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*Chapter Seven*

## RE-THINKING LANDFILLS AS ASSET: EMPIRICAL EVIDENCE FROM URBAN GHANA

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### ABSTRACT

Within the literature, landfills are often described as locally undesirable land use (*lulu*) facilities that impose negative externalities on neighbourhoods through noise, odours, flies, mosquitoes and other insects. They are assumed to depress nearby properties and are associated with emissions of methane and leachate which have implications on climate change and water quality respectively. In the meantime, landfills can also be a catalyst for the development of a society but this is often poorly understood. This study disentangles the poorly understood relationship between landfills and economic development. Using empirical data from three landfill communities from Kumasi where unchecked and rapid urbanization has engineered urban poverty, I argue that landfills can also play out differently as a vibrant entrepreneurial part of the urban economy. When they are properly nurtured, regularized and managed, they can potentiate economic growth, job creation and a reduction in extreme poverty of the host communities. This therefore calls for a reconfiguration of our understanding of landfills development and management.

**Keywords:** asset, landfill, Ghana, economic development, urban

### INTRODUCTION

Perhaps the most common chorus of the 21<sup>st</sup> century urban dweller in developing countries is the massive growth of the urban population and its accompanying environmental costs. The massive influx of migrants from the hinterlands towards the urban areas and the

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natural increase of the urban population brings to the fore the fact that the future of human race lies in cities (Grant & Oteng-Ababio, 2012). The situation has also propelled waste generation and disposal issues into greater prominence in the environmental arena, from the perspectives of both analysis and policy (Gibbons, 2003; Oteng-Ababio, 2013b).

Research by Molesi (2005) and Oteng-Ababio (2012) indicate that in the last two decades, solid waste collection and disposal has undergone significant modification owing in part to the evolving environmental, economic, political, social, technical and administrative changes in the services themselves. These factors have compelled city authorities to institute significant structural adjustments in their waste management policies. Indeed the structural adjustments which is spearheaded by the World Bank is not to replace the over-reliance on state sponsored policies but has come to augment the economic and political responsibility of the state in order to introduce other waste management practices such as reduction, recycling and re-use. This is aimed at addressing the over-reliance on open disposal sites as the only available means of proper solid waste management (EPA, 2002). Despite the very diverse benefits of the role of the structural adjustments in waste management services, the setting of new waste management systems and adjusting to them has not been an easy task. As observed by Strange (2002), the problems associated with adopting new waste management systems and the different strategies including plans and programs, technical standards and mandatory regulations, financial strategies (taxes and financial incentives) and persuasive strategies (information campaigns, public relationships and environmental management systems) which aims at promoting efficient waste management must be tactfully done in order to avoid excessive backlash.

Poor solid waste management has remained the Achilles heel of many cities in Ghana. This situation is impeding both sustainable growth and healthy living environments. A conundrum which is attributable to high population growth (Basel Convention, 1994); weak operational capacities of the municipal authorities; limited financial resources due to unreliable revenue sources (Ghana Statistical Service, 2010); implementation of imported policies without recourse to local conditions (Ali, 2010) and limited community participation in strategic plans and projects; poorly designed collection systems and the need to give equal attention to other development priorities (Wilson, 2006). This has led to the practice of uncontrolled and crude dumping in open spaces which constantly block both primary and secondary drainage networks (UN-HABITAT 2010). The lack of defined solid waste collection routes and inaccessible road networks in the low income communities has introduced additional difficulties in the existing problems (Post and Obiri-Opare, 2002). Ironically, these underserved communities have become the host communities for open disposal sites because of their inability to bargain with the city authorities for their rights; in any case, most of them are migrants who have settled on “empty” lands without any proper tenancy agreements.

Since the 1980s particularly, there has been a proliferation of discourse on improper management of solid waste disposal sites emanating from virtually all visages of academic and policy circles (Benneh et al., 1993; McGranahan et al., 1996; Songsore, 2005; Oteng-Ababio, 2013a). Conceivably the most surprising feature of the expansive literature is not the enormous size, or the diversity of disciplinary perspectives from which analysts have approached the subject, but rather the perfunctory attention given to the Ghanaian situation. Ghana follows the “end-of-pipe approach” where generated solid waste is collected and disposed in landfills/open dumpsites, which by far, remains one of the most reliable and economically viable methods (Seadon, 2010; Daskalopoulous et al., 2008). These final disposal sites are often located in ecological sensitive and challenging neighbourhoods including abandoned valleys without

proper leachate or gas recovery systems. Their maintenance falls short of the legally set standards required for safeguarding public health and environmental quality. These sites tend to be disturbingly degraded but typically, ‘environmental pollution’ becomes a veritable buzzword, adapted inadequately, or adopted uncritically to mask actions or inactions of the city authorities who ought to have done better. This has created a situation where public concerns are rified as to whether landfill practices constitute “a blessing or a curse” to the people they are meant to serve. Consequently, public consensus on locating such environmentally noxious facility has become very problematic as opposition to such facilities seems to rise in both frequency and intensity.

This is against the backdrop that the revised National Environmental Sanitation Policy (MLGRD, 2010) affirms that safe waste disposal is an important component of environmental sanitation and sustainability, and offers opportunities for income generation, health improvements and reduced vulnerability. The policy further enjoins all local authorities to acquire sufficient land and secure title with payment of due compensation for its immediate and future use. The magnitude of the problem manifests more clearly when viewed against Ghana’s land area of 238,000 km<sup>2</sup>, with 25 million people and 47,800 settlements, including 6 metropolitan, 49 municipal, and 161 district capitals (Owusu & Oteng-Ababio, 2014). This situation, by implication means that open spaces are becoming less available, thus making the practice of open disposal unsustainable.

