The role of environmental education and public enlightenment in urban waste management in Calabar, Cross River State of Nigeria

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Abstract: In spite of the laudable efforts of the Government of Cross River State to keep Calabar, the Capital city clean, rubbish heaps remain a common sight within the city, especially around low-income residential neighborhoods and commercial districts. This study discusses the problems of indiscriminate waste disposal in Calabar and the factors that contribute to waste problem in Calabar. Ignorance is observed as a major factor responsible for the indiscriminate waste disposal in Calabar. The need for immediate introduction of environmental education into the curriculum of schools, together with vigorous public enlightenment programmes cannot be overemphasized if the situation is to improve for the better.

Key Words: Waste Management, Public Enlightenment, Calabar Urban, Nigeria

Introduction

The 20th century and particularly the period since Nigeria’s independence up to the present has seen a dramatic increase in the production of waste, reflecting the enhanced level of affluence that followed the oil boom years of the 1970’s. With a four-region political structure at independence, Nigeria metamorphosed into a 36-state political structure with 36 state capitals which have suddenly become urban centers characterized by high population concentrations. Associated with these population concentrations are serious social and environmental problems such as the emergence of urban slums and rapid generation and accumulation of solid wastes. Being an ancient city, the restructuring of Calabar urban landscape for effective waste management has not been without its problems. In addition there is the near complete absence of sustained environmental education and public enlightenment aimed at changing the rural attitudes of most residents.

The increase in the municipal waste stream of Nigerian cities (including Calabar) can be attributed to a number of factors among which are: lack of awareness of environmental ethics; inherent rural attitude of most residents; rising level of affluence, which encourages the ‘throw-away’ culture; high consumption rate; low product durability; abundance of disposable items; cheaper consumer products, especially the fairly-used or second-hand goods (“Tokunbos”) that flood Nigerian markets from overseas; the proliferation of packaging; changing patterns of taste and consumption; poor infrastructure for waste management, shortage of skilled man-power and lack of political will, among others. In addition to the large volumes of waste generated in these cities, there is the problem of waste separation and sorting. Oftentimes, the wastes are a complex mixture from motor scraps to toxic materials derived from a variety of products such as paints, solvents and dry-cell batteries. This poses serious problems for evacuation.

In Calabar substantial efforts and resources have been committed to urban waste management. Government spends in excess of six million Naira monthly (₦6,000,000.0), which has won the state the position of the cleanest state capital in Nigeria in 2006. In spite of these achievements, pockets of undesirable refuse heaps abound especially in poor neighborhoods such as Mbukpa, Uwanse, Amika, Edim Otop and Ikot Ishie just to mention a few, and around commercial districts such as Akim and Mbukpa markets.

Worldwide, waste stream is growing in all societies. According to recent estimates, the United States alone produces 11 billion tonnes of solid waste each year. That is approximately two thirds of a tonne per head every year and twice as much per capita as Europe or Japan, and five to 10 times as much as most developing countries. New York has one of the highest per capita rates of municipal waste generation with an average of about 8 million tonnes. Similarly, the city of London produces an average of 4 million tonnes of waste annually (USEPA, 2001; Kaufman et al., 2004; Gandy, 1994).

Waste disposal is a serious problem in many urban centers in Nigeria. It poses a serious threat to environmental health and aesthetics in many contemporary Nigerian cities. Everyone generates waste but only a few
ever cares about what happens to their waste. Waste that is not properly disposed results in environmental pollution and degradation. Solid waste is responsible for the most acute type of environmental degradation in all cities of the world, especially in the third world countries. Solid waste poses the greatest threat to healthy living because of its potential to pollute not only the land, but also air and water (Sule, 2004; Omuta, 1998; Olatunji, 2004).

