

Assessment of Household Solid Waste Management in Gombe Metropolis.

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Abstract

This study examines the household solid waste management practices and the role of agencies responsible for its management in Gombe. The research gathered data from two main sources: primary and secondary sources. The secondary data were obtained from the library and internet sources while the primary data were obtained from the household heads, field surveys and oral interviews of employees of relevant waste management agencies such as: Gombe State Environmental Protection Agency (GOSEPA), Gombe Local Government, Formal Private Contractor (Inex Cleaners Limited), Informal Private Operators, operating in high and medium income neighborhoods, CBOs and waste collectors. .. The study revealed that the socio-economic characteristics of the households in the study area have influence on waste generation, collection and disposal in terms of their educational levels, monthly income, households' family size etc. At the high and medium income neighborhoods such as G.R.A and Federal Lowcost the rate of waste generation is higher compared to the low income neighborhoods such as Ajiya and Kagarawal. This is as a result of the high income levels of the residents of the high and medium income neighborhoods in purchasing more items than the residents of the low income neighborhoods. The study also revealed that majority of the residents in Gombe dumps their wastes in open spaces, drainages and vacant plots. About 32% of the residents do not have their wastes collected at all most especially in the low income neighborhoods such as Kagarawal. The results also indicate that waste separation does not take place at both households' level and official dumpsites. The results indicated that the agencies in charge of solid waste management in Gombe were not efficient. This could be closely linked with the lack of equipments, trained manpower, and poor funding of these agencies and also the negative attitude of the households towards solid waste management. Based on these findings, the study recommended strategy options for efficient and effective management of solid waste in Gombe. These include community participation, payment for waste management, public-private partnership, adequate resourcing of waste management agencies, monitoring and supervisor, use of integrated solid waste management model, use of appropriate technology etc.

Keywords: Household, Strategic Options, Waste management, Solid waste, Agencies

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I. Introduction

Solid waste management has become a global problem especially in developing countries of the world. One of the major factors that directly contribute to solid waste generation is urbanization and population growth. World population reached seven billion in 2011 and continues to rise with projection nearing 9.3 billion by 2050 (UNFPA 2010). Urban areas are the most populous areas in the world, especially in developing countries, where people migrate from rural areas to urban areas in search of better life and employment (UNFPA 2011). This increase in population which is accompanied by unexpected and unplanned rapid urbanization on the one hand and economic growth in developing countries on the other, have accelerated the generation rate of municipal solid waste (Al-Khatib 2010, Awomeso 2010, Medina 2010, Zerbock 2003, UNEP 2005a). The amount of household solid waste produced daily is significantly increasing in the cities of developing world. While the capacity and effectiveness of municipalities in providing municipal solid waste services remains undesirably low, (UN-HABITAT 2003, Medina, 2010). This result in the inability of the municipal corporations of the developing countries to handle the increasing quantities of wastes generated. These uncollected wastes litter the streets, roads and public places, this inefficient management and disposal of solid waste is an obvious cause of degradation of the environment in most cities of the developing world (Rathi, 2005). In Nigeria for instance, it is not unusual to see heaps of garbage in the major cities littering the streets, dumped in drains, vacant plots, and water bodies and this has in many cases resulted in spread of communicable diseases. The situations appears to continue unabated due largely to the factors of urbanization, population growth, improved life style and insufficient funds to properly manage solid waste.

Gombe whose population has multiplied sixteen times since 1952, reaching approximately 300,000 today has been as a typical example representing many other fast growing towns. Such high population growth

rates of 6% results in a doubling of the population every twelve years (Balzerek 2001, 2003). This together with insufficient tools and equipment's for collection coupled with irregular collection of these wastes, improper disposal method, inadequate transportation and storage facilities, and lack of separation and treatment mechanism in place compound problems of waste management.

From the foregoing, the paper aims at assessing the Household Solid Waste Management practices in Gombe metropolis. The specific objectives are as follows:

- a. To identify and assess the strategies and processes of house hold solid management practices in Gombe metropolis.
- b. To evaluate the roles of agencies responsible for house hold solid waste management in Gombe metropolis.
- c. To make recommendations for the improvement of house hold solid waste management practices in Gombe metropolis.