Studies concerning vulnerability of human systems to poor landfill management continue to grow exponentially; some of these (Owusu-Sekyere, 2013; Oteng-Ababio & Owusu, 2014; Oteng-Ababio et al., in-press) have examined the externalities of disposal sites on human health; others have also tended to concentrate on the disamenity of landfills on residential property values and land rent (Owusu, 2014, Oteng-Ababio et al., in-press) by taking into consideration, the existing conditions prior to the construction of the disposal sites. Though the results of these studies, to some extent, may have suffered from a significant overestimation of the perceived externalities, they paint a picture of how poorly managed landfills can impact negatively on dormitory communities (Elliott et al., 2006).

What is however lacking in the development discourse of landfills is its potential as an asset, which, when fully harnessed can also lead to the total development of the communities in which they are located. This chapter focuses on the positive impact landfills can have on host communities drawing on experiences from three landfills in Ghana. I argue in the ensuing discussions that the inaccurate and unrealistic assumption that broadly, landfills in Ghana are not operated according to ‘best practice’ and that they are facilities that connotes negative externalities on property values and human health which still underpins most discourses, blight the positive impact such facilities can have on the local economy. This situation tends to negate the realities on the ground, where even those living near such sites experience few social and environmental cost (EPA, 2002). Such an assumption appears rather simplistic and artificial and it provides little realistic guidance for environmental policy makers in Ghana.

The chapter answers the question whether there are any evidence to suggest that when properly managed landfills can correct the lags in development? If such evidence exists, to what extent can it lead to the development of the dormitory communities? The remainder of the chapter is organized as follows. After the introductory discussions, the next section discusses the theoretical perspective of landfills as a waste management option. This is followed by a presentation of the regulatory framework for landfills management in Ghana. The fourth section provides an overview of the processes involve in the selection of landfill sites well as the

research methodology and the study sites. The next section then presents the empirical evidence of the positive impact landfill development has had on our study locations. Finally, the last section interrogates the implications of the findings and draws some conclusions for policy considerations.

## **LANDFILL AS A WASTE MANAGEMENT OPTION: A THEORETICAL PERSPECTIVE**

The term “landfilling” refers to waste disposal on land, whether it involves the filling of excavations or creation of a landform above grade (EPA, 2002). Historically, all wastes in Ghana have been deposited on land because landfilling/open dumping is the cheapest and most convenient method of waste disposal. It is environmentally acceptable if properly carried out. A landfill may be regarded as a construction project, carried out over a period of time, to build a desired landform using waste materials and incorporating appropriate environmental protection measures. Effects such as pollution of the water regime and unacceptable final profiles may arise from generally incorrect landfill site selection, design, preparation and operation. These, together with the problem of disturbed and degraded land, may persist long after the landfill site has been closed (Oeltzschner & Mutz, 1994).

Historically, the evolution of sound waste management practices started in the 1970s in the more advanced countries focusing on reducing environmental impacts (Tanskanen 2000). Ready (2005) observes that these countries in the Global north created controlled open spaces for waste dumping (landfills), created waste depots or what is known as transfer stations and finally redirected all waste collection vehicles to these sites although Awunyo-Vitor, et al., (2013) indicate that crude dumping has been in existence before the dawn of civilization. This is evidenced from dumping pits located in or around archaeological sites. However, there was a policy shift between the 1980s and early 1990s where the focus on waste management was the development of new technological solutions. From the latter parts of the mid 1990’s until today, the focus is on resource recovery (Read et al., 1998; Oteng-Ababio, 2013a)

Worldwide, notwithstanding the advancement in the alternative means of waste disposal practices, landfill remains the most preferred and the ultimate disposal technology even when other advanced options such as recycling and reduction are becoming increasingly popular (Agamuthu, 2013). They are endorsed and form an essential element in most countries’ MSWM systems and strategies because they have proven to be the most reliable technology that can accept a wide range of incoming loads. Additionally, when correctly operated, they generate valuable landfill gas, a low BTU fuel which can have economic value and may add to a country’s energy requirement.

As observed by Awunyo-Vitor, et al., (2013, p1), “waste is directly linked to human development, both technologically and socially. Humans generate a great deal of waste as a by-product of their existence. Every task, from preparing a meal to manufacturing a computer, and so forth, is accompanied with production of waste material which cannot be used for other things and needs to be disposed of effectively. If not contained and handled appropriately, waste can balloon into a huge problem.” In a similar line of thought, Read et al., (1998) and Oteng-Ababio (2013a) argue that waste generated by the daily activities of man, through production and consumption activities needs to be properly managed to minimize

the risk it poses to the environment and human health. They argue that improper management of solid (inadequate collection and disposal) can lead to the spread of disease and environmental degradation. Studies by Gilbert et al., (1996) and Oteng-Ababio (2013b), suggest that while developed countries seem to have succeeded in developing appropriate laws and policies in managing their landfills effectively and are now focusing on minimizing its environmental externalities and maximizing its resourcefulness, developing countries including Ghana are struggling to acquire safe waste disposal sites. In some cases, when such sites are acquired, maintaining them according to best practice has become a problem. This poses daunting environmental challenges in view of the alarming rate waste is changing both in quantities and composition (Ali et al., 2005).

Landfills are commonly considered as a form of nuisance. They are places of activity involving trucking, dumping, filling, sorting, spraying, operation of heavy equipment, and noise (Nelson et al., 1992). Landfill emissions, mainly in the form of landfill gas and leachate, are not inversely related to the quantity and composition of waste disposed. In developing nations, limited resource capacities have compelled city authorities to dispose off almost 65 to 80 percent of the total waste collected into landfills without any characterization. Solid wastes in these countries have high degradable organic content (between 40-70 percent). The organic fraction is composed of kitchen waste including food leftovers, vegetables, leaves, animal excreta, rotten fruits and bones, a situation common across countries that thrive largely on agricultural products for economic development (WMA, 2014). The high percentage of the degradable organic content is a significant source of greenhouse gas (GHG) emissions. At present 90 percent of the world's landfills are dumpsites without proper LFG collection systems, resource that can be recovered and used for energy purposes thereby potentially offsetting fossil-fuel-based energy generation (Manfredi et al., 2009).