In Calabar, the waste stream has continued to grow dramatically over the years in spite of serious efforts to contain it. According to Edu (2003) the ratio of urban waste accumulation to removal by the waste management agencies in Calabar is 70:30 percent. Floyd and Ekpo (2003) outlined rapid growth of population in urban centers, overcrowding, uncontrolled urbanization, old habits of residents, poor city planning, inadequate refuse disposal sites, rapid industrialization, poor funding of refuse agencies and the absence of intensive public enlightenment programmes as some of the major factors responsible for the generation and accumulation of wastes in most urban centers in Nigeria. Earlier studies have put the per capita wastes generation for Nigeria at 0.5 kg per person per day (Oyediran, 1997). The per capita for urban dwellers will definitely be higher than the national average since the per capita waste generation is influenced by the resources available to the individual, the individuals’ consumption pattern, cultural practices and values.

The method of refuse disposal may be an important factor in refuse accumulation in urban centres. For instance, city councils that adopt the establishment of refuse collection points in designated parts of a city may have much more problem with refuse accumulation than the one that adopts the house-to-house refuse collection method. In either case, the commitment and dedication to duty of the staff of the refuse disposal unit will be the crucial factor in the success or failure of a particular method.

The attitude of residents to waste management is another factor in refuse generation and accumulation. As Mabogunje (1974) pointed out, solid waste problem in emerging urban centres in Nigeria is a consequence of drastic change occurring from the rural habits, norms and values of the people to those of urban civilization. Most residents still patronize the “old habits” of dumping refuse in their backyards in spite of inhabiting emerging urban neighborhoods. For instance, earlier studies on waste disposal in Calabar and Oron found that 32 percent of respondents in Calabar and 43 percent of respondents in Oron preferred to dispose of their waste in their backyards (Anim, 2006; Ebong and Bassey, 2004).

Besides the attitude of most residents, some of the refuse clearing agents do not possess the requisite expertise and experience to handle such jobs. Furthermore, some agents do not have the commitment to duty and often default in meeting collection schedules. In situations where the contractor does not evacuate refuse promptly, this could constitute a nuisance to the residents and subsequently affect their disposition to refuse tariff.

Where the refuse collection is undertaken by government through direct labour, inadequate funding often leads to inefficiency. For instance, while government expects refuse to be evacuated from collection points, it may not provide serviceable refuse trucks, working tools and safety gears for the direct labour staff.

The implications of indiscriminate refuse disposal are many and varied.

- It constitutes and eye-sore and helps to deface a city’s landscape. It downgrades the beauty and cleanliness of a city and contributes to the degradation of the environment.
- When refuse is allowed to accumulate it decomposes and pollutes the air, with severe health consequences for the residents and passers-by. Refuse heaps are often associated with the prevalence of typhoid, cholera, malaria and bronchial disorders.
- According to Udoessien (2003) decomposing refuse also emits carbon dioxide and directly contributes to global warming. Seepages from refuse heaps may also contain nitrates and nitrites, which have been associated with carcinogenic and mutagenic nitrosamines. Additionally decaying refuse could infiltrate the water supply system and pose serious health risks to residents.
- Refuse heaps along roads and street corners often obstruct traffic and may cause accidents, especially at night when visibility is poor.
- Refuse block gutters and often obstruct drainage which could lead to severe flooding during heavy rainfalls. In extreme case, severe flooding could lead to serious erosion and environmental degradation, loss of life and property, as well as disruption of traffic.
- Refuse heaps create habitats for rats, rabbits, snakes, mosquitoes and flies, which constitute serious menace to human health and aesthetics. In addition human scavengers who comb refuse dumps for livelihood are prone to severe accidental and health risks.
- Direct dumping of wastes into adjoining Calabar and Great Kwa Rivers may lead to pollution of the river and destruction of aquatic lives such as fishes, crabs, shrimps, oysters and their habitats.
- Ecosystem degradation associated with refuse dumping poses a serious threat to fishing and tourism.
This study examines the role of environmental education and public enlightenment in conditioning the behavior of both residents and waste management agencies towards effective waste management and improved environmental quality.

Data collection and analyses

The study hypothesized that there is a significant difference in the level of compliance with waste disposal instructions between the literate and non-literate members of the society. To collect data for this study, a questionnaire was designed, containing various items on different aspects of waste management. A total of 250 questionnaires were administered in different parts of Calabar city. Of that number, 246 questionnaires were retrieved and used for the study. Oral interviews were also conducted on relevant staff of the Waste Management Agency in Calabar as well as those of the Calabar Urban Development Authority.

