

Environmental and Socio-Economic Effect of Solid Waste on Local Livelihood in: Sierra Leone. A Case Study of Freetown Municipality

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ABSTRACT

This paper investigates the environmental and socio-economic effects of solid waste generated activities on the livelihood of the local people in Freetown, Sierra Leone. In addition to the sampling community opinions of waste generated activities, the paper recommends participation that can help in solid waste management in order to mitigate its negative effects. Obvious environmental and socio-economic enhancement can be realized within waste disposal communities if the government provides the required financial and technical support to community members together with the ability and willingness to recycle municipal solid waste.

Keywords: *Local people, Solid waste, Socio-economic, Freetown municipality*

INTRODUCTION

Open garbage dumpsite method as solid waste disposal scheme is a primeval stage of solid waste supervision in many parts across the globe. It is one of the extreme inadequately condensed services by community stakeholders in emerging nations as the methods applied are unscientific, archaic and ineffective. Open garbage dumpsites are found both within and on the peripheries of emerging urban capitals. With upsurge in the global populace and the mounting demand for goods and other fundamentals, there has been intensification in the volume of waste being produced daily by each family. This excess is eventually thrown into community dumping sites and due to poor and unsuccessful management, the garbage sites turn to bases of environmental and health threats to those living in the locality of such landfills.

One of the key aspects of anxiety is the pollution produced to the terrain—be it air, water and land. As stated by Nguyen et al. (2011) several cities in unindustrialized nations encounter grave environmental untidiness and health menaces due to the feebly industrialized urban solid waste management scheme. Numerous researches have been carried out in order to scrutinize the health and ecological effects mounting from waste landfills. Such findings disclosed that a relationship exists between the two (H. B. N. Yongsu, et al., 2008;

M. Aatamila, et al., 2010). The conclusion from these and other works has contributed to an increasing curiosity of academics in the study linking to environmental effluence as well as its consequences on human income and biodiversity. Very few of these researchers studied the environmental and socio-economic insinuations of solid waste disposal to individuals living in areas close to wastes dumpsites (K. O. Boardi and M. Kuitunen, 2005; A. B. Nabegu, 2010). The growing consumption of goods results in enormous amounts of solid wastes from work and domestic actions, which pose substantial threats to human health (R. A. Frosch, 1996). However, the harms of inappropriately disposed municipal solid wastes are quite abundant to be pointed out. Health hazard, disaster, overflow incidences, and environmental pollution are just a few of the negative impacts. In many unindustrialized countries, solid waste dumping sites are located on the fringes of metropolitan areas. These regions develop teens' sources of infection due to the generation and spread of flies, mosquitoes, and rodents. These are disease transmitters that distress the health of the populace. The supposed condition produces malaria, cholera, breathing, genetic, and numerous other kind of communicable diseases (A. Salam, 2010). Open landfills in unindustrialized municipal cities involve haphazard disposal of waste. They are not controlled and consequently pose key health

threats which affect the environs of urban municipalities (D. Sood, 2004). The UNEPA (2006) stated that wastes that are not appropriately managed, particularly solid waste from families and the community, are a crucial health risk and lead to the spread of infectious diseases. The report additionally acknowledged that unattended wastes plying around entice flies, mosquitoes, cockroaches, rats and other creature that turn out to spread diseases. Normally, it is the drizzly waste that decays and releases a bad stench. The bad stench impacts the people settled next to the trash pile, which shows that the dumpsites have serious effects to people settled around or next to them. The people at risk from this repulsive disposal of waste includes-the people in neighborhood where there is no appropriate waste disposal scheme, particularly the preschool children, waste staffs and employees in facilities manufacturing toxic and infectious resources. Other high-risk set includes people staying close to the waste dump (M. Aatamila, *et al.*, 2010). In particular, carbon-based domestic waste poses a great hazard, since they instigate, forming situations favorable to the existence and development of microbial pathogens. Direct management of solid waste can result in numerous types of communicable and lingering diseases with the waste employees and rag pickers being the utmost at risk (J. A. Nwanta and E. Ezenduka, 2010). Studies led by Yongsu (2008) display that subjection to harmful waste in landfill can affect human health, kids being the most susceptible to these contaminants. Direct contact can result to infections through biochemical subjection as the release of toxic waste into the environs leads to chemical extermination. Rushton (2003) in his research to ascertain a link between health and harmful substance revealed that biochemical from agriculture and manufacturing can also lead to serious health hazards. On the other hand, co-disposal of industrial waste with municipal waste can subject people to toxic and radioactive hazards. Health care excess and other medical unused disposed in landfill, mixed with domestic refuse, increasing the menace of contamination with Hepatitis B and HIV, and other associated diseases (World Bank, 2005). Open land fill is a key problem to the atmosphere particularly to the air that we gasp. Open landfills release horrible smells that causes infection to those living close to them (E. Marshal, 1995). According to Medina (2002), effluence, a key ecological effect of landfills, is

