasi suggested three key components of successful arrangements with the private sector as competition, transparency and accountability (Asase et al., 2009).

Given these divergent views, the study decided that one of the best approaches to understand the ineffectiveness of the solid waste management systems in the Kumasi city was to start a research and development process which will include an engagement with stakeholders involved in solid waste management in the city. Within this context, the first major stakeholder was the institutions that preside over management of the city, which are the MMDAs.

## METHODOLOGY

### Study area

Kumasi is the second largest city of Ghana and is the capital of the Ashanti region in the forest area of the country. It is about 250 km north of the national capital, Accra. The city has a population of over two million people and it is a major transportation and commercial hub in the West Africa region. It is also the most important cultural tourism destination in Ghana because of the Ashanti kingdom. The city also boasts of the largest informal market, Kumasi central market, in the ECOWAS sub-region. It has the largest commercial district in the country and one of the biggest informal industrial complexes in Africa. These attributes have had implications for solid waste management of the city. Three purposefully selected local government administrative assemblies, otherwise known as MMDAs in the sprawling Kumasi city,

comprised the study area. These were the Kumasi Metropolitan Assembly, Asokore Mampong and Oforikrom Municipal Assemblies as seen Figure 1.

### Study design

The qualitative exploratory case study approach was considered appropriate for this study. This approach offered the researchers a better understanding of the existing problem (Naslund, 2002) and enhanced the collection of adequate information to identify issues that will set the focus for the next stage of the research. Indeed, this study is the first phase of a major research the team is undertaking on enhancing community sanitation through community engagement. In this phase of the research, qualitative methods were mainly used for data collection. This comprised review of relevant literature, key informant interviews and observations. As suggested by Mason (2002), through qualitative research we can explore a wide array of dimensions of the social world, including the texture and weave of everyday life, the understandings, experiences and imaginings of our research participants, the ways that social processes, institutions, discourses or relationships work, and the significance of the meanings that they generate.

### Sampling, data collection and analysis

An interview guide was used to engage senior officers from the planning, waste management, engineering, environmental health, budget and finance departments of three purposefully selected local government administrative assemblies. The engagements offered the research team a very good initial understanding of solid waste management by the assemblies, including the opportunities and challenges that confront the assemblies. In all, a total of 24 respondents (eight from each assembly) were interviewed. These officers were purposefully selected based on their knowledge and role in the assemblies on the subject matter. Follow-up

observations were undertaken along eight (8) selected transects within the study area (two in each assembly) to crosscheck information gathered from the key informant interviews. It was also used to select communities for the subsequent household survey, which will be the second phase of the research. During the data collection, the researchers ensured that informed consent procedures were followed. All interviews were tape recorded and later transcribed for analysis. The data was analysed qualitatively using an in-depth assessment of the various thematic areas.

## RESULTS AND DISCUSSION

### Institutional perceptions of solid waste

In this section we present local authorities understanding of solid waste. It was considered important as their understanding will invariably inform the management of solid waste. Interviews with the three local assemblies underlined two contrasting understanding of a solid waste. On one hand, solid waste is understood as a residue or a discarded item with little or no use to individuals, households or business units that must eventually be disposed of. This includes refuse, rubbish, garbage, sludge, debris, tailings, litter among others wastes that is typically produced from residential, industrial, commercial and institutional sources. As a key informant explains, *we see it as those plastics, papers and other materials that are of no relevance to individuals, households or business entities and had to be disposed of*. On the other hand, solid waste is also seen as a *resource-in-transition*, which directs attention to waste as a resource with varied economic values. This latter view of waste introduces relativity into the understanding of waste as *what is waste to one person may not necessarily be waste to another*. Despite this understanding of a waste as resource, assemblies are of the view that very little of the waste generated within Greater Kumasi is actually recycled or converted to further uses or resources because of capacity constraints. As such, the former view of solid waste as a residue or discarded item that has to be disposed of dominates the thinking and actions of the assemblies.

