# Environmental Refuse Disposal Management Policies on Municipal Solid Waste in Port Harcourt Metropolis, Rivers State

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***Abstract:*** *The study examined the environmental refuse disposal management policies on municipal solid waste in Port Harcourt metropolis. The research work was carried out in view of the indiscriminate deposition of solid waste in urban areas like Port Harcourt. The major objective is to examine level of awareness of state policies on solid waste in Port Harcourt, identify the methods utilized in solid waste management, identify its economic benefits and identify also its problems. The hypothesis is to examine significant relationship between public awareness on environmental refuse policies and indiscriminate waste disposal. The study adopted urban ecology theory, environmental compliance model. The study adopted the case study research and a total of 144 persons were randomly selected from communities in Port Harcourt L.G.A. Well structured questionnaire was used in the study to collect data which was based on the research questions and hypothesis. Responses were analyzed using descriptive statistics and hypothesis was tested using Regression analysis. Findings revealed that majority are aware of environmental agency that manages solid waste as the mean value is 2.72 but are not aware of state policies guiding solid waste not even penalty that attracts fine for defaulters as the result showed 2.12.This is because of non-implementation of policies. Also various method utilized on solid waste were strongly agreed on as a means of managing it if maintained. Result showed that daily adherence to clearing of refuse dump, recycling, removal of illegal structures, monitoring/surveillance of drainage and citizen mobilization and environment education on solid waste management with mean value of 2.65, 2.80,2.69.2.47.2.79 respectively are methods of managing solid waste in Port Harcourt Metropolis . In identifying problems of solid waste management result (2.84) showed that majority of the respondents strongly agreed that a poor strategy for raising environmental awareness is a major problem due to poor awareness campaigns. The hypothesis was tested using regression analysis and it was showed that there is significant relationship between inadequate public awareness of environmental policies and indiscriminate waste disposal. Recommendations were put forward to the Government that they should fund public environmental education programmes using electronic and it should be translated in local languages, also there should be monitor teams that will ensure residents to fully adhere to regulation of the Rivers State Waste Management Board(RIWAMA).*

***Keywords:*** *Policies, disposal, solid waste, municipal, management, metropolis,*
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## I.    Introduction

Recently in major cities of Nigeria it is hard to see streets that are free from refuse, taking a walk around such areas, it is rare for one to breath in clean air. The way waste is being manage in Nigeria is really alarming, as it is left on roadsides, markets and in other public places which when decay produce awful odour. Man and animal's activities are what made up most of the refuse which are thrown away because it is needless, Okecha (2000).

Increase in population, migration to urban areas, lack of infrastructures and unawareness are major issues of this waste problems in Nigeria, Walling *et al.* (2004). Years ago in cities or in rural areas, refuses were well managed, except for leaves from trees which decays and adds nutrients to the soil. Now, the level of cleanliness in these areas is no longer satisfactory. Port Harcourt metropolis is not left out amongst cities facing waste management as major streets are refuse dumping sites. There has not been clear management policies on refuse disposal as well as the enforcement of laws to checkmate defaulters that are dumping refuse illegally.

According to Omisore *et al.* (2009), instability of Government, low finance, non-enforcement of policy are serious issues facing the management of solid waste in Nigeria. Despite agencies that are responsible in enacting and enforcing laws, it has not achieved success in protecting the environment. Concern has majorly been on beauty of the environment, which has proved abortive, Agunwanba (1998).

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## Objective of the Study

The general objective of this study is to examine Environmental Refuse Disposal Management Policies on Municipal Solid Waste in Port Harcourt Metropolis.

The specific objectives are to:
(i)    Examine level of awareness of existing State policies on solid waste
(ii)   Identify methods utilized in solid waste management.
(iii)  Identify its economic benefits.
(iv)   Identify problems of solid waste management.

## Statement of Hypothesis

There is no significant relationship between public awareness on refuse management policies and indiscriminate waste disposal.

