ENVIRONMENTAL CONSEQUENCES OF SOLID WASTE GENERATION IN IKA NORTH EAST AND IKA SOUTH LOCAL GOVERNMENT AREAS OF DELTA STATE, NIGERIA

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ABSTRACT

The survey on solid waste generation in Ika urban and rural environs was conducted to explore the environmental consequences. 240 respondents were randomly selected for the study. The data obtained were tabulated and subjected to descriptive analysis. The major causes for increased solid waste generation in these areas were identified to be increased population, earning and urbanization. It was observed that the nature of waste generated in Ika urban was mostly garbage; while in the rural area was agricultural waste and garbage. The major means of waste disposal in Ika urban was incinerator, while open dumping in the rural areas. However, proper waste disposal campaign among others was recommended.

Key words: *solid waste, environmental consequences, urban and rural dwellers.*

INTRODUCTION

Solid wastes are materials arising from human activities that are discarded as useless or unwanted. It includes all the heterogeneous mass of discarded items from residences and commercial activities as well as the more homogeneous accumulation of a single industrial activity. Recently, sanitation was mainly centered on the disposal of human excreta, while the disposal and management of other solid wastes remained neglected.

Much of the ill health in our country can be attributed to the defective sanitation system (Olawepa, 2000). For every human endeavour, solid waste is created. Solid wastes can be generated by natural phenomena such as wind, erosion, precipitation, volcanic eruptions, flooding of river banks, atmospheric fallouts, among others and by human activities including domestic, commercial, industrial and agricultural practices (ACS, 1969; Eipper, 1970; Moncrief, 1970). The magnitude of solid wastes generated from human activities alone may exceed 18,000 tons per year for a developing area (Habital, 1989; Onibokun, 1989).

The problems of solid waste can be traced back to ancient times when man started to congregate into clans, tribes, hamlets, communities (Ahmed, 2000). It was observed that as settlement grows and becomes more sophisticated due to higher rate of urbanization, more pollutants are spread on the landscapes. It was equally noted that the greater the concentration of population, the greater the amount of solid waste generated. Rapid urbanization has increased the amount of wastes produced and the incessant pressure on the environment with the externalities of development undoubtedly posed threats to sustainable development of the people and economy (Geoffrey, 1999; Olawepa, 2000). As population increases, the resources used to feed, cloth and provide infrastructure also increase, as wel as the quantity of solid wastes generated and disposed.

Generations past lived within small communities where wastes resulting from human activities were dispersed over large expanse of land, causing little or no adverse effect on the environment. Today, there has been a phenomenal increase in the volume and range of solid wastes generated daily in our cities due largely, to the increasing rate of population growth, urbanization and general economic growth. The emergence of urbanization is responsible to the rapid accumulation of wastes. Wastes

are often indiscriminately dumped along roadsides, drainage channels, streams, rivers and other water bodies. The discarded containers are difficult to handle in the traditional disposal processes. The indiscriminate dumping of vehicle scraps and unused machineries on the streets and highways is another major source of solid waste and environmental degradation. Another source of waste generation is as a result of changes in the wage earnings. Higher income earning leads to a greater propensity of buying, specifically, the packed items which have non-biodegradable packages and plastic bags.

In Nigeria, it has been exceedingly difficult to quantify the amount of wastes generated per household, community and settlement but it has been observed that about 75% of the total wastes generated each month are mainly from the urban centers (Nnamani, 2000). Though, the amounts and characteristics of the various types of refuse differ with time of the year, season, geographical location and the sanitation attitude or habit of the contributing population.

The disposal of wastes in or on the land without careful planning and management can present a danger to health and the environment (Smith, 2005). Waste management can be defined as the collection, transportation, processing, recycling or disposal of waste materials produced by human activity (Allaby, 1988). It is undertaken to reduce their effect on health, the environment or aesthetics. The most common method of disposing waste is by open dumping and burning. Open dumping is harmful to health, contaminates drinking water (both underground and surface supplies) and pollutes the air and land.

