

Household Participation in Waste Disposal and Management in Ijebu-Ode, Nigeria

Bolanle A. Odufuwa¹, Bashir O. Odufuwa², Omoighe M. Ediale³ and Segun Oriola³

¹*Department of Home Economics, School of Vocational and Technical Education, Tai Solarin College of Education, Ogun State, Nigeria*

²*Department of Urban and Regional Planning, College of Engineering and Environmental Studies, Olabisi Onabanjo University, Ogun State, Nigeria*

³*Department of Architecture, College of Engineering and Environmental Studies Olabisi Onabanjo University, Ogun State, Nigeria*

E-mail: ¹ <bolarem22@yahoo.com>; ² <olubashy22@yahoo.com>;

³ <omcdee2002@yahoo.com> <segunoriola@yahoo.com>

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ABSTRACT Waste disposal and management is a disturbing issue in most developing countries. Domestic waste generation in most Nigerian cities has increased prodigiously and management of waste in the country is not satisfactory; despite environmental sanitation programme adopted by government. Most parts of Ijebu-Ode are not covered by any institutionally organized waste management service; hence waste disposal and management issues have become a point of discourse in recent time. This was based on the health implication of improper waste disposal and management on the city dwellers. This study examined the factors influencing household participation in waste disposal and management. It was conducted in Ijebu-Ode, Ogun State, through a survey of 385 respondents using stratified and simple random sampling technique. Analysis revealed that there is a low level of household awareness about the environmental implications of improper domestic waste disposal and management in the city. It also reveals significant relationships between socio-economic variables and participation in domestic waste disposal and management. The study concluded that there is need for environmental education, particularly on waste disposal and management approach towards improving the household participation in domestic waste disposal and management in the city.

INTRODUCTION

The alarming rate of waste generation, exploding population and increasing urbanization cannot be divulge from approaches adopted by city managers in area of waste disposal and management. The pattern of waste disposal and management in most developing cities like Ijebu-Ode are beginning to change the patterns of biosphere functions, and contribute to depletion of ozone layer; particularly the global ecosystems at a time when millions of people are looking for sustainable livelihoods (Simmons 1999). In recent time, the pattern of waste generation and disposal has been a major concern for environmentalists, planners and other related professions (Adejobi and Olorunnimbe 2012; Chukwuemeka et al. 2012; Kamara 2006; Mata 2006; Ohakwe et al. 2011). It has become a major discourse in different conferences and workshops like the Rio de Janeiro Earth Summit in 1992; World Summit on Sustainable Development 2002 and more importantly the Millennium Development Goals (MDGS) and Vision 20:2020.

Waste is an inevitable aspect of human existence that results from man's productive and consumption activities upon which he depends for survival. Waste can be viewed as any material lacking direct value to the producer and so must be disposed (Science in Africa 2003). It is the precipitation of useless residual product after the removal of the valuable portion of the product (Ande 1994). Adebo and Ajewole (2012) observed that there is a rise in illegal dumping and proliferation of permanent piles of rubbish in some commercial, industrial and residential areas of Nigerian urban areas. They noted that lots of garbage were lying uncollected in streets, leading to environmental nuisance and danger to public health. Indeed, waste management remains one of the notable areas of worries in Nigeria. Though, Adebo and Ajewole (2012) posit that there is a widespread lack of resources and technical and administrative capacity to properly implement sound mechanisms for waste management in Nigeria. It should, however, be noted that active participation of stakeholders in waste disposal and management, particularly in

Nigeria requires effective funding and orientation of the Local Government Authority charged with the responsibility of waste management in Nigeria.

Surprisingly, governments at different levels in Nigeria appear to have failed to fulfill their duties in this area. It was made known that poor management of Nigeria's environment is costing the nation over \$5 billion dollars annually (SIA 2003). Besieged by a plethora of problems, governments are generally seen as incapable of dealing with the problems of waste management. Consequently, most cities residents have adopted different unfriendly methods of disposing their waste. They burn, bury or dispose their waste haphazardly (Longe et al. 2009). Stinking heaps of uncollected waste, waste disposed haphazardly by roadsides, road medians, in open spaces, in valleys and drains and waste water over flowing onto public lands are common features of most cities in Nigeria. It should therefore be noted that, if waste is poorly managed, it becomes a danger to health, a threat to the environment, a nuisance, a coding factor in civic morals, and possibly a major social problem.