From the institutional point of view, solid waste comprise domestic solid waste, commercial or markets waste, industrial waste and medical hazardous waste. As such solid waste management is understood to mean all the processes related to the tasks of ensuring that waste generated ends up in the landfill sites, where they are treated. These processes include waste generation, gathering, collection, transportation, recycling, disposal and treatments. To effectively manage waste within Greater Kumasi, the local authorities have adopted two main management practices for collection; door-to-door collection and communal collection. Regarding door-to-door service, local authorities have given dust bins to specified households where collecting trucks go to their homes and collect the filled-up bins on weekly or other agreed times. This door-to-door service is applicable,

however, to a small section of the population, usually in the first-class residential areas and places which are properly organized as explained by an official from the WMD. For most parts within Greater Kumasi, communal bin collection is the main approach deployed by the Assembly. Here, the assemblies have created transfer stations or communal disposal sites where households, businesses, traders and others have to send their waste to for onward collection and transportation to the landfill sites. An emerging practice in most parts of the metropolis is a situation where some unlicensed tricycle operators (locally known as *Aboboya*) visits some homes and collect their waste for disposal at a fee as seen in Figure 2. This appears to be very convenient to most homes and it is also creating employment opportunities for many male youth.

The views on solid waste management as expressed by the respondents were not entirely different from those expressed in literature (Lee, 1997; Furedy, 1997; Vigso, 2004; Miezah et al., 2015). In particular, the views correspond to Vigso (2004) who defined waste to constitute non-liquid materials arising from domestic, trade, commercial, agricultural, and industrial activities and from public services. Seeing waste as both a resource and a discarded item also correspond to Furedy's understanding of solid waste as residual materials that are considered to be of no use and must eventually be disposed of typically by dumping or incarceration (Furedy, 1997). Furedy used the term *would-be-waste* to conceptually drive home her view of seeing waste as a resource with economic value.

### The effectiveness of the institutional arrangements for solid waste management

#### *Institutional arrangement for waste collection and management*

Local assemblies recognize that it is their responsibility to effectively manage waste spread across their respective jurisdictions. As a key informant established, *waste in the metropolis belongs to the assemblies. And that the WMD of the assemblies are mandated to deal with it*. This recognition by the assembly is important as it provides the basis for accountability. Several departments and agencies are involved when it comes to the management of waste in Greater Kumasi. The study showed that the WMD of Kumasi Metropolitan Assembly (KMA), and the Environmental Health Departments/Units of the various districts (in this case, Asokore Mampong and Oforikrom) are the main institutions involved in solid waste management. Among other things, the main functions of these departments/units are to: (i) Keep the Metropolitan/Municipal/District area clean; (ii) develop and continuously update an environmental sanitation plan; (iii) educate the public on how to keep the local environment clean; (iv) provide conveniently situated



**Figure 2.** A tricycle operator collecting waste.

refuse disposal points; (v) remove solid waste; (vi) dispose of waste safely (vii) manage sludge disposal and (viii) clean and carry out routine maintenance of drains. These agencies also work with the regional office of Environmental Health and Sanitation Directorate and Judicial system (including local magistrates) who prescribe sanctions for offenders of sanitation by-laws.

According to Ogawa (2005), inefficient institutional arrangements are at the heart of the many problems related to solid waste management in Africa. Here, it is argued that the lack of coordination among different agencies responsible for solid waste management often creates gaps and negatively affects solid waste collection and management. In the case of Kumasi, although several agencies are involved, the state agencies mentioned above are not directly involved in the waste collection, disposal and management of landfill sites. Instead, all these functions have been outsourced by the assemblies to private third parties. At the time of the interview, there were six contractors who have signed concession agreements with the Kumasi Metropolitan Assembly and the Asokore Mampong and Oforikrom Municipalities. These were Kumasi Waste Management Limited, Asadu Royal Waste, V-Max and Sakkem and Antoco. The management of the landfill sites has also been outsourced to J Stanley Owusu Ltd, a private firm. Each of these firms has obtained a concession or part of

the Greater Metropolitan Area where it is responsible for waste collection. As private firms, it is assumed they would be more efficient and effective. Yet as the paper shows later, this has not really been the case.

