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Townships under 'Filth': Interrogating the Perception of Health Associated with Landfill Management in Ghana

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Abstract

Ghana's national governance hierarchy has been designed such that city governments tend to have administrative legitimacy to control peri-urban townships. The urban dominance has been to create place out of space through the intermediary of infrastructure. The paper adds the theme 'landfilling' as perspective in understanding urban infrastructure dominance. We examined the perception of health effects associated with landfill in Ghana using the mixed method approached. Our 'before and after' analysis is framed around the lived experiences of people residing in the vicinity of the "environmental bad". The results highlight how the flaws inherent in management practices of the facility were a source of health risk to host communities. The health effects were worsened by smoke, dust, flies and mosquitos. The interrogations also revealed contractual arrangements agreed upon before construction of the landfill has often been neglected, a situation that further perpetuated host communities' health risks. We conclude that contemporary socio-spatial characteristics of peri-urban communities are increasingly becoming incompatible with landfilling as waste management option.

Keywords: Disposal; Landfill; Urban; Nuisance; Dompoase.

Introduction

In the last three decades, rapid growth of urban centers in developing countries and its accompanying increase in production and consumption has challenged the balance between these countries unique and fragile ecologies and the demands for a more sustainable urban management. By 2030, more than half the global urban population will live in cities of developing world and this is expected to put more pressure on peri-urban towns that will absorb the cities' by-products. The urbanization process is a straight response to the cumulative effect of global corporate investments; opening up of asset ownership and the regeneration of urban physical space; the growth of the commercial enterprises and political regionalization. The mass congregation of individuals in cities comes with unexpected consequences not only for city authorities but their peri-urban counterparts as well. Among the many challenges, provision of sustainable solid waste management services (SWM) stands out. This critical environmental challenge is observed to be the financial 'health' of which cities depend. While cities besieged with garbage are disincentive for development, on the reverse side, a clean city attracts tourists, business development and investments. SWM systems are also intensely linked with urban planning and urban governance schemes as well as issues related to community health and dialogue on rights to the city's space.

The ability of city authorities to effectively manage SWM normally serve as a measure that can be used the system of good urban governance and hence administrative structure that can entrusted to seek the welfare of its people. According to the World Bank, city authorities in low-income economies spend almost a quarter of their annual incomes on waste management averagely - yet more than 90 percent of solid waste in these countries is still poorly managed. As cities in these economies grow swiftly, they urgently require structures to manage their growing waste. Until recently and despite its familiarity one segment of urban governance that had not attracted public attention is the land tenure system concerning safe waste disposal sites. Acquiring land for the construction of landfill has attracted public attention because of the unending conflicts associated with such acquisitions. Decision making around the disposal of municipal waste is complex and involves multiple stakeholders and process, many of which are not well-suited with local development trajectories.

Studies by Kumar, and Oteng-Ababio indicate that in the last two decades, methodologies for solid waste disposal have experienced substantial amendments as a results of the changing ecological, monetary, dogmatic, social, technical and administrative changes in the services themselves. These factors have compelled city authorities to institute significant structural re-organization in their waste management legislations. Indeed the structural re-organization led by the World Bank is not to replace the over-reliance on state sponsored policies [1]. It is rather being implemented to strengthen 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. In spite of the very diverse benefits of the role of the structural re-organization in waste management services, the setting of new systems and adjusting to them has not been an easy task. As observed by Strange, the problems associated with adopting new waste management systems and the different strategies which aim at promoting efficient waste management must be strategically done in order to avoid unnecessary repercussions [2].

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 population explosion; fragile resource base of city managers; inadequate funding sources; application of unfamiliar strategies without considering area specific condition and inadequate involvement of the general citizenry in policies and developments; ill planned waste management strategies and the necessity to make sure

that all other development needs are equally covered [3]. This has led to the practice of uncontrolled and crude dumping in open spaces, a situation that often blocks drainage channels in cities.