not directly transported from land to individuals, except in the circumstance of dusts and through contact with toxic constituents. Chemicals dumped on land typically enter the human system through the form of polluted vegetables, animals, food products, or water. These surroundings are inferior in the summer because of thrilling temperatures, which speed up the frequency of microbial action on decomposable organic solid. Dumping spots can also generate health hazards for the locality (K. O. Boardi and M. Kuitunen, 2005). Gouveia and Ruscitto (2009) emphasized that in a number of health studies, a wide range of health issues, including irritation of the skin, nose and eyes, respiratory systems, intestinal glitches, mental illnesses, and anaphylaxis, have been revealed. Also, landfills closer to residential areas are continuously feeding homes for domestic animals such as cats and dogs. These animals, together with rodents, transmit diseases with them to neighboring homesteads. Sierra Leone is one of the deprived countries in the universe, facing one of the worst solid waste administration challenges and remains a constant concern for both indigenous and Global agencies. The problem of waste management, tied with scarce economic resources, has led to unselective disposing of solid waste into open places and drainages, blocking pipes and causing overflowing, environment contamination and municipal health problems (UNEP, 2013; Perera, 2003). In Sierra Leone, the problem of poor solid waste supervision in Freetown is exacerbated by rapid population expansion and continuous economic development; waste generation in residential as well as business areas remains to grow quickly, pushing pressure on community's ability to process and discard of these resources. This has positioned a massive pecuniary load on local administration, making it tough for them to achieve solid waste sustainably (Crook and Ayee, 2006; Oteng-Ababio, 2010). Also, improper waste handling in accord with unrestrained waste discarding can root a comprehensive range of glitches, including contaminating water, enticing rodents and bugs, as well as increasing overflows due to blockage in pipes. Improper solid waste supervision can as well upsurge greenhouse gas (GHG) release, hence contributing to climate change (M. Aatamila, *et al.*, 2010). Besides the ancient and fairly well-structured neighborhoods of the center of Bangui, the entire of the capital (more than 80% of the urbanized space) has the following characteristics: high density and risky

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living situations of the inhabitants, insalubrity and under- equipment (drainage networks, roads, urban equipment and services, water, electricity). In the different neighborhoods this situation can be aggravated to the topography which directly determines the exposure to floods and waste transported by rainwater (Nguimalet, 2007). In some municipalities, the overflow of runoff exposes sites susceptible to immense floods requiring protective works. The main capital is one of the most affected town halls because it is located in the lower chunk of the city and receives a lot of runoff from the hills, crossing the city.

This paper therefore sought to present findings of a study carried out in Freetown municipal area in Sierra Leone to determine the environmental and socio-economic influence of solid waste dumping on local livelihood.

We suggested new insights concerning the dumpsite in conjunction to reducing the high prevalent rate of air and water borne diseases and other waste generated infections in the municipality. The results obtainable could be of significance for many urban communities in emerging countries and researchers interested in waste management.

In a case study of the Freetown Municipality, the current study wanted to examine the extent of Sierra Leone solid waste environmental and socio-economic impacts. The specific objectives of the research are as follows:

- To categorize and evaluate socio-economic activities which are significantly influenced by solid waste activities.
- To evaluate local communities observations on how solid waste activities impact the environment.
- To proffer solid policy recommendations that can help in mitigating the harmful impacts of solid waste.

Study Area

The study was conducted in Freetown the main capital of Sierra Leone, Freetown metropolis was selected for the study because of rapid urbanization and expansion of the metropolis which has led to enormous increase in solid waste generation (Dominguez-Torres, Carolina; Foster, Vivien. 2012). According to the 2012 Population and Housing Census (PHC), it had an estimated population of 1.2 million people, with a higher proportion (43.6%) living in urban

localities (Dominguez-Torres et. al., 2012). It has a total estimated land size of 71,740 sq.km), geographically lies between latitude 4°22'N and 18°35'E and longitudes 7° 0' 0" N and 21° 0' 0" E and located within the mountainous woodland Region of the country.

