The impacts of household waste disposal in Nigeria. Case study of Ibadan, Oyo State.

ABSTRACT

Household waste management is drawing increasing attention, as it can easily be observed that too much garbage is lying uncollected in the streets, causing inconvenience, environmental pollution, and posing a public health risk. There has been an increasing concern about the environment in which man lives. Solid wastes, mount of rubbish, garbage and sewage are being produced everyday by our urban society. In an attempt to dispose of these materials, man has carelessly polluted the environment. The amount of waste generated by humans has grown steadily in relation to our population and our economy. The postwar period of the 1950s saw a dramatic increase in economic activity in the industrialized world. Cheap plastics and aluminum revolutionized packaging and made possible a whole range of throwaway products and packaging. Since then, technology and growth have helped push the economy forward even further. With economic growth, consumption increases and everything consumed eventually becomes waste.

Geographical characteristics of Ibadan

Ibadan, at long. 7°2' and 7°40'E and lat. 3°35' and 4°10'N, was founded in 1829. It was initially occupied by immigrants, who moved into the city in search of security from intertribal wars. It is now the largest indigenous city in tropical Africa and is the capital of Oyo state, one of the 30 states in Nigeria. As the crow flies, it is 128 km northeast of Lagos and 345 km southwest of Abuja, the federal capital.

The city has grown particularly through the establishment of certain institutions and the construction of roads and the railway line. The convergence of the two major trade routes (through Ijebu and Abeokuta) on Ibadan, coupled with the arrival of the railway, accelerated the growth of the city. European traders were attracted and granted leasehold to land in 1903. Today, five primary roads and an expressway from Lagos radially converge on Ibadan from different directions. Most of southwestern Nigeria (excluding the Lagos area) is its hinterland for the procurement of specialized goods and services.

Since its founding the city has had rapid growth, both in area and in population. Developed land increased from only 100 ha in 1830 to 12.5 km2 in 1931, 30 km2 in 1963, 112 km2 in 1973, 136 km2 in 1981, and 214 km2 in 1988. Similarly, in 1856, the population was estimated at 60 000; by 1890, it had increased to about 200 000; in 1963, it was 625 000; and today, it is almost 2 million (NISER 1988).

The major sources of employment are, in descending order of importance, retail trade, public administration, service and repair industries, and education. (CASSAD 1994).

I.   INTRODUCTION

It is generally agreed that enormous quantities of household waste are generated in Ibadan daily, the exact figures have not been determined, probably owing to the use of diverse methods of calculation. Maclaren International Ltd (1970) found that the average per capita quantity of household waste generated was 0.37–0.5 kg/day for the traditional areas of the city and 0.53 kg/day for the newer areas.

Oluwande (1983) estimated the average household waste generated and its mean production rates per head for three distinguished areas of Ibadan: 0.420 kg/day in the GRA; 0.377 kg/day in outlying areas; and 0.35 kg/day in the old city.

According to Egunjobi (1986), 38 million kg of household waste was collected in the suburbs of Ibadan in 1986. The suburbs constitute about 21% of the city. On this basis, it can be estimated that 181 million kg of household waste was generated in the city as a whole in 1986. This gives a per capita waste-generation rate of 0.31 kg/day, using the 1986 estimated population of 1.6 million for the city. In 1982, PAI Associates recorded the

volume and weight of household waste generated per household per day in Ibadan. The study revealed that waste generation varied according to land use, with residential land use taking the bulk of the share. The generation rates were 3.4 kg/household per day in the traditional areas, 3.2 kg/household per day in the newer areas, and 3.3 kg/household per day in the whole city (altogether giving a per capita generation rate of 0.33 kg/day). The household waste composition in Ibadan comprises leaves, paper, food waste, tins, glass, and rags (Maclaren International Ltd 1970).

The environment is very crucial to the existence of every creature, just as it serves as a place of abode to any creature; it also contributes to a large extent to the quality of life of such creature (Oreyomi, 2005). The failure of the numerous efforts to address the problem of environmental health hazard in developing nations has been attributed to various factors like; unhealthy socio-cultural practices, poor environmental sanitation education and awareness, low literacy level, bad governance, disregard to the rule of law and other forms of indiscipline (Omotosho, 2005).