Studies (see Johannessen & Boyer, 1999; Oteng-Ababio, 2013b) maintain that the excessive reliance on landfills as waste management option has attracted major public concern owing to the perceived health impact. These poorly maintained dumpsites pose several environmental and health challenges such as toxic groundwater contaminants, including nitrate, ammonia, solvents, PCBs and heavy metals. Tchobanoglous et al. (1993) demonstrates the negative impact by citing example of how in the first half of the twentieth century, over 16 per cent of the US population was infested with Trichinosis from eating inadequately cooked pork as a result of poor dumping practices. Other hazards associated with poorly maintained landfills include odours arising from the decomposition, smoke arising out the landfill fires, flies, rodents as well as blowing papers (Owusu-Sekyere, 2013).

While there are challenges of design and construction standards to be followed, the major problem is the adherence to continued operation and maintenance management standards. The current operation practices of the engineered landfills in Ghana are not different from what pertains for controlled open-dumping at un-engineered sites. Meanwhile, these landfills are supposed to be managed at different levels of expertise. The next section of this paper discusses the regulatory framework for landfills management in Ghana as spelt out in the Ghana Landfill Guidelines developed by the Environmental Protection Agency (EPA), in July 2002.

## METHODOLOGY

The study was undertaken in Kumasi, the second largest city in Ghana which also serves as the nation's economic and cultural hub. Its central geographical location has allowed it to function as a natural market center, which has in turn made the city an important destination for a number of local and foreign trading firms. The city has grown significantly over time, from a population of 346,336 in 1970 and 487,504 in 1984; statistics indicate that there are over 2,022,919 people currently living in Kumasi (KMA, 2011). This phenomenal growth has also contributed to increased waste generation that far outstrips the city's capacity for containment and processing.

### Data Collection

To achieve the objective of the study, three sites (Dompoase landfill, Kwadaso and the decommissioned Ayigya waste dumpsites) were selected. The Dompoase facility is an engineered landfill that has been in operation since 2004, the Kwadaso open dump which has been in existence for more than ten years started as a transfer station but has grown to become an open dumpsite due to city authorities' inability to organize regular collection. The Ayigya waste dumpsite was the largest in the Ofrikrom sub-metro but has been decommissioned after it was full. It has become a scene of intensified agricultural activities. Data was collected from scavengers and vegetable farmers who have been scavenging or farming in the vicinity of the landfill sites. Snowballing was employed in identifying those who were directly involved in the process due to the threat of eviction from the sites by the city authorities. An air of suspicion therefore greets any stranger who visits the sites; hence considerable effort had to be invested in building relationships and trust. The data was gathered from in-depth interviews and focus group discussions. A total of eighteen scavengers and twelve vegetable farmers who were purposively drawn equally from the three solid waste dumpsites were interviewed using an unstructured interview guide. The reason for choosing relatively unstructured interviews was to allow for flexibility and to adjust the questions to each of the respondents. In addition, the use of unstructured interviews allowed frank expression of views so as to not betray the trust and relationships we had built together. It also offered me the opportunity to obtain other information that could be of interest to the study. These interviews elicited information about their activities, experiences, opinions and feelings concerning their operations. Of greater concern were the positive impacts the construction of the landfill/open dumps have had on their lives.

Specifically, the scavengers were asked to mention some of the reasons for engaging in the enterprise, the preferred material they like to pick, the income from daily sales and the number of years they have been in the enterprise. The vegetable farmers on the other hand were also asked to explain why they prefer to cultivate on the margins of the dumpsites other than lands elsewhere. They were also asked to mention the types of crops grown and how such crops are patronized judging from the fact that such lands are perceived to be contaminated. The issues of income and the general perception of the location of the facility were also explored. The in-depth interviews were supported with six focus group discussions at the three dumpsites (two each at the study sites, one for farmers and one for scavengers). Each group had five members

made up three males and two females, a situation which reflects the gender bias of the profession. The groups delineated the positive socio-economic changes that have taken place in their lives, showing both past and present trends, but also lamented on the escalating health problems with the enterprise. However, the level of income and the purported improvement in their living standards overshadowed the perceived negative impact.

Additionally, ten separate official-level interviews were done. The officials were from the waste management department, the environmental sanitation office, the public health department of the Ghana health service, the employment desk of the social welfare department and managers of the dumpsites. Each officer gave his/her perspective, understanding and knowledge of waste scavenging and urban farming as a livelihood activity in the metropolis. The point of concern to the researcher was the fact that in the strictest sense of the word, landfill management does not allow individuals free entry access, a point which is amply captured by the Ghana guidelines for managing landfills. It was therefore curious to note that the contrary was the situation in the sites selected for the study. Their responses are aptly captured in the form of narratives in the subsequent sections of this chapter. The officials were also asked to comment on the Kumasi waste-to-energy project which is intended to generate electricity from refuse for a number of communities in the Ashanti and Central Regions. Under the project, waste, which will be the main raw material for generating the electricity, will be of commercial value.