The chi-square statistical tool was used to test the hypothesis using the Formula: 

\[ \chi^2 = \sum \frac{(O - E)^2}{E} \]

Where \( \chi^2 \) = Chi-square; O = Observed frequencies; E = Expected frequencies; \( \Sigma \) = Summation sign

In processing the data for analysis, level of literacy was categorized as high, moderate and low. Those respondents who hold the Higher National Diploma (HND) or the Bachelors Degree (B.Sc) and above were grouped as highly literate. Those with Senior Secondary Certificate of Education (SSCE) or the Ordinary National Diploma (OND) were grouped as moderately literate. Those with First School Leaving Certificate (FSLC) or no formal education at all were grouped as lowly literate. The level of compliance with waste disposal instructions was also grouped into good, fair and poor.

Results and Discussion

The respective scores and their percentages on level of compliance of respondents with waste disposal instructions are presented in Table 1. Table 2 shows the results of chi-square (\( \chi^2 \)) test on the responses collected in Table 1.

Table 1: Relationship between level of literacy of Calabar residents and degree of compliance with waste disposal instructions.

<table>
<thead>
<tr>
<th>Level of literacy</th>
<th>Degree of compliance with waste management agency’s instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Highly literate</td>
<td>49</td>
</tr>
<tr>
<td>Moderately literate</td>
<td>28</td>
</tr>
<tr>
<td>Low literacy</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
</tr>
</tbody>
</table>

Source: Field Survey (2006)

From Table 2, the calculated \( \chi^2 \) is greater than the tabulated value of 18.37 leading to the rejection of the null hypothesis. There is thus a significant relationship between the level of literacy of residents and the degree of compliance with Waste Management Agency’s instructions on waste disposal.

There is a significant difference in the level of compliance with waste disposal instructions between the literate and non-literate members of Calabar society. It could therefore be inferred that literate people comply with waste disposal regulations more than the non-literate ones, which makes the need for environmental education and sustained public enlightenment even more urgent.

About 24 percent of those interviewed prefer to dispose waste in their backyards. For this category of residents, the survey shows that they reject incurring any expenditure in relation to refuse disposal or management. For instance, many residents often feel reluctant to buy refuse bins and bags to facilitate refuse disposal. They also refuse paying refuse tariffs until they are arraigned before a refuse court. Often residents treat refuse agents with contempt and perceive them as nuisance rather than partners in progress. With this uncooperative attitude, most residents prefer to dispose of their refuse in their backyards, in street corners or even in gutters rather than trek short distances to designated refuse collection points. They consider refuse collection and disposal as totally government business.
Table 2: Chi-square analysis of the relationship between level of literacy of Calabar residents and degree of compliance with waste disposal instructions

<table>
<thead>
<tr>
<th>Cells</th>
<th>Observed</th>
<th>Expected</th>
<th>o-e</th>
<th>(o-e)^2</th>
<th>((o-e)^2/E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>49</td>
<td>27.71</td>
<td>21.30</td>
<td>453.48</td>
<td>16.39</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>37.53</td>
<td>-9.53</td>
<td>90.73</td>
<td>2.42</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>21.04</td>
<td>-11.04</td>
<td>121.93</td>
<td>5.79</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>5.49</td>
<td>-8.49</td>
<td>72.06</td>
<td>2.83</td>
</tr>
<tr>
<td>5</td>
<td>37</td>
<td>34.52</td>
<td>2.48</td>
<td>6.14</td>
<td>0.18</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>19.35</td>
<td>-4.36</td>
<td>19.00</td>
<td>0.98</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>25.81</td>
<td>-12.81</td>
<td>16.99</td>
<td>6.36</td>
</tr>
<tr>
<td>8</td>
<td>42</td>
<td>34.95</td>
<td>7.05</td>
<td>49.67</td>
<td>1.42</td>
</tr>
<tr>
<td>9</td>
<td>35</td>
<td>19.60</td>
<td>15.40</td>
<td>237.19</td>
<td>12.10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>48.47</td>
<td></td>
</tr>
</tbody>
</table>

\[
\chi^2 = \frac{\sum (O - E)^2}{E} = 48.47
\]