Household Waste Management entails the collection, storage, transportation, treatment and disposal of waste in such a way as to render them innocuous to human and animal life, ecology and the environment generally. Household Waste Management poses serious danger to the handlers. Records have shown that man has suffered in no small way from diseases associated with household wastes and contamination of the subsurface water by the leachate from household wastes which are heavily laden with toxic chemicals and pathogenic organisms which contaminate the water and makes it not fit for human consumptions (Adedibu, 2008). Waste management is at its lowest ebb in most towns and communities in Nigeria; most parts of the city centers do not benefit from public waste disposal services and therefore have to bury or burn their waste or dispose it haphazardly. Other hazards, like flooding ensued from collected but poorly disposed wastes, especially in the open dump sites. The situation becomes worse in the rainy season as the wastes get directly exposed to the rain; the water makes the waste wet and it drains out, thus polluting the streets and nearby stream or block storm-water drains and thereby causing flooding. All these health and environmental hazards have been witnessed continuously by the study area for almost 20 years without a tangible measure to forestall and curtail the menace.

Waste management approachs

Many approaches to waste management exist. Generally, solid waste in Ibadan is managed through economic instruments, landfills, incineration, recycling or reuse. The antecedent condition for the effective application of all these tools is that which is central to many discussion concerning sub-Saharan progress good governance. Broadly defined, good governance refers to the successful management of community affairs through the mixing of private, public, and voluntary actors. (Stoker, 1998) Good governance encompasses visionary leadership. It incorporates legislated bye laws. It enforces fines and punishments when those laws are disregarded. A thorough discussion of Accra's governance would necessitate a detailed retelling of Ibadan's political history. For the purposes of this paper the reader should consider good governance as a potential moderator for each of the approaches discussed. Bad governance will weaken the approaches. Good governance will bolster the approaches. The relationship is reciprocal as well. Improvements to any of the elements discussed will in turn enable better governance.

Like most developing countries, Nigeria and consequently Ibadan actually has an established set of comprehensive environmental laws. However it lacks the means to enforce those laws. We will consider Nigeria's current legislative and administrative environment (corruption, political cronyism, etc) as fixed and discuss methods of improving waste management service delivery within these non-ideal environments.

Controlled Dumping Controlled dumping refers to the use of landfills as terminal endpoints for refuse. It is the preferred method of disposal by the Oyo state ministry of environment, because it is the most affordable and requires the least maintenance. Cities are permitted to appoint designated landfill sites, but these sites are more accurately designated as open dumps. Sanitary or engineered terminal end sites for Accra's waste deposition are non-existent. Engineered landfills are constructed to meet specific environmental standards including low permeability clay liner and natural flow (gravity based) leachate management.

The Oyo state Environmental Protection Agency has recognized the need to have the municipal dumps of Ibadan replaced or upgraded to engineered landfills and has set a 2020 target for the conversion of all these sites. (Dreschel, 2001) Presently, waste manage disposal is underdeveloped. Most of these landfills operate near or beyond maximum capacity. Waste is not subject

to compaction. Volume remains expanded, and as a result these dumps are frequently infested by roaches, rodents, and flies.

Composting:

Composting is the process of turning organic household waste into fertilizer through aerobic fermentation. This fertilizer can be used in lawns, parks, and gardens. Composting is a minimally used form of waste disposal in Ibadan and does not contribute to the danger of food pollution. Of the 1250 tons of garbage collected per day about 10 – 15% is composted. (Dreschel, 2001) In theory composting could reduce environmental pollution and provide job opportunities. Compost fertilizer also could help improve agricultural production and improve soil structure which means it offers a longer term advantage over other non-compost mineral-based fertilizers. The high percentage of organic material that is disposed as trash suggests that composting could be a viable municipal solid waste technology.