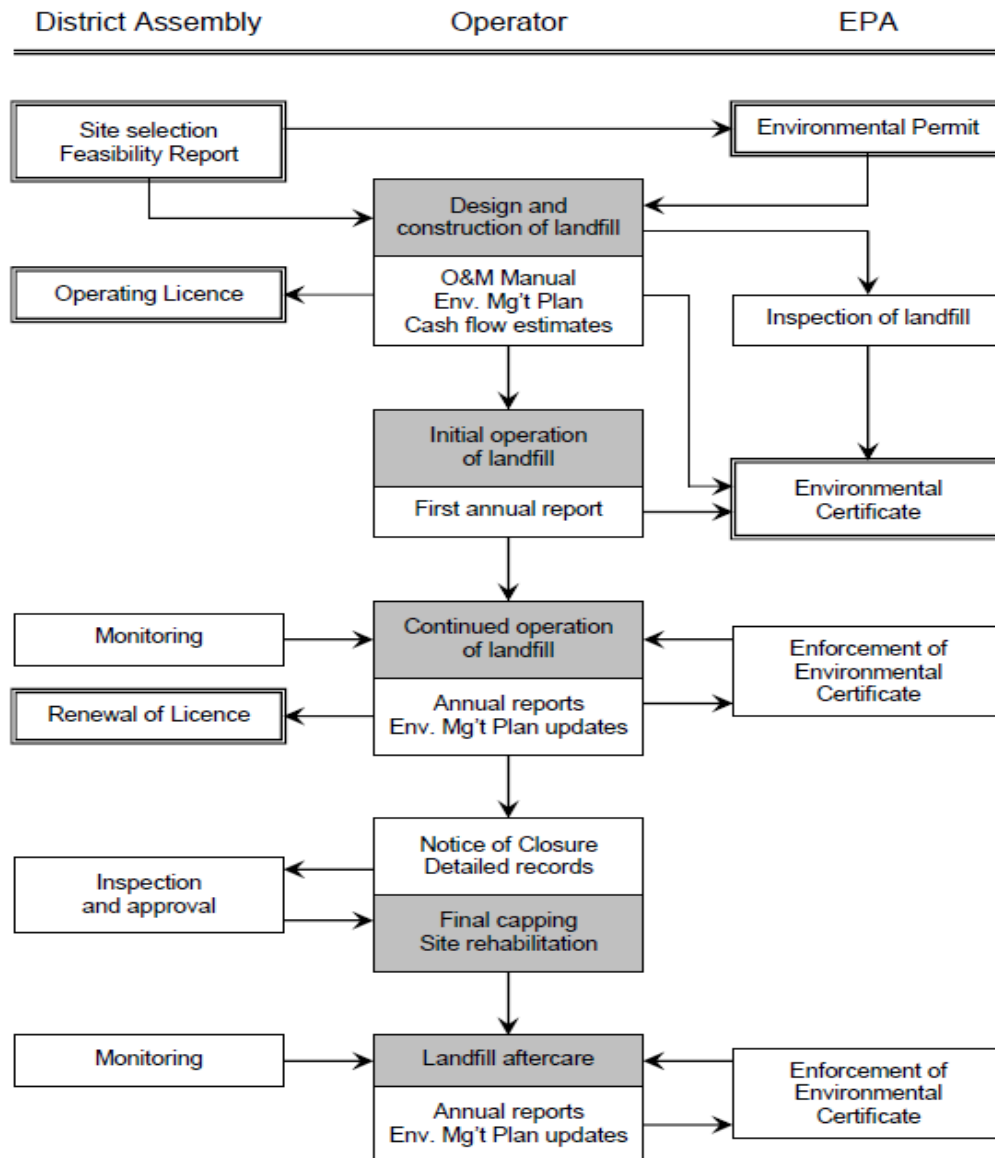
Furthermore, thirty nearby households (ten from each location) were contacted for in-depth interviews. Their views were used to identify potential asset capacity of the landfill/open dumps, their perceptions, reactions and coping strategies. The interviews were conducted with the principal home keepers/opinion leaders (well-informed people within the communities, including locally elected and non-partisan representatives) of the people who had lived in the communities before the construction of the landfills. Their interviews were very useful in obtaining information on factual matters concerning how the construction of the facility has helped, whether directly or indirectly towards the development of the communities. Systematic observations of the communities and the operations of the landfill sites provided an opportunity to learn at first hand and also experience a typical day in the life of the scavengers and farmers.

Lastly, the study reviewed extensive literature on the subject and also benefited from official documentations from the waste management department of the KMA and the Environmental Protection Agency. These are the two key actors officially mandated to regulate waste management activities in Kumasi. These documentary analyses helped considerably in illuminating the landfills operation and other matters relating to their management. It also helped in checking and cross-checking some of the information obtained from the empirical data from the interviews and the focus group discussions. The results of the interviews and the focus group discussions were arranged in themes to reflect the objectives of the study. The aim of this analytical approach is to explore the participants' view to understand and integrate their perspective on the subject under study. Following verbatim transcription of all interviews, notes were made to throw light on interesting or significant comments in relation to the resources potential embodied in the waste dumpsites.

## RESULTS AND DISCUSSION

### Institutional Framework for Landfills Operations in Ghana

The key institutions that are responsible for the construction and maintenance of landfills in Ghana as stipulated by the guidelines are the District and Municipal Assemblies, the landfill Operator and the EPA (Figure1).



Source: EPA, 2002.

Figure 1. Framework for Landfills Management in Ghana.



The major responsibilities of the Assemblies are to Identify and properly acquire sufficient land for landfill construction. The acquired land must cover not only the area required for the landfill but also the buffer zone around it, although this may be used for some types of economic activity. Additionally, the Assemblies issue and renew operating licenses to prospective operators, and also monitor the landfill sites to ensure that their management (both operational and after care) satisfy the approved environmental protection standards. The landfill operator (it could be public or private entity or public-private partnership) designs and operates the landfill under supervision of the Assemblies and the EPA. The Operator also designs the Operations and Maintenance (O&M) manual and follows all the prescribed standards (see Figure 1).

The framework also allows the EPA to regulate the environmental standards, and administers permitting and certification procedures for landfills amongst other activities potentially damaging to the environment. Once a landfill is certified and operative, the EPA would undertake the prosecution of any operator causing environmental damage. The EPA is also a reservoir of technical expertise, which the District Assemblies may draw upon when selecting landfill sites or instituting monitoring activities.

In principle, landfill systems in Ghana, like in any other country in the Global south, are operated within certain internationally required environmental standards. In July, 2002 the then Ministries of Environment and Science, Local Government and Rural Development, through the Environmental Protection Agency (EPA, 2002), developed the Ghana Landfill Guidelines. The guidelines prescribes the minimum criteria required to safeguard environmental quality, human health and welfare, water resources and the integrity of natural resources. The Ghana landfill guidelines require that the construction of all landfills is preceded with an Environmental Impact Assessment report. Once the impact assessment report is approved by the EPA, they will issue an Environmental Permit allowing for the construction of a landfill to start at the proposed site within 18 months, subject to the stated conditions (MLGRD, 2002). Among the environmental factors that the report takes into serious consideration relate to the potential threat to the physical environment, specifically water resources. Other factors such as topography, geology, hydrogeology, drainage, subsoil conditions and adjacent land use should be carefully considered. Excavations close to (within 1.5m) or intersecting the ground water table should be avoided as much as possible any polluting effect on the ground water should be minimised or localised. Siting of landfills too close to drinking, irrigation or livestock water supply sources should also be avoided. Table 1 provides the basic requirements for safe disposal of waste in a landfill.

