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# INFORMATION ON STATE OF CHALLENGES OF WASTE MANAGEMENT SYSTEM IN NIGERIA URBAN HOUSING SYSTEM

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***ABSTRACT***

***This research work is carried out on the environmental risk and impact of waste disposal in the urban housing system. The study aimed at providing solutions to problems of waste disposal in the Nigerian Urban housing system in some selected areas in Port-Harcourt metropolis, Nigeria. The major objectives of the study are; to determine the method of storing household waste in rivers state, to study the method of household waste in rivers state, to carry out a systematic analysis of the main waste collection system in rivers state, to study the implication of wrong waste disposal system, to determine the attitude and problems associate with in waste disposal system, to involve a method of curbing / reducing waste disposal system. The data for was collected through primary and secondary sources. The primary data source includes; questionnaire, and personal observation, whereas, the secondary data source, includes textbooks, research project, formal articles and electronic media. 150 sample size was used for the study, while the SPSS package and tools were used in data processing. The data were obtained in the field with the aid of questionnaire administration about the environmental risk and economic impact of waste disposal in rivers state was subjected to analysis and presentation. It was discovered highlighted some factors as forces that militate against effective waste disposal system at the selected locations, some of the factors include: attitudinal factor, social status, ignorance of the methodology of disposal, lack of waste management facilities. Adequate awareness in the art and methods of waste disposal would eliminate the menace of i8gnorance of approach while the attendant consequence of poor waste disposal would be eliminated.***

***KEYWORDS: Information, Waste, Management, Information & Urban***

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Original Article

## INTRODUCTION

Waste items could be defined according to the Environment Protection Act of 1990 as items that are suppose to be remnants of original items after the useful parts must have been used. This could be industrial waste, domestic waste, institutional waste, medical waste and agricultural waste, among many others. For instance, glass bottles that are returned or reused in their original form are not waste, whilst glass bottles banked by the public and dispatched for remolding are waste 'until they have been recovered. Manner of waste disposal is one of the most visible indicators of pollution in any environment while waste dumping and storage is often done with different motivations, barriers, participants and locations. Dumping and storage of waste indiscriminately have attendant effects on communities and society, the effects include sickness and infirmity, environmental pollution. Thus there is always need for different approaches in waste management. Also, illegal dumping also known as "fly dumping", midnight dumping, or wild cat dumping and roadside dumping, is a major problem in the urban and rural

communities in Nigeria. It is a significant concern regarding public health and safety, proper values, and quality of life. The concept of illegal dumping or flying waste dumping is primitive in nature and could be traced to era of ignorance, it is an environmental menace that can occur in any abandoned facilities or properties, vacant sites, abandoned industrial or residential facilities. Some people usually carry out the illegal dumping when the environment is deserted of people so as to avoid arrest. Also, private organized collectors has tendency to be involved in this practice too by collecting money from people with the promise of disposing their wastes for them and later abandoned the waste. Wastes could be generally classified into solid, liquid and gaseous. Gaseous waste is normally vented to the atmosphere, either with or without treatment depending on composition and the specific regulations of the country involved. In most of developed economies, industrial liquid wastes are often subjected to pretreatment before disposal, solid wastes are often pre processed and sorted before recycling while gaseous waste are disposed in controlled gas chambers. (Barrett and Lawler 1995; Foday Pinka Sankoh, Xiangbin, Yan Quangyenm, Tran 2013)

In most low- to medium-income developing nations, almost 100 per cent of generated waste goes to landfill. Even in many developed countries, most solid waste is landfilled. For instance, within the European Union, although policies of reduction, reuse, and diversion from landfill are strongly promoted, more than half of the member states still send in excess of 75 per cent of their waste to landfill (e.g. Ireland 92 per cent), and in 1999 landfill were still by far the main waste disposal option for Western Europe (EEA, 2003). (Douglas, 1992; Allen, 2001; Freduah George 2016; Renzoni, 1994; Medina (2002, Lekan, Charles 2017)

## WASTE TREATMENT AND DISPOSAL SYSTEM

Waste treatment is as important as its collection. Therefore an adequate method is needed to be able to maximize the treatment process. However, method of processing is often chosen. Some of the methods adopted in the study includes the following: biological treatment, detoxification with neutral ash, incineration, open burning, (Abdul 2010; Freduah George 2016; Barrett and Lawler 1995; Foday Pinka Sankoh, Xiangbin, Yan Quangyenm, Tran 2013).