In practice, composting is not a widely employed technology. Greater use of composting requires analysis of the different levels of technical sophistication and the potential transport capacity of Accra's waste collection system. Profitability and investment analysis for constructing and operating compost facilities in Ibadan would have to be undertaken. Such forms of analysis have actually been done as recently as 2004. (Dreschel, 2004)

The actual process of composting requires very little manpower, however because Accra's domestic waste is not segregated at the community level, laborers need to be hired to do the initial sorting (i.e. make sure no large pieces of metal are included). This raises the cost of compost production. The price of compost is also sensitive to transport costs. As Ibadan has grown and expanded, agricultural end destinations for compost have become further and further removed from the site of compost production adding to the expense of compost purchasing. The current preference of non-composting waste management technology may be difficult to adjust considering these circumstances, which is a shame as many urban farmers (inexperienced and experienced) have positive perceptions and are willing to use compost.

Recycling:

Only 2% of the solid waste is recycled at a recycling facility. Recycling is practiced informally, but the recycling base of Nigeria is in general weak. Households in low income areas do not dispose of plastics, bottles, paper, cardboards and cans readily.

Recyclable materials are used and reused for domestic purposes and only thrown away when they are no longer of any use to the owners. In high income areas, domestic servants will sell these materials to middlemen to supplement income instead of disposing them along with the other refuse. There are two main recycling plants in operation in Accra. Although more waste is generated than can be collected, both recycling plants have been operating under efficiency for years because the waste materials are not separated at the source. Unlike other poor cities around the world, Ibadan lacks a substantial sector of waste pickers to collect and sort household waste on behalf of merchants, recycling firms, and composting units. (Stoker, 1998) Encouragement of the waste picker labor market and other participants in the informal recycling sector could help extend the lifespan of the cities landfills through waste diversion.

Health risk and impact on society

Domestic waste in Ibadan is primarily made of organic material (65%). The remainder of the disposed waste consists of paper, plastics, glass, metals and textiles. (Fobil, 2001) The organic material is typically a mixture of kitchen waste (vegetables, rotten fruits, crop residues, and leaves) and animal excreta.[16] None of the organic material is in and of itself toxic to humans or the environment. Frequently it is the manner in which the waste is kept that dictates the exposure to health risks. The largest risk to humans comes in the form of diseases associated with unsanitary conditions. Infectious diseases of poor sanitation and poverty are the most common diseases affecting the residents of Accra. Vector born disease such as malaria, diarrhea, typhoid, bilharziasis, and hepatitis make significant health impact. More than half of these diseases are related to the poor sanitary conditions that exist and the attendant economic and social costs. (UN report on Nigeria's Climat change)

In the Ibadan households it is not uncommon to find open waste containers. Many households store their waste in baskets and plastic bags. The hot and humid weather conditions favor accelerated corrosion of organic matter. If open containers are not emptied, the decomposing material will attract flies. The presence of flies in the household lowers the threshold for contamination of food and cooking items. These houseflies can act as vectors for various diseases by transmitting pathogens through direct contact or through their droppings. The high incidence of diarrhea in children under 6 is related in part to food

contamination by flies. (Boadi, 2005) Hygiene related diarrhea alone is thought to cause 20,300 deaths per year and is considered one of the most common presentations at outpatient Ibadan facilities. (Domfeh, 2005) Outside of the home, health risks are no better. When disposal facilities are not accessible or have overflowed, residents will dispose of their waste in open spaces and surface drains. If drainage channels becomes blocked with solid waste, water cannot drain from streets. Blocked drains and standing water pools are a contributing factor in the endemic status of Malaria. Malaria transmitting anopheles mosquitoes use the stagnant water piles as breeding grounds. Malaria accounted for 53 percent of all reported diseases at Ibadan outpatient facilities in 1998, and is the leading cause of morbidity in Accra. (Domfeh, 2005)

Poor sanitation practices are also a cause of cholera. Cholera, an acute intestinal infection caused by *Vibrio cholera*, infects humans through contaminated food and water. The standard treatment, oral rehydration therapy, is safe and usually effective. Nonetheless cholera symptoms (profuse watery diarrhea, vomiting) are unpleasant. Waste practices can cause air pollution. About 18% of households in greater Ibadan region (mostly low-income households) burn their waste. (Fobil, 2001) This burning can contribute to outdoor air pollution. Leachants from burned refuse can enter the groundwater. Leaching of refuse into water, particularly from household products like batteries, is a very pressing concern during the rainy season. Many neighborhoods are situated in low-lying areas which are susceptible to floods. Contamination of surface water in these flood prone areas raises the risk of exposure.

