

The Impact of Indiscriminate MSW Collection Points in Greater Port Harcourt City, Nigeria

Dr Augusta Ayotamuno

is of the Institute of Geosciences and Space Technology (IGST) at the Rivers State University (RSU) Nkpolu, Port Harcourt, PMB 5080, Port Harcourt, Nigeria;

Abstract: *The unwholesome handling of MSW from cradle to grave is one of the negative commentaries bedevilling most cities of Nigeria; particularly for the sprawling Greater Port Harcourt City, this has recently been worsened by the numerous waste collection points scattered all over the nooks and crannies of the city. It was therefore necessary that a quick study be carried out to determine the effect of this on the people and their surrounding environment. Data for this study were collected from both primary and secondary sources including visits to Greater Port Harcourt City Development Authority (GPCDA) and other agencies of government responsible for the environment. Questionnaires were administered face-to-face by trained interviewers to households in selected neighbourhoods. Results show that the Rivers State Waste Management Agency (RIWAMA), a parastatal in the Ministry of Environment of the Rivers State Government of Nigeria, is responsible for managing waste and maintaining cleanliness within the Greater Port Harcourt environment. That the management system put in place is somewhat crude and far below international standards. That this has led to flash flooding in many parts of the city as rain water cannot flow freely due to blocked drainages of refuse carried into them by wind and runoff water. The city is filled with bad odour due to decomposing garbage stench at different corners. The research therefore recommends that government should: provide proper containers assigned for various categories of waste; designate points and receptacles for dumping of waste; and educate the people on proper waste disposal practices. Also RIWAMA should be supervised and staff be trained and exposed to modern waste management techniques.*

Keywords: *Receptacles, Collection Points, MSW, Greater Port Harcourt, Waste Disposal, Stench, Flooding,*

Date of Submission: 01-03-2020

Date of Acceptance: 16-03-2020

I. Introduction

Waste management is the collection, treatment and disposal of different wastes including Municipal Solid Waste (MSW). Waste management also entails the recovery of resources from the waste through sustainable development. Generally, the main functional elements of waste management include Waste Reduction, Waste Generation, Reuse, On-Site handling (treatment), storage and processing, Collection, Transfer and Transportation, Processing and Recovery and Disposal. This study is looking at the collection, Transfer and Transportation of solid waste management.

The discussion on Municipal Solid Waste (MSW) Management is an important issue in any society that needs proper handling and its consequent environmental impact on the citizens. There have been several studies on MSW in Port Harcourt over the years. Ayotamuno and Gobo (2004) in an article discussed solid waste management in Port Harcourt and the inefficiency of the system. Several factors are said to contribute to the solid waste management problem in the city, including management factors, inadequate provision of facilities for waste management and ineffective approach to carrying out waste management (Zia and Devadas, 2007); low-skill workers (Ayotamuno et al., 2004; Khalil and Khan, 2008); financial constraints and inadequate transportation facilities (ESES, 1998; Ayotamuno et al., 2004; Asase et al., 2009); and inadequate law enforcement and lack of monitoring and supervision of the activities involved in waste management (Khalil and Khan, 2008).

Previous studies of cities of Nigeria and many other developing countries have also attributed MSW collection, transportation and disposal problems to lack of institutional arrangement, absence of bylaws and standards, inflexible work schedules, insufficient information on quantity and changing nature of waste (Ajani, 2007; Babayemi and Dauda, 2009; Ogwueleka, 2009). In addition, the culture of the people, social and political factors (Ishaq, 2004), inappropriate technology (World Bank, 1992) as well as personnel and administrative factors (Onibokun and Kumuyi, 2003) are said to also play significant roles.

According to Ogwueleka (2003), local authorities in developing countries spend 77-95 % of their revenue on collection and disposal, but only end up collecting 50-70 % of the waste. The question then is what happens to the rest of the MSW that is not collected and where does it end up?

The need to answer this question has become more necessary in relation to Port Harcourt because the population of the city has increased tremendously due to its aerial expansion into the Greater Port Harcourt City. With the additional population, came a corresponding increase in the generated MSW and a deteriorating management system. Under these circumstances, the vision to modernize, improve the standard of living and provide a better living environment for the Port Harcourt residents can hardly be achieved as the city is littered with uncollected MSW at indiscriminate collection points on major roads and street corners. Therefore, the aim of this research is to understand the effect of these indiscriminate MSW collection points in the Greater Port Harcourt City with the following specific objectives which are expected to give a clearer picture of the real situation.