### Open Burning

Open burning is an ancient method of waste disposal. It involves burning of garbage in an open space without control from weather element like air or wind. In this type of method, smoke is released into the environment in an uncontrolled manner. It has been widely accepted that open burning method has tendency to create environmental pollution. Sometimes refuse could be confined to barrel or incinerator, once the burning device does not contain emission control device or lid it is agreed to be open burning. Also, smokes are often released into the air can cause fog, acidulated precipitations, acid rain, depletion of Ozone layer on account of the release of aerosol to the atmosphere (Department of environmental quality 2006; Barrett and Lawler 1995; Foday Pinka Sankoh, Xiangbin, Yan Quangyenm, Tran 2013 and Lekan, Charles 2017)

### Dumps and Landfills

Dumps are location designated for stacking of refuse and waste materials. Buffer location is always selected where there is a low water table or areas where water that percolates through the dumps or landfills would not leak into the ground. The landfills or dumps are also designed in a way that the sides and bottom are lined and covered with impervious materials that would not allow a leaching process to take place. The filtrate is collected at the bottom of the dumps or land fill are pumped out for biological and chemical treatment before disposing. Rodents and pest are often kept off by covering

with and polythene covering or shadow shed or pantiles. Moreover, underground water course pollution to surrounding land mass is possible, this is often overcome through creating of weeping bore holes which water's would be subjected to in vivo and en vivo hydrological test for possible watercourse contamination. In advanced European countries, dumps and landfills are equipped with gas sensors as illustrated in Figure 1, that has capacity of detecting release of methane gas and morphine or Chloro fluoro hydrocarbon emission (Amusan, Joshua, Oloke 2013; Abdul 2010; Freduah George 2016).

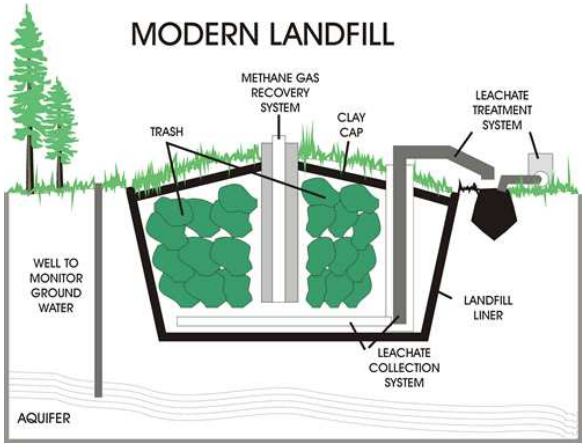


**Figure 1: Main Features of a Modern Landfill (Source http://www.eia.doe.gov/kids/energyfacts/saving/recycling/solidwaste/landfiller.html)**

**Controlled Dumps**

In controlled dumps, environmental and biological vices that often create pollution are usually taken care of, it is often kept off from accumulation of located at the bottom of the fills. Also, the release of methane gas to the surrounding is controlled. Controlled dumps have reduced incidence of ground and environmental contamination (Amusan,Joshua, Oloke 2013; Abdul 2010; Freduah George 2016). Department of Environment and Conservation 2004.

**Waste Packaging**

Waste need to be well packaged before disposal and treatment. There are containers and bags that are often used in refuse and garbage packaging. There are different types of packaging materials that are often used. Plastic materials could be used, steel bin, plastic bin, steel bins, polythene bags, and aluminium foils among others. Irrespective of the type used, cost, quality, aesthetics and durability are desirable qualities in the choice of bins type. Some of the packages prevent emission of poisonous gases such as Methane, Ammonia which could be injurious to health (Amusan, Joshua, Oloke 2013).

## RECYCLING OF WASTE DISPOSAL

Recycling of waste and garbage could be described as a process of converting waste collected into usable items. It could be referred to as converting waste to wealth. Recycling of items consists of three stages, the sourcing stage, sorting stage and processing stag. Materials are sourced from different locations and sorted based on category of waste. Waste can generally be classified into the following classes: medical waste, animal waste, chemical waste, metallic waste, gaseous waste, biodegradable and non biodegradable waste among others (Department of Environment and Conservation 2013; Amusan, Joshua, Oloke 2013; Abdul 2010; Department of Environment and Conservation 2013; Cyen 2015). Descriptions of the main types of collection systems are given in the table below.

**Figure 2: Colour Coded Recycling Bins for Waste Separation at the Source of Production (Source: www.unpluggedliving.com)**

## RESEARCH METHODOLOGY

### RESEARCH DESIGN

In this study, descriptive research was carried out. Nwankwo (1999) describes it as pure descriptive survey in which the features or variables being studied for any sample are compared for various strata of the sample.