Since the 1980s particularly, there has been increased discussions from both academic and policy circles on how poorly managed waste disposal sites affect nearby residential neighbourhoods. Studies from some developed countries reveal that landfills operate over different geographical scale and intensity and equate landfill proximity with diminished environmental quality. Other studies highlight the effects of waste disposal sites and describe them as conforming to the first law of waste: "everybody wants it picked up, but nobody wants it put down anywhere near them". Admittedly while there is expansive literature on the subject from diverse academic and policy backgrounds, what is somewhat missing is the little attention given to the Ghanaian experience. Significantly, how waste disposal sites impact host communities is under-researched or, at best, remains speculative. Owusu et al. and Oteng-Ababio et al. in their recent studies, endeavoured to research into this knowledge space by investigating how some landfills in five Ghanaian has impacted rent of nearby residential facilities [4]. Their results show that while waste disposal sites do reduce rental values nearby residential facilities, the effects are dependent on, but not limited to the location of the residential facility relative to the level of urbanization of the community, and the construction date and the overall cost of the property.

The challenge then relates to ascertaining the extent to which the waste disposal sites represent a major health threat to nearby communities. This paper is built on calls for more research on landfill governance especially issues relating to landfill–host community relationship. Specifically, the article examined the perception of health associated with landfill in Ghana using the Dompoase landfill in Kumasi as a case study. Our interrogations are framed around the lived experiences of people residing in the vicinity of the "environmental bad" who presumably could bring the historical perspective of the area to bear on the analysis [5]. The significance of our study is that it particularly highlights some of the flaws inherent in the present landfill management practices and the often neglected arrangements agreed upon before the construction of such LULU facility. The paper is made up of six parts. The introduction is followed by historical perspective of landfill as waste management option. This is followed by the methodology while the results and discussions follow subsequently. The article concludes with some policy recommendations.

Landfill as a waste management option: historical perspective

Solid waste is believed to be as old civilization as humans started generating waste around 10,000 BC during the era of non-nomadic societies. Historically, the evolution of sound waste management practices through dumping started with earliest societies such as the Minoans. They fashioned a rudimentary arrangement of entombing solid wastes but this did not come without challenges to human health and environmental degradation [6]. As a way of regulating waste and ensuring that its disposal does not compromise environmental quality, carefully selected locations were then identified. However with population growth and increasing urbanization, there was a corresponding increase and concentration of waste such that finding appropriate areas for disposal turn out to be difficult to find. The resultant effect was that there were increased incidences of contamination and diseases in many parts of the globe.

In Europe for instance, Tammemagi observes that the waste crises led to health problems with the notorious 1347 plague that affected thousands of people. As a consequence, the Parliament of England banned the disposal of solid waste in valleys and water-logged areas by the end of 1388. However, this proved to be difficult because of the lack of alternative solid waste disposal sites and therefore the practice continued into the 19th century. Realizing that poor waste management was directly linked to health problems, many municipal governments in the global North by the turn of the 20th century instituted basic system of waste collection. Landfilling emerged as the most popular method of waste disposal. EPA (2002) defines landfill as an open waste disposal site as a prudently built area either on the ground surface or a dug up into the ground where waste of all kinds are kept away from the surrounding environment, groundwater, air and rain. It is also seen as a site where waste is managed such that the extent of contamination and pollution is reduced to the minimum level [7].

Notwithstanding the advancement in the alternative means of waste disposal practices, landfill remains the most preferred and the ultimate disposal technology globally, even when other advanced options such as recycling and reduction are becoming increasingly popular. They are endorsed and form an essential element in most countries' waste management systems and strategies because they have proven to be the most trusted system that has the ability to management large quantities of waste irrespective of their diversity. The added advantage is that when landfills are operated they can also supply prercious landfill gas and energy which can have economic value and may add to a country's energy requirement. Studies by Moore and Agamuthu, 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 resource potentials, 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.

Landfills are commonly considered in the literature as a form of nuisance. They are assumed to depreciate nearby property values, degrade environmental and impact negatively on human health. Again, landfill emissions, mainly in the form of landfill gas and leachate, are not inversely related to the amount and level of diversity of waste disposed. In developing nations, limited resource capacities have compelled city authorities to dispose almost 65 to 80 percent of the total waste collected into landfills without any characterization [8]. Solid wastes in these countries have high degradable organic content (between 40-70 percent). The degradable segment is made up household domestic waste from everyday consumption patterns. The high percentage of the degradable organic content is a significant source of greenhouse gas emissions. At present 90 percent of landfills in developing countries are dumpsites without proper leachate collection systems, resource that can be trapped and converted to energy thereby possibly complementing other sources of energy generation. For these reasons, depending excessively on landfills as waste management option has received backlash from many countries due to the perceived environmental and health challenges.

