

ENHANCING SOLID WASTE COLLECTION AND TRANSPORTATION FOR SUSTAINABLE DEVELOPMENT IN THE IBADAN METROPOLIS, NIGERIA

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ABSTRACT

This paper assessed solid waste collection and transportation activities in Ibadan, Nigeria, and the associated challenges with a view of providing a sustainable solution to waste management problems in the city. An intensive literature search, key informant interviews (KIIs), in-depth interviews (IDIs) and on-site observation checklist were used for data collection. The KIIs were conducted with the Oyo State Waste Management Authority, Agodi, Ibadan and the heads of the scavengers at four dedicated dumpsites in Ibadan. In addition, IDIs were widely conducted with the residents and private waste collectors in both low- and high- density areas. There were 400 registered private refuse companies licensed by the government to complement the efforts of the state government and 244 street sweepers to sweep the city on daily basis. However, despite the efforts of both actors, substantial quantity of solid waste remained on the streets to be collected and transported to designated dumps. There was communication gap between the residents and waste management actors. This was a main factor undermining effective waste collection and transportation, thereby inhibiting litter-free environment in the city. Respondents believed that effective communication on solid waste management issues would provide a long lasting solution to waste management problems in the city. The paper recommended the integration and collaboration of all the stakeholders through broad-based sensitization and communication of effective and sustainable waste management in Ibadan. This should be conceptualized under Information, Education and Communication (IEC) strategies, integrated solid waste management approach and community participation. This holistic approach can be adapted for effective and sustainable waste management in any part of the country.

Keywords: Community participation, Effective communication, Solid waste management, Street sweepers.

INTRODUCTION

After independence, more than five decades ago, Nigeria is still battling with the problem of municipal solid waste (MSW) collection. Different approaches were made in the past without success. Viewing the problem from several perspectives, Hammed (2013) considers the magnitude of the impact of poor waste collection and management on the political, institutional, social, financial, economic and technical development of the country. Research has also shown that poor waste management has significant impacts on the socio-economic development of an area, pollution of drinking water sources, increased treatment cost of water supplies, demoralization of people, excessive stress on the health budget, environmental degradation, competition for scarce resources and creation of hideout for miscreants who indulge in hemp smoke and other practices (Hammed et al., 2012). Such scenarios can also prevent foreign investors from promoting businesses in the country.

Ibadan residents generate waste at the rate of 0.51 kg per person per day (Ogwueleka, 2009). The recent trend is dumping of waste on the road medians and is increasing daily. More and more waste collection vehicles are being imported by the government, drivers and maintenance staff are trained abroad, and yet no solution is found. Despite the huge amounts of money expended by the Oyo State Government and the 11 local government areas in Ibadan on waste management, solid waste is not collected adequately and in a sanitary manner. The current waste collection practice has failed to solve the persistent problems of environmental sanitation, poverty eradication, resource conservation, unemployment and community development. The manner in which people daily dump MSW on the road every day, in storm water during rain and at any convenient point is posing a serious threat to the sustainable development of the city. Waste dumped on the road medians by the residents continues to increase in volume day after day. This can lead to public health and aesthetic problems in the overcrowded communities. In order to avert similar problems in Lagos State, Nigeria, the Lagos State Government has taken a novel step in buying recyclable wastes from residents for recycling and composting activities. The programme is being operated jointly through private operators, scavengers and the waste vendors. However, the community members who are the waste generators are minimally involved and this might affect the success of the programme.

For solid waste management efforts to be successful, involvement and participation of the citizens is necessary. Citizens' participation can be effective only if they are fully informed of the various activities and policies geared towards riding the environment of waste. That is why waste management agencies in both developed and developing countries usually develop approaches to achieve effective communication of their waste management activities to the citizens. This paper describes the current practice of waste collection and transportation in the city of Ibadan, Nigeria and suggests holistic approaches in communicating solid waste management policies and strategies for efficiency and effectiveness. It also describes in detail a conceptual framework for policy-makers and other stakeholders involved in the city's waste collection, transportation and management.