From Table 1, the selection of the landfill site should take into account social, environmental and economic factors, and must be assessed for financial and technical viability (EPA, 2002). The guidelines notwithstanding, available literature on landfills operations in Ghana indicate that they remain ordinary open dumpsites domiciled on open plots, wetlands and lands with water near the surface. They are usually not provided with liners, fences, compactors or soil cover (see CSIR, 2011; Oteng-Ababio, 2011b; Owusu et al., 2012). The outcome of the study shows that landfills within the Kumasi metropolis do not conform to the legally promulgated standards of landfill operations. This situation allows for free entry and exit of unauthorized persons and groups such as scavengers and farmers. While the scavengers sift for recyclable materials from the landfills, the farmers make use of the buffer zones for cultivation. This practice has made the uncontrolled landfills the hub for economic activities.

**Table 1. Basic Requirements for safe disposal of waste on landfills**

Variable	Preferred requirement
Neighbourhood	<ul style="list-style-type: none"> <li>- Landfills should not be located in the immediate proximity of occupied dwellings, waterways, or water bodies.</li> <li>- A minimum distance of at least 500 m from residential facilities should be provided, but cognizance must be taken of the fact that transport costs for waste increase almost linearly with distance.</li> <li>- City development and future land use should be anticipated.</li> <li>- A need for a buffer zone (cultivated area—bush vegetation) for segregating the landfill from residential areas to prevent vector migration, absorb scattered dust driven by landfill equipment and waste collection vehicles, and reduce noise and odour nuisances of the landfill operations.</li> </ul>
Geological and hydro-geological conditions	<ul style="list-style-type: none"> <li>- Necessary to determine the potential risk of emissions from the landfill for the underlying soil and groundwater.</li> <li>- Best situated in areas where subsurface layers are characterized by low hydraulic conductivity of less than <math>1 \times 10^{-8}</math> m/s.</li> <li>- Necessary to develop groundwater monitoring wells up- and down-gradient of the landfill.</li> </ul>
Risk of flooding, subsidence, and landslides	<ul style="list-style-type: none"> <li>- Sites endangered by landslides, flooding, and subsidence are unsuitable, and such information can be gained through interviews with community leaders or city authorities.</li> </ul>
Access control and signposting	<ul style="list-style-type: none"> <li>- To keep people and animals out for safety reasons.</li> <li>- To help monitor types and volumes of waste dumped at the site.</li> <li>- To provide information of the type of waste acceptable.</li> </ul>
Daily compaction and cover	<ul style="list-style-type: none"> <li>- To prevent wind scatter (windblown litter) and fly breeding.</li> <li>- Compaction uses airspace more efficiently.</li> </ul>
Record keeping	<ul style="list-style-type: none"> <li>- Record keeping of incoming waste types and quantities must be accurate for planning and reporting purposes.</li> <li>- A weighbridge is very important, but in its absence, a proper method for estimation must be employed.</li> </ul>
Fire must be avoided	<ul style="list-style-type: none"> <li>- Though difficult due to the presence of landfill gas, fire must be avoided to prevent the release of harmful substances in the air.</li> </ul>

Source: EPA, 2002.

### **Agronomical Value of Landfills**

The buffer zones of the landfills visited has been transformed into fields of intensified agricultural activities of planting, nurturing and harvesting. While there is enough evidence (Adarkwah, 2012; Owusu-Sekyere et al., 2013) to suggest that agriculture in the metropolis has seen dramatic dwindling fortunes in the last two decades due to rapid urbanization resulting in the demand for residential, industrial and commercial land uses, lands around landfills offer new hope for much greater agricultural land use. The intense agricultural activity at the Ayigya

dumpsite and Dompouse landfill site is attributed to the availability of the well manure soils. The farmers cultivate vegetables such as Cabbage, Carrots, Green pepper, Lettuce, Garden eggs, Pepper, Okra and Shallots among others. Besides vegetable production, the cultivation of food crops like yam, cocoyam, plantain, cereals, legumes and fruits take place concurrently.

While the farmers were not oblivious of the negative effect the landfill can have on their lives and on their produce, they were not perturbed because of the monetary considerations. One farmer in interview had this to say:

“Though we sometimes complain about the negative effects on our health and how it can also affect our produce, the soil has been helpful to us. I am able to harvest three times in a year. And as you see, this gives me all year round income. Am therefore happy to be here,” he concluded.

Another male farmer corroborated the earlier assertion when he opined with happiness in a focus group discussion:

“As for me, I am able to pay for my children’s school fees with proceeds from my harvest, last year (2014) for example, I got almost GHC5000 (\$1200 at December, 2014 rate) from the sale of my vegetables. I wish you could come and see how retailers come queuing for my lettuce, business was good last year.”

The results of the research show that there is more than enough opportunity for the vegetable farmers to increase production if they are well regulated so that they do not interfere with the smooth operation of the landfill. This practice can also serve as catalyst for reducing urban food insecurity.

