

Sustainable solid waste management in developing countries: a study of institutional strengthening for solid waste management in the Ga West Municipality, Accra – Ghana

Prince Nii Koi Kotei

(Institute for Environment and Sanitation Studies (IESS), University of Ghana, Legon - Ghana)

Abstract: Poor solid waste management (SWM) is a major threat to public health and socioeconomic well being of Metropolitan/Municipal/District Assemblies (MMDAs) as waste generation exceed management capacity. In Ga West Municipality, many interventions have been put in place to enhance SWM. However, there seems to be the lack of improvement in the management of solid waste. The study sought to assess the performance of Ga West Municipal Assembly in the management of solid waste. Specifically it assesses the problems affecting the implementation of policies and enforcement of laws on SWM. This study employed qualitative research method. A total of 20 respondents were interviewed from Ga West Municipal Assembly and Accra Compost and Recycling Plant. Findings revealed that solid waste collection rate was low and it was mainly limited to the urban areas. A greater proportion of waste collected was discarded without processing. Laws and policies for the management of solid waste were relaxed. Poor stakeholder participation, inadequate skilled staff, lack of political will and inadequate logistics are among the problems militating against the implementation of policies and laws on SWM. This study recommends that Ga West Municipal Assembly must be strengthened and well resourced in terms of logistics, finance, skilled manpower, stakeholder involvement and minimal political interference to enable the Assembly to carry out its mandate efficiently.

Key words: Law enforcement, policies, stakeholder participation and performance

Date of Submission: 05-10-2020

Date of Acceptance: 19-10-2020

I. Introduction

The need to manage solid waste sustainably is a matter of concern for the managers of all MMDAs of the world today. Whereas some MMDAs have achieved remarkable results in the management of solid waste, others are still wallowing in the waste menace ((Puopiel, 2010). To achieve an efficient, sustainable SWM in Ghana, appropriate institutions of government have been set up to regulate, coordinate and control SWM programs, projects, systems and practices.

In Ghana, municipal SWM is the direct responsibility of the waste management and environmental health departments of MMDAs. Over the years, the government of Ghana in an effort to address the waste management problems has developed various policies, strategies, legislations and measures for the sound management of municipal solid wastes (Sarfo-Mensah *et al.*, 2019).

These policies and legislation include:

- National Environmental Policy 1991
- Local Government Act (Act 462)
- Environmental Protection Agency Act, 1994
- Water Resources Commission Act 1996
- National Building Regulations 1996
- Environmental Sanitation policy, 1999
- Environmental Assessment Regulations 1999
- Radiation Protection Instrument, LI 1559, 1993
- National Environment Policy 2010

In addition to the above policies and legislations, the Ministry of Environment, Science and Technology, the Environmental Protection Agency (EPA), Ministry of Local Government and Rural Development and the Ministry of Health have prepared the following guidelines and standards for waste management:

- National Environmental Quality Guidelines (1998)
- Ghana Landfill Guidelines (2002)
- Manual for the preparation of district waste management plans in Ghana (2002)
- Guidelines for the management of healthcare and veterinary waste in Ghana (2002)

- Handbook for the preparation of District level Environmental Sanitation Strategies and Action Plans (DESSAPs).

Although MMDAs are the key institutions responsible for the management of sanitation and waste at the local and community level, they are assisted by other institutions such as the Environmental Protection Agency, National Environmental Sanitation Policy Co-ordination Council, Private waste operators among others. More so, various capacity building programs, interventions, seminars and workshops on environmental education and awareness creation have been organized and are still ongoing in various places to help improve SWM. Additionally, a National Environmental Sanitation Day was established and observed annually to sensitize the general public in keeping their environment sound and clean (MLGRD & EHSD, 2010).

In spite of all these interventions designed to enhance SWM, there seems to be a lack of improvement in the management of solid waste in Ga West Municipality (MLGRD & EHSD, 2010; Service, 2014). Consequently, since solid waste is not managed efficiently, it poses threat to public health leading to the outbreak of environmental related diseases such as cholera, typhoid, malaria and many others. Inadequate access to funds, lack of appropriate technology, poor motivation, inadequate staff, complexity of waste, changes in consumption trend, etc., are among the problems that continue to hinder the attainment of a sustainable SWM (Oteng-Ababio, 2011). It is also argued that ineffective SWM must be seen as a consequence both of institutionalized failure to implement policies and regulations as well as a corresponding failure to recognize the importance of private agents and community participation in the sound management of solid waste.