II. Materials And Methods

The research gathered data from two main sources: primary and secondary sources. The secondary data were obtained from the library and internet sources while the primary data were obtained from the household heads, field surveys and oral interviews of employees of relevant waste management agencies such as: Gombe State Environmental Protection Agency (GOSEPA), Gombe Local Government, Formal Private Contractor (Inex Cleaners Limited), Informal Private Operators, operating in high and medium income neighborhoods, CBOs and waste collectors. ... The

MEASURES FOR PERFORMANCE ASSESSMENT

Solid waste management assessment is undertaken to measure performance of a scheme with the main aim of improving existing strategy and practices (Anschutz, 2004). The approach will be that of assessment of the institutional aspects of the solid waste management framework. The evaluation indicators as set by Schubeler et al (1996) is adopted to provide a general impression of the institutional structures, arrangements for solid waste management as well as organizational procedures and the capacity of responsible institutions.

Effectiveness

Schubeler, *et al.*, (1996) defined effectiveness in service outcome as the degree to which stated objectives are achieved. Stakeholders' direct or indirect involvement may result in a better match between what users want and what providers offer (Schubeler, 1996). Solid waste services are considered effective if there is safe removal of all the wastes generated. Effective solid waste collection produces health related, economic and environmental benefits, among others (Klundert and Anshutz, 1995). For households, effectiveness is related to the extent to which service delivery corresponds to the real needs and demands of society. Solid waste management

III. Results And Discussions

OVERVIEW OF SOLID WASTE MANAGEMENT IN NIGERIA

Waste management is a growing public concern in Nigeria. In many cities of the country, waste management is poor and solid wastes are dumped along roadsides and into open areas, endangering health and attracting vermin. In Nigeria, there is a steady increase in waste quantity and variety due to population growth and industrialisation (Imam *et al.*, 2007) while the basic solid waste management system based on collection, transportation and disposal remains highly inefficient and ineffective, especially in the urban centres (Ayotamuno and Gobo, 2004). Nigeria is the most populous and the tenth largest country in Africa with a population of over a hundred and fifty million people across a landmass of 923,768 square kilometres (WDI, 2010). Statistics show that the population growth rate of Nigeria as at 1991 was 3.0% and an urban growth rate of about 5.5% per annum, while the average waste generation rate is put at 0.49 kg per day. Urban centers in Nigeria has also witnessed a steady rise in waste generation due to urbanization and increase in population, for instance Abuja the nation's capital generates between 0.55-0.58 kg of waste per person per day, and Lagos state one of the most populous cities in the world generated 4 million tons of waste in 1995 and by year 2000, the quantity of municipal solid waste generated in Lagos metropolis alone was estimated to have increased to 998, 081 tons while Minna the Niger state capital generates about 90 tons of solid waste per day among others. These have put enormous pressure on the ability of the public sector to collect all the wastes generated. Currently, the level of solid waste collected in Nigerian cities averages between 30-50 percent of waste quantities generated (UNSN, 2001). As a result, a large proportion of the solid waste generated remains uncollected. Large parts of the cities, particularly, the low income areas receive little or no attention of the public sector. The fundamental deficiency of the solid waste management is attributed to government's failure to assume basic responsibility in raising sufficient funds to provide acceptable levels service (Onibokun and Kumuyi, 1999; Ajadike, 2001). While all the waste generated in developed countries are collected, in the developing countries, most of the

waste produced are not collected (Cointreau, 2006). For cities to be relatively clean, at least 75 percent of the waste should be collected (UNDP, 2005).

SOLID WASTE MANAGEMENT IN GOMBE

Over the years, solid waste disposal has become a major problem in the town. Therefore, indiscriminate dumping, irregular collection of waste generated and inadequate resources are the key problems facing solid waste management in Gombe. In Gombe, the authorities entrusted with the task of collection of waste generated per day, collects less than half of the waste generated in many part of the town. This leaves a backlog tons of waste uncollected a day. This has resulted in littering, heaping of waste and overflowing of skips with waste in the town most especially in the low income neighborhoods and peri urban areas such as Ajiya, Bajoga, Bolari, Dawaki, Kagarawal and Shamaki, etc.