Data Collection and Analysis

A direct face-to-face interview was employed in this study to elicit information by using a combination of methods, including participatory rural appraisal (PRA) tools and techniques, participant observations, and formal and informal surveys. Pair-wise ranking was initially carried out to help identify harms caused by solid waste disposal as acknowledged by the local people in the research area, and to rank socio-economic activities based upon their contribution to household livelihood. The discussion made use of frequencies, percentages and means. Analysis of variance (ANOVA) and cross tabulations involving chi-square tests were used to test statistical discrepancies in various indicators between solid waste disposal and non-solid waste disposal communities.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Table 1 details the percentage of the respondents interviewed during the survey. There was no significant difference in gender within surveyed waste disposal and non-waste disposal communities ($p > 0.05$). Only 28.4% of the respondents in solid waste disposal areas were males (Table 2), likely because solid waste disposal activities are gender and age-oriented, demanding the services of more females and young children (age bracket < 18) than males (particularly adults).

Solid waste disposal and non-solid waste disposal communities exhibited minimal difference in terms of average household size: On average, household size was 5.4 and 5.7 persons per household within the surveyed waste disposal and non-waste disposal communities respectively (Appendix 1). Surveyed areas likely have comparatively higher household sizes because of the existence of the commercial and or industrial activities, which generate population increase through migration. The characterization survey found that all types of waste are produced by a large majority of the population surveyed in the waste disposal communities (Appendix 3). The composition of

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waste is marked by the high production of agricultural waste (31%) and organic waste (25%). The fine elements (sieving 10 mm) and

incombustibles (pebbles, stone ...) are also found in household waste with a fairly significant fraction (11%).

Table1. Socio-economic characteristic of respondents in this survey

Variable	Community status		Total (n=172)	χ^2 -Value
	Waste disposal community (n=86)	Non-waste disposal community (n=86)		
Gender				0.275 ^{ns}
Male	17 (19.8)	24 (27.9)	41 (23.8)	
Female	69 (80.2)	62 (72.1)	131 (76.2)	
Household size				0.703 ^{ns}
1-4	11 (12.8)	13 (15.1)	24 (14.0)	
5-7	32 (37.2)	30 (34.9)	62 (36.0)	
8-10	28 (32.6)	26 (30.2)	54 (31.4)	
>10	15 (17.4)	17 (19.8)	32 (18.6)	

Source: Field survey (2017).

Figures out of parentheses are frequencies and those in parentheses are percentages

ns = Non-significant at P > 0.05.

Table2. Characteristics of waste depositors interviewed

Variable	Community status		Total (n=110)	χ^2 -Value
	Waste disposal community (n=95)	Non-waste disposal community (n=15)		
Gender				0.041*
Male	27 (28.4)	.....	27 (24.5)	
Female	68 (71.5)	15 (100.0)	83 (75.5)	
Age category				0.038*
<18	25 (26.3)	5(33.3)	30 (27.2)	
18-30	6 (6.3)	.....	6 (5.5)	
31-43	19 (20.0)	3 (20.0)	22 (20.0)	
44-56	32 (33.7)	7 (46.7)	39 (35.5)	
>56	13 (13.7)	....	13 (11.8)	

Source: Field survey (2017).

Figures out of parentheses are frequencies and those in parentheses are percentages

diverse economic activities, including trading (petty trading), Agricultural activities, construction works and civil service activities etc. (Table 3).

*Significant at p<0.05. Within the surveyed area, respondents reported to be involved in

Table3. Socio-economic activities of the respondents

Variable	Community status		Total (n=172)	χ^2 -Value
	Waste disposal community (n=86)	Non-waste disposal community (n=86)		
Main occupation				
Trading	38 (44.2)	62 (72.1)	100 (58.1)	0.014*
Agriculture	27 (31.3)	.....	27 (15.7)	0.000***
Civil service	6 (7.0)	10 (11.6)	16 (9.3)	0.721 ^{ns}
Construction works	3 (3.5)	....	3 (1.7)	.....
Driving	4 (4.7)	9 (10.5)	13 (7.6)	0.035*
Saloon	....	2 (2.3)	2 (1.2)	
Unemployed	5 (5.8)	....	5 (2.9)	
Retired	....	3 (3.5)	3 (1.7)	
Others	3 (3.5)	....	3 (1.7)	

Some 31.3% of respondents in solid waste disposal communities reported to be engaged in agricultural activities as a primary occupation.