1. To briefly appraise the current MSW management system in Greater Port Harcourt City
2. To examine the emergence of indiscriminate waste disposal points and their impact on the Greater Port Harcourt City environment
3. To make informed suggestions on the best way to manage the waste disposal points.

II. Study Area Phenomenal Growth

The growth of Port Harcourt has been phenomenal since its inception. Growth has been experienced in terms of population and space. Two years after its founding, the population was 5,000. Census figures for the city through its history are 7,185 in 1921; 15,201 in 1931 and 71,634 in 1953. The 1963 census gave the city's population as 179,563 and in 1973 it was 213,443 (Ogionwo, 1979). The 1991 census fixed the population of Port Harcourt and Obio/Akpor Local Government Areas at 645,883. The projection for 1996 by the National Population Commission was 832,471 for the two local governments and the interim figure for the 2006 national census is over one million.

Spatially too, Port Harcourt city has grown to cover much of the Upper Bonny River Basin. Originally the city covered a 25km² area between the UTC junction and the New Layout Market. In the land use and vegetation map of Nigeria (1975/76) the built-up area of Port Harcourt covered 17.4km². Twenty years later, a similar map showed the extent of the city as 89.4km. This is a five-fold increase. By the 1976 Local Government Reform, the Port Harcourt Local Government Area Council stretched from Choba and Rukpokwu in the north, Iriebe in the east and the main western channel of the Bonny River in the west. This is an area of over 239.6 km².

The Master Plan of 1975 developed by Specialists Konsult., a Swedish consultancy company lasted for 30yrs and expired in 2005. This plan was largely unimplemented because there were no legal instruments to ensure compliance. At its expiration, there was a vacuum hence the need for a new Master Plan. The Rivers State Government therefore engaged Arcus GIBB, a multi-disciplinary consulting South African firm in 2009 to develop a Master Plan for the newly designated Greater Port Harcourt City (GPHC).

Greater Port Harcourt City Development Authority (GPHCDA) was established on April 2, 2009, the legal instrument being "The Greater Port Harcourt City Development Authority" Law No. 2 of 2009, with a mandate to facilitate the implementation of the Greater Port Harcourt City Master Plan and develop the New City.

The Greater Port Harcourt City Master Plan is a holistic plan for the development of the Greater Port Harcourt City which spans eight (8) Local Government Areas namely; the whole of Port Harcourt Local Government Area (LGA) and parts of Oyigbo, Okrika, Ogu/Bolo, Obio/Akpor, Ikwerre, Etche, Eleme LGAs with a population of approximately 2 million people. The Master Plan is for a period of 50 years, and it is expected to be reviewed periodically to ensure that it continues to meet with changing realities of an emerging city. The key anchors of the New City are the Port Harcourt International Airport, the Old City and Onne seaport. The Greater Port Harcourt City spans a total landmass of 19,000 km² (Ede, Owei and Akarolo, 2008).