This study seeks to assess the performance of Ga West Municipal Assembly in SWM and the problems affecting the implementation of policies and laws on SWM.

II. Materials and Methods

2.1 Study Design

This study employed qualitative research method. It offered the researcher a deeper and broader understanding of the existing problem and enhanced the collection of adequate information for the study. This comprised review of existing literature, semi structured interview, informal interview and observation. This study is the first phase of a major research the researcher is undertaking on assessing the sustainability of SWM systems and practices in the Ga West Municipality.

2.2 Sampling, Data Collection and Analysis

An interview guide was used to engage senior officers from the Environmental Health and Waste management, planning, budget and finance departments of Ga West Municipal assembly, Assembly men and Accra Compost and Recycling Plant (ACARP). They were purposefully selected for the interview. In all, a total of 20 respondents were interviewed. Follow-up observations were undertaken to crosscheck information gathered during the interviews. During the data collection, the researchers ensured that informed consent was followed. The data was analyzed qualitatively using an in-depth assessment of the various thematic areas.

III. Results

3.1 Institutional Mandate

The Ga West Municipal Assembly was established in 2017 legislative instrument (LI) 2313 and is responsible for the development of the Municipality through the formulation, preparation and implementation and monitoring of development plans and projects. The Environmental Health Department of Ga West Assembly is charged with coordinating and managing waste and sanitation activities in Ga West municipality. At the time of the research there were five key officers at the unit and some national service personnel. The officers of the Unit were trained to handle general environment and sanitation issues in the Municipality but employed the services of specialists such as engineers, researchers etc for specialized activities. Collaboration existed among the departments of the Assembly, Environmental Protection Agency (EPA), District Health Directorate, Ghana Education Service and Private waste operators. However, collaboration and participation was low for stakeholders such as householders, market traders, schools, scavengers, lorry stations, food processors and skip operators. There were also limited programs to bring stakeholders to collaborate for effective SWM. Public Private Partnership existed between the Assembly and Nsumia Waste Disposal Facility as well as between the Assembly and ACARP. Sources of funding include internally generated fund, District Assembly Common fund and Donor fund.

3.2 Performance assessment of Ga West Municipal Assembly in SWM

Tables 1 - 5 shows an assessment of Technical, Environmental, Financial, Economic, Sociocultural, Institutional and Legal Performance of Ga West Municipal Assembly in SWM

Table 1: Technical & Environmental Performance of Ga West Municipal Assembly in SWM

Technical & Environmental Performance Of Ga West Municipal Assembly In SWM	
Questions	Answers
1. What is the waste generation, composition and collection rate?	Solid waste generation rate is 160 tons per day but 80 tons (50%) is collected by the Assembly (30%) and Private operators (20%). About 30% – 35% of the population is served by Private waste operators. Organic waste forms an average estimates of about 61% of the entire waste volume, glass and bottle forms 6.8%, Plastics and rubber forms 26 % and metals form 6.2 %
2. Is collection coverage wide enough	No. It is mostly concentrated within the urban area of Ga West Municipality
3. How many areas are not served by regular collection	The rural communities of Ga West municipality
4. What is the number of skips in the municipality?	Refer from table 6
5. Vehicle productivity (amount of waste collected per route and per time unit)	Ga West Municipal employed 12 vehicles, comprising of 1 cesspit emptier, Tractor, roll-ons and compacter truck.
6. Duration and volume of collection per vehicle	Vehicles collect seven (7) tons of solid waste per trip and collection is done as and when the containers are full by the Municipal Assembly vehicles. However, a private waste operator like Zoom lion has a vehicle with the capacity to collect about 8.5 tons.
7. Performance of waste processing plants	Refer from table 7. Compost and recycling is done at ACARP through a Public Private Partnership program.
8. General sanitation rate	Percentage of the population at present served by sanitation is 22% .
9. Waste recovery rate	5 % of total waste generated.
10. Presence of environmental related diseases	In 2014, cholera case were 13,500 victims in Ga West, which forms 48.4 % of the nationwide cholera cases of 27, 900. 240 people from the country, died while 8 sustained injuries in Ga West municipal.
11. Existence of policies to promote waste reduction, reuse, segregation and recycling	Yes but inadequate.