### **Landfills as Centers for Resource Recovery**

As a result of chronic and rising joblessness, rising poverty levels and more importantly, unchallenged political neglect, the urban population in Kumasi has taken the solid waste dumpsites as assets where they recover and sell discarded waste for livelihoods, without considering the risk accumulation processes that comes along with such occupation. Waste resource recovery, also called scavenging is a popular economic activity at open solid waste dumpsites in Kumasi because they are repository of both quantity and quality of waste generated by the population. In order to scavenge for first grade waste resource anytime fresh deposits were made, which normally took place early in the morning or late at night, a greater number of the scavengers have rented houses, kiosks or raised tents in the waste dump communities. These homes also constitute the warehouse and therefore carting their ‘catch’ to the warehouse was convenient in terms of distance and cost. The home also served as the market place where prospective buyers met their suppliers and transacted business. Unlike in some South American countries where scavengers typically specialize in recovering only one or a few types of materials from waste (Medina, 1997), scavengers included in the research scavenged for anything recyclable, including plastics, metals, glass bottles among others depending on the existence of a market for such a commodity (i.e., the price and demand) and

the need for secondary raw materials. While busily sifting through the refuse, a joyous scavenger shared his experience in a brief interview:

“As for me, I prefer scrap metals from vehicles, earth moving equipment and electronic waste (e-waste) because the agent from Tema (Ghana’s industrial hub) prefers to buy them with ready cash.”

Electronic waste was among the preferred items usually scavenged. As noted by Oteng-Ababio (2013a), e-waste contains valuable metals like copper, gold and silver that is of significant value when recovered. As noted in previous studies (Owusu-Sekyere, 2014), these materials are normally obtained from computers, refrigerators, sound systems, used or discarded mobile phones and television sets. In another FGD, a scavenger revealed that on a good day, he can earn an average income of about \$4.50, a figure above the daily minimum wage of \$2.15 (January, 2014 exchange rate). It should be noted that this figure is based on his guess estimates because as he acceded to, he does not keep any records on quantities of collected commodities or financial revenues that accrue from his transactions. This figure represents about two and a half times the average income of most formal workers in Ghana as reported by Grant & Oteng-Ababio (2012). Even with the immense potential as a livelihood opportunity, waste scavenging is fraught with adverse health hazards, but that is outside the scope of this work.

Waste recovery from waste stream is an important economic activity that provides income for over 15 million people worldwide, most of whom are in cities in developing countries, and has a financial impact of several billions of US-dollars every year (Medina, 2010). From all indications, the scavengers are in the occupation, not by choice, but due to increased levels of unemployment and poverty. For this reason, they considered the occupation as a stepping stone whereby after acquiring some money, they would move to a more ‘dignified’ profession. Waste scavenging as a livelihood strategy derives its significance, not merely from its existence, but from the economic value of the waste recovered. It is therefore more of a coping strategy than as an end in itself.

### **Landfill Infrastructure/Property Values**

As indicated previously, in terms of the landfill–property value debate, landfills are equated with diminishing environmental quality and diminishing property values (Nelson et al., 1992; Lim & Missios, 2007). Parker (2003) highlighted the externalities of landfills and described them as conforming to the first law of waste: “everybody wants it picked up, but nobody wants it put down anywhere near them.” He opined that waste must be “seen,” “known,” and “appreciated” as part of the emergent diverse externalities of urbanism. In this section, I draw on a broader study conducted by Oteng-Ababio et al. (in-press), to augment the empirical findings from the field. In that study, they concluded that there was enough evidence to suggest that landfills can have positive effects on property values of host communities to some extent and that can serve as a catalyst towards the overall development of the host communities using the results from Kwabenya in Accra, Dompouse in Kumasi and Siriyirie in Wa to support their claim.

From the field evidence, respondents from the host communities (in these case, opinion leaders) shared their experience on the state of economic development of the host communities 'before' and 'after' the construction of the facility. In the case of Dompouse for instance, the construction of the landfill has led to the construction of a 10 km road linking the Esreso Highway to the landfill site. The construction of this access road has brought much relief to the residents of the communities located near the site. Hitherto, vehicular movement in these communities was restricted because of the bad nature of the road. Not only has the road been constructed but three bridges have also been constructed on other water bodies to facilitate the free flow of the tributary streams of River Oder. The access roads have opened up the communities and promoted economic activities. One joyous Assemblyman (elected representative of the community) had this to say in an interview:

“.....ever since they constructed this road, business is okay as many people now come here to buy our items. At first, the bad nature of the road prevented people from coming because they preferred Atonsu to this place.”

He did not, however, care about the circumstances under which the road was constructed. In another interview, one resident recounted her happiness with the construction of the road:

“At first, the slightest drizzling will trigger off massive flooding, but ever since this road was constructed, flooding has been a thing of the past. We thank the government for this project.”

These findings resonates with earlier studies in Ghana where the construction of a 2 km road at the Kwabenya landfill site led to a mad rush for the acquisition of land in the vicinity (see Oteng-Ababio, 2011). In the case of property values, the findings revealed that in tandem with the provision of electricity and the construction of access road, the price of land and subsequent property development has seen a higher appreciation. On the whole, about 90 percent of responses from the landfill communities indicated that the construction of the landfill has impacted positively on land values. Until the landfill operations began, property values in Dompouse for example, remained exceptionally low. Using land prices as proxies, a plot of land which was less than GH¢100 [US\$66.7] before the construction of the landfill at Dompouse now sells above GH¢4,500 [US\$3,000], a situation attributable to the opening up of the community by the presence of the landfill (see Oteng-Ababio et al., in-press).

## **Landfill as Energy Sources**

In 2004, the first engineered landfill was constructed at Dompouse in Kumasi by a South African company. As part of the broad objective of the project, methane is to be captured from the landfill as a viable economic option for a waste-to-energy facility (WTE) where between 30-50 megawatts of energy is expected to be generated. The findings revealed that when completed, majority of communities from the Ashanti and other communities in the Central regions will also benefit from the energy project. The WTE project is seen as a panacea for abating the solid waste management conundrum. Again, the project has been hailed as timely and important as Ghana has been going through energy crises for the past decade due to

shortfalls in generating capacity. The project is seen as the ‘silver bullet’ to the energy crises. However, the WTE project is yet to start, 10 years after commissioning, a situation which city officials blame on three core points; lack of funding, inadequate quantities of biodegradable waste sufficient to be converted to energy and lack of investor interest. While Kumasi presently generates between 1500 to 2000 tonnes of solid waste daily, collecting and transporting the waste to the site is the biggest bane (KMA, 2011; Owusu-Sekyere, 2014). Meanwhile, the success and functionality of such energy project depends not only on cost but also on the quantity of biodegradable waste chemical and physical properties, particle size, calorific values, moisture levels, heating values, as well as daily load volume (SWANA, 2004). This important data is however currently non-existent.