Materials and Methods

Study Area

The research took place in Kumasi, which also functions as the next largest urban center in Ghana after Accra, the national capital. Kumasi generates over 2000 tons of solid waste a day and has over 400 open disposal sites where waste is deposited before final collection to the Dompoase landfill site, the largest engineered landfill in the northern section of Ghana. The Dompoase landfill is located in the Asokwa Municipality and covers about 100 acres and was constructed in 2004. The landfill is situated on the Sokoban stool lands which are in close proximity to the Dompoase, a community which is about 10 km from the city center [9]. The disposal site has specifications that are in line with international best practice with leachate collection and treatment ponds as well as base liner. The leachate collection and treatment ponds operates at different stages including settling artificial aeration (aeration pond), and natural aeration. It is from the aerated ponds that treated leachates are emptied into nearby rivers.

The data on the negative effect of the landfill were collected from Dompoase, Sokoban and Aprabon (Figure 1). The three communities were chosen for the study because residents on numerous occasions have embarked on series of demonstrations on what they describe as an unacceptable management of the waste disposal site. In September 2016 for instance, angry residents organised a demonstration dubbed "yentumi bio" to wit "we can no longer contain it" and blocked the major road leading to the disposal site. The protest was against the poor conditions at the disposal site which they speculated was affecting their health and gradually degrading the communities. All trucks carrying waste materials were grounded as the demonstrators prevented entry to the dumpsite causing heavy vehicular traffic congestion in the Aprabon industrial enclave. Similarly in January, 2018 (Ultimatefmonline.com), residents near the landfill threatened to demonstrate against city authorities for poorly managing one of the cells at the dumpsite that is responsible for treating faecal matter. Since its construction in 2004, residents have consistently demonstrated against the facility which they claim is a death threat.

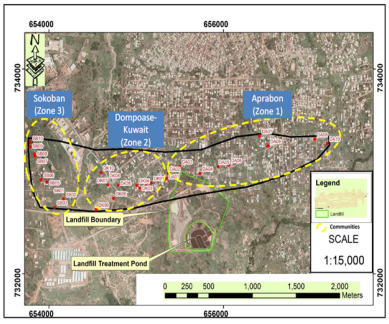

Figure 1: Dompoase Landfill Site showing selected communities

Data collection

The primary data were collected from Dompoase, Sokoban and Aprabon over a five month period, May-September, 2018. Using the four compass coordinates of north, south, east and west as a guide, 350 houses located within two kilometres radius from the edge of the landfill as prescribed by the Environmental Protection Agency of Ghana were selected for data collection (Table 1).

Distance	Houses	Percent
0-0.5km	53	15.1
0.5-1km	194	55.4
1-1.5km	62	17.7
1.5-2km	41	11.7
Total	350	100

Table 1: Housing location relative to distance from landfill.

The two kilometer radius is to serve as a buffer zone between the landfill and the nearest neighborhood. Dompoase had 130 houses within the radius, Sokoban had 120 houses while Aprabon had 100 house. In each house, the landlord or next in command was selected to participate in the survey after the purpose of the research had been explained and confidentiality assured. The data collection tools included interviews guide, questionnaires and direct observation. Among the issues that were interrogated included number of years one has stayed in the community; hazards associated with the landfill and health perception among others.

Additionally, using almost the same set of questions in the questionnaires but with slight variations, in-depth interviews were conducted with traditional leaders and local government representatives from the communities. Institutional level interviews were held with the landfill site managers and other officials working with the urban sanitation unit of the Kumasi Municipal Assembly. The interviews sought their views on their function in managing solid waste as well as their detailed knowledge about the site, conformity to maintenance standards and extent of community participation as enshrined the EPA Act (Act 202 on landfill management in Ghana). Each interview lasted for almost one and half hours, and all were audio-recorded. The research also benefitted from personal site visits and contacts with some demonstrators during one of their protest matches in the communities [10]. The interaction with demonstrators allowed an opportunity to understand the sentiments of the community members. As a way of triangulating the data obtained from residents, the views of environmental health experts and community health nurses from the communities were sort. The triangulation provided a good context for better grounds for comparative analysis. The proceedings were recorded with an audio recorder and then transliterated, examined and organized along the main themes. A Chi-square test was run to quantify the strength of association between location of the landfill and health hazard using a five point Likert scale - Always, Often, Sometimes, Rarely and Never (Table 2) to answer the question: To what extent do you experience mosquitoes bite, flies disturbance, bad odour and smoke pollution from the landfill?