Large proportions of respondents (44.2% and 72.1% solid waste disposal and non-solid waste disposal communities, respectively) were

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engaged in trading activities. It was indicated that poor waste management are the main reason behind unpredictable disease outbreak, due to the fact that many locals have chosen to take up petty trading and agriculture as an occupation. Excessive garbage disposal, which are commonly associated with high risks and destruction, are as a result of poor management in the waste that are largely generated from participating in these socio-economic activities.

Figures in parentheses are percentages and those out of parentheses are frequencies.

***Significant at $P < 0.001$,

*Significant at $P < 0.05$.

ns = Non-significant at $P > 0.05$

Generally, it was found that solid waste management activities was not the major socio-economic activity of the local people in Bangui community but rather a complimentary source of income (Tables 4 and 5).

In Freetown municipality, the dominant native tribes are the Kerios, Temnes and Mendes which comprises mainly traders (petty traders). The results in Table 3 indicate that 44.2% and 72.1% of respondents in waste disposal and non-waste disposal communities, respectively, are petty traders ($p < 0.05$). Nevertheless, it was frequently observed that waste dumping sites (figure 1) contributed to the exposure of the people to outbreaks of diseases

in solid waste disposal communities, findings which suggest that solid waste activities have a negative socio-cultural impact on the livelihoods of the local people.

Table4. Pair-Wise Ranking of Socio-Economic Activities in Waste Disposal Community

Socio-economic activities	1	2	3	4	5	6	7	Rank
1 Agriculture	x							2 nd
2 Civil Service	1	x						3 rd
3 Driving	1	2	x					4 th
4 Waste Collection	1	2	3	x				5 th
5 Trading (Petty business)	5	5	5	5	x			1 st
6 Unemployed	1	2	3	4	5	x		6 th
7 Saloon	1	2	3	4	5	6	x	7 th
Frequency	5	4	3	2	6	1	0	

Source: Field survey (2017).

Table5. Pair-Wise Ranking of Socio-Economic Activities in Non-Waste Disposal Community

Socio-economic activities	1	2	3	4	5	6	7	Rank
1 Civil Service	x							2 nd
2 Driving	1	x						3 rd
3 Retired	1	3	x					4 th
4 Waste Collection	4	4	4	x				5 th
5 Petty Trading	1	5	5	4	X			1 st
6 Agriculture	6	6	6	4	5	x		6 th
7 Construction Work	7	7	7	4	7	7	x	7 th
Frequency	3	0	1	6	3	3	5	

Source: Field survey (2017).



Figure1. Waste disposed communities surveyed

Contribution of Solid Waste Generated Activities to Local Income

The evidence from Table 6 point out that approximately 87.2% and 62.8% of the survey

participants in waste disposed and non-waste disposed communities, respectively, benefit differently from the existence of waste generated activities ($p < 0.001$).

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Within waste disposal areas, some 14% of participants benefit from sources of waste management employment; 37.2% from petty business; 26.7% from selling food crop; and 9.3% from construction works. It was established that none of the respondents in non-waste disposal areas benefit from direct waste generated activities as a source of alternative market for waste generated products, while 15.1% benefit indirectly from petty business, and 23.3% from employment. The results show that solid waste generated activities have created a massive amount of income opportunities for the inhabitants of Freetown municipality. There were significant differences in the benefits provided by the large-scale waste generated activities to waste disposed and non-waste disposed area in terms of market for waste generated products ($p < 0.001$); particularly, non-waste disposed communities tend to be more neglected than waste disposed communities. The results are in conformity with findings by Nguyen et al., (2011) which demonstrated waste disposed communities as the recipients of a wide range of new services, including market for agricultural produce.

The presence of large waste generated activities in Freetown Municipality has created market opportunities for local farmers. As shown in Table 6, roughly 26.7% and 20.9% of participants in waste disposed and non-waste disposed communities, respectively, secure markets for their agricultural produce through their waste generated activities. Within surveyed waste disposed communities, the average annual income earned from agriculture through selling of food crops was reported to be XAF 57,804.93, compared to XAF 46,242.34 in the non-waste disposed areas surveyed (Appendix2).