Ifeoma et al. (2011) noted in a study conducted in Nigeria that improper handling, storage and disposal of wastes are factors responsible for increasing environmental pollution and enhances the activities of pathogenic organisms and facilitates the spread of infectious diseases. It was further emphasized that effective disposal of household waste will limit the incidence of infectious diseases and propel a healthy environment for living. Ohakwe (2011) emphasized that formal recycling programme for waste materials is urgently needed in order to achieve resource conservation and environmental protection. It is, however, important to note that waste recycling programme in Nigeria can be realized through effective or good governance at all levels. Study in Europe explained that among the obstacles to improving waste management in households was accessibility of recycling and waste management facilities. The issue of space as a factor influencing household waste management attitudes and behaviours was also mentioned (European Commission 2007). Waste disposal remains a contentious issue, with no end in sight in Ijebu-Ode—a notable medium size city in Ogun State. Refuse are thrown on roadways and road media particularly during environmental sanitation exercise, thus compounding the

flood problem during the rainy season. It becomes so bad that a pragmatist approach was adopted requiring residents to spend the last Saturday morning of each month to clean their environment. This is however yet to achieve the expected goal.

Evidence suggests that the state of waste disposal and management in Ijebu-Ode continues to worsen despite the monthly environmental sanitation exercise. Large parts of Ijebu-Ode, especially poorer areas, are becoming untidy due to improper domestic waste disposal and low participation in domestic waste recycling or management. It is disturbing that waste phenomenon has become so disgusting and aggravating to the extent that mountain heaps of waste now adorn roadsides forming part of city's landscape, roads are sometimes halved or coned off by heaps of refuse. To this end, there is need to investigate the household awareness and participation in waste disposal and management. Findings from this study will contribute to existing literature on household waste disposal and management. Also, it will be instrumental for policy makers, planners and other environmentalist in understanding the extent of environmental education approach to waste disposal and management. Nevertheless, it will inform stakeholders, particularly policy makers on the best approach for designing and implementing environmental education programmes that will encourage or enhance household's participation in waste disposal and management.

Conceptual Framework and a Brief Literature Review

This section discusses the concepts of household, participation, environmental education and domestic waste management. It also examines the waste management ladder. There appears to be no universally agreed definition of households. According to Ellis (1998), household is viewed as a social unit characterized by sharing the same dwelling unit, incomes that are pooled together for common use. Also, Robertson (1984) defined household as a group of people who pool resources or eat from the same pot. This concept can also be applied to co-residence, a task-oriented unit or the site of shared activities (Kanji et al. 1999). In other words, household may involve close family, order kin networks and can induce unrelated co-

residents such as lodgers. It should, however, be noted that, household being an imperative area of public issue, is frequently viewed as a single entity and treated as a unit of analysis (Kanji et al. 1999). For this study, household is seen as a unit of joint welfare function in which equitable or rational distribution of responsibilities among its members is guaranteed based on the family altruism and under a household head.

Participation according to Schwarz (1993) is defined as getting involved in or taking part in an activity by individuals and groups at all levels. Participation in this study refers to taking part in activities related to domestic waste disposal and management. It should be noted that, large proportion of household waste is related to food production and consumption. Thus understanding the relationship between household consumption patterns and waste disposal; requires a broad interdisciplinary approach of household as the unit of analysis. The most important task is to consciously create the relationship between household influences on environment and environmental behaviour. Therefore, to change environmental behaviour, there is need to spread knowledge and give advice step by step so that individual can integrate the recommended behaviour into action.

Environmental education since 1970s has been characterized as a process that prepares citizens to prevent and solve environmental problems. The need for environmental education as a strategy for an effective environmental management have over the years being the major discourse in several global and regional conferences on the environment. For instance, the United Nations Conference on the Human Environment (1972), United National Environmental Programme Conference 1977, the Rio-de Janeiro Conference, 1992 and the Millennium Development goals; stressed the need for environmental education as liberator of the society from the shackle of waste disposal and management menace or problems. According to UNESCO (1978), environmental education it is a process of developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. Obviously, environmental education is a process of recognizing values and

clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among people, their cultures, and their biophysical surroundings (Neal and Palmer 1990).

The United Nations Intergovernmental Conference on Environmental Education (1977) identified the following as the objectives of environmental education programmes:

- i. awareness: to acquire an awareness and sensitivity to the total environment and its allied problems;
- ii. knowledge: to gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems;
- iii. attitudes: to acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection;
- iv. to acquire the skills for identifying and solving environmental problems;
- v. participation: to encourage citizens to be actively involved at all levels in working toward resolution of environmental problems (UNESCO, 1978 cited in Day et al. 2000).