Categories of Solid Waste Generation in Gombe

With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly particularly in developing countries and its composition changing. In Gombe the following types of wastes and trash are generated. The biodegradable includes food and kitchen waste such as meat trimmings, vegetable peelings, papers, etc and the non-biodegradable items such as glass, tin, plastic bottles, other plastics etc. These particular wastes are common in the residential areas.

Administrative Framework

Waste management in Gombe town is been handled by both formal and informal sectors. The trend of solid waste management has been administered at different levels of government by different establishments, agencies and parastatals as follows;

Gombe State Ministry of Environment: - Through GOSEPA is primarily in charge of setting up guidelines for solid waste management in the state, environmental quality standards and related penalties and fines, and ensuring compliance for pollution control. It is also responsible for the overall policy formulation, implementation, monitoring, inspection and prosecution of defaulters of all environmental offences throughout the state.

Gombe State Environmental Protection Agency (GOSEPA):- Established by edict No. 3 of 1997 and came into force on 10th June, 1997 to take over and replace the activities of the defunct task force on Environmental Sanitation. Till date, GOSEPA holds the responsibility of solid waste management in the state. But with increase in complexity and volume of waste generation and to improve the sanitation condition in the state, the Gombe state government entered into public-private partnership based on contract with Inex Cleaners Limited. The partnership is on collection, transportation and disposal of the solid waste generated in the town.

The Community Based Organizations (CBOs):- Carried out sanitation services at monthly intervals and usually involve evacuation of waste block and public drains evacuation.

Informal Private Operators: - Unregistered operates within the low and medium density areas like the G.R.A and Federal lowcost. Collection of waste by these operators depends on the income of the owner of the waste to be able to pay the amount charged.

Stakeholders Involved in Solid Waste Management in Gombe

Solid waste management is a complex task, which depends as much upon organization and cooperation between numerous public and private sector actors as it does upon appropriate technical solutions. Thus, a wide range of individuals, groups and organizations are concerned with SWM as service users, service providers, intermediaries and/or regulators.

Administration Enforcement, Monitoring and Compliance Zonal offices Waste Mgt. and Sanitation

The stakeholders involved at Federal level include National Environmental Standards and Regulations Enforcement Agency (NESREA), Federal Ministry of Environment (FMOE), Federal Ministry of Environment, Housing and Urban Development (FMEHUD) and at the state level Gombe State Environmental Protection Agency (GOSEPA), Gombe State Ministry of Environment and Gombe Local Government.

The Community Based Organizations (CBOs), service users (Households), the formal private contractor like Inex Cleaners Limited and the informal private operators also partake in solid waste management.

SOLID WASTE MANAGEMENT STRATEGIES

Solid Waste Management involves managing activities associated with generation, storage, collection, transfer and transport, processing and disposal of solid wastes in an environmentally compatible manner with due considerations of the principles of economy, aesthetics, energy and conservation. For an urban center with

rapid urban migration, poor solid waste management practices are considered as disastrous. Solid waste management strategies can be broadly classified into three groups, viz; the public sector, the private sector and the community sector. Each of these stakeholders is seen as enjoying a comparative advantage in the performance of certain roles, as outlined below: In Nigeria there are two major approaches to waste management. They are private and public arrangements. The private system is a contractual arrangement between an individual or group of persons who undertake waste disposal as a business venture and the waste generator. This system is common among the high and medium Income households who can afford the charge. The public system is more conventional. This is a situation where government establishes a waste disposal agency whose responsibility it is to collect waste from waste generators and dispose them at disposal depots. Some cities adopt the combination of the two systems particularly when the public system is ineffective to cope with the volume of waste generation; the private system is adopted to compliment the efforts of the public arrangement. This hybrid arrangement is quite common in Nigerian Cities such as Enugu, Port Harcourt, Aba, Owerri, Ibadan and Kano (FMHE, 1983). The hybrid system has many attributes which support its adoption. While the public system is under state government control and supervision, the private system, because of its profit motive tries to offer satisfactory service so as to get more customers and enlarge its area of operation. This motive in turn ensures that efficiency is maintained (Omuta, 1988).