LITERATURE REVIEW

Studies have revealed that there are several factors that contribute to the solid waste management problem: management factors, inadequate provision of facilities for waste management and ineffective approach to carrying out waste management (Zia and Devadas, 2007); low-skill workers (Ayotamuno et al., 2004; Khalil and Khan, 2008); financial constraints and inadequate transportation facilities (ESESA, 1998; Ayotamuno et al., 2004; Asase et al., 2009); and inadequate law enforcement and lack of monitoring and supervision of the activities involved in waste management (Khalil and Khan, 2008). According to Ogwueleka (2003), local authorities in developing countries spend 77-95 % of their revenue on collection and disposal, but can only collect 50-70 % of MSW. Previous studies have also attributed MSW collection, transportation and disposal problems to lack of institutional arrangement, absence of bylaws and standards, inflexible work schedules, insufficient information on quantity and changing nature of waste (Ajani, 2007; Babayemi and Dauda, 2009; Ogwueleka, 2009). In addition, the culture of the people, social and political factors (Ishaq, 2004), inappropriate technology (World Bank, 1992) as well as personnel and administrative factors (Onibokun and Kumuyi, 2003) also play significant roles.

Hammed et al. (2011) demonstrated a direct correlation between socio-demographic factors and community waste collection practices. Age, educational status, type of marriage and

occupation were identified as factors influencing solid waste management in highly populated cities, like Ibadan. The results were corroborated with similar studies conducted by other researchers (Vining and Ebreo, 1990; Eddie et al., 2009). Poor refuse collection will encourage fly-breeding and result in faeco-oral infections, like diarrhoea, dysentery, typhoid, balantidiasis, cholera and salmonellosis (Ishaq, 2004). Efficient recycling and composting could save 18.6 % in waste management costs and 57.7 % in landfill cost (Agunwamba, 1998).

METHODOLOGY

Description of the Study Area

Ibadan is the capital city of Oyo State and the third largest metropolitan area in Nigeria by population, after Lagos and Kano according to the 2006 Nigerian census. It has coordinates of 7°23'47"N and 3°55'0"E and a total area of 3,080 km². Ibadan has a tropical wet and dry climate, with a lengthy wet season and relatively constant temperatures throughout the year. Ibadan's wet season runs from March to October, though August seems somewhat of a lull in precipitation. This lull nearly divides the wet season into two different wet seasons. The remaining months forms the city's dry season. Like a good portion of West Africa, Ibadan experiences the 'harmattan' between the months of November and February (Areola, 1994).

Data Collection Procedure

An intensive literature search, key informant interviews (KIIs) and on-site observation checklist were used for data collection. The KIIs were conducted with the officials of Oyo State Waste Management Authority (OYSWMA) and the heads of the scavengers at the four dedicated dumpsites in Ibadan. In addition, in-depth interviews were conducted with randomly selected residents and private waste collectors in both low- and high-density areas. All the instruments were designed to comprise questions relating to the existing waste collection practices, procedures of waste collection and transportation, appropriateness and effectiveness of equipment used, and challenges being experienced.

RESULTS

There were three institutions charged with the responsibility of overseeing the environment of Ibadan. The OYSWMA is the statutory body under the Oyo State Ministry of Environment and Habitat that was established by the state government to undertake waste collection, processing and disposal in the city. As at the time of this study, there were 400 registered private refuse companies that licensed by the state government to evacuate waste, particularly in the low density areas of the city. There were also 244 street sweepers to sweep all the fourteen dual carriageways within the city on daily basis. However, all the efforts by the different actors saddled with the responsibility of managing waste in the state have not been translated into much success, as shown in Figure 1. The residents of Ibadan generate 485 860 260 kg of solid waste annually in the city with only 10 % of this being evacuated (OYSWMA, 2012). The rest find their way into streams and river channels, open spaces, road medians and side drains, and other unauthorized places (OYSG, 2011).