The entry of people in seeking job at waste disposed areas has increased demand for commodities, consequently increasing opportunities for local community members to sell their food crops. The results imply that waste generated activities significantly contribute to the incomes of local people engaged in crop production by providing markets to their agricultural produce.

Table6. Respondents' viewpoint on household benefit of waste generated activities

Variable	Community status		Total (n=172)	χ^2 -Value
	Waste disposal community (n=86)	Non-waste disposal community (n=86)		
<i>Type of benefit</i>				
Petty business	32 (37.2)	13 (15.1)	45 (26.1)	0.000***
Employment	12 (14.0)	20(23.3)	32 (18.6)	0.000***
Selling food crops	23 (26.7)	18 (20.9)	41(23.8)	0.017**
Construction works	8 (9.3)	3(3.5)	11 (6.4)	0.000***
Market for waste generated products	9 (10.5)	.....	9 (5.2)	0.000***
No benefit	2(2.3)	32 (37.2)	34(20.9)	

Figures in parentheses are percentages and those out of parentheses are frequencies.

***Significant at $P < 0.001$,

**Significant at $P < 0.01$.

Indigenous Perceptions of the Environmental Impacts of Solid Waste Disposal

A pair-wise ranking of problems, which elicited local peoples' perceptions on the problems experienced in waste disposed communities, indicates that the most pressing problems in waste disposed areas are environmental pollution especially of water sources from organic materials, public health issues, environmental fouling and flooding due to blockages (Table 7). A massive amount of tons of solid waste are produced every day in

Freetown municipality, most of which is dumped in waterways or informal trash heaps, making solid waste management an area of increasing concern for the country (IPA, 2014). Two changes in the flow of solid waste have occurred over the last few years: 1) the volume of waste generated by residential households has significantly increased; and 2) the combination of solid waste has changed from primarily organic material to a mix of synthetic and organic matter. The increase in quantity and change in combination are ascribed to the following factors 1) Rapid population growth and economic expansion (meaning more people to create waste and more money to buy products that will become waste); 2) inadequate of infrastructure to deal with the increase and; 3)

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inadequate financial support for planning and appropriate operation. Solid wastes disposed in these communities have formed a mountain of garbage (see figure 1).

Table7. Problem ranking in waste disposed communities

Waste Problems	1	2	3	4	Rank
Environmental Pollution	x				1 st
Public health issues	1	X			2 nd
Flooding due to blockage	1	2	X		4 th
Environmental Fouling	1	2	4	x	3 rd
Frequency	3	2	0	1	

Source: Field survey (2017).

Table 2 presents the age categories of waste disposers (waste staffs) in the households interviewed. Some 26.3% of the waste disposers interviewed were children aged eighteen (18) and below. Many children in waste disposed dominated areas were seen either working autonomously or helping their parents with activities such as collecting and disposing waste without protective gears: activities which expose them to serious health hazards. According to medical officers in the municipality of Freetown, the excessive exposure of children to waste can cause different sickness in them through air borne diseases. The tendency of children engaging in waste disposition encourages absenteeism in school and increases the rate in school dropout. Environmental pollution and public health issues (table 7) are a major problem in the waste disposed areas of Freetown municipality. Continuous and improper disposal of solid wastes contributes to air and water pollution, which are harmful to human health, domestic animals and wildlife

biodiversity, and have severe effects on the welfare of the waste disposed communities, particularly groups of children and women being the major disposers of waste. The health and safety of waste disposers without protective gears and the nearby communities are at risk from a range of factors, ranging from the inhalation of foul air, to water pollution and poor safety procedures. Unprotected dumping sites (figure 1), for example, during the rainy seasons, create breeding grounds for disease carriers such as houseflies and mosquitoes that serve as agents that spread water borne diseases and malaria. Table 8 shows some of the widespread diseases pointed out in the research area. The water and air pollution mainly originating from improper solid waste disposition in Freetown municipality has been reported by local community people to increase the rate of maternal mortality and air borne infections. Prior to the actual survey, characterization was carried out in three (3) districts of the pilot project in Freetown in the densely populated area located downstream of the city of Freetown where floods are recurrent due to intensive rains and the high level of the river which does not facilitate the city's rainwater evacuation system where all waste and residues settle in collectors and drains, causing flooding in the southwestern parts of the capital. Based on the technical services of the municipality of Freetown, the daily production of garbage in the city of Freetown is estimated at 930 m³ / day which should be a great concern for its consequence on the environment and the livelihood of the local people.