The Public Sector

This sector comprises of Government institutions that are directly or indirectly involved in providing and managing urban infrastructure services. The major role of this sector as seen by Schuttenbelt, *et al.*, (1994) is "... to create competitive pressures for more effective and efficient service delivery..." it should, further "...enable, facilitate, regulate and monitor partnership arrangement." In most cities of the developing world, solid waste management is the responsibility of the municipal government, but because service delivery is inefficient, initiating other strategies has been a common practice. The limitations to this strategy are weak incentives for efficient resource use because the operators lack authority in accessing or collecting solid waste user charges. Such operators depend on the municipality to finance the majority of their operations. Solid waste management is generally accorded a low priority in collection coverage and has low percentage of local government budgets, low public awareness by the local councils, complete absence of professional management staff and poor management practices. Therefore, government remains the most important partner in urban facilities management not only in the convectional of approaches but also in the participatory management practices.

The Formal Private Sector

This sector involves the organized private sector partaking in waste management activities. This sector has access to financial resources more readily and the potential ability to operate more efficiently, (Schuttenbelt, *et al.*, 1994). The private sector is capable of playing a role in financing and providing certain infrastructural services that provides for and coordinate effective waste management strategies so as to safeguard the human living and working environment (Adebola, 2006). The privatization of certain infrastructure services is seen as the key to reform and the solution to urban infrastructure provision problems. Given their potential for lower production costs improved efficiency in service delivery and greater capacity to maintain capital equipments, private enterprises have advantages over governmental agencies. Privatization of solid waste management is increasingly becoming attractive to governments in developing countries, where most municipal budgets go on waste management (Schubeler, 1996).

IV. Summary Of Findings

Based on the analysis of the data, the following are the major findings:

a) Solid Waste Management Practices at Household Level

Proper handling of waste at households' level constitutes the first step to effective waste management. Therefore, waste handling practices at the household level in Gombe is improper. This is as a result of indiscriminate dumping of households waste within the neighborhoods most especially in the low income neighborhoods such as Ajiya and Kagarawal where there are few or no official designated collection points. Therefore, residents of these areas resort to the use of open ground for storage, dumping of waste in open spaces, drainages and vacant plots. Burning in order to reduce the quantity of waste generated. Furthermore, there is no waste separation at the point of generation within households as all the components of waste are stored together in one receptacle. The house to house collection system by the formal and informal private operators is more accessible to households than the communal depots method by the public sector.

b) Role of Agencies Responsible for Solid Waste Management in Gombe

The Gombe state environmental protection agency (GOSEPA) is the agency vested with the responsibility of handling solid waste management in Gombe. Despite effort to tackle this problem, still heaps of these wastes are

clearly seen all over the town thereby making the city dirty. This shows that the agency has not been able to tackle the problem of solid waste within the town.

Poor funding of the agency is one of the main reasons for irregular collection and disposal of waste in Gombe. Lack of funds has forced the Gombe State environmental protection agency to maintain few staff on a permanent basis. The waste management fee is insufficient to cover for waste management. Therefore the agency does not have adequate capacity to handle the increasing solid waste mainly due to limited budgets. The existing equipments for solid waste management were grossly inadequate in comparison with the population of the study area.

Lack of manpower and trained staff to run solid waste management programme in Gombe, the Gombe State Environmental Protection Agency (GOSEPA) is currently understaffed and the staffs are poorly trained workers. Majority of the GOSEPA staff have little or no functional background or training in environmental management issues, so the operations result is ineffective and inefficient solid waste management. Also, there is no reliable measurement of generated waste within the study area.

The private sector is not fully involved into the management system as there is only one contracted private firm, that is the Inex Cleaners Limited and the role of the informal sector has not been recognised by the agency responsible for solid waste management in Gombe.

