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Environmental Literacy levels on Waste Management in Ibadan, Nigeria

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Abstract

Waste management is at its lowest ebb in most towns and communities in Nigeria. Most parts of the city centres do not benefit from public waste disposal services. The goal of this study was to assess the level of environmental literacy in the management of solid waste in Ibadan, Nigeria. The specific objectives were to investigate the waste management practices, assess the level of awareness, their willingness to participate, concern for waste management, attitudes to waste management and governmental strategies used to educate residents about waste management in Ibadan. A total of three hundred and eighty four questionnaires were administered to randomly selected households. Key informant interviews were conducted with officials at the Oyo State Ministry of Environment and Oyo State Waste management Authority. Statistical package for Social Science (SPSS) was used to analyze the quantitative data. The statistical methods used included descriptive statistics of frequency and percentage. The result on waste management practices amongst residents showed that food waste was the most generated in Ibadan, followed by polythene and paper. With regards to awareness, findings showed that residents were generally aware of what waste is and also aware of waste management practices such as recycling and composting. The findings on attitude to waste management revealed that positive attitude was only exhibited towards the benefits of waste management while negative attitude was displayed toward the practicality of waste management. With regards to governmental strategies, result showed the major governmental strategies as public education through media jingles, community awareness campaigns, and inspection of market places, printouts and town meetings. One of the recommendation was that incentive based recycling programs should be introduced to encourage the practice amongst residents.

Keywords: Waste, Management, environmental literacy, Ibadan, Nigeria.

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INTRODUCTION

Environmental Literacy is defined as the capacity to perceive and interpret the health of environmental systems and to take appropriate decisions and actions to restore, maintain and improve the health of these systems (Allers 1997). Environmental Literacy is a set of understandings, skills, attitudes, and habits of mind that empowers individuals to relate to their environment in a positive fashion, and to take day-today and long term actions to maintain or restore sustainable relationships with other people and the biosphere (Roth 2002). Environmental literacy is also seen as the ability to recognize that one's choices impact the environment; to identify the most sustainable solution to a problem; and to be able to act in the most environmentally friendly way on that solution (Miller 2010). Disinger and Roth (1992) defined it as essentially the capacity to perceive and interpret the relative health of the environmental systems and take appropriate action to maintain, restore and improve the health of those systems. Furthermore, Environmental Literacy is the capacity of an individual to act successfully in daily life on a broad understanding of how people and societies relate to each other and to natural systems, and how they might do so sustainably (Elder 2003). Environmental literacy is important for all individuals because their daily decisions affect their environment. The ability to make choices in a fashion that will permit a sustainable human society is dependent upon the degree of environmental literacy of each citizen (Roth 1992). With the present state of the global environment, improvements in the degree of environmental literacy are very important to improve quality of the environment and avert threat to continued existence of life. This is because environmental literacy addresses the need to learn how people can live in harmony with the environment. This learning involves understanding natural systems and how human beings relate to them and acquire basic skills and an ethic that will prepare people to deal effectively with environmental problems and issues. It is important to note that sustainable development is dependent upon the degree of environmental literacy of each citizen. An environmentally literate person, is sensitive towards environmental problems, has positive attitudes, values, and is committed to caring for the environment. These characteristics are needed to take appropriate actions to improve the quality of life and quality of the environment.

Waste management is at its lowest ebb in most towns and communities in Nigeria; most parts of the city centres do not benefit from public waste disposal services and therefore have to bury or burn their waste or dispose it haphazardly (Fafioye and Dewole, 2013). Waste generation rate in Nigeria is 25 million tons annually and at a daily rate of 0.44-0.66 Kg/capital/day (Ogwueleka 2009). This large generation at high rates without corresponding efficient technology to manage the waste is a contributing factor to the current waste problem in Nigeria (Babayemi and Dauda 2009). The situation at state level is no different in Ibadan City, where open and indiscriminate dumping of refuse is a norm. Piles of decaying garbage which are domestic in nature dominate strategic locations in the heart of the city (Adeolu, Enesi and Adeolu 2014). According to Omoleke (2004), the issue of solid waste dumping in Ibadan dates back to early 60s when Ibadan City council was responsible for the maintenance of Ibadan. Factors responsible for the persistence of this problem included, high rate of illiteracy, ignorance, uncivil culture of indiscriminate waste littering (i.e throwing of wastes on bare ground), people inability to maintain a sanitarily clean environment and reluctance of people to cooperate with the authority by disposing solid waste in illegal dumps, rather than using the means provided by the government, poor funding and limited technology.