#### ***Constraints associated with waste collection and management***

Waste management is still a challenge for the various local authorities in Kumasi. Interviews and observations carried out as part of the study revealed significant dispersal of uncollected waste as well as the overflow of refuse in many bin collection or transfer points. This suggests that the institutional arrangement for waste management is not as effective as expected. Interviews revealed some constraints which undermine the arrangements for solid waste management in Kumasi. These include financial or budgetary constraints, operational and logistical constraints, and local attitudes and low enforcement of regulations. In the following sections, we discuss resource allocation and related constraints.

#### ***Financial resources***

The municipal authorities are faced with problems of

limited financial resources to effectively manage solid waste and its related activities. The metropolitan authorities are budget constrained and, therefore, lack operational funds to support comprehensive waste management and to create an acceptable and hygienically clean environment for healthy living. Discussions with officials of the WMD of the assemblies studied were conclusive that waste management is the biggest component of the assemblies' budget. Explaining the cost involved in waste management, a key informant at the WMD of the Kumasi metropolitan assembly narrated that:

*This Assembly pays the contractor a huge sum, paying like GHS30.00 per tonne of waste and we generate around 1500 t a day, so you can realize that the figures are that big. Thus, in the Kumasi Metropolitan Assembly alone, at least GHC 45000 is the average daily expenditure by the assemblies on waste management. Funding is a major challenge. We really spend a lot. We are talking about millions of Ghana Cedis here (A senior metropolitan waste management official).*

This realization was not too surprising. This is because many researchers have equally found limited financial resources as one of the major constraints of solid waste management in developing countries (Ogawa, 2009; Loshe, 2003). Loshe (2003) has maintained that in so far as urban populations expand and widen, demand for infrastructure and services including waste disposal would increase to put financial strain on local authorities. From our case study, the institutional arrangement governing waste management fuels the high cost involved in waste management. Per the present arrangement, the waste collection, disposal and treatment have all been outsourced to third parties. In certain areas, the assemblies pay a fixed cost to the contractors whether they perform to satisfaction, or not. It is interesting to note that some of the contractors have been engaged by the Central Government, but are paid by the metropolitan assemblies. Consequently, the assemblies spend a significant amount of resources on some of these contractors and leave very little to support the operations of the Environmental Health Departments that undertake community education, sensitization and enforcement of by-laws.

Another revelation from the study is that part of the assemblies' budget for waste management is often misapplied as part of it is used to pay the salaries of over-staffed and unskilled or under-qualified employees as well as private waste service providers/contractors. Indeed, the authorities confirmed unfulfilled financial commitments by the metropolitan assemblies as they still owe private waste contractors substantial amount of money. This affects service delivery as contractors withhold waste collection and disposal services compounding the already existing dire solid waste

management situation in the metropolis. Further evidence from the study indicates that the limited number of vehicles, supervisors and solid waste collection crews are among the major challenges to effective solid waste management within the assemblies. This is the direct result of financial constraints and probably misappropriation of funds within the assemblies or WMD.

Under the Ghana Environmental Sanitation Policy and its related National Environmental Sanitation Strategy and Action Plan (NESSAP), the various MMDAs are to set aside a dedicated fund purposely for environmental sanitation which will be sourced from internally generated funds (IGF), transfers from central government and donor support (EPA, 2014). The associated problem is that while the central government expects the MMDAs to use their IGFs to support sanitation services, the MMDAs rather expect the funds from the central government for sanitation activities. The result is that the fund from the central government is almost always released late and the MMDAs don't generate enough internal funds for their projects and waste management, thus compounding the financial challenges facing the MMDAs.

The study revealed that the MMDAs receive financial support from the country's development partners. Discussions with the Metropolitan authorities, for example, confirmed that the assemblies have received a number of financial and material support from Alliance Francaise de Development (AFD) and the World Bank to support the management of solid waste through the financing of nine cells at the Oti landfill site to improve the facility. However, this support has not been enough to supplement the efforts of the local government in the management of solid waste in the metropolis.