Specifically on waste management, Agenda 21 implored governments and non-governmental organizations to launch programmes that will focus on the following areas:

- i. Develop and strengthen national capacity to reuse and recycle an increasing proportion of waste;
- ii. Review and reform national waste policies to provide incentives for waste re-use and recycling;
- iii. Develop public education and awareness programmes to promote the use of recycled products.

It is worth mentioning that Adejobi and Olorunnimbe (2012); Van Beukering et al. (1999) explained that effective waste management methods depend on the immediate situation of the concern environment or area. According to these scholars adequate waste management cannot be separated from available resources, strands of knowledge, technology, state of development and environmental priorities. Interestingly, Kamara (2006) conceptualized waste management methods into a ladder that gives an overview of the range of acceptable practices. These prac-

tices are considered as a menu of available options, each of which should be critically assessed and applied under appropriate conditions (Kamara 2006; Van Beukering 1999). Based on the conceptualization, it is most desirable to reduce the rate of waste generation as far as possible, meanwhile prevention in itself can never be absolute, but efforts should be asserted to re-use and recycle household waste so as to reduce disposable components. Where possible, controlled incineration of disposable components is preferred over landfills and dumping. Meanwhile, the least preferred methods, which cannot often be avoided most especially in developing countries are dumping, and open burning which is associated with air pollution (Kamara 2006).

Viewed from environmental educational perspective, the need for having stronger environmental education programmes increases with rising preference for more environmentally friendly methods such as prevention, re-use and recycling. Invariably, environmental education clearly plays an imperative role in enhancing movement upward along the waste management ladder, from open burning through recycling and re-use to prevention. It should be noted that, environmental education involves among others, the acquisition of knowledge, skills, motivation and commitment to work individually and collectively towards the solution of existing environmental problems, and towards the prevention of new ones (Tilburg 1992 cited in Kamara 2006). Environmental education aims at orientating citizens; and helping them in developing perceptions and positive actions towards environmental conservation and protection. Invariably, environmental education strategy needs to be:

- i. Comprehensive: covering all educational fields and communication channels
- ii. Integrated: coordination of educate and media efforts to produce synergy;
- iii. Participatory: involving diverse groups of people in both planning and implementation.

Aim and Objectives

This study aim at contributing to literature on household activities in regards to waste disposal and management. This paper therefore investigates factors affecting household partici-

pation in waste disposal and management in Ijebu-Ode, Ogun State, and the objectives are to:

- i. Examine the level of awareness about the importance of domestic waste sorting, disposal and management.
- ii. Examine the household socio-economic status in determining participation in domestic waste disposal and management.
- iii. Identify factors affecting household participation in waste disposal and management.

Hypotheses

- i. There is no significant relationship between socio-economic variables (Education, income, age, and household size) and household participation in waste disposal and management.
- ii. Household participation in domestic waste disposal and management is not a function of household location.
- iii. Institutional factors (provision of facilities, environmental awareness programme) are not determinants of household participation in waste disposal and management.

METHODOLOGY

The study was conducted in Ijebu-Ode, Ogun State. Ijebu-Ode, at Longitude 30°58'E and Latitude 60°47'N is one of the 20 Local Government Areas (LGA) that make up Ogun State. Ijebu-Ode region covers an area of about 72km² and the second largest urban centre in Ogun State in terms of population and infrastructural facilities, being next only to Abeokuta the state capital. Since the last two decades, the town has proved to be a rapidly growing and expanding urban centre. Its importance as an administrative headquarters and commercial centre predates the colonial period. Ijebu-Ode is a medium-sized city with a population of over 192,000. Topographically, Ijebu-Ode presents a generally gentle undulating plain which rises from about 20 meters above sea level. The topography is underlain by recent alluvial deposits. The town being of very low latitudes is liable to flood during the rainy season. This often results from over flow from drainage channels and blockages of drainage gutters by domestic garbage coupled with ill-maintenance of the drainages by the people and the government agency con-

cerned. Areas usually affected are: Imepe, Degun, Oyingbo, Apebi, Folagbade Road, Balogun Kuku Road and old Ondo-Benin Road etc. Ijebu-Ode has the tropical wet and dry climate characterized by heavy annual rainfall, high temperature and relative humidity. Above all, the town is characterized by modern economics and administrative headquarters.