### POPULATION OF THE STUDY

The population of the study is made up of the all the inhabitants of twenty selected Housing Estates in River states in Nigeria especially Port Harcourt metropolis. This is because everybody generates and disposes refuse. Port Harcourt, the study area is the capital of Rivers State Nigeria, with area coverage of about 12,000Ha (NDDC, 2003). The population of the area is estimated at 1,200,000 million using a projection of 2.8 per cent growth rate of the 1992 population figure (NPC, 1991).

### SAMPLE AND SAMPLING TECHNIQUES

The population sample comprised of people living very close to noticeable heaps of refuse or dumping sites in the selected study areas in the metropolis. The simple random sampling technique was used to select respondents for the study. Nzeneri (2002) states that the technique is unbiased since each person's; event, object or thing in the population is given equal opportunity of given an answer for the study.

### RESEARCH INSTRUMENT FOR DATA COLLECTION

The study utilizes a questionnaire as its research instrument. Evaluation of environmental risk and impact of waste disposal in Nigeria (case study Rivers State) was developed by the researcher. The questionnaire was divided into eight sections. A, B to H. front page is elicits background information about the respondents. Section A is the general information of the respondent about waste disposal in their area, Section B seeks information about the method of storage household waste and C sought for 'method of disposing household waste, D sought for description of the main collection system, E sought for implication of wrong waste disposal system, F sought for waste disposal attitude and problems, G sought for method of curbing wrong dumping of waste /refuse and H sought for the impacts of wrongly waste disposal on the surrounding environment also general suggestion in improving the managing of waste disposal in Port Harcourt metropolis. Each of the research questions has between one and five statements or items to elicit information from the respondents. Respondents were required to indicate their opinion on each item based on like five-point scale of Strongly

Agreed (SA), Agreed (A) Disagreed (D) Strongly Disagreed (SD) and Neutral (N).

## VALIDITY OF THE INSTRUMENT

Validity refers to data that are not only reliable, but also true and accurate Fisher and Forfeits (2002). Validity of an instrument determines the extent an instrument is able to collect the expected date (Nzeneri, 2002). It connotes the trustworthiness of an instrument. Nzeneri 2002 and Nwankwor (1996) states that for content and face validity, the instrument must be passed to experts or specialists for validation. In addition, Nwankwor (1996) adds that the experts must be provided with the following: the purpose of the study including all the objectives the researcher wants to achieve. (ii) The researcher questions to be answered and to be tested (iii) other things the experts are expected to do to ensure and determine the suitability or otherwise of the items of the questionnaire. Based on this, copies of the questionnaire were given to an individual in the area of environmental situations, health, urban and regional planning, environmental education, psychology, measurement and evaluation, and educational research methodology for validation. These experts are practicing lecturers and research fellows from various universities and research institutes. The experts were requested to check the suitability of items, the clarity of language, the content covered and the appropriateness of the items. Ambiguous items were removed and some were modified. These experts made some recommendations in which modifications were made on the instrument. It was finally submitted to the supervisor for final face and content validity to make it suitable for the research being conducted.

## RELIABILITY OF THE INSTRUMENT

Reliability refers to the consistency, stability, or dependability of the data (Fisher and Foreit 2002). The reliability of an instrument implies that the instrument must consistently measure what it is supposed to measure and also indicate how much confidence one can place on the result of the test. A reliable measurement is one that, if repeated a second time will give the same result as it did the first time.

## PRESENTATION OF DATA AND ANALYSIS

The Waste Disposal Study Questionnaire Survey (WDSQS) that was employed for this project is a total number of 70 survey questionnaires which were randomly administered among households surrounding in part of Rivers State. The questionnaire design consists of eight sections: General question; Method of storage household waste; Method of disposing household waste; Descriptions of the main collection systems; Implication of wrong waste disposal system; Waste disposal attitude and problems; Method of curbing wrong dumping of waste / refuse; The Impacts of wrongly waste disposal on the surrounding environment and suggestions for improving the managing of waste disposal in the area.

# RESULTS

The results are simultaneously presented in the tables in the order of the respective sections of the WDSQS questionnaire.

### Section A

Generally a greater percentage of (82.2%) respondents show that there is indication of occurrence of wrong waste dump in their area, which can affect the communities and part of Rivers State in finances and health care. Also, greater percentage of (82.9%) respondent's show that they need more information about how and what types of garbage they can compost, reuse, and recycle in order to reduce the amount of waste that they need to get rid of.(84.3%) are willing to

participate in efforts aimed at separating their household garbage into separate bags for collection purposes if the recycle / reuse program is put in place.