Urban non-biodegradable solid wastes, which include plastic, sachets, bottles, containers, leather burning of combustible non-biodegradable gives off gasses which eventually leads to acid rain, global warming and ozone layer depletion, while buried plastic products prevent water movement, thus causing imparable damage to soils. Plastic products block drainage channels causing flooding. Cellophane wrappers used for food are hazardous to some domestic animals like goat and sheep. Other effects include reduction in aesthetics of places, and affluences from refuse dumps alter soil chemistry. More so, littering, declining biodiversity, excessive leaching of rich alluvial soil, spread of epidemic and pandemic diseases are parts of poor waste management effect.

In Nigeria, series of decrees were promulgated on environmental protection and sustainable environment. These include: (i) Petroleum Decree of 1969, (ii) Territorial Water Decree 1967, (iii) Explosive Act 1964, (iv) Federal Environmental Protection Agency Decree 58 of 1988, (v) Harmful Waste (special criminal provision) Decree No 42 of 1988, (vi) National Environmental Protection (pollution abatement in industries and facilities (Generating Wastes Regulations 1991), (vii) Environmental Impact Assessment Decree No 86 of 1992, (viii) Monthly National Environmental Sanitation day in 1985. The above legislation and regulations provide the authorities concerned to enforce compliance with the nation's environmental protection standard and the instrumentation for their enforcement.

Waste generation is a major problem affecting the society. In fact, it is a societal problem. The incidence of waste generation is on the increase these days in most of our major cities. Hence it becomes very imperative to investigate the causes for the increased waste generation problem and to question if waste generation problem is only experienced in the city. In fact, a comparison of waste generation problem in Ika urban and rural areas necessitated this study. Therefore, the major objective of this work was to investigate the causes for increased wastes generation in both urban and rural areas of Ika environs, Delta State.

Others were to identify the sources of waste, the nature of wastes, means of wastes disposals, problems of waste disposal, problems created by wastes generation in both urban and rural areas of Ika environs and makes recommendations.

MATERIALS AND METHODS

The work on waste generation was carried out in Ika environs of Delta State, Nigeria. Ika environs comprises two local government areas (Ika North East and Ika South) with twelve clans of which two clans are urban. Ika environs is located between latitudes $5^0$30' and $5^0$45"N and longitudes $6^0$15" and $6^0$30"E of the Equator and Greenwich meridian respectively. The area of study has an average annual rainfall ranging from 2,300mm to 2,500mm and annual mean temperature of 28^0C-30^0C (Ofuanne, 1993).

The major economic activity of the people within the area is farming. Reconnaissance survey was conducted on the study area. two hundred and fourty copies of questionnaire centered on waste generation, causes, sources of waste, nature and means of waste disposal were administered to 240 purposefully selected respondents; 120 respondents each from urban and rural areas respectively. However, 200 respondents complied. The data obtained from the two hundred respondents were subjected to descriptive statistics (percentage and frequency).

RESULTS AND DISCUSSION

The results as shown in table 1 indicated that in both urban and rural areas of Ika environs, more than 55% of the respondents are married. The age distribution shows that the greatest percentages of the respondents in both areas are within the age range of 31-50 years. This implies that majority of the respondents are in the climax of maturity and are very active. Hence, answers to the questions on wastes management is relied upon by the researchers. The least educational status of the respondents is primary school level. The possible implication here is that majority of the people are literate and hence easy acceptance of measures to combat waste generation problems will be high. Literacy facilities have been used in the communication channels. The sex of the respondents shows higher percentage of female in the urban and in the rural. In both urban and rural areas, women are very much concerned in sanitation of the environment than the male and hence much interested on environmental issues. Women rely more on natural systems such as soil, water and forestry for survival hence they have more interest in environmental protection and repair (Gwagwa, 1991).

Distribution of respondents by occupation reveals that majority of the people in rural areas are involved in farming. The implication here is that rural areas are mainly agrarian environment and hence the major activity of the people is farming as a means of livelihood. But in the urban area, majority of the respondents as indicated are into business and in civil service. Hence, they depend on day-to-day business transaction and on government for their livelihood (table 1).

The sources of waste as shown in table 2 indicates that in the urban area, the major sources of waste is commercial followed by residential, industrial, agricultural and domestic respectively. These sources of waste are reflections of the occupation of the dwellers. Since majority of the people in the urban areas are engaged in business and civil service job. The interaction of people in form of buying and selling leads to formation of wastes, which actively pollute the environment. The wholesalers break the bulk, the retailers break further and the consumers finally buy. During this process, the packs, bottles; tins and plastics are disposed off as wastes. However, in the rural areas, the major source of waste is Agriculture, followed by residential and lastly domestic. This is also, a reflection of the major economic activity of the people. The majority of the people as shown in the occupational distribution are farmers. Hence, agricultural wastes like palm oil processing wastes, animal wastes, cassava processing wastes etc are common in the rural areas.