The target population were the household heads. Stratified random sampling technique was used in the selection of the respondents. Ijebu-Ode Local Government Area was stratified into eleven (11) wards based on the existing socio-political administrative structure of the Local Government. A table of random numbers was used to select 35 households in each ward. 385 questionnaires were distributed among selected households. The reliability of survey instrument was conducted using test-retest method, and this gave a reliability coefficient of $(r) = 0.76$. Information obtained from respondents include the socio-economic characteristics (age, household size, income, level of education) environmental awareness, awareness of waste management issue and participation in domestic waste disposal and management. Data collected were analyzed using descriptive statistics (to access the socio-economic profile of the sample) and simple statistical analysis (Pearson Product Moment Correlation) to test the stated hypothesis.

FINDINGS AND DISCUSSION

The selected socio-economic characteristics analyzed include age, educational status, income and household size. The result in Table 1 reveals that, well over 50% of the respondents ages are between 31-40 years old, while 24% and 14% were 41-50 years and above. This indicates that respondents are mature, and could give better information about the issue. Table 1 shows that, over 50% of the respondents have primary and secondary school education, with just about 33% having tertiary education. The implication of this is that, well over 50% of the respondents do not have adequate education required for waste management. This can be traced to the fact that waste management education is not included at various educational curricula; and there is little or no public awareness programmes on the importance of effective waste management in the city. It is pertinent to

note that, level of education have a resultant effects on the attitude of respondents towards waste disposal and management.

The income level of respondents is also a significant determinant of the kind of waste generated and disposal method. As noted by Medina (1999), there is positive relationship between individual's income and the amount of waste generated. As revealed in Table 1, 98% of the respondents were lower income earners, earning below thirty thousand naira per month. Interestingly, wealthier individuals tend to consume more than the lower-income groups, which results to a higher volume of waste generated by the former, but they seem to have positive attitude towards disposal and management of waste. Also worth mentioning is that the lower income earners tend to dump their waste indiscriminately at their backyards.

Table 1: Socio-economic variables of respondents

(i) Variables	Frequency	%
<i>(i) Age</i>		
21 – 30 yrs	12	3.11
31 – 40 yrs	217	56.36
41 – 50 yrs	94	24.42
Above 50 yrs	57	14.81
No response	05	1.30
<i>(ii) Education</i>		
Primary School	129	33.5
Sec.School	73	18.96
Tertiary School	128	33.25
No Education	43	11.17
No response	12	3.12
<i>(iv) Household Size</i>		
Less than 4	13	3.38
4-6	251	65.19
7-10	117	30.39
Above 10	04	1.04
<i>(iii) Income</i>		
Less than #5,000	17	4.42
#5,000 - #15,000	42	10.9
#16,000- 25,000	87	22.6
#26,000- 35,000	194	50.3
Above #35,000	36	9.3
Above #35,000	09	52.34

Source: Authors Field Survey

About 65% of the household size is between 4-6 people, while 30% have between 7-10 people. The obvious implication of this is that, since 98% of the respondents are lower/middle income earner, they could not afford living in a 3-bedroom flat, thus they all live together in a small room in the compound of face-to-face facilities.

The waste generated is stored in waste containers which are kept at the backyard; and later empty by household members at nearest public space or burnt at their backyards. This situation is partly responsible for the unhealthy environment witness in some parts of the city.

Table 2: Participation in waste disposal

Response	Frequency	%
Yes	267	69.35
No	97	25.19
No response	21	4.45
Total		100

Source: Authors field survey

Table 3: Methods of disposing waste

Methods	Response	%
Bin collection system	37	9.61
Open dumping system	216	56.10
Sanitary landfill	14	3.64
Burning	118	30.65
No response	-	100

Source: Authors Field Survey

Table 2 shows the level of respondent's participation in wastes disposal and management. About 69% of the respondents participate actively in waste disposal, while less than 30% of the respondents do not participate in waste disposal and management. This was partly attributed to the nature of the environment in which they found themselves, their level of environmental management awareness, prevailing governmental policy and the household size. In actual fact, this view was justified by the methods of waste disposal used by the respondents. Over 96% of the respondents uses bin collection system, open dumping system and burning, while about 4% are partially involved in sanitary landfill system (see Tables 3 and 4). It is surprising to note that, about 67% of the respondents are not aware of the implications of poor waste management. As revealed in Table 5, below thirty percent of the respondents are familiar with the effects of improper waste disposal and management. This implies that there is need for proper enlightenment on the health implications of improper waste disposal and management in city. Interestingly, empirically tested hypotheses revealed that, there is significant relationship be-

tween the marital status, income, household size, accessibility and environmental awareness programme and participation in waste disposal and management (see Table 6). This connotes that respondent's participation in waste disposal and management is a factor of the above mentioned variables. It is worth mentioning that, educational status, age and available facilities are not significant determinants of participation in waste disposal and management in the city.