**Table 1: Method of Storage Household Waste**

| S/N | Method of Household Waste Storage | Closed Container % | Open Container % | Plastic Bags % | Other(Pile in the Yard % |
|---|---|---|---|---|---|
| 1 | Food waste | **47.1** | **1.4** | **38.6** | **1.4** |
| 2 | Yard trimmings | **15.7** | **32.9** | **15.7** | **15.7** |
| 3 | Paper/cardboard | **18.6** | **44.3** | **31.4** | **1.4** |
| 4 | Plastic | **12.9** | **40** | **25.7** | **5.7** |
| 5 | Metals | **24.3** | **25.7** | **14.3** | **22.9** |
| 6 | Glass | **30** | **25.7** | **17.1** | **11.4** |
| 7 | Construction and Demolition waste | **11.4** | **24.3** | **4.3** | **42.9** |
| 8 | Residential | **18.6** | **8.6** | **35.7** | **11.4** |
| 9 | Agricultural | **17.1** | **17.1** | **18.6** | **21.4** |
| 10 | Institutional | **21.4** | **21.4** | **21.4** | **7.1** |
| 11 | Industrial (non-process wastes) | **31.4** | **14.3** | **17.1** | **14.3** |

In household garbage method of waste disposal, the table 4.1 shows that food waste are stored in a closed container (47.1%), while some (38.6%) store theirs in plastic bags, few (1.4%) in open containers and others pile garbage in the yard. In the yard. Plastic waste, respondent shows that (40%) are stored in open containers, (25.7%) in a plastic bag, (12.9%) in close container, while (5.7%) is an others pile in the yard. Metal waste, the respondent shows that (25.7%) store their waste in open containers, why plastic bags (14.3%) and (22.9%) for others pile in the yard. Glass waste, the data show (30%) makes use of close container and (25.7%) open container which shows that respondent are aware of storing their waste. Construction and demolition, majority of respondent (42.9%) shows that it is another pile in the yard, which means it can be reused for other purposes. In residential waste, the respondent shows that (35.7%) of their household waste generated is kept inside plastic bags to avoid littering and inviting rodent in the residential area. Agricultural waste, respondent shows that (17.1%) make use of close and open container, (18.6%) make use of plastic bags, why (21.4%) pile in the yard to reuse as manual. Institutional waste, the majority of the respondent (21.4%) shows that their household waste are stored in close and open container and plastic bags, why (7.1%) of their waste are pile in the yard in an open space. Industrial (non-process wastes), majority of the respondent (31.4%) shows that they make use of close container as their storage facility because it can lead to the damage of live and properties in the environment. With the exception of external dustbins, none of the waste storages does not have a roles to play base on the garbage generated (personal observation). A substantial percentage of the garbage is put into close container, open containers and plastic bags before kept in the garbage truck location.

**Table 2: Method of Disposing Household Waste**

| S/N | Method of Household Waste Disposal | Burn % | Bury % | Dump in River/Gully % | Dump on the Road Side % | Garbage Truck % | Recycle % | Reuse % | Other % |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Food waste | **0** | **7.1** | **0** | **7.1** | **67.1** | **1.4** | **0** | **2.9** |
| 2 | Yard trimmings | **15.7** | **7.1** | **1.4** | **7.1** | **47.1** | **0** | **0** | **1.4** |
| 3 | Paper/cardboard | **35.7** | **1.4** | **0** | **2.9** | **38.6** | **2.9** | | **1.4** |
| 4 | Plastic waste | **20** | **0** | **0** | **5.7** | **41.4** | **14.3** | **1.4** | **1.4** |
| 5 | Metals waste | **2.9** | **7.1** | **0** | **4.3** | **44.3** | **18.6** | **2.9** | **7.1** |
| 6 | Glass waste | **1.4** | **4.3** | **0** | **4.3** | **57.1** | **15.7** | **1.4** | |

| Table 2: Contd., | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | Industrial waste | **1.4** | **5.7** | **1.4** | **2.9** | **38.2** | **14.3** | **1.4** | **11.4** |
| 8 | Construction and Demolition waste | **2.9** | **2.9** | **2.9** | **8.6** | **31.4** | **8.6** | **10** | **10** |
| 9 | Residential waste | **0** | **0** | **1.4** | **7.1** | **50** | **5.7** | **0** | **4.3** |
| 10 | Commercial waste | **0** | **1.4** | **1.4** | **8.6** | **50** | **5.7** | **2.9** | **5.7** |
| 11 | Agricultural waste | **8.6** | **14.3** | **0** | **2.9** | **32.9** | **4.3** | **5.7** | **8.6** |
| 12 | Institutional waste | **4.3** | **1.4** | **0** | **5.7** | **44.3** | **4.3** | **1.4** | **10** |
| 13 | Industrial (non-process wastes) | **5.7** | **2.9** | **1.4** | **1.4** | **35.7** | **12.9** | **1.4** | **10** |