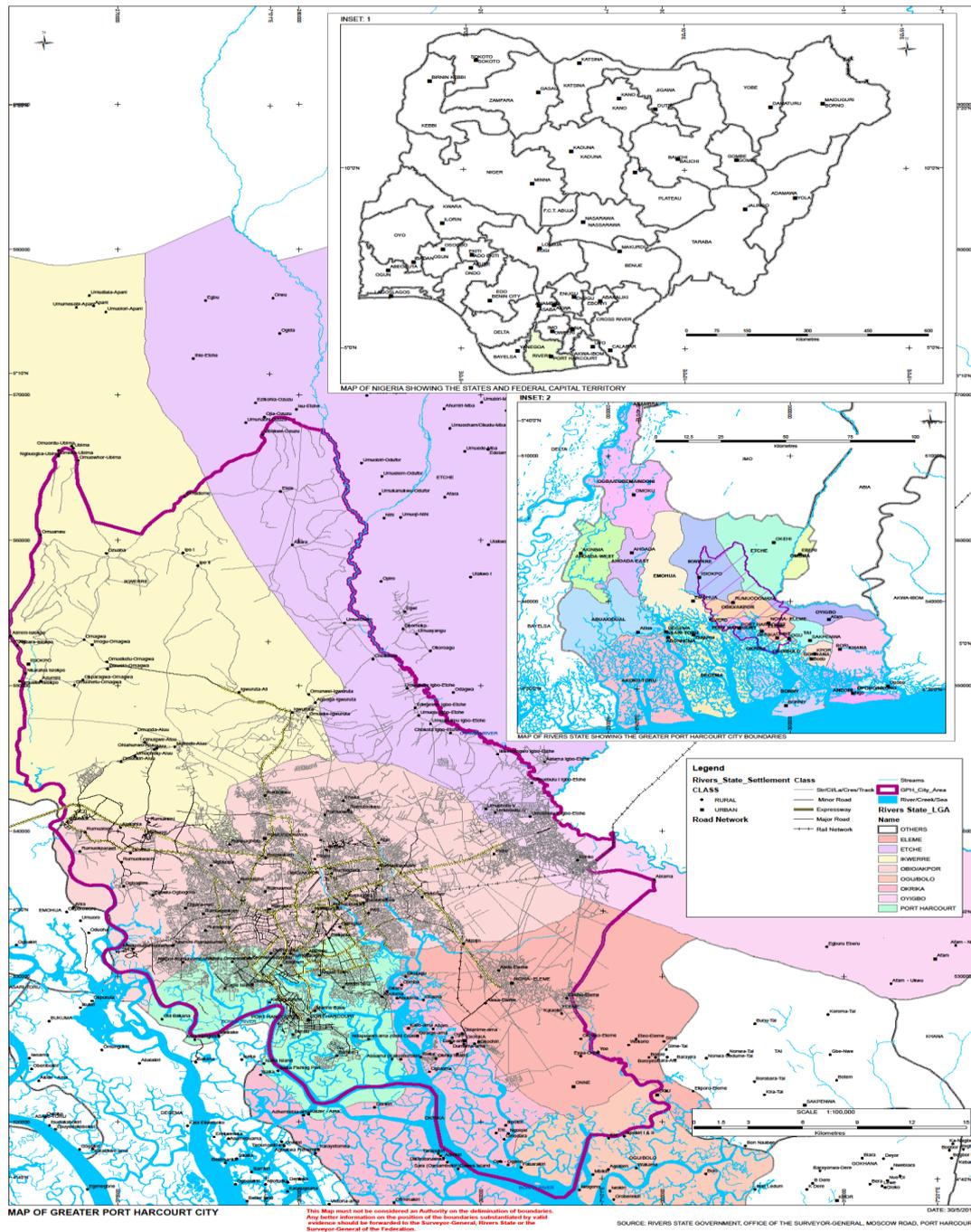


Fig 1: Map of Greater Port Harcourt Area. Nigeria and Rivers State inset (1 & 2)

Port Harcourt being the hub of oil and gas in Nigeria is regarded by many as the treasure base of the nation. And because of its cosmopolitan disposition it has attract many people, both within and outside Nigeria to settle in it and thereby becoming one of the fastest growing cities in the Nigeria. This rapid aerial and population expansion may haveover stretched the few available basic utilities of the city, not least the facilities for proper waste management.The problem may further be compounded if the existing MSW management system is inadequate for the new city. It is therefore necessary at this juncture to briefly review the current MSW management system in Greater Port Harcourt City with a viewunderstating if best practices are followed.

III. Research Methodology

This research involves Passive-observational design which entails studying subjects at one point in time, *in situ*, without experimental manipulation. This study employed the passive-observational category because it did not involve manipulation of the target populations. They were rather studied *in situ* at one point in time.

3.1 Target Population

This comprised an ordered list of 1761 (One thousand, seven hundred and sixty-one) housing units comprising dwelling units. A household occupies a dwelling unit. Therefore, a sample of dwelling units also represents a sample of households. There was a total of 2,475 dwelling units (ie, 2,475 households) contained in private residential estate buildings constructed between 1978 and 2014 by private developers throughout the 8 Local Government Areas (LGAs) that wholly or partially fall within the GPHC territory.