It was also mentioned that platforms which would have enhanced the assemblies' ability to source for technology and research information to improve solid waste management have not been sustained due to financial constraints. For example, the National Environmental Sanitation Conference (NESCON), the first and second conferences which were organised in 2011 and 2012 respectively to showcase cutting edge technologies and strategies to deal with the sanitation problems in the country, could not be sustained due to financial challenges from the assemblies and the sector ministry that is, Ministry of Local Government and Rural Development (MLGRD). It is, therefore, apparent that the MMDAs have inadequate financial resources to support waste management activities. This constitutes one of the major challenges facing national and local authorities and partly accounts for the MMDAs inability to manage solid waste effectively and efficiently.

#### **Attitude towards solid waste management**

The interviews at the MMDAs also revealed varying views about waste, and this we consider as a reflection of

socio-cultural norms, tradition and beliefs. For instance, discussions with private individual group of waste collectors revealed that to them waste is a source of livelihood. There are limited employment opportunities and, therefore, to this group of people, the more waste people generate the higher income they get from collection. Further, discussions with other stakeholders and key informants indicated that people generally see solid waste generation and indiscriminate dumping as a worrying situation which needs serious attention. Indeed, people recognize waste as a serious human and environmental issue, but the irony of this recognition and concern sadly do not stop littering of plastics and other household waste. This indiscriminate littering attitude among some residents makes it extremely difficult for the waste management authorities to improve the existing environmental sanitation situation in the Kumasi metropolis. One other observation is that some people are seen throwing out waste from both moving and stationary vehicles. Further, people dump waste carelessly and shamelessly at lorry stations, public and other unauthorized places. There is this general excuse that, there is not enough trash bins around to dump waste into but astoundingly, even in areas where there are bins people still dump their waste indiscriminately.

One major underlying cause of this attitude and behavior is the lack of effective sanctions or control systems for punishing by the local authorities. This reinforces one major observation of the study that the traditional waste management systems are malfunctioning due to rapid urbanization. The increased rural-urban migration and concentration of the population in few urban areas, particularly regional capitals and major urban service centers, have exacerbated the situation. This has eventually made solid waste management an onerous task for the local authorities to cope with.

Another important observation made in respect of changing attitudes relates to the local perception which in the past underscored that management of solid waste was the collective responsibility of central and local governments as well as the communities or the general public as a whole. However, with the creation of the WMD in the assemblies, local people have the perception that solid waste management (collection and final disposal) is the sole responsibilities of the various assembly authorities. This finding compares favourably with earlier studies (Songsore and McGranham, 1993; Vidanaarachchi et al., 2006) which emphasize that community members generally view waste management as the preserve of the local authorities. This shows lack of concern and understanding of the link between clean environment and good health.

During the group interviews with key staff of the assemblies studied, the problem of non-participation of communities in waste management was attributed to the attitude of a section of the society who has the perception

that they have no impact on the decision-making process due to their low socio-economic status in the society. They further alluded that the attitude is not the general characterization of all people but rather differs among socio-economic groups. Those who belong to higher and wealthier socio-economic groups are more likely to have a positive feeling that they can involve themselves and make a difference regarding issues on environmental problems and can do something about these problems as they have the belief that they have the means and ability to make positive impact in addressing and fixing the waste problem. The opposite is true with members of the society who belong to the lower socio-economic groups who have less regard for environmental issues and, therefore, have no concerns in helping to address relating to waste management and sanitation, but rather concentrate on immediate family needs and livelihood. This perception agrees with earlier findings of researchers who argue that people of lower socio-economic stand are more concerned with employment and housing as their main priorities than waste management and sanitation issues (Periou, 2012).

The indiscriminate dumping of solid waste and the filthy environment are not common characteristic of the general environment of the Greater Kumasi city. Solid waste is well-managed in the first class residential areas in the metropolis where rubbish bins are available and the rich and affluent people easily afford payment for frequent door-to-door collection of generated waste by private waste companies. These areas, therefore, have clean and healthy environment. The contrast was found in the urban slums and outskirts of the city, where the urban poor live. These areas were found to be filthy with accompanying unpleasant smell. This indicates a direct link between poverty and filthy environment, and poor health.

The observations above on attitudes and behavior of local people and how they impact on solid waste management are underscored in the findings of (Al-Khatib et al., 2015). The researchers assert that public littering rates are caused by lack of social pressure to prevent littering, unrealistic penalties or lack of consistent enforcement, and lack of knowledge of the environmental effects of littering.