In this method of household waste disposal, the table shows that (67.1%) of respondents believed that food waste are disposed through the use of a garbage truck. Also yard trimming (47.1%) the questionnaire analysis of the respondents shows paper / cardboard (47.1%) are dispose through garbage truck and (35.7%) respondents shows disposal through the use of burnt. Majority of the respondent shows that plastic waste (41.4%) are dispose through garbage truck, metals waste (44.3%), glass waste (57.1%) industrial waste (38.2%) construction and demolition waste (31.4%) residential waste (50%) commercial waste (50%), agricultural waste (32.9%), institutional waste (44.3%), industrial (non-process waste) (35.7%). Generally, it was realized that a greater percentage of the respondents relied on garbage trucks than other waste disposal methods. This might be because it was provided by the government and perhaps could accommodate more waste but lack of any garbage truck damage can lead to littering of refuse which can have serious health implications. Most of the refuse is kept close to the road side and water way, which may has tendency to cause pollution and can result into plague of diseases like cholera, dysentery, thypoid among others.

**Table 3: Descriptions of the Main Collection Systems**

| S/N | Waste collection mechanism | SD % | D % | N % | A % | SA % |
|---|---|---|---|---|---|---|
| 1 | Residents and other waste generator are required to dump their waste at a specified location or in a masonry enclosure. | **5.7** | **1.4** | **2.9** | **31.4** | **42.9** |
| 2 | Residents and other generators put their waste inside a container which is emptied or removed. | **1.4** | **4.3** | **11.4** | **35.7** | **30** |
| 3 | Collector sounds horn or rings bell and waits at specified locations for residents to bring waste to the collection vehicle. | **0** | **15.7** | **7.1** | **40** | **18.6** |
| 4 | Waste is left outside property in a container and picked up by passing vehicle, or swept up and collected by sweeper. | **18.6** | **18.6** | **4.3** | **12.9** | **20** |
| 5 | Waste collector knocks on each door or rings doorbell and waits for waste to be brought out by resident. | **30** | **17.1** | **8.6** | **22.9** | **7.1** |
| 6 | Collection agents enter property to remove waste. | **28.6** | **24.3** | **12.9** | **10** | **5.7** |

While most of the respondents (42.9%) strongly agreed that they individually Residents and other waste generator are required to dump their waste at a specified location or in a masonry enclosure, a greater percentage of the respondents (35.7%) agreed that Residents and other generators put their waste inside a container which is emptied or removed. A greater number of respondents (40%) agreed that: Collector sounds horn or rings bell and waits at specified locations for residents to bring out waste to the collection vehicle. Most of the respondents (20%) also agreed that Waste is left outside

property in a container and picked up by passing vehicle, or swept up and collected by the sweeper, why (18.6%) disagreed and strongly disagreed that Waste is left outside property in a container and picked up by passing vehicle, or swept up and collected by sweeper because of the location and the industrialization of the area. Greater number of respondents (30%) strongly disagreed that Waste collector knocks on each door or rings doorbell and waits for waste to be brought out by residents which is not applicable in a healthy environment. Also, a greater percentage of respondents (28.6%) strongly disagreed that Collection agents enter property to remove waste.

**Table 4: Implication of Wrong Waste Disposal System**

| S/N | Implication of Wrong Disposal System | SD % | D % | N % | A % | SA % |
|---|---|---|---|---|---|---|
| 1 | Health risk related to burning garbage | **0** | **1.4** | **2.9** | **45.7** | **37.1** |
| 2 | Illegal dumps pollutes water bodies | **0** | **0** | **1.4** | **27.1** | **57.1** |
| 3 | Diseases related to improper storage and disposal | **0** | **1.4** | **0** | **31.4** | **41.4** |
| 4 | Flooding due to garbage blocking drains and gullies | **1.4** | **0** | **4.3** | **24.3** | **42.9** |
| 5 | Reduction of resources we buy and use | **4.3** | **22.9** | **21.4** | **24.3** | **14.3** |
| 7 | Waste litters the environment | **0** | **0** | **1.4** | **28.6** | **57.1** |
| 9 | attraction of rats, disease causing insects | **0** | **1.4** | **2.9** | **21.4** | **61.4** |
| 10 | Physical hazards cause by pollution | **1.4** | **4.3** | **4.3** | **22.9** | **52.9** |
| 12 | Waste dump cause by fire. | **5.7** | **14.3** | **32.9** | **12.9** | **18.6** |
| 13 | Contamination of water and air | **0** | **1.4** | **1.4** | **25.7** | **58.6** |

Majority of the respondent (45.7%) agreed on health risk related to burning garbage. (57.1%) strongly agreed on "Illegal dumps pollutes water bodies". (41.4%) strongly agreed on "Diseases related to improper storage and disposal". (42.9%) strongly agreed on "Flooding due to garbage blocking drains and gullies". , (57.1%) strongly agreed on "Waste litters the environment". Others are self- explanatory.