Kayode and Omole (2011) stated some factors contributing to Solid Waste Management problems in Ibadan Metropolis. Firstly, the core or the traditional area of the city is characterized by slum, inaccessibility, poor condition of the environment which is an evidence of poor town planning in the previous years. Secondly, shortage of manpower both skilled and unskilled hampered the efficient management of refuse in Ibadan metropolis. The shortage of staff makes environmental law and order to be ineffective in the core area. Oguntayo and Obayelu (2012) in their research highlighted Primitive food packaging practices, poor physical planning, inaccessibility of households in the interiors and unwholesome waste disposal habits of the resident as challenges hampering effective solid waste disposal in Ibadan. In a study to assess the attitudes of market women to the weekly sanitation exercise in Ibadan, Adedeji (2015), reported that, the main driving force for poor environmental conditions experienced in the market is attitudinal. Whatever efforts made so far failed to bring about significant attitudinal change and awareness creation on environmental sanitation in the market.

The goal of this study was to assess the level of environmental literacy in the management of solid waste in Ibadan, Nigeria. The specific objectives were to investigate the waste management practices, assess the level of awareness, their willingness to participate, concern for waste management, attitudes to waste management and governmental strategies used to educate residents about waste management in Ibadan.

METHODS AND MATERIALS

A cross-sectional study design was used to assess the knowledge, attitude and practice of waste management amongst stakeholders in Ibadan. The study involved field survey, and interviews in collecting data to assess the level of environmental literacy on solid waste management amongst residents of Ibadan. Key informant interviews were carried out with official at Oyo State Waste Management Authority and The Ministry of Environment to find out the strategies used by government to educate residents on proper solid waste management in Ibadan. Secondary data was sourced from the Ministry of Environment and Habitat as well as the Oyo State Waste Management Authority (OYSWMA) on environmental education programs that have been implemented with regards to solid waste management.
The sample frame of this study was the total number of households in the above stated Local Government Areas. Formula for population projection for number of household for 2015 is stated below:

$P_1 = P_o (1 + r/100)^t$

P_o= Base Population

P_1 = Projected Population

r = Rate of growth (in this case 3.2%)

t = number of years (in this case 9)

Krejcie and Morgan's sample size determination formula below was used to determine the sample size for this study. A total of three hundred and eighty four questionnaires were administered to randomly selected households.

$$n = \frac{x^2 NP(1-P)}{\left[d^2(N-1)\right] + X^2P(1-P)}$$

Where; n=required sample size

X^2= the table value at desired confidence level at 95% confidence interval = 1.96
N = given population size
P = population proportion (assumed to be 0.5to provide the maximum sample size)
d = the degree of accuracy as reflected by the amount of error that can be tolerated in the research study by the researcher (0.05).

$$n = \frac{3.841 \times 321639 \times 0.5(1- 0.5)}{(0.05)^2 \times 321639 - 1 + 3.841 \times 0.5 (1- 0.5)}$$ n = 384

Since the number of households vary in the local government areas, the following formula was used to determine a proportionate number of households selected in each local government area.(Table 1)

$$\frac{\text{Total number of house pop} \times \text{total sample size}}{\text{Total number of households in the selected LGA's}}$$

Table 1: Summary of Sample frame, sample size

Local Government Name	Number of Households (2006)	Projected (2015) From each LGA	Sample size
Ibadan North East	81661	108426	129
Ibadan North	76740	101892	122
Ona Ara	59097	78466	94
Ido	24745	32855	39
Total		321639	384

Statistical package for Social Science (SPSS) was used to analyze the quantitative data that was collected during the fieldwork. The statistical methods that were used in this study included descriptive statistics of frequency, percentage, mean and standard deviation. Excel was used to develop graphs, bar charts, and pie chart to present result. Discussions from key informant interviews were summarized and reported.