### **Law enforcement and sanctions**

There exist national and local environmental legislation and policy to guide and ensure an effective management of solid waste. These include: (1) The 1992 Constitution of Ghana Section 41 (k) which states clearly that it is the duty and responsibility of every citizen to protect and safe the environment; (2) Criminal Code, 1960 (Act 29) provides that whoever places or permits any refuse, or rubbish or any offensive or otherwise unwholesome matter on any street, yard, enclosure or open space,

except at such places as may be set aside by the local authority or health officer for that purpose commits a punishable offence; (3) Ghana Landfill Guidelines, 2002; (4) Manual for Preparation of District Waste Management Plans in Ghana, 2002 (EPA, 2014). The problem, however, is lack of political will to enforce policies and bye laws on sanitation and this is the key challenge to ensuring sustainable waste management. This has become a major institutional hurdle that greatly contributes to the present mismanagement of solid waste in the metropolis and other urban and rural settlements in the country. There is evidence of frustration on the part of local authorities to apply the lay down by-laws relating to sanction of offenders as captured in the box below.

*At the law enforcement department, our main challenge is that when we send environmental cases to court, the courts are usually not interested and hence frequent adjournments of cases. And some of our traditional chiefs too impede our work. But when we have an issue of noncompliance of sanitation law, we tell them to take (legal) action. Sometimes, we wait and nothing happens. Sometimes too, we wait and somebody else such as a politician may come and intervene on behalf of the culprit to prevent prosecution. So those are some of the issues (A Metropolitan Waste Management Official).*

This is a clear case of political interference which has contributed to the disregard of the local laws on waste management in the country. Offenders are quick to take refuge in chiefs and politicians (members of parliament and the local executives of the ruling party) who intervene to set them free in order to win votes during elections. Consequently, local authorities are powerless and ineffective in the application of sanctions. This finding confirms similar studies (Zhu et al., 2008; Ogbonna et al., 2002) which concluded that lack of enforcement of waste management legislation is a major impediment to achieving effective and sustainable waste management in Ghana. It is important to note that the national capital of Accra which has established sanitation courts is still grappling with serious problems of solid waste management. Thus, all the MMDAs have sufficient legislation covering waste management, but the authorities lack the political will to enforce them. The results are the unregulated rubbish dump and improperly discarded waste.

Additionally, the finding supports the view that in most situations, the heart of the problem with effective solid waste management in the developing countries is not the environmental legislation itself as some of these countries have more refined legislation than developed countries. The real problem, however, is the lack of enforcement of policies and laws which is a major institutional challenge that greatly contributes to the poor and ineffective management of solid waste in the urban settlements in the developing world. A case in point is

Kenya where there exists sufficient legislation covering waste management, but local authorities lack the capacity to implement them (Ogawa, 2005; Al-Khatib et al., 2015).

### **Policy implementation**

A review of policy documents on sanitation shows that broadly, Ghana has an Environmental Sanitation Policy with an associated NESSAP aimed at achieving filth-free and healthy environment with particular reference to the sanitation sector. This is a well-thought and laudable proposal on waste; *materials in transition (MINT)* have been greatly emphasized in both documents. The overall objective is to promote re-use, recycling and recovery of solid waste to create a more effective method from the current generate-collect-and-dispose philosophy. This noble idea is also expected to substantially cut down the operational cost of managing waste by MMDAs. Unfortunately, the ideas contained in this well-thought out document continues to gather dust as this policy is yet to be implemented. Thus, the ideas and plans to help effective waste management are in existence but poor or delayed implementation is not helping the cause. This observation may support the assertion that the range of waste management services is limited because waste management does not constitute a major priority for policy makers and planners (Henry et al., 2006).