The sample size was obtained using the Yamane (1967) formula as detailed in an earlier work by Ayotamuno and Obinna (2018). A round figure of 400 was used in the study to allow for possible non – response, since the figure of 344 was considered a minimum at the specified level of precision – 5%. Thereafter, systematic probability sampling was applied to the ordered list of households/dwelling units to choose the actual households to be questioned. Considering the sample size of 400 and the total household dwelling units of 2,475, the sample fraction was 1 in 6. Then after making a random start between 1 and 6 in the ordered list of households/dwelling units, every other 6th case was picked, until the end of the list was reached, yielding the desired sample size of 400. Therefore, it was straightforward to determine the actual households to be questioned, since in the ordered list, every household/dwelling unit was attached to a particular building in a particular estate. The head of each household was the respondent to each questionnaire as he/she was considered the most knowledgeable about household conditions.

3.2 Instrumentation and Data Collection

Data for this study were collected from both primary and secondary sources including visits to Greater Port Harcourt City Development Authority, Ministries, Departments and Agencies of Government responsible for the environment.

Primary sources comprised:

- i. A largely pre-coded questionnaire, which was administered face-to-face by trained interviewers to a probability sample of households in selected neighbourhoods;
- ii. Photography of waste collection points.

Secondary sources comprised:

Official documents which were gotten from Ministries, Departments and Agencies (MDA) include the following:

- (a) Greater Port Harcourt City Development Authority – Policy Documents
- (b) Rivers State Ministries of Lands and Survey (Maps), Urban Development and Physical Planning
- (c) National Population Commission (NPC) – Population Figures
- (d) Rivers State Waste Management Agency (RIWAMA)

Computer analysis (with the aid of the micro-computer-adapted Statistical Package for the Social Sciences (SPSS), Version 16) was used.

IV. Results and Discussion

4.1 The Current MSW Management System in Greater Port Harcourt City

The Rivers State Waste Management Agency (RIWAMA), a parastatal in the Ministry of Environment of the Rivers State Government of Nigeria, is responsible for managing waste and sanitary habits of the populace with the aim of maintaining cleanliness within the Greater Port Harcourt environment. The Agency employs the services of private waste contractors (called service providers) to collect and transport waste to final disposal sites (Fig. 2). The entire metropolis is sub-divided into zones and currently about thirty-one (31) zones respectively handled by thirty-one (31) service providers (www.riwama.com.ng), whose major qualification for recruitment is the possession of at least two compactors and some other sundry requirements. There are also service providers who are not necessarily assigned to zones but serve as contractors to mostly industries producing MSW, as well as some households who utilize their services, for a fee.

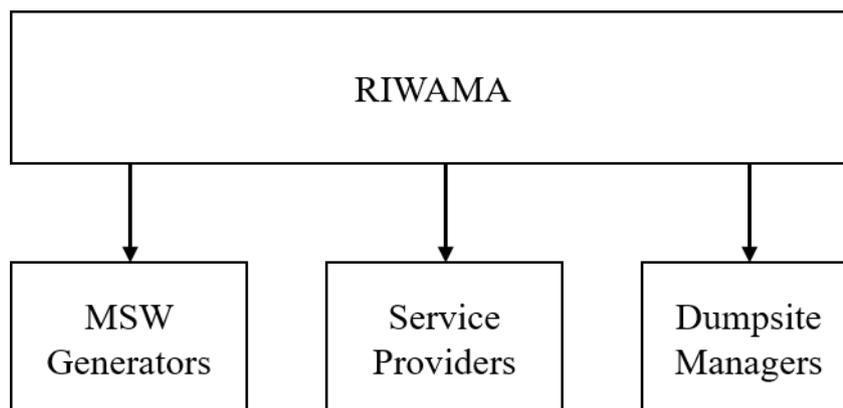


Fig. (2): Structure of MSWM in Port Harcourt Metropolis.
Source: Author’s work

4.2 The Indiscriminate Disposal and Emergence of MSW Collection Points

A survey of the households shows that waste is put in all kinds of storage bags ranging from polythenebags to simple cartons made of paper (Table 1.). It was observed that right from the homes these wastes are usually not sorted. Most are placed in torn polythene bags and plastic bins that are filled to the brim and overflowing with debris. These torn, leaking and overflowing waste bins are then carted from the homes by hand and deposited indiscriminately at all kinds of locations (Table 2) including those across the entire length of the roadside, median, and street corners without considering the officially recognized locations, which are themselves not properly designated and few. That is, there are no receptacles for MSW to be deposited before the pickup truck come to collect them to the dump site. The people just dump their waste on the bare ground, which give a bad view to the entire environment. At these irregular collection points there is no regulation on the hours of the day waste is dropped off and how is it dumped. There are no set rules on the way MSW should be packaged and so the waste is just dropped off haphazardly. It is actually obvious there is no form of supervision at any of the collection points ranging from the Road Median to Vendors and even Scavengers (Table 2), who sometimes find valuable resources in the waste for recycling.