FINDINGS AND DISCUSSIONS

Socio demographic characteristics

Majority of the respondents (56.5%) were female while respondents between 30-39 years accounted for majority (26.4%) of the respondents. Majority (48.4%) attained tertiary education. On marital status, 54.5% of them were married, 47.9% of respondents earn between N10, 000-N49, 000. Trading (42%) is the predominant economic activity in the study area.

Waste management practices among residents of Ibadan

Food waste (33%) is the most generated while black nylon (22.8%) bags are the most preferred storage facility for generated waste. Sorting an important activity that aids in separating waste is practiced by 28.3% of the respondents. With regards to waste disposal, burning of waste was the most preferred (31.4%) followed by dumping in streams and drains (18.3%).

Level of awareness on solid waste management amongst residents

Majority (75.4%) of the respondent's defined waste as anything you don't want. Majority of the respondents (61.3%) have heard about recycling and (67.8%) that have heard about recycling. From the results it is noted that residents are aware about what waste is and are knowledgeable about practices in waste management that would help in reducing waste sent to landfills and improperly disposed.

Level of concern about solid waste management amongst residents of Ibadan

As shown in figure 1a & 1b, it can be deduced that there is a significant high level of concerned about solid waste management amongst residents of Ibadan. This results are in line with a study by Mukama etal (2016) to assess the practices, concerns and willingness to participate in solid waste management in two urban slums in Uganda. They concluded that residents were generally concerned about the solid waste management. They mainly showed concern for presence of vectors such as and diseases related to improper use and disposal of waste. They were less concerned about the reduction of natural resources and presence of waste in their neighborhood. However findings of this study shows that resident were concerned about reduction of natural resources and presence of litter.

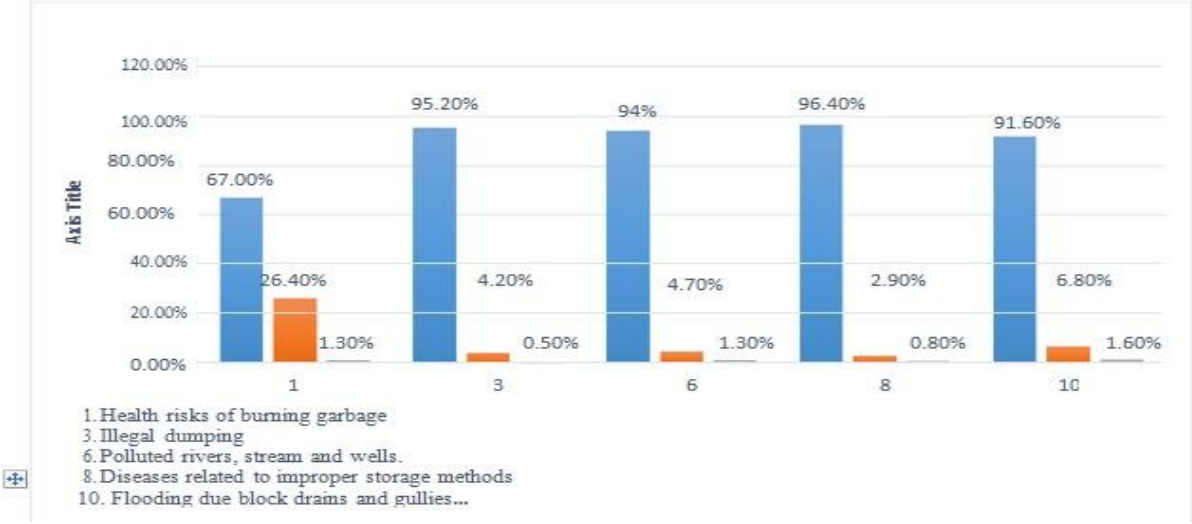

Figure1a: Level of concern about Waste Management

Additional areas of concern were highlighted such as flooding due to improper waste management and the need to compost biodegradables and separate waste for recycling. The concerns expressed by residents is legitimized by Garret (2013) who stated that waste management is a global concern that is not exclusive to just one country or continent. As such, there is need for actions to be taken seriously, immediately to improve the state of our planet. The World Bank (2016), reports that concern and sensitivity to waste management includes; health and environmental impacts of accumulated uncollected waste and clandestine disposal

sites. Health and environmental impacts of solid waste management facilities including transfer, composting and landfill facilities. Emissions from waste collection and transfer vehicles. Special handling and disposal of hazardous waste including healthcare and industrial hazardous waste. Lastly, the issue of waste management is of paramount importance because poor waste management does in fact determine the functioning of the different components of the environment.