The nature of waste generated in Ika environs as shown in table 2 indicates that in urban areas, rubbish formed the largest form of wastes, followed by garbage, industrial refuse and lastly agricultural. The nature of waste generated is strongly related to the occupation and sources of wastes in the area. Large amount of waste in form of rubbish like cans, tins, plastics, cellophanes, papers etc. are generated from commercial and residential activities, which formed the major sources of wastes in the urban areas. Garbage waste like waste food items, market wastes etc which formed 30% of the nature of waste is also closely related to the sources of waste and occupation of the people. Industrial waste/refuse like detergent and soap waste, paint waste, pieces of construction materials, abandoned car spare parts and different types of industrial waste arising from industrial activities formed 10% of the nature of wastes in urban area.

These wastes are generated from industries located within the urban areas. However, in the rural areas, agricultural wastes in the form of cassava processing wastes, palm oil processing waste, animal waste etc formed the highest percentage followed by garbage and rubbish. The nature of waste generated is also related to the economic activities of the area as well as the major sources of waste. Agriculture formed the major occupation of the people in rural areas. It was observed that 2 compounds out of 20

compounds in rural areas have garri and palm oil processing mills sited indiscriminately without considering the environmental consequences.

On the causes for increased waste generations, respondents in both areas (urban and rural) indicated increased population as the major cause of increased waste generation as shown in table 2. Population increase tends to increase human activities and increase in human activities generates more wastes. This finding agrees with Ogundele (2005) who observed that the greater the population, the greater the waste generated. Other causes as indicated by the respondents are urbanization and increased earning. This is closely related to increase population, because increased population leads to increased earning and urbanization.

The means of waste disposal as shown in table 2 indicates that the use of incinerator is the most common means of waste disposal in urban areas. Incinerators are sited in some strategic positions in urban areas, though a little distance away from dwelling places there by creating problem of effectively disposing wastes. Very close to incinerator as a means of disposal of waste is burying followed by open dumping and burning. These methods of waste disposal are used in less populated urban areas. However, short comings of these methods are: Pollution of underground water, degradation of the environment and pollution of the atmosphere. In rural areas, open dumping is the most common means of wastes disposal, followed by open burning. In the rural areas, most pits dug at the backyard of compounds usually act as waste dumping sites. Many a time, these waste sites are not treated and hence formed a very good breeding ground for most vectors of diseases. More so, offensive odour usually detrimental to health emanated from these pits. Open burning on the other hand creates problems of atmospheric pollution.

Frequency of waste disposal as shown in table 2 indicates that in urban areas, wastes are disposed off majorly on monthly bases. This may be attributed to the federal monthly sanitation exercise conducted nationwide. 6% and 5% of the respondents indicated weekly and forthrightly respectively. These responses can be attributed to the State Government sanitation exercise conducted in the State. However, in the rural areas, waste disposal is majorly on daily bases as indicated by 85% of the respondents. This may be attributed to the dumping pits dug at various backyards of different households. Others are on weekly bases and twice a

week as opined by 10% and 5% of the respondents respectively. In rural areas, sanitation exercise is a daily routine. Most families mandatorily sweep the compound every day in the morning thereby disposing off every waste generated to the waste dumping pits. Some sweep twice a week, while some sweep every Sunday. This rural dwellers' attitude to sanitation generated the result shown in table 2.

Nature of wastes disposal problem as shown in table 3 indicates that unavailability of collection centers is the major waste disposal problem as indicated by 70% of the respondents in the urban areas. This is followed by collection centers so far away and lastly inadequate collection centers. However, in the rural areas, 100% of the respondents indicated lack of treatment face as the only and major waste disposal problems. This can be attributed to numerous open dumping pits situated at various households that have never received attention of health workers/Government that these open pits need to be treated. Hence, emission of some harmful fades into the air which results in air pollution. Also, these sites act as a favourable breeding ground for vectors of diseases.