Location/Frequency of hazards		N	Marginal Percentage
Location of residential facility	0-0.5km	53	15.10%
	0.5-1km	194	55.40%
	1-1.5k	62	17.70%
	1.5-2km	41	11.70%
	Always	91	26.00%
Extent of Mosquito Bites	Often	162	46.30%
	Sometimes	56	16.00%
	Rarely	40	11.40%
	Never	1	0.30%
	Always	61	17.40%
Extent of Flies Disturbance	Often	179	51.10%
	Sometimes	79	22.60%
	Rarely	30	8.60%
	Never	1	0.30%
	Always	151	43.10%
Extent of Odour Disturbance	Often	137	39.10%
	Sometimes	48	13.70%
	Rarely	11	3.10%
	Never	3	0.90%
	Always	50	14.30%
Extent of Smoke Disturbance	Often	92	26.30%
	Sometimes	63	18.00%
	Rarely	73	20.90%
	Never	72	20.60%
Valid		350	100.00%
Missing		0	
Total		350	
Subpopulation		112a	

Table 2: Location/Frequency of hazards

Results

Length of stay in the communities

People living in the same ecological zone can be exposed to a shared hazard. However, they may have different levels of exposure depending on the number of years of exposure. The first level of our analysis focused on the number of years participants had stayed in the community (that is 2 km the waste disposal site). This was essential for two reason: to ascertain a before and after situation and also to determine the extent of exposure and its likely health implications. In studies of this nature, the literature shows that length of stay also has a direct relationship with vital data that could aid planning. In short, those who have stayed near such facilities for a longer period of time have a lot of information to share than new comers. Figure 2 presents the picture of the number of years, research participants have stayed in the landfill communities.

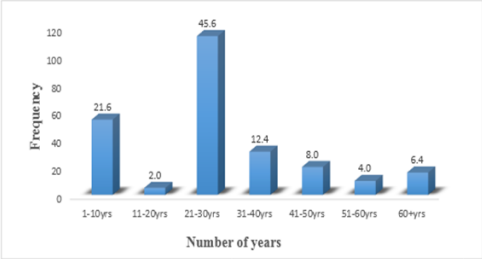

Figure 2: Participants' length of stay in communities.

Cumulatively, figure 2 shows that over 77 % of respondents had stayed in the communities for over 20 years. Given the fact that the facility was constructed in 2004 means that such residents could give proper before and after analysis and also have been vulnerable to the risks of the facility for a considerable period of time than transient residents. Insightfully, the study revealed that the connection between length of stay and the residents' perception of the externalities associated with the waste dumping site was not prejudiced on the economic, educational or social background of the participants. This confirmed studies by who revealed that irrespective of the economic, educational or social background of the participants, their longitudinal stay near open waste sites exposed them to some degree of health problems.

Reported health pathways associated with the landfill

The study participants sampled from the three landfill communities, irrespective of their ages, occupation or level of education were concerned about the nuisance posed by the facility. Among the hazards they indicated during the survey included increased mosquito population, flies, cockroaches and rodents among others (Table 3).

Community	Increase mosquitoes %	Increase Flies %	Increase Cockroaches %	Increase Rodents %
Dompoase	46	51	49	55
Aprabon	30	27	28	23
Sokoban	24	22	23	22
Total	100	100	100	100

Table 3: Perceptions of health hazard associated with the landfill.

Generally, all research participants expressed worry about the nuisance posed by the landfill site especially increased population of mosquitoes in the communities. In order to authenticate the responses from the survey, follow-up interviews were conducted with our key informant at Aprabon. She narrated good stories of the past when the community was characterised by forest vegetation and serene environment which attracted diverse leisure makers from far and near in the year 2000 when she first came to settle in Aprabon and how the situation has changed since the construction of the landfill:

"Those days Aprabon was a good place to live. Though mosquitoes, flies and cockroaches are common everywhere in Ghana, this place was almost free of these insects. Those days hardly would you see bola (local name for filth) in this community like you see today. Now, the vehicles have created all these potholes that collect water during the raining season. The pools of water and the poor management of the site produce mosquitoes like mosquito farm. What have we done wrong? She asked.