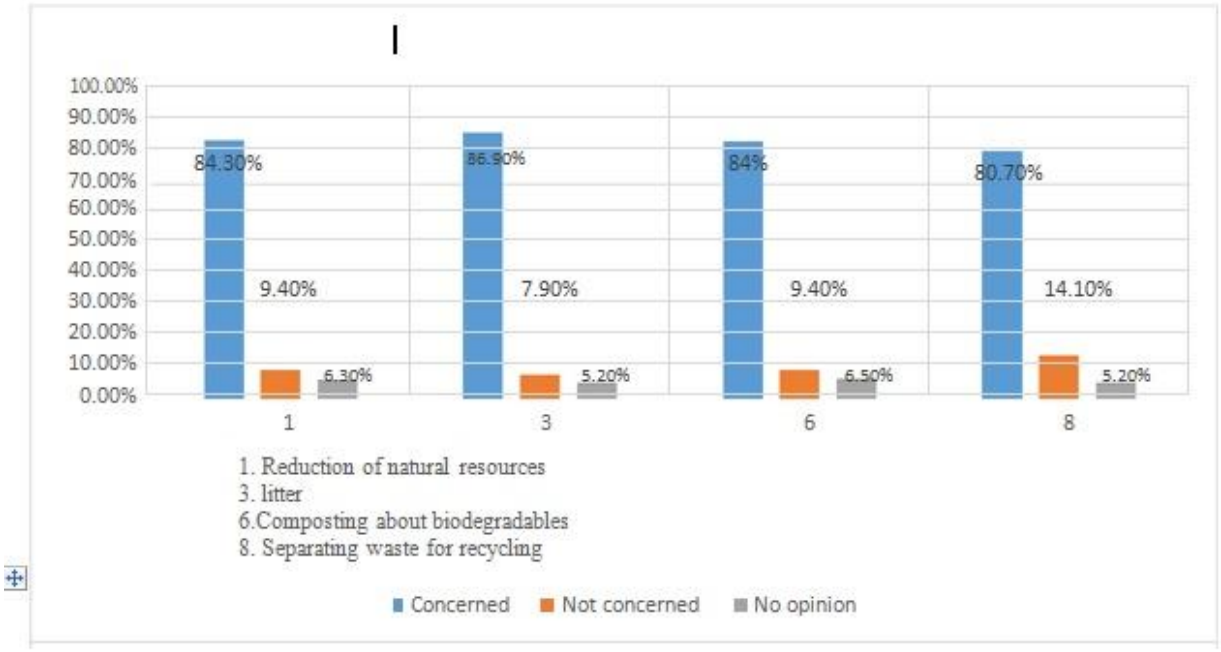

Figure 1b: Levels of concerns about Waste Management.

Willingness of residents to participate in solid waste management

With regards to participation in waste management initiatives, the results (figures 2a) reveals that 37.2% were willing to partake in a recycling program that collected materials like plastic, paper, metal by separating these into separate bags for collection purposes while 27.2% disagreed and 35.6% were undecided. Furthermore, 41.3% of the respondents were undecided about paying for pickup of these recyclable materials from their homes while 40.1% agreed and 18.6% respondents disagreed. The proportion of respondents that disagreed and those on the fence together far outnumbered the ones that are willing to participate. As such it can be said that residents are not willing to participate in waste minimization techniques such as recycling. This result is ironic because 67.8% of residents indicated that they are have heard about recycling. This knowledge about recycling ought to have translated into a readiness to participate in it when the need arises without any hesitation. This reluctance to participate in recycling, inhibit residents from harnessing the benefits of recycling as explained by Pearson and Dale (2013) below. Recycling reduces the need for virgin resources and using recycled.