During the survey, most of the refuse staff interviewed complained about the unit being under-staffed and poorly funded. The list of needs include diesel, engine oil, brake fluid, and tires for refuse trucks. They cited these deficiencies as being partly responsible for their inability to perform maximally. The survey also revealed that the number of waste disposal bins placed at most collection points especially around the markets and poor neighborhoods were inadequate, leading to the overflow of waste onto the ground. There is therefore the need for the waste agency to conduct its in-house survey so as to determine which collection points require more bins.

Environmental education is education aimed at developing a world population that is aware of and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitments to work individually and collectively towards the solution of current problems and prevention of new ones (Kyoto Protocol, 1997). The absence of a sustained culture of environmental education and enlightenment over the years in Nigeria has impeded the effort for a high quality system capable of improving human welfare in relation to the aesthetic characteristics of the physical environment (Aina, 1991; Dede, 2002; Ebong, 1983). Environmental education has come to be seen as a crucial element in constructing and awakening one’s precept, reinforcing, expanding, modifying or enhancing the relationship between man and the aesthetic characteristics of his physical environment. After all, man’s interaction with his environment depends not so much on the intrinsic nature or realities of the physical environment as objective science would prove them to be, but rather on what man has imagined and conceived in regards to influences around him (Ebong and Bassey 2004). Therefore, a clear understanding of the cognitive imperative and behaviour of people constitute a prerequisite for effective urban waste disposal vis-à-vis management. Additionally, a clear understanding that man is an inseparable part of the environmental system consisting of man’s culture and the biophysical environment equally serves as an “invisible guiding hand” shaping and regulating the relationship between man and the aesthetic and hygienic status of his environment (Stapp and Swan, 1970).

Environmental education can therefore be used to create awareness on the evils of indiscriminate waste disposal as well as the gains from proper waste management. From this study, it is clear that ignorance on the part of residents plays a significant part in the waste problem of Calabar urban. As we have seen, most of the residents are yet to imbibe the ethics of a clean and beautiful environment. If the defaulting residents were to appreciate the benefits of keeping the environment clean, then the task of riding Calabar of indiscriminate wastes would be far easy. Residents need to be aware of the fact that the refuse heaps in their backyards or street corners were responsible for their incessant illness and regular visits to the clinic to encourage them to pay refuse tariffs for effective evacuation of refuse in their neighborhoods than pay huge sums of money to the clinics for medical treatment.
Conclusion

An important lesson here is that the menace of indiscriminate solid waste disposal causes health and safety hazards, and also constitutes a major form of aesthetic nuisance. Solid waste must be sufficiently and efficiently managed to ensure safety, sound human health and disease free environment. For effective management of waste in Calabar, the study makes the following suggestions:

- House to house refuse disposal method should be adopted by the Waste Management Agency in Calabar and indeed other cities in Nigeria.
- Government should own refuse incinerators or landfills (located outside the city) for proper management of final disposal sites.
- Environmental education should be introduced into the curricula of primary and secondary schools, together with sustained public enlightenment program that is aimed at sensitizing the citizens on the dangers of improper waste disposal, as well as the benefits of a clean and healthy environment.
- Appropriate bye-laws should be enacted by government to punish refuse defaulters.
- Awards for the most descent cities or layouts could be instituted to encourage the spirit of competition among residents.
- The wage for refuse disposal should be made attractive so that the labourers can take greater interest in their jobs and pay more attention to finesse in the evacuation and transportation of waste.

In conclusion, environmental education holds the key to effective management of our environment as well as the creation of high standard of environmental ethics among citizens. Thus let us advocate for a sustained programme of environmental education as a panacea for effective urban waste management in order to promote a congenial milieu for sustainable living. We have only one earth and it behooves on all of us to be the keepers and protectors of our environment. By managing our waste properly, we will make the earth a better place not only for ourselves, but also for the generations yet unborn.

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