There is ample evidence from the Global north (European Environment Agency, 2013; DEFRA, 2014;) to show that not only does turning landfills gas to energy add to a country’s energy stock but also generates employment and creates a multiplier effect in investment. A case in point is Bandeirantes landfill in Sao Paolo, Brazil where decomposing rubbish from the landfill has been turned into biogas, which is used to generate electricity ([www.aljazeera.com](http://www.aljazeera.com)). Since the project started in 2004, it is estimated that it has prevented the net release of 7.4 million tonnes of greenhouse gases.

## CONCLUSION

This study has demonstrated an essential finding that has a wider implication for solid waste management not only in Kumasi but Ghana in general. Waste generation is a function of population growth and economic development and giving the realities that population growth is not going to dip, at least in a short time period, and also giving the fact that Ghana’s economic growth is not predicted to see a downturn, it is imperative that appropriate, cost saving and sustainable means of managing solid waste is pursued. In this direction envisioning waste dumpsites as resource-embedded locations will help ameliorate the current solid waste management conundrum. Additionally, re-conceptualizing waste dumpsites as assets will also enhance community participation in the planning, implementation and execution of such projects. Solid waste dumpsites in Kumasi have become centres of economic activities, a situation which has redefined new modes of urban development. The research has also revealed that when properly managed waste disposal sites can help with redistribution of the economic space and help reduce congestion at the city’s core. These developments have implications on entitlements to the waste dump communities, infrastructure and the economy. In this regard, I suggest that the prevailing view of waste disposal sites has to change. There is need to have a paradigm shift towards recognizing such facilities as resource, instead of perceiving them as a nuisance and treating them with aversion.

## REFERENCES

- Adarkwa, K.K. (2012). The changing face of Ghanaian towns. *African Review of Economics and Finance* (4).

- Agamuthu, P. (2013). Landfilling in developing countries *Waste Management & Research* 31(1) 1–2.
- Ali, M., Cotton, A. & Westlake, K. (2005). Down to earth: Waste disposal for low-income countries. Loughborough University, Water, Engineering and Development Center.
- Ali, A. (2010). Wasting time on solid waste in developing countries. *Waste Management*, 30, 1437-1438.
- Awunyo-Vitor, D., Shaibu, I., & Jasaw, G. S. (2013). Urban Households' Willingness to Pay for Improved Solid Waste Disposal Services in Kumasi Metropolis, Ghana, Hindawi Publishing Corporation, *Urban Studies Research*, 8 pagesdx.doi.org/10.1155/.
- Basel Convention (1994). Basel Convention on the control of transboundary movements of hazardous wastes and their disposal. The Basel Convention and the African Countries, Basel Convention Series/SBC No. 94/010.
- Benneh, G., Songsore, J., Nabila, J. S., Amuzu, A. T., Tutu, K. A., Yangyuoru, Y., & McGranahan, G. (1993). Environmental Problems and the Urban Household in the Greater Accra Metropolitan Area (GAMA), Ghana. *Stockholm Environment Institute, Stockholm*.
- CSIR (2011). Municipal Waste Management – Good Practices, ISBN 978-0-7988-5596-9, 1<sup>st</sup> ed. CSIR, Pretoria.
- DEFRA (ed.) (2014) Draft Materials Recovery Facility (MRF) regulations for insertion into environmental permitting (England and Wales) (Amendment) regulations. Available at: <http://www.gov.uk/government/consultations/draft-materials-recovery-facility-mrf-regulations-for-insertion-into-environmental-permitting-england-and-wales-amendmentregulations>.
- Daskalopoulous, U., Mayes, D., Harris, C., & Lansbury M. (2008). Status of Institutional Reforms for Integrated Water Resources Management in Asia: Indications from Policy Reviews in Five Countries. Working Paper 108, International Water Management Institute, Sri Lanka.
- Elliott, P., Cuzick, D., & Stern, R. (2006). Geographical and Environmental Epidemiology: Methods for Small-Area Studies. *World Health Organisation, Oxford*.
- EPA, (2002). Ghana Landfill Guidelines: Best Practice Environmental Guidelines. Accra: Ghana: EPA, MES, MLGRD, Ghana Landfill Guidelines; 2002.
- European Environment Agency (2013). Managing municipal solid waste – a review of achievements in 32 European countries. EEA Report No 2/2013.
- GSS (2010). Ghana Population and Housing Census. Ghana Statistical Service, Accra.
- Gibbons, S. (2003). Paying for good neighbours: Estimating the value of an implied educated community. *Urban Studies*, 40 (4), 809-833.
- Gilbert, R. (1996). Making Cities Work, The Role of Local Authorities in Urban Environment, Earthscan Publications, New York.
- Grant ,R.& Oteng-Ababio, M. (2012). Mapping the invisible and real African economy: urban e-waste circuitry. *Urban Geog* 33(1):1–21.
- Johannessen, L.M., & Boyer, G. (1999). Observations and solid waste landfills in developing countries, Africa, Asia and Latin America. working paper, The International Bank For Reconstruction And Development, the World Bank, Washington, DC.
- KMA (2011). Kumasi Metropolitan Assembly Waste Management Department. *Data for purposes of planning waste management intervention programmes*. Kumasi Waste Management Department. Kumasi, Ghana.