This should not give the erroneous impression that the central government is unconcerned with general waste issues in the MMDAs and of course all other places in the country. Under the NESSAP programme is the proposal for the establishment of courts to deal specifically with sanitation offences. As a follow up of this proposal, eleven of such sanitation courts were established in the national capital of Accra only in the year 2010, sadly leaving the other major cities and towns. As at the time of this study, the other major settlements are yet to benefit from similar sanitation courts. Unfortunately, the purpose and impact of the sanitation courts are yet to be seen and felt as people are not deterred by the courts and Accra continues to be engulfed with more filth characterized by littering along the streets and choked gutters. The situation of littering still goes on unabated in the study metropolitan assemblies and their immediate environs and this could be attributed to delayed or poor implementation of policies on management of solid waste in the country. This calls for a very concerted action on implementation of policies on sanitation and solid waste management.

### **Human resources**

Human resources relating to skilled manpower and technical know-how for waste management are either



limited or, in some cases, totally lacking in the metropolitan assemblies covered under the study. The study has identified unskilled workforce as one of the major challenges facing local authorities in the management of solid waste. This situation of inadequate man-power has forced the metropolitan authorities to sometimes take ad hoc measures in the handling of solid waste which eventually become regular and permanent system of managing of solid waste.

Some of the waste management officials responsible for handling the complex issues involved in waste management have limited or no technical training in waste management. Further in-depth discussions with some key stakeholders revealed that more often than not, some of the waste management staff are employed based on their political affiliation to the party in power. The ruling party gives employment to these unskilled party followers as *thank you* and in exchange for their continuous votes during local and general elections. This situation makes it difficult to provide such people with the needed technical assistance. Relatedly, the study reveals that, in addition to the problem of unskilled manpower, workers of waste management generally have low social status and some of these workers are people from a specific social stratum. The self-employed young men who use tricycle known locally as *aboboyaa* to collect and dispose of garbage are mostly unsupervised and this compounds the indiscriminate dumping of solid waste. Of course, the local authorities do not have official contract with this group of individual solid waste collectors. Extra manpower hired from private waste companies to provide additional waste collection services are not frequently monitored. Generally, there is lack of or limited monitoring and evaluation of waste collection and disposal in the metropolitan assemblies.

Many researchers have argued that the absence of comprehensive waste management planning in developing countries is the direct result of lack of capacity with regard to the human resources available to manage solid waste (Marshall and Farahbakhsh, 2013; Schübeler et al., 1996; JICA, 2005), and findings of this study gives a true reflection of the assertion. This study further reveals that, there is general absence of actual quantitative statistical data on the actual volume of waste generation and production within the metropolitan assemblies which would have formed the basis for predicting and planning for quantity of future waste generation and its management. As indicated earlier, this is the result of lack of regular and inefficient monitoring and evaluation which makes it difficult for local authorities to keep abreast with changing trends in consumption and waste generation. This is an indication of inadequate organisational capacity in metropolitan and municipal solid waste management.

This finding also confirms earlier studies (JICA, 2005; Zurbrugg, 2002) which concluded that, the collection and analysis of solid waste data are generally not given

sufficient attention by waste management authorities in developing countries. This study also shows inadequate development programmes for human resources. Consequently, there are limited opportunities for waste management administrators to gain the needed experience and become experts and to formulate and implement waste management plans that are tailored to the actual situation.

### ***Logistics and service operation***

One key contributing factor for achieving efficiency in solid waste management is the availability and sufficiency of the needed logistics. Unfortunately, this is not the case with the MMDAs in the country. The metropolitan authorities are struggling to cope with the problems of inadequate operational and maintenance culture. The WMD do not have adequate logistics relating to vehicles, garbage bins and communal dumps among others as seen in Figure 3. The identified problems also include weak waste transportation system that includes inadequate waste collection trucks most of which have broken down due to lack of routine maintenance. There is also the problem of inadequate supply of garbage containers and limited number of communal dumping sites with skips, and poor roads to landfill sites. The standard of skip ratio per population is estimated to be 1:700 but the indication is that the current skip ratio in the metropolis is far below the acceptable standard. The end result is the provision of inadequate services, operational inefficiencies, and limited coverage of garbage collection, indiscriminate disposal of waste and increasing pile of waste in the study area. This situation of inadequate logistical support has compelled the city authorities to centralize resources in the affluent areas of the city where the rich residents can afford payment for waste collection services.

This finding confirms that of studies which concluded that in the developing countries, only a limited part of the urban population generally receive services under municipal and metropolitan solid waste collection schemes, and that the people remaining without waste collection services are usually the low income population living in urban and rural areas (Al-Khatib et al., 2015; Vidanaarachchi et al., 2006).