Table 2: Financial and economic Performance of Ga west Municipal Assembly in SWM

Financial and Economic Performance of Ga West Municipal In SWM	
Questions	Answers
1. Does the municipality have the authority to raise its own funds for SWM (through fees or taxes)?	Yes
2. Does SWM have its own budget lines?	Yes it has its own budget and money allocated is used for the purpose
3. Do collected fees go into a special earmarked budget / account, which are only used for waste management?	No. collected fees goes into the internally generated fund
4. Do all stakeholders share waste management cost?	No. Ga West Municipal Assembly is the main financier of SWM
5. Are fees the same for commercial and residential clients?	No. Commercial clients pay higher than residential clients. The system is affordable for the users and financially viable for local authorities involved and private enterprises.
6. What is the percentage of budget allocated for SWM?	SWM forms about 20% - 25% of budget in Ga West Municipal
7. Does the government release common funds on time to Assembly?	Common fund mostly delay

Table 3: Socio-cultural Performance of Ga west Municipal Assembly in SWM

Socio-cultural Performance Of Ga West Municipal Assembly In SWM	
Questions	Answers
1. Are all the stakeholders involved by SWM decision making?	No
2. Does the municipality co-operate with all stakeholders?	Stakeholders are informed officially for focus group discussions. There are frequent meeting between EPA, Ga West municipal Assembly
3. Is there a structure for communicating with other stakeholders?	Yes

4. Is there any complaint mechanism in the municipality for the general public (to complain about missed collection, illegal dumping)?	Complaints are made at the environmental health department. All complaints are written in a log book, together with details of complainant and location of event. Environmental Health officers trace and analyze the source of the issue and find remedies to the situation. Remedies may range from immediate directive to stop nuisance to demolishing of structure and judicial adjudication
5. Is this complaint mechanism functioning well?	Yes. Office is opened to all complainants
6. Do women have a recognized influence on waste management?	Some of the skips site operators were women. Picking of pure waste sachet purely done by women in the municipality but this is not officially recognized. Many Private waste sweepers are also women.
7. Is SWM system able to deliver appropriate level of benefits (quality, quantity, convenience, continuity, health) to all, including the poorest?	No, since solid waste collection by private waste operators are focused on urbanized areas than rural areas and skips are also not adequate.

Table 4: Institutional and Organizational Performance of Ga West Municipal Assembly in SWM

Institution and Organizational Performance of Ga West Municipal Assembly in SWM	
Questions	Answers
1. Its management of SWM institutionalized	Yes. It is done by the Assembly and Environmental Protection Agency (EPA)
2. Are tasks divided over several departments?	SWM is the responsibility of Ga West municipal (Environmental Health department) and EPA.
3. Does the municipality have the authority to contract private enterprises?	Yes On franchise basis and contract basis
4. Are there sufficient skilled staff for SWM	Our skilled staff has improved but still inadequate.
5. Are scavengers organized and integrated?	Not properly organized. Not formally integrated in the SWM program.

Table 5: Policy and Legal performance of Ga West Municipal Assembly in SWM

Policy And Legal Performance Of Ga West Municipal Assembly In SWM	
Questions	Answers
1. Is there a national framework waste management law?	Yes
2. Does the municipality have jurisdiction and authority to plan, finance and operate waste management systems and/or to contract them out?	Yes but there is unresolved boundary disputes
3. Is there rule of law?	There is rule of law to a minimal extent. Laws are relaxed
4. Are contracts binding and enforced in law?	Contracts are binding and enforced in the law court
5. Are laws and regulations for waste management sufficient (do they cover all necessary issues, are sanctions severe enough)?	No
6. How well does enforcement of these regulations function?	Polluter pay principle is enforced. Defaulters are sent to court for creating environmental nuisance and non-compliance to environmental directives upon complains by other households. But law enforcement rate is low
7. Who is the disposer of last resort for waste? Who is the payer of last resort?	Ga West Municipal Assembly
8. What are the main obstacles for attaining the objectives in the solid waste management strategy/plan?	Lack of political will, Inadequate personnel, poor stakeholder cooperation and compliance, inadequate capital and logistics,

3.3 Distribution of Skips in Ga West Municipality

In order to enhance waste collection by Private waste operators, the municipality is zoned into 17 sub regions among 10 Private waste operators. Ga West Municipal Assembly distributed skips at zonal councils for waste collection. However, the skips were unevenly distributed within the municipality. In all, there were only eighteen (18) container sites present in the municipality. Only twenty (20) out of the twenty-seven (27) containers are in good condition. Environmental Health Officers complained of inadequate logistics. This is presented in table 6.