These sentiments were re-echoed during the in-depth interviews with a traditional ruler at Sokoban:

"Our concern is not just the presence of the mosquitoes and flies but the discomfort and annoyance they bring. The bites from mosquitoes and buzzing sounds of flies and the other insects at night will never let you have a sound sleep. Though we have been encouraged to sleep under mosquito treated nets, the heat and discomfort the net also produces is something else. In fact, the mosquitoes are killing us and therefore something must be done".

The responses from participants at Dompoase were even more revealing. A community leader recounted in the interview how the entire community has been invaded by snakes especially Pythons. He explained:

"My brother we are really suffering from the landfill. Almost every day a snake is killed in one house or another. What makes the situation worst is that most of the snakes are Pythons and you know how dangerous these animals can be. Just few weeks ago, I killed one in my courtyard after I saw it hiding under the barrel. Only God knows what would have happened if any of the children had attempted fetching water from the barrel. In fact we are even scared staying here".

An elected representative from Dompoase summed-up the concerns of the community when he indicated that they suspect among the waste dumped at the landfill are dead bodies of neonates.

"Most of the times if you visit the landfill site you find white clothes with blood stains. How they are normally rapped raises a lot suspicion. You will also find vultures and other bird congregating around such things. However, one is not allowed to go deep into the landfill to really examine the waste composition".

The concerns of the elected member is not a novelty as earlier studies have shown that in Ghana liquid and other hazardous waste from private health facilities are concealed and dumped together with domestic waste.

Environmental concerns

Apart from hazards from insects and rodents, environmental pollution also emerged as a concern to research participants. In Table 4, research participants' discernment on the ecological effect of the Dompoase landfill is presented. For some 55% of respondents at Dompoase, the dominant concern was air pollution from smoke and dust. Again increased vehicular activity was very worrying to research participants. Overall, the communities expressed dissatisfaction on the environmental impact of the landfill.

Community	Increase Smoke %	Increase Dust %	Increase Vehicular activity %	Chaotic Environment %
Dompoase	56	55	53	55
Aprabon	30	27	26	23
Sokoban	14	18	21	22
Total	100	100	100	100

Table 4: Perceived Environmental effects of Dompoase Landfill.

As a way of validating the results from the survey, the perception of key informants were sort. Our key informant who was also the elected representative of the Dompoase community indicated in an interview:

"The major concern is the many vehicular activity in the community. Sometimes the trucks and tri-cycles carry the waste are so many that there are no space on the roadside for ant activity. There have been many instances where children closing the road have been knocked down by some of these trucks".

The key informant further stressed that there were flaws inherent in the present management practices and that was contrary to the agreement reached with residents. For instance as part of the agreement, site managers were expected to fumigate the site every week in order to reduce the bad smell to bearable levels. The key informant indicated that the refusal to fumigate the landfill has led to some residents contracting respiratory diseases.

"Some of the people who have rightly bought lands and houses in the community have had to abandon their homes because of the severity of the problem. We want the landfill to be either relocated or managed according to the terms agreed upon". He concluded.

A shop owner also passionately intimated:

"The dust from moving trucks really disturbs a lot. Because of the dust I have even stop selling fresh fruits and vegetables, though they used to give me lots of profit. The reason is that people don't want to buy foodstuffs that are dirty and unhygienic".

These narratives show the extent of breach of the social contract between the state authority and the communities hosting the biggest landfill in the northern half of Ghana. The communities anticipated that their good health was not going to be interfered with, while at the same time the operations of the landfill was going to lead to job creation through public participation. The narratives also resonate with the findings from similar studies on community perception on construction and management of locally undesirable facilities such as waste disposal sites.

Perception of health associated with the landfill

Having identified the perceived hazards associated with the Dompoase landfill, research participants were asked to identify perceived health problems associated with the landfill. They were asked to identify the common re-occurring environmentally disease using two months recall symptom criteria. In other words, respondents were asked whether they or any of their relatives especially children reported having environmentally related disease in the two months preceding the survey. According to health experts two months is long enough for a disease causing organism to have reached the maturity stage to alter the smooth function of the human system. For instance in the case of malaria, the symptom used was manifestation of fever accompanied by increase in body temperature. Based on this criterion, the health problems identified included malaria, diarrhoea, respiratory tract and skin infections among others. Even though one could not rule out preconceptions and other unexplained factors, the responses show that there were potential risks associated with residing near a solid waste disposal site. The way respondents perceived the health effect of the landfill is shown in Table 5.