From the time the waste is dumped which could be anytime of the day and until late hours of the night when the garbage trucks would come to pick up the waste, a lot of impact would have taken place between the waste and the environment. First, the climatic elements such as the sun, wind and rain would have affected it and somewhat changed the composition. The heat of the sun which is relatively high in this part of the world has the potential to change the composition of some of the waste as well as disintegrate them further. When it is windy, which is quite common in Port Harcourt, some of the waste is blown away and the entire streets are littered with waste. These end up in blocking the drainages and causing of urban flooding in many parts of the city.

The Service providers are responsible for collection, transportation and disposal of waste at designated dumpsites or burrow pit within their zones. At the final disposal sites, RIWAMA officials and dumpsite contractors do the spreading and compaction of the wastes. The refuse is usually not treated or processed before final disposal, therefore the possibility of leachate percolating through the soil and contaminating the groundwater table, which is relatively low in Port Harcourt, is very high. From the foregoing, the management of MSW from the point of collection up to final disposal at selected dump sites or landfills is crude and far below international standards.

Table 1. Percentage Distribution of Household Storage of Waste (Household waste storage patterns?)

Item	N	%
Stored in Polythene Bags	200	50.0
Stored in Metal Waste Bins	18	4.5
Stored in Plastic Waste Bin	154	38.5
Stored in Cane Waste Baskets	21	5.3
Stored in Cartons	7	1.8
Total	400	100

Source: Author’s Field Work

Table 2: Percentage Distribution of Waste (Collection Points?) Disposal Methods in the Study Area

Item	N	%
Road Median	161	40.3
Government Approved Dumpsite	68	17.0
Estate Approved Dumpsite	6	1.5
Street Corner	78	18.8
Drains/Gutters	5	1.3
Rivers/ Water Bodies	26	6.5
Vendors	55	13.8
Burning	4	1.0
Total	400	100

Source: Author's Field Work



Fig 3. Waste Dumped on the Median of the Road along Ikwerre Road, Port Harcourt. 2019



Fig 4. Approved Riwama Dump Site by the Mile 3 Park, Port Harcourt. 2019

4.3 The Consequence of Indiscriminate Waste Collection Points

(i) Flooding

A consequence of having all kinds of waste collection points is flooding in different parts of the city immediately after every rain fall. Greater Port Harcourt has experienced a lot of flash flooding in recent times, after rains, as a result of debris carried in and around the waste collection points carried by runoff water that clogs the water channels to the outlets. From the study, the respondents who throw their waste into Rivers and Water Bodies is as much as 6.5%, while 1.3% throw their waste into the Drains/Gutters (Table 2). In most environments and especially in the evenings, when the atmosphere is somewhat windy, waste is blown-away all over the place by the wind and many eventually end up in the drainages (Figures 5 and 6).



Fig 5. Waste Being Scattered by Wind All Over the Street along Ikwerre Road, Port Harcourt. 2019



Fig 6. Some Bagged Refuse Flowing Out by the Mile 3 Market, Port Harcourt. 2019

(ii) Odour Nuisance and Potential Spread of Air Born Diseases

When MSW is dumped at the various collection points, the collection trucks do not pick them up till very late hours of the night and even into the early hours of the morning. At festive period like the Christmas, MSW may not be picked up, sometimes for days (Figure 7). And because Port Harcourt climate is somewhat peculiar most parts of the year, including heavy rainfall of about 233 – 327mm per month, Wind Speed of 8 – 56km/h, Relative Humidity of 89% and Temperatures of 22⁰C to 36⁰C; the waste most of the time is soaked with water and decompose within a short period of time resulting in a bad stench and indeed an odour nuisance all over the city which is unhealthy to for the inhabitant to breath.