- Lim, J.S., & Missios, P. (2007). Does Size Really Matter? Landfill scale impacts on property values. *Applied Economics Letter*, Vol. 14, 719-723.
- Manfredi, S. D., Tonini, T.H., & Scharff, H. (2009). *Landfilling of waste: accounting of greenhouse gases and global warming contributions*. *Waste Management & Research*: 2009: 27: 825-836.
- Medina, M. (1997). *Informal Recycling and Collection of Solid Wastes in Developing Countries: Issues and Opportunities*. United Nations University Working Paper No. 24.
- MLGRD (2010). *Government and Rural Development (MLGRD)*. Ghana: The Local government system. Accra: Ministry of Local Government and Rural Development.
- Melosi, M. V. (2005). *Garbage in the cities. Refuse, Reform and the Environment*, University of Pittsburg Press, Pittsburg, PA, USA.
- Oeltzschner, H. & Mutz, D. (1994). *Guidelines for an Appropriate Management of Domestic Sanitary Landfill Sites*, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Eschborn/Munich.
- Nelson, A. C., Genereux, J. & Genereux, M. (1992). Price effects of landfills on house values. *Land Economics*. 68(4): 359-365.
- Oteng-Ababio, M. (2013a). Unscripted (in) justice: unequal exposure to ecological hazards in Metropolitan Accra. *Journal of Environment and Planning*. doi: 10.1068/a45256.
- Oteng-Ababio, M. (2011b). Beyond technical details: the stalled Kwabenya engineered sanitary landfill project in Accra, Ghana, *Geografisk Tidsskrift (Danish Journal of Geography)*, Vol. 111 No. 2, pp. 169-179.
- Owusu, G., Oteng-Ababio, M. & Afutu-Kotey, R.L. (2012). Conflicts and governance of landfills in a developing country city, Accra. *Landscape and Urban Planning*, Vol. 104/1, 105-113. DOI: 10.1016/j.landurbplan.2011.10.005.
- Oteng-Ababio, M. (2013b). Guilty with explanation?: rethinking the destiny of landfills in a Millennium City in Ghana. *Management of Environmental Quality: An International Journal* Vol. 25 No. 2, 2014 pp. 200-215.
- Oteng-Ababio, M. & Owusu, G. (2014). Moving Unruly Contemporary Urbanism Toward Sustainable Urban Development in Ghana by 2030. *American Behavioral Scientist (ABS)* (Special Issue).
- Owusu G (2014) *Solid Waste Landfills and Residential Property Values in Ghana: A Case Study of the Oblogo and Mallam Landfills*, Accra.
- Owusu-Sekyere, E. (2013). *Epidemiological Analysis of Households near Three Solid Waste Dumpsites in the Kumasi Metropolitan Area*. Unpublished PhD Thesis Submitted to the University Of Ghana.
- Owusu-Sekyere, E. (2014). Scavenging For Wealth Or Death? Exploring The Health Risk Associated With Waste Scavenging In Kumasi, *Ghana Journal of Geography* Vol. 6; Pages 63 – 80.
- Owusu-Sekyere, E., Yiadom-Boakye E., Nkegbe P.K., & Ohene-Yankyera, K. (2013). Gender, resource use and technical efficiency among rice farmers in the Ashanti Region, Ghana *Journal of Agricultural Economics and Development* Vol. 2(3), pp. 102-110, March 2013, ISSN 2327-3151.
- Parker, B.J. (2003). *Solid waste landfills and residential property values, White Paper, National Solid Wastes Management Association*, Washington, DC.
- Post, J. & Obirih-Opareh, N. (2002). Quality assessment of public and private modes of solid waste collection in Accra, Ghana. *Habitat Int'* 26:95-112.



- Potts, D. (2012). What do we know about urbanization in Sub-Saharan Africa and does it matter? *International Development Review* 34, v–xxi.
- Read, A.D., Phillips, P., & Robinson, G. (1998). Landfill as a future waste management option in England: the view of landfill operators, *The Geographical Journal*, Vol. 164 No. 1, pp. 55–66.
- Ready, R.C. (2005). Do landfills always depress nearby property values. *Rural Development Paper, Vol. 27*. The Northeast Regional Center for Rural Development, Pennsylvania State University.
- Seadon, J.K. (2010). Sustainable waste management systems. *Journal of Cleaner Production* 18: 1639–1651.
- Oteng-Ababio, M., Amoah, S. T., & Owusu-Sekyere, E. (in-press). Landfill externalities and property values dilemma—emerging Ghanaian insights. *Journal of contemporary African Studies*.
- Songsore, J. (2005). *State of Environmental Health: Report of the Greater Accra Metropolitan Area*. Accra, Ghana Universities Press.
- McGranahan, G. Songsore, J. & Kjellen, M. (1996). Sustainability, poverty and urban environmental transaction. In: C. Pugh, ed. London, Earthscan; 103–133.
- Strange, K. (2002). Overview of waste management options: their efficacy and acceptability. In: Hester y, R.E., Harrison, R.M. (Eds.), *Environmental and Health Impact of Solid Waste Management Activities*. Royal Society of Chemistry, Thomas Graham House, Cambridge. pp. 1–52.
- SWANA (2004). *The Environmental Consequence of Disposing of Products Containing Heavy Metals in Municipal Solid Waste Landfills*. Solid Waste Association of North America, Silver Spring, MD.
- Tanskanen, J.H. (2000). Strategic Planning of Municipal Solid Waste Management Resources, Conservation and Recycling. pp 30, 111–133.
- Tchobanoglous, G., Thiesen, H., & Vigil, S. (1993). *Integrated Solid Waste Engineering Principles and Management Issues*. McGraw Hill, U.S.A., 1<sup>st</sup> edition, pp 15, ISBN 0-07-063237-5.
- UN-HABITAT. (2010). *Solid waste management in the world's cities*. Nairobi: UNHABITAT, 2010.
- Wa Municipal Assembly (2014). *The Composite Budget of The Wa Municipal Assembly For The 2012 Fiscal Year*.
- Wilson, D.C., Velis, C., & Cheeseman, C. (2006). Role of informal sector recycling in waste management in developing countries. *Habitat International* 30: 797–808.
- [www.aljazeera.com/programmes/earthrise/2011/11/20111113115012136544.html](http://www.aljazeera.com/programmes/earthrise/2011/11/20111113115012136544.html).
- Yaro J. A. (2013). Neoliberal globalisation and evolving local traditional institutions: implications for access to resources in rural northern Ghana, *Review of African Political Economy*, 40:137, 410–427.

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