Community	Malaria %	Respiratory %	Skin infection %	Diarrhoea %
Dompoase	42	51	49	55
Aprabon	38	27	28	23
Sokoban	20	22	23	22
Total	100	100	100	100

Table 5: Perception on the Health Impact of the Dompoase landfill site.

Significantly, the responses from the survey were supported by interviews with the health officials who took part in the research. For instance environmental health personnel of the KMA remarked during the in-depth interviews:

"The poor management of the waste disposal site endangers the lives of all others living in close proximity. People living at Dompoase and its environs face serious health hazards due to pollution from the waste disposal site".

The community health nurse also reiterated the earlier narratives when he noted:

"We need to recycle many of the components of the waste we generate in Kumasi, so that we don't poison others in the process. Efforts to protect the environment and conserve valuable resources must be coupled with proper health and safety procedure. Unfortunately, just saying this doesn't make it happen".

The statistical analysis also supported the responses from the interviews on the perceived relationship between the location of the landfill and health hazards. The strength of association between health hazards and location of the household respondents relative to location of the landfill is shown by the regression analysis in Table 6. The analysis emphasizes on Multiple R; R- Square, ANOVA (sig and F Stat) and the Residual. A multiple R of 0.61 indicates that there is a fairly strong positive association between location of the landfill and perceived health hazards. This means that the closer a household to the landfill, the higher they experienced severe health hazards. Also R Square (R2) of 0.37 means that approximately 40% of reported health hazards came from respondent located near the landfill. This by implication means that households that were far from the landfill were likely to report less health hazards.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.610817							
R Square	0.373097							
Adjusted R2	0.371296							
Standard Er	53.35104							
Observations	350							
ANOVA								
	df	SS	MS	F	Sig. F			
Regression	1	589504.3	589504.3	207.1101	3.59E-37			
Residual	348	990523.9	2846.333					
Total	349	1580028						
	Co-efficient	Standard Error	t -Statistics	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	209.598	5.283	39.674	3.40E-131	199.2081	219.9895	199.2081	219.989
X Variable 1	-68.713	4.774	-14.391	3.59E-37	-78.1042	-59.3227	-78.1042	-59.322

Table 6: Relationship location of the landfill and health hazards.

From the ANOVA results, the X-variable that represent the percentage reported cases of health hazards from the landfill indicate a negative probability (-0.593 or -59.3%). The ANOVA results, thus Sig. F (3.59 x 10-37=0.0000), implies that there is a significant difference in mean between the two variables tested. This is evident from the Residual results of SS and SM (990523.9 and 2846.333) respectively. These results are also supported by the P-value (3.4E-13<std. err 5.3) that shows that the further a respondent stayed from the landfill, the lesser they were exposed to health hazards from the landfill.

Discussion

The results confirm data reported by the Ghana Health Service that since waste dumping started at Dompoase, reported cases of malaria, diarrhoea, respiratory tract infections and skin infection by nearby communities have increased. Other studies have also confirmed that poor waste management has in many instances affected the health of not only nearby residents but to waste workers as well. The Medical Association of Ghana for instance, have also indicated that about five million infants die every year from diseases related to the environment in which they live and that majority of the cases are reported from communities where waste management is a challenge. In August 2008, Greenpeace an environmental non-governmental organization indicated that some waste disposal sites in Ghana contained certain metals concentrations that are above the allowable standards and that can compromise the health of surrounding communities. From all indications, the research outcomes confirm the substantial effects the landfill can have on the health of communities and the surrounding environmental.