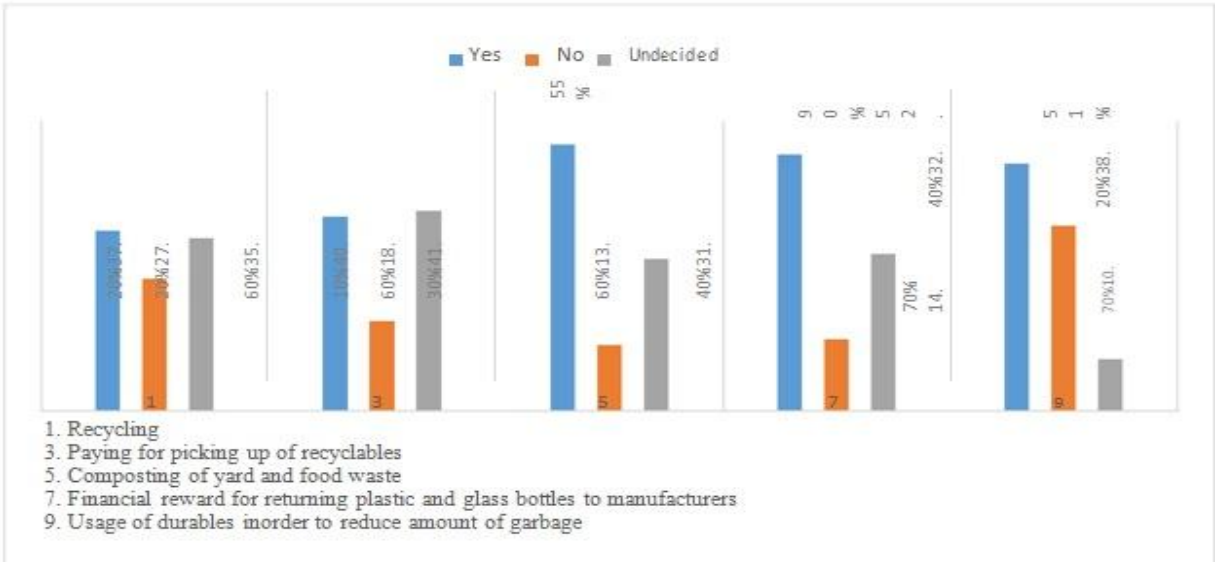

Figure 2: Levels of willingness to participate in Waste Management

Attitude of residents towards solid waste management

The results in Figures 3 shows the attitude of residents to waste management. 78.3% of the respondents consider waste management to be an important and inexpensive activity (51.5%) that is not time consuming (60%). As such, households according to (83%) of the residents should properly dispose of their waste, refrain from burning (66%) and employ composting (81.4%) a practice that is very beneficial. Moreover improper waste management has both health (87.7%) and environmental effects (71.7%). The benefits of waste management according to respondents included source of income, employment (89.3%) and saves money (55.7%) as waste from one industry can serve as an input to another that it saves money (84%). Although (85.9%) of respondents viewed waste management as a shared responsibility, 57.4% denounce their responsibility for managing their own waste and shift this to the state government (76.2%). As they believe regular collection of waste is the only solution to tackling the garbage crisis (73.8%).