Problems created by waste generation in the rural areas as shown in table 4 are: ill health; un-conducive environment as a result of air pollution where in urban areas, un-conducive environment, ill health, flood disaster and blocking of the drainage systems are common. All these problems are connected to the ways/means of solid waste disposal, frequency of disposal and lack of treatment face of waste sites.

Periods of waste problems occurrence as shown in table 5 indicates that the problem of waste can occur in both seasons in both rural and urban areas but is most common in wet seasons. This may be attributed to the fact that wet season favours breeding of vector of diseases, encourages the activities of purifying bacteria and pollution as well as encourages percolation of some poisonous ions down to the underground water thus polluting the underground water bodies.

Waste generation may be seen as that part of human activity that is regarded as unuseful thereby discarded, and brought together. However, not all solid wastes or scrap are waste as they may form raw materials for the production of other items. For example, recycled plastic containers can be used to produce other plastic products or waste papers can be used to produce toiletry products like tissue paper.

Efforts to combat waste generation problems as shown in table 6 in urban areas indicate enforcing environmental laws, ensuring regular environmental sanitation, provision of disposal vehicle and creation/ provision of dumping sites. All these explained the efforts made by the Government to ensure healthy sanitary condition for the inhabitants. The environmental sanitation done once in every last Saturday of the month nationwide is one of the major efforts made by the government to cub waste generation problems, however, more efforts to enforce better implementation should be put in place. In rural areas, community clean up as indicated by 90% of the respondents is the major way the rural dwellers maintain their environment. It is a culture within Ika environs that members of the community, clean up the major streets, roads and all major meeting places once in a week and any defaulter is seriously fined accordingly.

CONCLUSION AND RECOMMENDATIONS

Waste management is a major problem affecting the developing societies. The incidence of waste management is on the increase as human and economic activities are also on the increase. Hence, investigating the causes for the increased waste management problems and to question if waste management problem is only experienced in the urban areas. In fact, a comparison of waste generation problem in Ika urban and rural areas necessitated this study. From all indications, it suffices to conclusively state that waste management problem is prevalent and felt more in the urban areas than in the rural areas. Therefore, all stakeholders of the environment should imbibe environmental conscious and friendly behaviours by ensuring that every waste generated is properly and appropriately disposed. Efforts to ensure that face treatments of dump sites should be intensified to reduce the activities of vectors of diseases. Adequate waste collection and evacuation vehicles should be provided and the frequency of collection of wastes should be increased. The environment is ours, so, every individual should own a responsibility of keeping the environment safe before looking up to the government who on their part should not be a disappointment in discharging it legitimate responsible of ensuring an enabling living environment for its citizens.

Table 1: Socio-Economic Characteristics of Sampled Respondents

Variables	Urban		Rural	
	Frequency	%	Frequency	%
Marital Status				
Single	45	45	40	40
Married	55	55	60	60
Age Distribution				
20 - 30	10	10	5	5
31- 50	75	75	80	80
51 and above	15	15	15	15
Educational Status				
primary school	20	20	25	25
secondaryn school	30	30	35	35
tertiary institution	50	50	40	40
No formal school	5	5	4	4
Sex				
Male	40	40	45	45
Female	60	60	55	55
Occupation				
Farming	15	15	60	60
Business	40	40	16	16
Civil/public servant	40	40	15	15
Applicants	5	5	9	9
Total	100	100	100	100

Source: Fieldwork, 2008

Table 2: Summary of Waste Generation on the Bio Data of the Respondents in Ika Environment

Variables	Urban		Rural	
	Frequency	%	Frequency	%
Sources of Wastes				
Agriculture	5	5	60	60
Commercial	40	40	-	-
Domestic	5	5	15	15
Industrial	20	20	-	-
Residential	30	30	25	25
Others	-	-	-	-
Nature of Waste				
Garbage	30	30	30	30
Rubbish	58	58	30	30
Agricultural Waste	2	2	40	40
Industrial refuse	10	10	-	-
Causes for Increased Waste				
Increased population	85	85	90	90
Changed in style of living	-	-	-	-
standard of living -	-	-	-	
Urbanization	5	5	-	-
Increased earning	5	5	-	-
All of the above	5	5	10	10
Means of Waste Disposal				
Open dumping	10	10	82	82
Open burning	10	10	18	18
Burying	20	20	-	-
Incinerator	60	60	-	-
Frequency of Disposal				
Weekly	6	6	10	10
Forth nightly	5	5	-	-
Monthly	80	80	-	-
Daily	-	-	85	85
Twice a week	-	-	5	5
None of the above	5	5	-	-