**Table 5: Waste Disposal Attitude and Problems**

| S/N | Waste Disposal Attitude and Problems | SD % | D % | N % | A % | SA % |
|---|---|---|---|---|---|---|
| 1 | People throw garbage on the streets and in the drains and gullies because they have no other means of disposing their garbage. | **35.7** | **21.4** | **4.3** | **8.6** | **17.1** |
| 2 | Regular collection of garbage is the only solution to garbage problem. | **4.3** | **4.3** | **1.4** | **32.9** | **27.1** |
| 3 | The Local Government is not doing enough to fix the waste disposal problem. | **2.9** | **10** | **8.6** | **38.2** | **25.7** |
| 4 | Ignorance of the effect of wrong waste disposal | **2.9** | **11.4** | **5.7** | **40** | **22.9** |
| 5 | Problem of difficulty locating and acquire landfill site | **11.4** | **21.4** | **20** | **21.4** | **8.6** |
| 6 | Poor public cooperation | **4.3** | **7.1** | **7.1** | **40** | **25.7** |
| 7 | Inadequate service coverage (some people not given service) | **2.9** | **14.3** | **11.4** | **31.4** | **24.3** |
| 8 | Lack of authority to make financial and administrative decision | **1.4** | **14.3** | **12.9** | **32.9** | **18.6** |
| 9 | Lack of trained personnel | **5.7** | **12.9** | **11.4** | **30** | **24.3** |

In this method of waste disposal attitude and problem, the table shows higher percentage of respondent (35.7%) strongly disagreed that People throw garbage on the streets and in the drains and gullies, because they have no other means of disposing their garbage. (32.9%) agreed that regular collection of garbage is the only solution to garbage problem which can protect the health of individuals in the society. (38.2%) agreed that the Local Government is not doing enough to fix the waste disposal problem. (40%) agreed that Poor public cooperation, i.e. the attitude and character of citizen to waste

disposal is very important.(31.4%) of respondent agreed that the Inadequate service coverage is the reason (some people are not given service).(32.9%) agreed that Lack of authority to make financial and administrative decision is the major reason. Finally (30%) of the respondent agreed that Lack of trained personnel is the cause

**Table 6: Method of Curbing Wrong Dumping of Waste / Refuse**

| | Method of Curbing Wrong Disposal System | SD % | D % | N % | A % | SA % |
|---|---|---|---|---|---|---|
| A | Provision of public waste bin at a visible places | **1.4** | **1.4** | **1.4** | **25.7** | **55.7** |
| B | Picking up garbage around my community is my responsibility as a Rivers resident. | **15.7** | **22.9** | **15.7** | **21.4** | **8.6** |
| C | Creating awareness in the community about waste dump wrongly | **1.4** | **1.4** | **5.7** | **38.2** | **40** |
| D | Environmental education should be taught in schools. | **0** | **0** | **1.4** | **32.9** | **52.9** |
| E | It is very important that the Rivers Local Government put recycling laws and programs in place. | **0** | **0** | **2.9** | **34.3** | **50** |
| F | Public education about proper waste management is **one way** to fix the waste dispose crisis. | **1.4** | **0** | **2.9** | **24.3** | **57.1** |

Table 4.6 shows that (55.7%) of the respondents strongly agreed that there should be provisioned of public waste bin in a visible place. (22.9%) of the respondent disagreed that Picking up garbage around my community is my responsibility as a Rivers resident. The majority of the respondent (40%) strongly agreed to consign that creating awareness in the community about waste dump wrongly, However, either due to resource crunch or inefficient infrastructure, not all of this waste gets collected and transported to the final dumpsites. If at this stage, the disposal is improperly done, it can cause serious impacts on health problems to the surrounding environment. Higher percent (52.9%) of respondent strongly agreed that environmental education should be taught in schools. (50%) of respondent strongly agreed that it is very important that the rivers, local government should put recycling laws and programs in place. Finally (57.1%) respondent to the questionnaire strongly agreed that public education about proper waste management is one way to fix the waste dispose crisis.