Table 4: Frequency of use of waste disposal methods

Disposal methods	Not available	Daily	Twice a week	Once a month
Bin collection system				7.53%
Open dumping system		53.25%		
Sanitary landfill system				4.87%
Burning		34.53%		

Source: Authors Field Survey

Table 5: Awareness of the implications of improper waste disposal

Response	Frequency	%
Yes	112	29.09
No	259	67.27
No response	14	3.64
Total		100

Source : Authors Field Survey

Table 6: Correlation analysis of selected variables and household participation in waste disposal and management

Variables	R	P	Decision(s)
Marital status	-0.14	0.09	Significant
Educational level	-0.10	0.06	Not significant
Income	0.16	0.02	Significant
Age	0.02	0.89	Not significant
Household size	0.19	0.02	Significant
Accessibility (distance)	0.13	0.02	Significant
Availability of facilities	-0.01	0.79	Significant
Environmental awareness programme	0.15	0.01	Significant

Source: Field Survey

Tested at 0.05 level of significance

CONCLUSION

Household participation in waste disposal and management will over the time continue to

be a significant discourse among academia and policy makers. The appropriate choice of disposing and managing waste in the city is important; simply because it affects the environmental wellbeing of the communities. In other words, the circumstances of household members, especially their responsibilities affect the types and methods of waste generation and disposal methods. Based on this premise, it is pertinent that an "all-involved" decision-making mechanism should be accorded in different households to allow the views and preferences of all household members in disposal and management of waste. This paper has explicitly examined the level of involvement of various decision-makers in the households towards disposal and management of waste. From the findings however, it is obvious that, socio-economic variables have a relationship with household waste disposal and management. In other words, socio-economic background of respondents is a significant factor that determines involvement or participation in household waste disposal and management. Thus, as the environment affects almost every aspect of our daily lives, it is becoming increasingly difficult for most households to live comfortably in community that is free from environmental nuisance courtesy improper waste disposal and management. It however implies that, the socio-economic wherewithal of the respondents stands as a prominent variable that enhances participation of household members in disposal and management of waste.

RECOMMENDATIONS

The study recommends a public enlightenment programme on waste disposal and management. Government should integrate environmental education into existing curriculum of schools in the country. In addressing the accessibility challenge faced by the people, government should strengthen the activities of the private public waste management organization through rehabilitation of bad roads that link most streets to major roads in the city. This will facilitate or enhances the prompt contact between the people and waste management organization. Government should also discourage the placement of household waste on road sides and road medians. This can be done through effective and enforced environmental law and provision and well managed waste disposal sites at strate-

gic locations as well as the use of adequate or functional waste collector van or containers. People participation in waste disposal and management policy or decision should be encouraged. This will foster better relationship between the city managers (government) and the people at large, particularly in the area of waste disposal and environmental management strategies. The paper also encouraged the recycling of waste in the city. It argued for waste separation and recycling. This will not only results to healthy environment, but it will facilitate economic activities through employment opportunities and creation of wealth from waste.