Source: Fieldwork, 2008

Table 3: Nature of Waste Disposal's Problems in Ika Environs

Variables	Urban		Rural	
	Freq.	%	Freq.	%
Lack of treatment face	-	-	100	100
Unavailability of collection centers	70	70	-	-
Collection centers so far away	20	20	-	-
Inadequate Collection Centers	10	10	-	-

Source: Fieldwork, 2008

Table 4: Problems Created by Waste Generation in Ika Environs

Variables	Urban		Rural	
	Freq.	%	Freq.	%
Flood Disaster	20	20	-	-
Ill Health	30	30	50	50
Un-conducive Environment	30	30	40	40
Blocking of Gutter	10	10	-	-
All of the above	10	10	10	10

Source: Fieldwork, 2008

Table 5: Periods of Waste Occurrence

Variables	Urban		Rural	
	Freq.	%	Freq.	%
Wet Season	80	80	90	90
Dry Season	15	15	5	5
Both Seasons	5	5	5	5

Source: Fieldwork, 2008

Table 6: Efforts to Combat Waste Generation Problem in Ika Environment

Variables	Urban		Rural	
	Frequency	%	Frequency	%
Enforcing environmental laws	30	30	10	10
Ensuring regular environmental sanitation	30	20	-	-
Community clean-up	-	20	90	90
Provision of disposal vehicles	30	20	-	-
Provision/creation of dumping sites	5	5	-	-
All of the above	5	5	-	-

Source: Field, 2008

REFERENCES

Ahmed, Y. A. (2000). *Waste Generation and Management.* In Jimoh, H. I. J.and Zifabiyi, I. P. (eds.) *Contemporary Issues in Environmental Studies.* Ibadan: Haytec Press and Publishing Co. Ltd, 13 - 22pp.

Allaby, M. (1988). *Macmillan Dictionary of the Environment* (Third Edition). London: Macmillan Press Ltd.

American Chemical Society (ACS) (1969). Cleaning our Environment. The Chemical Basis for Action, Washington, D.C; 249 Pp.

Eipper, A. W. (1970). Pollution Problems, Resources Policy and the Scientist. *Science,* 169, 11-15.

Geoffey, L. (1999). Waste. Our Planet. *UNEP Magazine* Vol. 10 (4) 19 United Nation Environmental Programme.

Gwagwa, N. N. (1991). Women in Local Government. Towards a Future South Africa. *Environment and Urbanization,* 3,1.

Habital, C. (1989). Solid Waste Management in Low Income Housing Projects. The Scope for Community Participation. United Nation for Human Settlement. Nairobi, Kenya.

Moncrief, L.W. (1970). The Cultural Basis for Our Environmental Crisis. *Science,* 170, 508-512.

Nnamani, J. O. (2000). *Waste Management Problems of Nigeria Urban Centres.* Lagos: Justin Tech Educational Service Publishing. Subsidiary of Enviro-Links Project, Nigeria Ltd.

Ofune, J. A. (1993). Regional Geography of Nigeria, West Africa and the Rest of Africa. Benin City: Umeh Press, Nigeria.

Ogundele, J. A. (2005). *Relationship Between Human Comfort and Micro-Climatic Parameters*. In Ibitoye, O. A. (Ed) *Scientific and Environmental Issues in Population, Environment and Sustainable Development in Nigeria.* Ado Ekiti: Petoa Publishers.

Olawepa, R. A. (2000). *Environmental Pollution and Management.* In Jimoh, H. I. J. and Zifabiyi, I. P. (eds) *Contemporary Issues in Environmental Studies.* Ibadan: Haytec Press and Publishing.

Onibokun, A.G. (1989). *Urban Growth and Urban Management. in Nigeria.* In Stern, R. E. and White, R. R. (eds) *African Cities in Crisis.* London: West View Press.

Smith, K. R. (2005). Indoor Air Pollution, update on the Impacts of Household Solid Fuels: Environmental Matters. *Annual Review, World Bank.*