The results of the study also have implications on Ghana's quest for legitimate solid waste disposal strategy as the current solid waste disposal prasctice has a plethora of challenges. The Multiple R and the R2 as revealed in the analysis indicate a positive relationship between landfill location and household health. These findings do not contradict the literature. For instance, several studies have revealed that residents who are located 500m(0.5km) from landfill sites mostly experience higher mosquitoes bites, inhale bad odour and experience higher levels of pollution from smoke than those far from the sites. The agitations and demonstrations of the communities significantly indicates that majority of residents are not enthused with the way the site is being managed, a situation that has lots of policy implications, and which is also in sync with similar studies in Ghana concerning waste management. Again, the findings also throw in the question whether the future of solid waste management in Ghana lies with landfilling. This is because landfill development in Ghana is usually not captured in the zonal planning of host communities. The literature for instance portrays landfill development as after-thought where other solid waste management planning regimes has failed. As a result, the siting of many waste disposal sites has resulted in consistent protest from host communities as well as environmental non-governmental organizations.

The case in Dompoase is not an isolated case as there are many such examples from different parts of Ghana. Though in Ghana, the EPA has developed landfill guidelines which aims at improving landfill development and management standards, operationalizing the tenets has been a mirage. As opined by Marshal (1995), open waste

disposal sites are general a major problem to the overall human existence. The negatives are characterized by the unacceptable levels of bad or poisonous odor and pollution from smoke that cause health problems to communities in nearby vicinity. For this reason the perceived health impact of the Dompoase landfill express by the host communities are not out place. The effects of landfill on nearby communities are generally acknowledged in the literature. What is not clear is the degree of negative impact since many of the studies cited are perceptional studies. For instance, the perception since the early 1990s has been that landfills has the potential to be source of chemical contamination or airborne pollution and that the contamination happens when gases and leachates migrate to other areas far from the waste disposal site while the site is operational.

In line with the earlier studies on the impact of waste disposal sites on nearby residents and in light of the evidence presented, our study supports the proposition of the adverse effect of waste disposal sites on values of nearby infrastructure. The research offers a snapshot of the urgent need for cleaner communities and sound waste management policies such that no group of people is disadvantaged when it comes to implementation. Already landfill communities in Ghana in general are overburdened with pollution and unemployment and are looking for stable, cleaner employment and economic development opportunities. Proper landfill development through the implementation of the EPA guidelines may present strong alternatives because such facilities serve as a convergence point of interest for community groups, environmentalists, industry and the government. Although often at odds with one another, there is ample evidence to show that where these stakeholders have collaborated, sustained environmental and economic benefits have accrued. Success stories have emerged from situations where there is strong community participation in the planning, development and the management framework of the facility. Although when properly managed landfills can serve as catalyst for community development, city authorities need to look beyond looking for empty land and dumping waste since continuous increase in population and economic development is making land availability more and more limited. The results from the study give a clue to understanding the impact of Ghana's current solid waste disposal practices.

Conclusion and Recommendation

This study set out to examine perceived health hazards associated with the Dompoase landfill. Generally, it was observed that the management of the landfill was primitive and that many of the standards for safe disposal were not adhered to. Though dumping of solid waste at the site appeared to be done in accordance with best principles and practices in theory, what actually happened practically were a source environmental threat to the nearby communities. There was every indication that the landfill has degraded the communities through excessive externalities. There was vivid indication of serious pollution of the communities near the site and it was the result of poisonous substances which were both organic and inorganic in nature that emanated from the site. Based on the findings of the study, it is recommended that in order to pursue a more sustainable solid waste disposal strategies, state policies of solid waste management will have to be re-aligned so that more emphasis can be placed on alternatives such as waste prevention activities.

Without doubt, waste is a fact of life. Its generation is inevitably linked to increase in population and economic development. For this reason, it is imperative that Ghana must, as a matter of urgency be looking for a more sustainable means of managing it. Obviously, with rising population of Kumasi, gathering solid waste and dumping it on communities through landfilling may have to be re-examined. The situation becomes even direr as peri-urban communities are now housing the excess population from the city's core. Again, peri-urban communities have also become the center of industrial development. This means that land scarcity will very soon be a common phenomenon in the city. This by implications means that there will be less land for waste dumping. In this direction there will be the need to fashion appropriate policy intervention(s) to decrease the magnitude of waste that goes to the landfill sites while at the same time increasing public acceptability and willful participation in all other waste management strategies. To do this will need a multi-sectoral approach that will involve government agencies, the private sector and civil society groups. Finally, we propose that because the views expressed by our respondents were perceptions there is the need for broader investigations on the link between the rising environmental disease and the location of the Dompoase disposal site. Such studies are crucial since the socio-spatial dynamics of every landfill location is different.

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