Table 6: Distribution of Skip at Zonal councils of Ga West Municipality

Zonal Council	Container sites	No. Available	Types of containers	Conditions
Mayera	Mayera toilet	1	Skip	Serviceable
Kotoku	1.Medie Kitiwa	1	Skip	All are serviceable
	2. Medie Market	2	Skip	
	3.Sapeiman	1	Skip	
	4.Pobiman (hearts park)	1	Skip	
Ofankor	1.Ofankor market	2	Skip	Serviceable
	2.Asofan	1	Skip	Serviceable
	3.St. John's	1	roll on	Not in place now
Pokuase	1.Gokukope	1	All are skips	Serviceable
	2.Chief's palace	3		2 are serviceable serviceable
	3.Pokuase Junction	1		1 serviceable
	4.Afiaman	4		Non-serviceable
	5.Abensu Quarters	2		Serviceable
	6.Fise toilet	1		
Amasaman	1.Assembly	1	Skip	All are in good conditions
	2.Hospital	1	Skip	
	3.Market	1	Skip	
	4.Lorry Station	2	Roll-ons	
Total	18 container sites	20 out of 27 in good condition		

3.4 Recycling and Composting of Solid Waste in Ga West Municipality

Compost and Recycling in Ga West Municipality is done by ACARP. Table 7 below shows the operational capacity and efficiency of the plant.

Table 7: Recycling and Composting of Solid Waste at ACARP

Operation of Plant	Findings
Size of Plant or designed capacity	600 metric tons per day
Operation capacity	450-500 metric tons per day
Volume of waste brought to the plant per day	400-600 metric tons
Volume of solid waste disposed per day	80-120 tons (20% of volume per day)
Percentage of solid waste recycled per day	25% or 100-150 tons
Percentage of solid waste composted per day	55% or 220-330 tons
Types of solid waste brought to the plant. E.g. Medical , E waste, municipal solid waste etc.	Municipal solid waste including E-waste
Is solid waste segregated?	Yes
Volume of solid waste brought from Ga West Municipal	14% - 20% of total volume per day
Type of landfill. E.g. Engineered or un engineered	An Engineered landfill
Is there a gas recovery system	Yes
Is there a leachate recovery system	Yes
Nature of contract. E.g. Public-private partnership	Existence of Public Private Partnership (PPP)
Existence of partnership between Compost & Recycling Plant and Private Waste Operators	Yes
Existence and Nature of partnership between Compost & Recycling Plant and Itinerant solid waste buyers or scavengers	No partnership
Existence of scavengers at the landfill	No
Amount of fees charged for solid waste brought to the plant	No fees are charged. Government pay the fees under the PPP
Tools and safety of workers. Especially those segregating waste	Mechanical separation machines such as magnetic separator and rotary screen machines. Hand separation is done by workers using protective tools and wares.
Total number of work force	Over 100 workers
Demand for recycled material/compost on the Ghanaian and for foreign market	High demand for recycled products. Demand for compost is below expectation due to low farmer knowledge on compost.

3.5 Existence of Bye Laws in Ga West Municipality

Bye laws implemented in the municipality to regulate solid waste disposal are derived from sub section 1, 2 and section 79 of the Local Government Act 1993 (Act 462) and the Local Government Act 2016. In these Act,

- A person must not litter near water sources or other unauthorized places.
- A person of 18 years and above who resides within the jurisdiction of the Assembly shall participate in communal labour on days determined by the Assembly as communal labour days.

- A person who contravenes these bye laws commit an offence on summary conviction to a fine of not more than 25 penalty units or to a term of imprisonment of not more than 3 months or to both. Penalty category B of dumping refuse at unauthorized places attracts a fine of GHC 35.

In spite of these bye laws, there were many illegal solid waste dumps in the municipality. Open burning, open dumping; vector borne diseases and indiscriminate disposal into drains and wetland are common. There were underground and surface water systems within the vicinities of formal and informal dumps which could pose danger to public health.