Table8. Surveyed responses on the impacts of solid waste on human health

Variable	Community status		Total (n=172)	χ^2 -Value
	Waste disposal community (n=86)	Non-waste disposal community (n=86)		
Common disease				
Air borne	32 (37.2)	17 (19.8)	49 (28.5)	0.040***
Water borne	26 (30.2)	11(12.8)	37 (21.5)	0.022***
Malaria	12 (14.0)	41(47.7)	53(30.8)	0.037**
Worms	3 (3.5)	7(8.1)	10 (5.8)	0.721 ^{ns}
Bilharzias	9 (10.5)	1(1.2)	10 (5.8)	0.000***
Others	4(4.7)	9 (10.4)	13(7.6)	0.654 ^{ns}

Figures in parentheses are percentages and those out of parentheses are frequencies.

***Significant at $P < 0.001$,

**Significant at $P < 0.01$.

ns = Non-significant at $P > 0.05$

RECOMMENDATIONS AND CONCLUSIONS

Solid waste activities have already caused severe social and environmental impacts in

some improper waste disposal areas in Sierra Leone, including Freetown municipality. These problems include environmental pollution, harm to water quality, spread of water and air borne diseases, and harm to domestic animals and wildlife biodiversity. Despite the increasing consciousness of the significance of effective solid waste management amongst communities and Government officials in Sierra Leone,

mitigation approaches are possibly offset by conflicts of interest on both financial and willingness grounds at governmental and local levels. People tend to neglect the fact that proper solid waste management is achieved by collective efforts from both the government and community members. To address the problem of solid waste: Those in authority such as government officials and other stakeholders should take steps to sensitize the public on waste reduction and separation as an issue of national policy and they should endorse waste-minimization regulation as a preliminary step. Emphasis on the need for information about environmentally responsible behaviors, such as recycling and waste minimization, needs to be presented in a culturally and emotionally appropriate context. Behavior change and waste prevention policy needs to be designed with convenience in mind, based on the needs of today's households for time and space. This will be demonstrated to persuade householders to engage in waste management practices, provided that information on such a system is well disseminated. Socio-economic characteristics (especially wealth) may determine attitudes such as the perceived ability or willingness to recycle municipal solid waste, but these attitudes may be positively influenced by awareness-building campaigns and educational measures.

This can be achieved using a variety of factors such as the integration of environmental education centered on solid waste management and the environment into the school curriculum beginning with the elementary schools. Public awareness can also be improved through some low cost methods such as seminars, workshops, newsletters, speeches, and church bulletins. Solid waste planners can also make the best use of all available community resources which include elected officials, the news media, interested groups and community organizations, all of which have the ability to generate community support.

Even though municipality normally deliver urban solid waste management services, resourceful and successful service delivery is difficult to achieve without the active participation of and support from local communities. Even though socio-psychological incentives, or moral and social motivations, may prove effective in the long term scale, these public campaigns aimed at changing attitudes and norms are also the most difficult to achieve.

However, a combination of socio-psychological and economic incentives, along with educational awareness campaigns and increased community involvement, may just be the winning combination for success in solid waste management in Sierra Leone. In order to collect recyclable materials, a separate waste collection scheme should be implemented in Freetown and its environs. In this study, we recommended that a well-prepared awareness campaign should be organized, and also residents should play their part in sorting their waste. However, these activities, will recover valuable materials thus find a second life in the economy. Furthermore, this solid waste will produce fuel that will be used for generating electricity for the city. The new system is also expected to create so many jobs for engineers, biologists, energy specialists as well as finance and logistics experts. This paper has evaluated the socio-economic and related environmental impacts of solid waste disposal in Freetown, Sierra Leone. Regardless of not being a primary economic occupation for the majority of the municipality's local people, solid waste generated activities does however provide necessary supplementary income. In terms of environmental impacts, the observation shared within local communities is that solid waste generated activities have caused environmental pollution. Dumping sites have clearly contributed to air and water pollution, which are harmful to human health, domestic animals and wildlife biodiversity, and have severe effects on the welfare of the waste disposed communities, particularly groups of children and women being the major disposers of waste. The problem of poor solid waste management in Freetown is aggravated by rapid population increase and continuous economic activities, waste generation both in residential as well as commercial areas continues to grow rapidly, putting pressure on society's ability to process and dispose of these materials and thus adversely affecting their livelihoods.

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