Waste collection and the disposal by the formal and informal sectors, and CBOs are in response to the low performance of the public sector. These sectors are engaged by the household for collection of waste at a price while the CBOs generally are involved in environmental cleaning and sanitation. Though there is remarkable improvement in the collection, especially recyclable materials but the level of collection still remain low than the level of generation.

The increasing uncooperative attitude of the households toward waste management practices, most especially in the low income neighborhoods as shown in plate 1 and 2.

There is no public awareness and enlightenment campaigns as regards to the dangers of poor waste management practices.

Inadequate and inappropriate siting, design, operations and maintenance of collection points and disposal sites as the final disposal method is open dumping without proper treatment and landfill procedures.

Therefore, the overall performance assessment of the agencies responsible for solid waste management in Gombe was not efficient.

V. Recommendations

Based on the findings of this study, the following strategy options were recommended for efficient and effective management of solid waste in Gombe. This will include the following:

- a) **Community participation:** There should be actively community participation and involvement of community based organizations in solid waste management since Gombe has few community based organizations. It is recommended that the government should encourage participation through involving the residents and CBOs in decision making on solid waste management process. Also, Non-Governmental Organizations should be more involved in the planning and execution of solid waste management in the state.
- b) **Payment for waste management:** The low income neighborhoods such as Ajiya and Kagarawal should be made to pay for disposing their waste. Also, generators should be made to pay for solid waste collection charges.
- c) **Pay as you throw principle:** This should be introduced but these should be done through education by letting residents know the importance of environmental cleanliness and how they can contribute to it. This will go to support the financial base of the waste management agencies.
- d) **Public-private partnership:** The private sector should be actively involved; Informal waste collectors can be incorporated into public-private partnership as government alone cannot provide the necessary funds to tackle solid waste management in the area. Yet, the presence of informal sector remains un-integrated into the formal waste management system in Gombe. Therefore, there is need for the government to regulate and register the activities of the informal sector. They should be involved in collection activities, waste recovery and supply of recovered materials for recycling and street sweeping.
- e) **Adequate Resourcing of Waste Management Agencies:** The waste management agencies such as GOSEPA should be adequately resourced in terms of funding, personnel and equipments by the Gombe State Government to ensure efficient and effective waste management in the area.
- f) **Monitoring and Supervision:** There should be regular monitoring and supervision of agencies by GOSEPA to determine the extent of coverage, frequency of collection, rate of collection and safe disposal.
- g) **Use of Integrated Solid Waste Management Model:** This should be adopted to ensure efficient and effective solid waste management in the area. Residents should be encouraged to separate the waste generated into their various components before final disposal. Waste can be disaggregated into plastic, metals, cans, bottles and food waste. In this case rubber cans, bottles, metals can be reused; plastics like polythene bags and

empty water sachets can also be recycled. The rest like food waste can be composted for manure, incinerate those that are combustible and land filled those that cannot be subjected to any of the above mentioned methods.

h) Use of Appropriate Technology: The GOSEPA disposal sites should be provided with sanitary landfill facilities to avoid open dumping and open burning. The Inex Cleaners landfill site should be upgraded and properly designed in accordance with environmental standards. These include the weighbridge, gas recovery system and leachate collection system. Perhaps it is necessary for the government to device improved techniques for solid waste management.

VI. Conclusion

The study revealed that as a result of population growth, waste generation is higher than collection which leads to waste accumulation overtime, thereby, degrading the environment. Disposal in open space, drainages and vacant plot remains the most commonly used method of waste disposal and waste collection is irregular and non collection in some areas especially in the low income neighborhoods. Waste collection is constrained by lack of equipments, trained and skilled manpower, coupled with poor funding of agencies involved in solid waste management. Wastes are not treated before disposal at the final dumping sites. Waste minimization and recycling has not gone beyond the practice of picking and sorting through heaps of refuse or garbage by the informal waste collectors. Waste sorting does not take place at both household level and official dumpsites. Payment for waste management services is not popular in the low income neighborhoods as residents display varying attitude towards the issue and negative attitudes of the populace towards waste collection and disposal. It is however important to educate them on the importance of paying for waste management services and in keeping their environment clean as it will facilitate the process of solid waste management.

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