Figure 1: Waste collection scenarios in Ibadan

Findings revealed that solid waste that was being collected in Ibadan by both the OYSWMA and registered private contractors. With regard to the staff strength, OYSWMA has 20 security guards, 60 waste vehicle drivers and 40 waste collection crews. In 2011, 559 Yes O cadets were recruited to supervise waste collection in the state. However, their employment could not be sustained owing to lack of fund to finance their wages. In less than a decade, more than 100 vehicles were procured by the state government which included: 8 Goliath skip eaters (Figure 2), 20 RO-RO bin vehicles (Figure 3), 3 long trucks, 12 compactors and some tippers. Most of these vehicles were grounded at various dumpsites in the city. Lack of proper maintenance, lack of spare parts and poor technical know-how were among the reasons adduced by the officials for the breakdown of these vehicles. It was observed that 60 % of the existing trucks were always out of service at a given time, resulting in inefficient and ineffective waste evacuation and disposal.

Uncontrollable and regular recurrence of solid waste at several illegal dumpsites after evacuation was a major setback and challenge to effective waste collection and transportation, as claimed by the respondents. Residents did not use the skip bins provided by the government. Therefore, the bulk of the waste generated in Ibadan was not collected. People were fond of dumping in streams or in open places early in the morning, while waste collection took place later in the day, making the supervision very difficult. Owing to bad road networks and, sometimes, traffic congestion in the city, each waste vehicle could not make more 3-4 trips per day. Apart from the high cost of maintaining the vehicles, fuel expenses and salaries of the waste collection crews put extra financial burden on the cost of waste collection, as 4 to 5 workers were allocated to each vehicle. The in-depth interviews also revealed communication gap between the residents and waste management actors, including the government and private collectors. Asked for what they considered as a solution to the challenges, the respondents argued that effective communication on solid waste

management issues would provide a long-lasting and sustainable solution to waste management problems in Ibadan.



Figure: Goliath skip eaters depositing waste at Ajakanga Dumpsite



Figure 3: Roll on- Roll off (RO-RO) transporting waste to Afonfura Dumpsite

DISCUSSION

An Overview of Solid Waste Collection Practices in Ibadan

Waste management problems, most especially waste collection from inner core of cities, is not peculiar to the peri-urban area of Ibadan. In a study carried out in Onitsha, Agunwamba et al. (2003) observed that 60 % of trucks available were always out of service at any given time and the few available trucks broke down frequently owing to overuse. Dauda and Osita (2003) revealed in their study that the Borno State Environmental Protection Agency (BOSEPA) had a total of nine vehicles in Maiduguri (seven tippers, one loader and one gully emptier) out of which only four tippers and one loader were functioning. Owing to bad road networks, vehicle ran three to four trips per day in Ibadan, which is better than the two trips reported in Onitsha, Lagos and Benin (Ogwueleka, 2009). In another study carried out by Ogwueleka (2004) in Makurdi, Nigeria, it was found that reduction in waste collection crew size resulted in saving of 32.69 % of the collection cost. Also community participation in waste segregation and reuse can offset enormous cost incurred on waste management (Hammed et al., 2012). A major finding of this study was that community people were not involved in MSW management in Ibadan owing to ineffective communication. According to Zahra et al. (2012), awareness campaign had a highly significant impact on the mindset of people. Lilliana et al. (2013) aver that communication between different stakeholders is of high importance in order to get a well-functioning waste collection and transportation system in the cities in developing countries.

Conceptual Framework for Effective Communication in Solid Waste Management

A conceptual framework for communicating solid waste management in Ibadan is presented in Figure 4. For any communication to be effective, it has to generally address all the issues that directly or indirectly affect the management of solid waste, especially collection and transportation. Since communication cannot take place in a vacuum, the cardinal points of the

communication including the target people to whom a message is communicated (who), the message itself (what) and the strategies of communication (how) and so on should be considered. However, there are no definite communication techniques applicable to all situations; they vary from place to place according to their specific problems, cultures and social set-up. Each component is discussed in the following paragraphs in line with the current situation and the prevailing environment in Oyo State.



Figure 4: Conceptual framework for effective communication of solid waste management in Oyo State
(Source: Authors)

1. **Who:** This mainly comprises the audience that receive the solid waste management information. They are waste generators that need positive behavioural change towards waste management. The following four levels of intervention, as described by London Borough of Lambeth (2011), are identified for effective solid waste communication in Ibadan:

- Household
- Community
- Local council

- Institutions.