IV. Discussion

The study found solid waste collection to be low at 50% of the total solid waste generated per day. This is not consistent with collection rate in Accra metropolis and Sekondi – Takoradi metropolis, where collection rate ranges between 75% - 90% and 72% per day respectively (Annepu and Themelis, 2013; Fei-Baffoe *et al.*, 2014). More so, collection was mostly concentrated in the urban areas of the municipality which is not congruent with recommendations from literature (Oteng-Ababio, 2011). Many reasons may be deduced from this finding. For instance, where logistics and service operation facilities such as tools, vehicles, skips, garbage bins and better roads to landfill sites are inadequate, the resultant effect would be low collection and coverage rate, operational inefficiencies, inadequate services and poor sanitation. This may further lead to the outbreak of environmental related diseases such as cholera (Mwinkom *et al.*, 2013). No wonder cholera outbreak was very high in Ga West Municipality in 2014, a statistics about half of the national cholera outbreak cases. Additionally, the limitation of waste collection to urban Ga West may be because the rural communities are not willing to pay for door to door collection or that they prefer traditional methods of solid waste disposal such as feeding to animals, dumping into dug out pits, heaping and illegal dumping. This situation of inadequate logistical support can also compel the Assembly to centralize waste collection in the affluent areas of the municipality where the rich residents can afford payment for waste collection services (Sarfo-Mensah *et al.*, 2019).

Recycling and composting of solid waste is encouraging as it is higher than what exist in Sekondi-Takoradi metropolis, but lower than what exist in China (Chen *et al.*, 2010; Fei-Baffoe *et al.*, 2014) However, the total amount of solid waste from Ga West Municipality composted and recycled out of the total waste collected in the same municipality is still low. Given a collection rate of 50% and compost and recycling rate of about 20%, then bulk (30%) of the waste collected is discarded. This is clearly not sustainable and it is inconsistent with the waste management hierarchy which relegate disposal to the background (Agbesola, 2013).

On financial and economic performance of Ga West Municipal Assembly in SWM, it is clear from findings that government common fund to the Assembly often delay. More so, only 20-30% is channeled into SWM. This is low since Accra Metropolitan Assembly (AMA) spent 82% of its funds on solid waste management in 2008 (Annepu and Themelis, 2013). Also, since all internally generated funds are deposited into one account there may be competition from other vital needs affecting the municipality concerning the use of the funds. This may be one of the reasons why the Assembly lacks logistics and certain vital infrastructure for SWM. Additionally, the Private sector and waste generators must assist the Assembly in terms of finance by paying for SWM services and through donations. Since the Assembly has the authority to raise additional revenue to finance SWM, a consensus must be reached through stakeholder participation to find appropriate avenues to increase the Assembly's financial capacity (Klundert and Anschitz, 2000)

On socio-cultural performance of Ga West Municipal Assembly in SWM, it is evident from findings that stakeholder involvement and coordination was low especially with the informal sector and most waste generators. This may be a reason why waste recovery rate by scavengers is very low, why ACARP operate under capacity and better still why door to door collection is still below average. This is because many studies have shown that stakeholder involvement and consultation is crucial for a successful SWM (Klundert and Anschitz, 2000; Oteng-Ababio, 2010; Oteng-Ababio, 2011; Annepu and Themelis, 2013).

The availability of an official complaint desk at the Environmental Health department vis-à-vis the presence of open dumps and indiscriminate disposal shows that law enforcement and prosecution of culprits who break bye laws are very low. One explanation for the present argument may be that people feel reluctant to report cases on indiscriminate dumping as nothing is done to culprits or that people see such indiscriminate disposals as "normal". The rule of law which is found to be relaxed in this study is recommended as a principal solution to environmental nuisance. Laws on environment and SWM if enforced strictly can help reduce indiscriminate dumping (Sarfo-Mensah *et al.*, 2019). Therefore, legally the Assembly needs to sit up, review and update its laws and make sure that these laws are put to work.

A review of sanitation policies in Ghana shows that Ghana has an Environmental Sanitation Policy with an associated DESSAP for the sound management of solid waste. Nevertheless, findings show that policies on SWM are not adequate. Possible reasons may be because policies are not suitable to all local situations in Ga West Municipal or there exists certain gaps in the policies. Even with the existing policies, their implementation

is always a problem, since many stakeholders are ignored particularly the informal sector and generators (Ahmadi *et al.*, 2013).