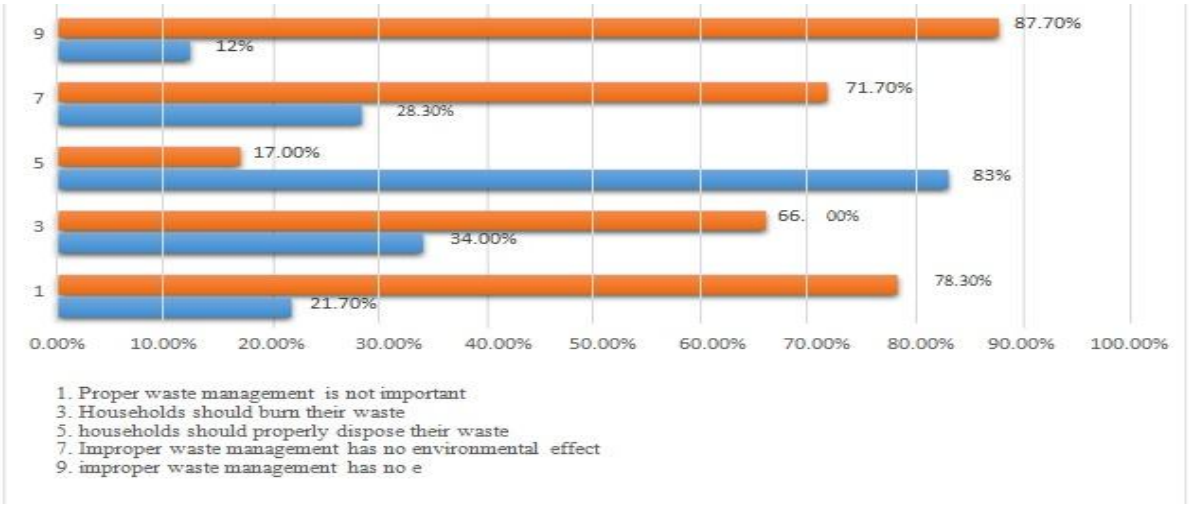

Figure 4: Levels of Attitudes towards Waste Management

Strategies adopted by government to promote awareness on waste management.
In order to find out strategies used by government to educate residents about proper waste management in the state, key informant interviews were carried out at the ministry of environment and the Oyo State Waste Management Authority (OYSWMA). At the Ministry of Environment, it was reported that illegal disposal of refuse and untreated industrial effluents in unauthorized places such as river channels, vacant plots of land etc. were highlighted as one of the major environmental problems faced by Oyo state. Inadequate man power, lack of funding and the attitudinal indifference of people were factors pinpointed as stumbling blocks to proper solid waste management in Ibadan. These factors have also been highlighted by Kayode and Omole (2011), Oke etal (2013) as barrier to effective waste management in Ibadan. To promote proper waste management, jingles, household and community awareness campaigns, inspection of market places and printouts are utilized. The jingles were said to have been broadcasted on the Broadcasting Corporation of Oyo State television channel and on radio stations. These jingles discourages residents from dumping waste into water ways and channels and were prepared using English, Yoruba and Pidgin language to ensure that everyone understood its contents. Banners and leaflets with message of proper waste management were also said to have been printed and placed in strategic locations and distributed amongst residents. These were also translated in either English or Yoruba language to ensure easy understanding for all who came across it. The use of environmental educational materials according to Mbalisi (2009), have been effective in enhancing effective environmental education. End-user Environmental Adult Educational materials like posters, fliers located at strategic locations in various parts will constantly keep the citizens informed about appropriate attitude and proper methods of handling the wastes they generate daily. Furthermore Mbalisi (2009) states that the use of local languages in the dissemination of information on how to manage wastes properly is paramount in the sustainable solid waste management so as to reach out to the citizens that do not understand English language. These materials therefore can be prepared in different languages so as to enable the target audience comprehend the messages they convey.

Household and community awareness campaigns were conducted whenever environmental health officials were responding to a complaint. For instance when a complaints is lodged by concerned residents about pig rearing in a residential area, the affected area is visited and the owner and residents are educated on the consequences of such action. Appropriate actions are then taken to ensure the health of the population at large and health of the environment also. Markets such as Bodija market are inspected regularly and traders are encouraged to clean up. Environmental offenders are also penalized for actions that completely disregard the health of the environment. With such corrective measure, people will think twice before engaging in such. Oyo state Waste Management Authority is in charge of waste management in the state. It responsible for monitoring waste collection and ensuring that it is effectively dumped. Questions such as population of areas were waste is collected, physical characteristics of solid waste collected, Collection service coverage for domestic premises and commercial premises, amount and type of waste generated and collected, disposal sites were not answered by official. Implied in the above response to operations of the authority is lack of recording keeping, which affects services rendered. Waste management is an activity that requires detailed planning to ensure its effectiveness. For example if the Waste Management Authority knows the type and amount of waste generated in the city, proper vehicles and equipment will be used to evacuate them. Lack of proper records will therefore hinders