Insufficient facilities has left the metropolitan authorities with no option but to contract the services of private waste companies to supplement their efforts and to close the logistical gaps in solid waste collection and disposal and ultimately the overall management of solid waste and disposal. Unfortunately, most of these companies are not very effective in solid waste collection and disposal than the local authorities. Moreover, it is often difficult for the assemblies to exert full control over the outsourced services from these private waste contractors due to their own operational deficiencies.



**Figure 3.** Picture of a communal waste dumping site in the Oforikrom Municipality.

The assemblies' main mechanism for dealing with these constraints includes continuous dedication of budget for waste management, reviewing performance of contractors, community education and sensitization. However, judging by the amount of uncollected waste within the study area, these mechanisms can be said to be ineffective.

### **Public education on waste management**

Lack of education and public awareness of effective waste management practices have been identified as one of the key challenges facing local authorities. Indeed, appropriate strategies to achieve reduction in indiscriminate disposal of solid waste in the Kumasi city area include education and awareness programmes. Education at all levels is an important starting point in practical, effective and lasting municipal solid waste management.

Inferences drawn from separate discussions with local authorities and key informants are that there has not been extensive public education and awareness creation of the negative implications of indiscriminate waste generation and disposal on human and general environmental health. This is indispensable for a truly effective community cooperation and partnership in solid waste management. The discussions further revealed that the local authorities spend substantial part of their budgetary allocation on waste management to help keep a clean and healthy environment. Ironically, it is considered by some people as misapplication and, therefore, a waste of funds. They would have preferred

that city authorities rather use the money on other activities or projects as remarked by a management official below.

*It is a big challenge. Sometimes the assembly undertakes public engagements and we tell them we are spending so much in terms of waste management. They themselves think it is waste of money. They would rather prefer you build a hospital, school or something else; but for you to spend it on waste, they don't get it. So all those attitude is a problem. And you don't manage waste with zero resource or zero capital.*

This is clear indication of ignorance and lack of public knowledge and understanding of the direct linkage between filthy environment and good human and environmental health. This may help to partly explain the apathy and the very low-participation of people in waste management activities.

The above community perception could also be explained in relation to social problems, such as unemployment and poverty which are inextricably linked to solid waste management. Indeed, some city authorities indicated that the urban poor and other low-income people in the city are more often than not concerned with their immediate needs and livelihood but not the quality of the environment and related issues. They further said that the urban poor in particular will be interested and willing to participate both directly and indirectly in waste management, for example recycling of waste activities, if it will earn them some income as a livelihood option. In addition, some respondents emphasized that this attitude and lack of interest in ensuring clean environment

creates a culture of non-participation of communities in decision-making involving solid waste management. This may lead to a situation which enhances lack of community responsibility for pollution and waste issues and eventually create communities that have little or no knowledge of, and concern for their impact on the environment.

Therefore, education and awareness creation among stakeholders is considered very necessary and should be led by the metropolitan and municipal authorities in charge of management of solid waste, environmental and other professional health officers generally.

## Conclusion

The overall objective of this study was to examine the key factors that underlie effective solid waste management in the urban areas in Ghana using Kumasi, the Ashanti regional capital and the second largest city of Ghana, as a case study. Results from this study have shown that solid waste management is a major problem which the city authorities are grappling with. Generally, there is inadequate management expertise, lack of practical or technical know-how and inadequate infrastructure for disposal of the increasing volume of solid waste. The assemblies spend huge sums of monies to manage solid waste and this is diverting limited resources needed for other development projects. Solid waste management in the city was found to be inefficient and therefore very expensive for the city authorities to finance.

The study also concludes that attitudes and behavior of local people, absence of social and environmental awareness, and lack of institutions promoting sustainable actions in waste management are key factors that underlie effective solid waste management.

Faced with limited financial resources, the local authorities' policy initiatives should be more towards education, workable sanctions and enforcement of by-laws on solid waste management. In this respect, there is a need for effective collaboration among government and private agencies to ensure effective and workable management practices.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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