**Table 7**: **The Impacts of Wrongly Waste Disposal on the Surroundings Environment**

| S/N | Impacts on the Surroundings | SD % | D % | N % | A % | SA % |
|---|---|---|---|---|---|---|
| 1 | Sleeping sickness | **7.1** | **10** | **15.7** | **31.4** | **21.4** |
| 2 | Scabics, scrub typhus | **1.4** | **5.7** | **5.7** | **48.6** | **21.4** |
| 3 | Eye infection (onchocerciasis) particularly among infants and children | **5.7** | **8.6** | **15.7** | **30** | **22.9** |
| 4 | Malaria fever, yellow fever, filariasis, dengue fever | **1.4** | **2.9** | **2.9** | **41.4** | **37.1** |
| 5 | Air pollution | **1.4** | **0** | **0** | **35.7** | **50** |
| 6 | Flooding | **1.4** | **1.4** | **2.9** | **25.7** | **54.3** |
| 7 | Water pollution | **2.9** | **0** | **5.7** | **27.1** | **51.4** |
| 8 | Aesthetic Nuisance in the state | **1.4** | **2.9** | **10** | **37.1** | **35.7** |

Table 4.7 indicates that there is an awareness of the implication of waste disposal wrongly in environment surroundings.

## CONCLUSIONS

In this study, information on state of challenges of waste management system in Nigeria Urban Housing System is

presented. However, it is glaring that people are not ignorant of the effects of wrong waste disposal or general poor sanitation, but for the location of refuse receptacles are sometimes too far to the people for easy dumping of waste and the few available ones are widely spaced and far from household dumping area, sometimes up to three kilometers or more than.

Hence the dump vehicles should be maintained at the appropriate period of time to avoid victims of likely sickness that may attend to the difficulty that is associated with dumping exercise e.g. malaria, chest pains, diarrhea, cholera, irritation of the skin and nails. Public environmental education would go a long way in changing people attitudes and behavior towards the environment. Also, government and non-governmental organization have role to play in enlightening the people on the need to clean their environment and package their waste properly and stop indiscriminate refuse dumping. Awareness creation through the mass media on the implication of wrong waste disposal can affect a lot in our individual homes and organization and it should be done in a clear and simple language or pictorial way.

Both adults and children generate waste and disposed waste, but the children end up dumping waste at undesignated places than adults. Hence environmental education is not only needed for people at home, but in schools for children (the future generation) as well. Places of worship like churches, mosque also companies, market leaders can also assist in educating their adherents on the interrelationship between humans and the environment and the need to dispose their waste frequently on daily bases at the designated areas. Adequate public enlightenment is needed in most of Urban settlements so as to prevent indiscriminate waste dump. Finally, promoting environmental behavior in waste management has to be addressed simultaneously at all levels from household and business to society level. Although some level of behavioral change can be achieved through additional monitoring and a sustained behavioral change program over a longer time. Since the topic indicates the environmental risk and economic impact of waste disposal, it can only be changed or influenced by adequate communication.

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### *REFERENCES*

1. *Abdul Salam (2010) Journal of Sustainable Development in Africa Environmental and Health Impact of Solid Waste Disposal at Mangwaneni Dumpsite in Manzini: Swaziland. Volume 12, No.7.*
2. *Adara, A.O. (2002). Educating the non-school public about overpopulation in P.O Okebukola and B.B Akpan (eds) Strategies for teaching overpopulation. Ibadan: STAN.*
3. *Adara, A.O. (2002). Educating the non-school public on energy consumption. In P.O Okebukola and B.B Akpan (eds) Strategies for environmental Education:*
4. *Adegoke, S.O (1990). Waste management within the context of sustainable development. FEPA, Abuja*
5. *Akpan E.A (1995) Environmental health education. In N.S Olaniran, E.Akpan E.E, Ikpeme, G.A.Udofia, (eds) E nvironment and health. Lagos: Macmillan Nigeria publishers.*
6. *T. Ravindra Reddy etr al., Solid Waste Management in Kadapa Municipal Corporation - A Case Study, International Journal of Environment, Ecology, Family and Urban Studies (IJEEFUS), Volume 6, Issue 6, November - December 2016, pp. 23-28*