One problem affecting waste management policy and by laws implementation is lack of political will and this is the key challenge to ensuring sustainable waste management (Sarfo-Mensah *et al.*, 2019). This has become a major institutional stumbling block that greatly contributes to the present mismanagement of solid waste in Ga West Municipality.

In terms of organization capacity, the skilled manpower of the Environmental Health Department is low. This is consistent with what exist in Kumasi Metropolis (Sarfo-Mensah *et al.*, 2019). This may be because of low remuneration paid to workers, lack of political will to employ more skilled staff or the unattractiveness of SWM services to some competent personnel. Where personnel are inadequate it will be difficult to do a meaningful sanitation inspection exercise.

V. Conclusion and Recommendation

This study assessed the performance of Ga West Municipal Assembly in SWM. It explored the problems affecting the implementation of policies and law on SWM.

The survey established that

1. Solid waste collection rate was low and it was mainly centered on the urban areas
2. A greater proportion of collected waste was discarded.
3. Law enforcement was low and policies were inadequate.
4. Lack of political will, inadequate skilled staff and logistics are among the problems militating against the implementation of policies and law on SWM

From the findings, it is recommended that Ga West Municipal Assembly must be strengthened and well resourced to enable Environmental health officers to carry out their mandates of SWM efficiently. Operational funds, logistics, minimal political interference and qualified personnel must be provided to enable them to discharge their duties effectively.

Reference

- [1]. Agbesola, Y. *Sustainability of Municipal Solid Waste Management in Nigeria: A Case Study of Lagos*; 2013.
- [2]. Ahmadi, M.; Hashim, H. S.; Mohamed, A. F.; Moharamnejad, N. Toward Community-Based Waste Management: Tehran as a Case Example. *Middle-East Journal of Scientific Research* **2013**, *15* (8), 1102–1107.
- [3]. Annepu, R.; Themelis, N. J. Analysis of Waste Management in Accra, Ghana and Recommendations for Further Improvements. *New York: Earth Engineering Center, Columbia University* **2013**.
- [4]. Chen, X.; Geng, Y.; Fujita, T. An Overview of Municipal Solid Waste Management in China. *Waste management* **2010**, *30* (4), 716–724.
- [5]. Fei-Baffoe, B.; Nyankson, E. A.; Gorkeh-Miah, J. Municipal Solid Waste Management in Sekondi-Takoradi Metropolis, Ghana. *Journal of Waste Management* **2014**, *2014*.
- [6]. MLGRD; EHSD. *National Environmental Sanitation Strategy and Action Plan: Materials in Transition*; Ministry of Local Government and Rural Development and Environmental Health ..., 2010.
- [7]. Mwinkom, K. F. X. (2013). *URBAN SOLID WASTE MANAGEMENT AND THE ENVIRONMENT: THE CASE OF THE TECHIMAN MUNICIPALITY IN THE BRONG AHAFO REGION OF GHANA* (Doctoral dissertation).
- [8]. Oteng-Ababio, M. Private Sector Involvement in Solid Waste Management in the Greater Accra Metropolitan Area in Ghana. *Waste Management & Research* **2010**, *28* (4), 322–329.
- [9]. Oteng-Ababio, M. Missing Links in Solid Waste Management in the Greater Accra Metropolitan Area in Ghana. *GeoJournal* **2011**, *76* (5), 551–560.
- [10]. Puopiel, F. Solid Waste Management in Ghana: The Case of Tamale Metropolitan Area. PhD Thesis, 2010.
- [11]. Sarfo-Mensah, P., Obeng-Okrah, K., Arhin, A. A., Amaning, T. K., & Oblitei, R. T. (2019). Solid waste management in urban communities in Ghana: A case study of the Kumasi metropolis. *African Journal of Environmental Science and Technology*, *13*(9), 342-353.
- [12]. Service, G. S. *2010 Population and Housing Census Report*; Ghana Statistical Service, 2014.
- [13]. Van de Klundert, A.; Anshitz, J. The Sustainability of Alliances between Stakeholders in Waste Management. *UWEP/CWG* **2000**.

Prince Nii Koi Kotei. "Sustainable solid waste management in developing countries: a study of institutional strengthening for solid waste management in the Ga West Municipality, Accra – Ghana." *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, *14*(10), (2020): pp 28-34.