The burning of domestic waste has been associated with respiratory illness. Households that are serviced inconsistently by waste collection companies sometimes burn their waste. In these households, respiratory diseases are more common in mothers and children. One suspected cause of this association is that these households are prone to burn their waste, and burning is an activity primarily performed by women and children. (Surjadi, 1993) Women and children may be exposing themselves to harmful fumes and consequently presenting with a higher incidence of respiratory disease.

Water pollution is another important potential outcome of inappropriately managed waste. The unregulated leachants from refuse near waterways increase the technical difficulty of providing clean water and subject city residents to urban flooding risk. Urban floods occur when drainage systems and other storm control devices overflow because of waterway blockages.

The poorer population of Ibadan bears a disproportionate amount of the environmental health risk burden. The most vulnerable populations are sanitation workers and the migrant workers from the North. Migrant workers frequently resort to scavenging to provide income. Scavengers can be seen in broad daylight searching through refuse at open dumps for materials plastic slivers and metals that can be sold back to processing factories. (Ndzibah, 2009) These

Sanitation workers are hired by private companies. However, they receive little or no protective clothing from the waste management companies which employ them. These workers earn low wages, and thus are not able to purchase appropriate clothing for their protection. Thus, they suffer more exposure, and as a consequence have a higher turnover rate, higher incidences of sick days and work-related accidents, and higher mortality than the rest of the city population.

II.   CONCLUSION AND RECOMMENDATION

The natural environment requires protection in order to remain healthy for all of its inhabitants. To protect and bring about a healthy and sustainable environment requires the collective efforts of the public, the environmental health authorities and the private sector. Domestic waste management has been a persistent problem in Ibadan for years. The current system of disposing waste on empty land is unsustainable. A more acceptable and safer means of waste disposal needs to be introduced. To cope with the present and future challenges of waste management, the Oyo state environmental agency will need to play a role in creating a culture of waste reduction supported at the community level. The development and importation of technology that will improve the long term sanitation environment will have to be facilitated at the state level. The municipal government is not designed to fund the creation of engineered sanitary landfills or support experimentation with other terminal waste disposal technologies. Until budgetary allocations can be sufficiently increased, Oyo state environmental agency may do well to consider adopting an economic funding model (raising fees on high-income households to cover the services of low-income neighborhoods) that facilitates broad service coverage. These approaches will undoubtedly take years to mature. A present improvement in waste

management conditions will require the participation of new actors.

Unemployed residents of the capital may have a role to play here. There is vast potential to engage the citizens of Accra in improving the provision of environmental services. The literacy and environmental awareness of the needier communities may be too low to support the creation of environmental care groups and neighborhood task forces. Still the sheer availability of physical capital, the high unemployment rate of the city, and the urgent need for better waste management call for a solution that is in part labor intensive. Labor intensive policy can range from a mass mobilization of city residents to unclog drains to using health workers to teach container composting as healthier alternative to refuse dumping.

It is therefore suggested that for proper waste management in Ibadan, the following must be carried out:

1. Adequate orientation on waste management for the residents so that they will be properly equipped as to how to handle and process their wastes and even to generate incomes from them.

2. Government should provide more sanitary and health personnel to adequately and sufficiently cover the whole community for proper monitoring and education on waste management.

3. Government should also supply adequate equipment's and facilities for the sanitary and health personnel to work with, in order to achieve maximum output.

4. Government should also encouraged government-private partnership, in order to lessen the burden on the government and increase community participation in the environmental management.

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