Fig 7. Waste Dumped by a Corner of a Street in D/Line, Port Harcourt. 2019

Diseases thrive in such conditions as in Figures 7 and 8 when MSW is left open for hours, not bagged or put in receptacles, it attracts flies and other disease carrying agents.



Fig 8. Waste Dumped Close To A Secondary School in D/Line, Port Harcourt, 2019

V. Conclusion and Recommendations

The present method of waste collection in Greater Port Harcourt City is of great concern. The aesthetics of the garden city has long been lost but rather we now have the entire city littered with dirt everywhere you look. The research observed improper management of Municipal Solid Waste and the unavailability of designated collection points and receptacles for collection of waste. This has resulted into flash flooding in many parts of the city as rain water cannot flow freely due to blocked drainages of refuse carried into them by wind and runoff water. The city is filled with bad odour resulting from decomposing garbage stench at different corners. The research therefore recommends that the government should: provide proper containers assigned for various categories of waste; designate points and receptacles for dumping of waste; and educate the people on proper waste disposal practices. Also defaulters of the proper disposal methods should be made to pay a fine, Vendors should be better organized, trained and rewarded accordingly. There should be regular collection of waste and continual improvement. Finally government agencies like RIWAMA concerned with waste management should be supervised.

References

- [1]. Asase et al. (2009) Comparison of municipal solid waste management systems in Canada and Ghana: A case study of the cities of London, Ontario, and Kumasi, Ghana. *Waste Management* 29, 2779-2786.
- [2]. Ayotamuno, A., & Obinna, V. C. (2018). Private Estate Housing Productivity in Greater Port Harcourt, Nigeria. *American Journal of Educational Research and Reviews*. 3(27), 1-14.
- [3]. Ayotamuno, M. J., & Gobo, A. E. (2004). Municipal solid waste management in Port Harcourt, Nigeria: obstacles and prospects. *Journal of Management of Environmental Quality*. 15(4), 389-398.
- [4]. Cook, T. D. & Campbell, D. T. (1979). *Quasi-Experimentation – Design and Analysis Issues for Field Settings*. Boston: Houghton Mifflin Company.
- [5]. Currivan, D. (2004). *Sampling Frame in Lewis-Beck, Michael S. Bryman, Alan, Liao & Tim F. The Sage Encyclopedia of Social Science Research Methods*. SAGE Publications, Inc. Retrieved: <http://knowledge.sagepub.com/view/socialscience/SAGE.xml>. Accessed (August 19, 2014).
- [6]. Ede, P., Owei, O. B. & Akarolo, C. (2011). Does the Greater Port Harcourt 2008 meet aspirations for liveable city? A Paper presented at the 47th Congress of the International Society of City and Regional Planners. *Liveable Cities: Urbanizing World, Meeting the Challenge*. Wuhan. http://www.isocarp.net/Data/case_studies/1859.pdf. Accessed (October 4th, 2014)
- [7]. ESESA (Enugu State Environment Sanitation Agency), (1998), ESESA Report, 1998.
- [8]. Greater Port Harcourt City Development Authority (2009). <http://www.GPHCDA/>

- [9]. (Accessed on: September 29, 2013).
- [10]. Khalil, N. & Khan, M. (2009) A case of a municipal solid waste management system for a medium-sized Indian City, Aligarh. *Management of Environmental Quality: An International Journal*, 20 (2), 121-141.
- [11]. Ogwueleka, T.C., (2003). Analysis of urban solid waste in Nsukka, Nigeria. *Journal of Solid Waste Technology and Management*, 29 (4): 239-246.
- [12]. Rivers State Government (RSG),(2003). Rivers State Physical Planning and Development Law No. 2. Rivers State Ministry of Physical Planning and Urban Development
- [13]. RIWAMA (Rivers State Waste Management Agency)
- [14]. Yamane, T.(1967). *Statistics: An Introductory Analysis*. Second Ed. New York: Harper & Row
- [15]. Zia, H., Devadas, V. & Shukla, S. (2007) Municipal solid waste management in Kanpur, India: Obstacles and prospects. *Management of Environmental Quality: An International Journal*, 18 (1), 89-108.

Dr Augusta Ayotamuno. "The Impact of Indiscriminate MSW Collection Points in Greater Port Harcourt City, Nigeria." *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, 13(3), (2020): pp 26-35.