REFERENCES

- Adedibu AA 1993. Solid waste characteristics and management in Ilorin. *Journal of the Nigerian Institute of Town Planners*, II(1): 21-30.
- Adebo G, Ajewole O 2012. Gender and the urban environment: Analysis of willingness to pay for waste management disposal in Ekiti-State, Nigeria. *American International Journal of Contemporary Research*, 2(5): 228-236.
- Adejobi O, Olorunnimbe R 2012. Challenges of waste management and climate change in Nigeria: Lagos State metropolis experience. *African Journal of Scientific Research*, 7(1): 346-362.
- Ande T 1994. Strategies for Domestic Refuse Storage and Collection, Sewage and Refuse Disposal and Environmental Sanitation in the Local Government Areas of Ogun State. *Paper Presented at the Workshop on Healthy Physical Environment and Solid Waste Management in Ogun State*, August 30-31.
- Chukwuemeka E, Osisoma B, Onwuka E, Ugwu J 2012. The challenges of waste management to Nigeria sustainable development: A study of Enugu State. *International Journal of Research Studies in Management*, 1(2): 79-87.
- Day B A, Monroe M C 2000. *Environmental Education Communication for a Sustainable World, Handbook for International Practitioners*. Academy for Educational Development, Washington, DC.
- Egunjobi O 1986. Problems of solid waste management in Nigeria urban centres. *Journal of Nigerian Institute of Town Planners*, XII: 14-25.
- Ellis F 1998. *Peasant Economics: Farm Households and Agrarian Development*. Wye Studies Agricultural and Rural Development. UK: Cambridge University Press.
- European Commission 2007. A New Approach to Investigating Household Waste Management Behaviour. *Science for Environment Policy News Alert Service*. Brussels: European Commission
- Faniran A, Adeboyejo A F 1999. Environmental education and awareness for effective environmental protection and management in Nigeria. *Journal of Nigerian Institute of Town Planners*, XII: 1-13.

- Ifeoma M, Onyeonoro U, Ezeama N, Ogbuagu C, Agam N 2011. Public health implication of household solid waste management in Awka South East Nigeria. *The Internet Journal of Public Health*, 1(1): 13-21.
- Kamara AJ 2006. *Household Participation in Domestic Waste Disposal and Recycling in the Tshwane Metropolitan Area: An Environmental Education Perspective*. Thesis in Environmental Education, Unpublished. University of South Africa.
- Kanji N, Beall J 1999. Households, Livelihoods and Urban Poverty. Urban Governance, Partnership and Poverty. *Theme Paper 3*. UK: DFID.
- Longe E, Longe O, Ukpabor E 2009. People's perception on household solid waste management in Ojo Local Government Area in Nigeria. *Iran Journal of Environmental Health Science*, 6(3): 209-216.
- Mata J I 2006. El Salvador's National: Environmental education strategy. In: B Day, M Monroe (Eds.): *Environmental Education Communication for a Sustainable World*. Washington, DC: AED, 91-103.
- Neal P, Palmer J 1990. *Environmental Education in the Primary School*. Blackwell: Oxford.
- Odufuwa BO 2005. Mitigating environmental tragedies in Nigeria. *International Journal of Environmental Issues*, 3(1): 227-239.
- Ohakwe J, Nnorom I, Iwueze I 2011. Survey of attitude of residents towards environmental deterioration in Nigeria and factors influencing their willingness to participate in reducing the trend: A case study of waste management. *Trends in Applied Sciences Research*, 6(2): 154-164.
- Olokesusi F 1994. Sustainability and solid waste management in Metropolitan Lagos: The imperatives for improvement. In: OE Albert, J Adisa, T Agbolla, G Herault (Eds.): *Urban Management and Urban Violence in Africa*. Institute for Research in Africa (IFRA), Ibadan. Volume 1: 315-323.
- Ozkan Y 2002. Investigation of consumption behaviour of families related to the generation of waste. *Pakistan Journal of Social Sciences*, 4(3): 385-391.
- Science in Africa (SIA) 2003. Waste: Is the Developing World Ready? July-August 2003. *Africa's First online Science Magazine No. 13*: 16-18.
- Schwarz C 1993. *The Chambers Dictionary*. London: Chambers Harrap Limited.
- Simmons IG 1996. Environmental thought: The last 25 years. *International Journal of Environmental Studies*, 29: 163-170.
- Tilbury D 1992. Environmental education within pre-serviced teacher education: The priority of priorities. *International Journal of Environmental Education and Information*, II: 267-280.
- Umeakuka JM, Mba HC 1999. Solid waste management practices: A case study of Anambra State. *Journal of Nigerian Institute of Town Planners*, XII: 14-26.
- United Nations Educational Scientific and Cultural Organization 1978. Final Report *Intergovernmental Conference on Environmental Education*. August, 3rd USSR, pp.14-26.
- Van Beukering P, Sehker M, Gerlagh R, Kumar V 1999. Analyzing Urban Solid Waste in Developing Countries: A Perspective on Bangalore India International Institute for Environmental and Development (IIED). *Working Paper No. 24*. CREED Working Paper Series, Amsterdam.
- Yusuff R 2003. Application of GIS to municipal waste management. In: Y Fawehinmi (Ed.): *Urban Finance and Infrastructural Development in Nigeria*. Ibadan: Atlantis, pp.135-148.