Community entry activities at all local government areas (LGAs) can start from the Department of Community Development Inspectorate (CDI) at each LGA. Here, the list of all community development associations (CDAs) in that area and other relevant information will be obtained. Each CDA has landlords and landlords as its members; therefore, reaching households to sensitize them for participation in waste management will not be a constraint.

Solid Waste Management is an activity in which volunteerism and public participation are the keys to success. It is not only the technology but also public attitude and behaviour that are going to make the difference. A minimum participation of the community is required in putting the garbage by the street to be collected in a proper way at the right time (Fatin, 2011). There are numerous case studies in developing countries that has proven that community participation in waste management plays a vital role in contributing to the success of the services provided (Poerbo, 1991; Ogu, 2000; Mongkolchaiarunya, 2005; Rathi, 2006; Sujauddin et al., 2008).

2. What: This concerns the content of the information to be passed across. That is, all aspects of waste management, including: (i) adoption of the 4R concept-reduce, reuse, recycle and recovery; (ii) storage and segregation at source; (iii) awareness creation on the ill effects of poor solid waste management such as health hazards, aesthetic damage and environmental issues; and (iv) capacity building of community people on the various technical options (including conversion of wastes to resources).

3. How: This deals with the methods to be used to convey the information. In making the people in various communities in Oyo State aware of municipal solid waste management practices, an approach that has been recently developed and is seen to be very effective is Information, Education and Communication (IEC). According to the London Borough of Lambeth (2011), IEC is a process of working with individuals, communities, and decision-makers to develop communication strategies to promote positive behaviours which are appropriate to their culture and social/community behaviours. The IEC combines all suitable strategies, approaches and methods that enable individuals, families, groups, organizations and communities to play active role in achieving, protecting and sustaining the desired behavioural change. As no single method is suitable for all situations, any of the following strategies/channels or their combinations may be adopted in communicating solid waste management in Ibadan: sensitization workshop; radio talk; school rallies; interpersonal communication (IPC) along with posters, leaflets, print media and electronics media; use of public transport; incorporating the concept of SWM in school curriculum; exhibition, lecture series; panel discussion; and group/community meeting.

Megaphones need to be mounted on compactor trucks to relay waste management messages to the residents during garbage collection. Public transport buses (popularly known as Ajumose) need to be branded with useful information that triggers positive behavioural change of community people. The activity should also encompass sensitization workshop for community leaders on SWM. This is aimed at requesting community leaders to disseminate the information in their communities. The workshop can also be used to identify volunteers dedicated to the cause of municipal solid waste management (MSWM) who would be very useful for IPC and act as waste management ambassadors to ensure a waste-free community. The community leaders and volunteers will deliver the message to each and every household and take their feedback. Involvement of educational institutions in organizing school rallies, essay competitions and so on is also important.

4 Action: This explains what is currently needed to be done to achieve positive results in solid waste management in the city. Any action to be taken requires strategic planning to review: where we are now (the present condition of waste management in the city); what we need to do (vision and mission); how we will get there (strategy and action) and how to stay there (sustainability). The present strategies and action, which can be adopted to enhance waste management in Ibadan, is Integrated Solid Waste Management (ISWM) that is complemented with IEC.

5 Outcome: This fifth stage of the framework reveals whether the vision and mission of waste management is met as well as performance and effectiveness of strategies adopted for communicating solid waste management in the city. This is a report to be prepared against progress in achieving the identified objectives with all stakeholders, including target audience, to increase transparency and long-term engagement in the process. It allows flexibility and opportunity for improving the system through monitoring and control activities. The following are expected as yardsticks to measure the outcome of the communication strategy: change in knowledge, change in attitude and change in practice.

CONCLUSION

The current waste collection and transportation practice in Ibadan has failed to solve the persistent problems inherent in municipal solid waste management. A new plan that would ensure that the citizens are made aware of their roles in achieving clean and healthy communities in Ibadan were discussed in this paper. Three major strategies and approaches recommended for adoption to achieve effective and sustainable solution are: Information, Education and Communication strategies, Integrated Solid Waste Management approach, and community participation. The combination is imperative and forms a holistic approach that is necessary for effective waste management in the city of Ibadan, as no single approach can work in isolation.

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