services rendered. The only highlighted strategy used by the Authority to educate residents on proper waste management was town meetings. When asked about partnerships in waste literacy programs, the public, Ministry of Environment, stakeholders, media outlets such as premier radio and amuludi were also identified. The contents of these programs however were not provided to the researcher. Questions pertaining With the status of waste management and the continual identification of resident's attitudes, illiteracy, behavioral patterns by various authors and lack of awareness identified by 34.3% of respondents as hindrances, Ministry of Environment and the Oyo State Waste Management Authority are not doing enough to sensitize the populace on the consequences of their actions or instilling skills need to prevent, minimize and properly dispose waste. strategies such as the use of cinemas, educational forums, street plays, street dances and animations like puppet shows cartoons as suggested by, establishment of environmental clubs and programs in primary, secondary and tertiary institutions, teaching business establishments to reduce their waste as suggested by Adekunle et al (2012), Evans et al., (1996) have not been employed by the Ministry of Environment nor by OYSWMA. The strategies in place so far appear to be reactive rather than being continuous and entrenched in the daily activities of people. For instance religious institutions could be approached and encouraged to continually pass across the message of proper waste management. The findings of this study with regards to strategies utilized by government to educate the populace about proper waste management is in accordance with Fafioye and Dewole (2013) who concluded that the community inhabitants' sensitization and education on adverse effects of poor environmental management on health is not adequate.

Comparism of the characteristics of an environmentally literate according to Roth (1992) vs characteristics exhibited by Residents of Ibadan

Table 2: Characteristics of an Environmentally Literate

An environmentally according to Roth (1992) is someone who:	**Results of Ibadan resident's attitude, awareness, concern and willingness to participate.**
Takes action to correct environmental imbalances;	• Majority of residents engage in unwholesome waste disposal methods 31.4% burn waste generated, 18.4% dump waste instreams and river channels, 3.9% in open spaces, and 2.1% by roadside. • Only 37.2% of residents were willing to partake in a recycling program.
Demonstrates willingness to some individual privileges	• Only 41.4% of the respondents were willing to pay in order to dump their garbage into community skip. They are unwilling to part with small amount of money however, residents prefer to receive money in exchange for carry out a waste reduction. • 52.9% of the respondents agreed to return every plastic and glass bottle to their manufacturers provided they will be rewarded with money.
Continues to gather information about environmental issues throughout his life;	• Only 43.2% of the respondents agreed while the remaining 56.8% (15.4% disagreed and 41.4% undecided) are not interested in acquiring more knowledge on composting.
Rejects short-term gains when they threaten long-term benefits;	• 89.3% of the respondents considered other issues (like crime, unemployment and cost

	of living) to be more important than a waste free environment. Implied in this statement is that residents are only concerned about meeting immediate needs while neglecting the future.
Has a keen sense of stewardship	• 57.4% of the respondents denounced their responsibility for managing their own generated waste. Rather, municipal government was held responsible by 76.2% of residents to manage waste.

Source: authors

From the comparism of an environmentally literate person as postulated by Roth (1992) with residents of Ibadan, are at the nominal stage of Environmental literacy as they are aware and concern about waste management issues. Majority of residents are practicing unwholesome waste disposal methods. With regards to attitude, they exhibit positive attitude only towards the benefits of waste management and show nonchalance towards the practicality of waste management. For instance, it was widely agreed that waste management is a shared responsibility, however when it came to their involvement, they relegated the management of waste to the government. The willingness of residents to participate in waste management is not commendable, they are not interested in acquiring information to aid in composting, majority are not interested in recycling and are motivated by incentives rather than the benefits that will be gained in participating in waste management.

SUMMARY AND CONCLUSION

The present waste management practices amongst residents are not environmentally friendly. Though resident are aware and concern about waste management in the city, their attitude and willingness to participate is not commendable. The current methods used to educate people about proper waste management are not sufficient. Comparism of attitudes awareness, concern and willingness to participate with characteristics of an environmentally literate person as postulated by Roth (1992) shows that residents of Ibadan are not environmentally literate with regards to waste management. The state Government should utilize more innovative ways of educating the people about proper waste management. Religious institutions should be approached to help in spreading the news. Incentive based recycling programs should be introduced to encourage the practice amongst residents

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