7. *Akpan E.A (1995) Primary health care in environmental protection. In N.S Olanran, E.A Akpan.E.E, Ikpeme, G.A Udofia, (ed) Environmental and health. Lagos. Macmillian Nigeria publishers*
8. *Allen, A., Brito, G., Caetano, P., Costa, C., Cummins, V., Donnelly, J., Fernandes, C., Koukoulas, S., O'Donnell, V., Robalo, C., Vendas, D. 2001 The Development of a GIS Model for the Location of Landfill Sites in Ireland and Portugal. Final Report Interreg 2C Atlantic Region, EA-B1IRE-No.2.15, 193pp.*
9. *Allen, A.R. 2001 Containment landfills: The myth of sustainability. J. Eng. Geol., 60, 3-19*
10. *Amusan Lekan Murtala, Joshua Opeyemi, Oloke Olayinka (2013). Performance of Build- Operate-TransferProjects: Risks' Cost Implications from Professionals and Concessionaires Perspective. European International Journal of Science and Technology 2 (3), 239-250*
11. *Apel, H, and camozzi, A (1996) Adult Environmental Education: A handbook on content and methods. Bonn: Institute for International C cooperation of the German Adult Education Association*
12. *Aribisala, J.O (1997) Waste Transport in Unsaturated Soil. International Journal of Environment and development. Vol. 1, No. 1 pp 49-54*
13. *Atta, M. 2003. Problems of domestic waste management in Nigeria: Ant repressor? www.nigerialawguru.com*
14. *K. Suganya, Augmenting the Liquid Waste Management Skills of Rural Shg Women of Madurai District Through Eco-Wash Literacy, International Journal of Agricultural Science and Research (IJASR), Volume 7, Issue 4, July - August 2017, pp. 359-362*
15. *Ayodele,J.O. (2005) Community Base Approach as a Mechanism for Effective Environmental Sanitation (garbage control) in Nigeria Cities. Apaper presented at the 13th Conference of Environmental Behaviour Association of Nigeria held at University of Benin, Benin-City.*
16. *Ayuba K.A., AbdMnaf L., Sabrina, A.H. and S.W. Nur Azim (2013). Current Status of Municipal Solid waste management in F.C.T Abuja. Research Journal of Environmental and Earth Sciences 5 (6): 295 – 304.*
17. *Barrett, A., Lawlor, J. (1995) The economics of waste management in Ireland. Economic and Social Research Institute, Dublin. 129pp Babandda, N. (2011). Characterization of non-point Source Pollutants and their dispersion in Lake Victoria: A case study of Gaba landing site in Uganda. African Journal of Environmental Sciences and Technology 5 (2): 73 – 79*
18. *Chukwu, A. O. 2002. The effect of indiscriminate disposal of plastic waste in the environment: A case study of Enugu. An unpublished degree dissertation BURP department of urban and regional planning. University of Nigeria, Enugu campus.*
19. *Community partners for Health (CPH) (2005) Lagos Environmental Sanitation and Malaria Control Project. Report No. 1- 15 Cyen(2015) http://www.cyen.org/innovaeditor/assets/Solid%20waste%20management.pdf.*
20. *Cottrell, S and Graefe, A. R (1997). Testing a conceptual Frame work of Responsible Environmental Behaviour. The Journal of Environmental Education 29 (1): 17-28.*
21. *Doherty V.F., Sogbanmu T.O., Kanife U.C., and O. Wright (2012). Heavy Metals in Vegetables Collected from Selected Farm and Market Sites in Lagos, Nigeria. Global Advanced research Journal of Environmental Science and Toxicology 1(6): 137 – 142. Department of Environment and Conservation (2013). Queensland Littering and Illegal Dumping Action Plan: An Assessment of Attitudes and Behaviour amongst Multi-Unit Dwelling Residents in Relation to Illegal Dumping. NSW Government.*
22. *Douglas, T. 1992 Patterns of land, water and air pollution by waste. In: Newson, M.(Ed.) Managing the Human Impact on the Natural Environment John Wiley & Sons, 150-171*

23. *Freduah George (2016) Problems of Solid Waste Management in Nima, Accra. Undergraduate Research Journal for the Human Sciences. University of Ghana, Legon. 2(3). 12-22.*

24. *Faniran, A. and Adeboye, A. T (1999) Environment Education and Awareness for Effective Environmental Protection and Management in Nigeria Journal of the NITP, October, 1999.*

25. *Foday Pinka Sankoh[1,2], Xiangbin Yan[1], Quangyen Tran Environmental and Health Impact of Solid Waste Disposal in Developing Cities(2013) A Case Study of Granville Brook Dumpsite, Freetown, Sierra Leone Vol.4 No.7.*

26. *Lekan M Amusan, Charles Ayo (2017) Multi-Parameter Optimization Of Cost Entropy For Reinforced Concrete Office Building Projects Using Ant Colony Optimization. Journal of Engineering And Applied Sciences.12(9). 2260-2275.*