## Theoretical Framework
## The Urban Ecology Theory

Stadtökologie is a German name for urban ecology, which has the notion that man affects their surroundings. Its origin is from the "biology notion of the interaction of living things and their environment" when urban areas has not been seen by researchers to be a place to carry out their field study, Marcotullio *et al.* (2003). Researchers wanted to prove, using the principle of urban ecology that man residing in urban areas has direct relationship with nature, Collins *et al.*(2000). Urban ecology also includes man's attitude and how it influences its surroundings, Sukopp *et al.* (1998). Indeed, the consumption of fossil fuels play a vital role in emission of gas, the increasing population, migration of people contribute in producing refuse in urban areas

## Environmental compliance model

According to Ayres *et al.* (1992), he implemented the idea of self regulation. The pyramid in Figure 1 gives detail of the model. The pyramid consists of   persuasion, a warning letter, a civil penalty, a criminal penalty, license suspension, and license revocation. The first stage of the pyramid from bottom is self-regulation; the second stage implements self-regulation through the aid of the government, also the other stage is an order of regulation which administers disciplinary action at one's own judgment and the last stage, orders rules with harsh disciplinary action.
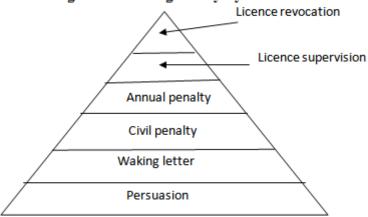


**Figure 1: The Regulatory Pyramid**

According to Gunningham  *et al.* (1998), he opined that  "smart regulation" is very essential. As it requires the intervention of those in authourities. The model centres on regulators who enforce definite environmental objectives which lead to great achievement.

## II.  Methodology

### Study Area

Port Harcourt metropolis (Port Harcourt Local Government Area) is the case study. Its administrative seat is located in Port Harcourt. It is situated 52kilometres (32mi) Southeast of Ahoada and about 40Kilometres (25mi) northwest of Bori. It is bounded to the South by Okrika, to the East by Eleme. Its size is 109 square

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Kilometers (42sqmi). Its total number of residents is 638,360 and Density of 5,856.5/km 915,168/sq mi) (National Population Commission, 2011). Port Harcourt Local Government consists of 26 communities.

**Research Design**
The case study research method is adopted.

**Data Collection Method and Sources**
Data was collected from primary source, interview schedule and structured copies of questionnaire was used to source for data from residents in Port Harcourt Local Government Area.

**Data Analysis Techniques**                                           Descriptive statistical tools
such as frequency, percentage, mean were used in analyzing the data. The objectives are achieved using four point Likert, while regression analysis is used to test the Hypothesis.

**Model Specification**
Model specification for this study as adopted from Oladele *et al*. (2005), is written as:
$Y = B_o + B_iX_i + ei$
Where:
$Y$ = dependent variable – indiscriminate waste disposal in Port Harcourt metropolis
$X_i$ = independent variable – inadequate public awareness of environmental policies
$B_o$ = the intercept
$B_i$ = slope or regression coefficients that explain the probability of indiscriminate waste disposal
$ei$ = error term
The decision rule was to reject the null hypothesis ($H_0$) if the computed value of the test statistics is greater that the critical value at a given level of significance (0.05) and a given degree of freedom, otherwise, accept the alternate hypothesis.

## III. Results and Discussion

**Table 1: Level of Awareness of Existing Policies on Municipal Solid Waste in Port Harcourt Metropolis**

| Existing policies on waste management | SA | A | U | SU | Total Score | Mean |
|---|---|---|---|---|---|---|
| Are you aware that there are government agencies that manage solid waste in Port Harcourt metropolis. | 42 | 45 | 31 | 26 | 144 | 2.72 |
| Are you aware that there are solid waste policies guiding management of solid wastes in Port Harcourt metropolis | 22 | 33 | 29 | 60 | 144 | 2.12 |
| Are you aware of Section 57(1)of RIWAMA on offences of refuse dumping and the penalties? | 32 | 25 | 41 | 46 | 144 | 2.29 |
| Are you aware of Section 48(1) & (ii) which state that a person who generate waste shall minimize the toxicity and amount of the waste generated also deliver the waste to a licensed waste disposal facility | 27 | 36 | 20 | 61 | 144 | 2.20 |
| Are you aware that indiscriminate disposal of wastes attracts fine in Port Harcourt metropolis? | 29 | 38 | 31 | 46 | 144 | 2.35 |

*Source: Field Survey 2017.*

The result revealed that there is no awareness on the following as it mean value is below 2.5: solid waste policies guiding management of solid waste, section 57 subsection 1 of RIWAMA on offences of refuse dumping and the penalties as well as that of section 48 subsection i &ii which state that a person who generate waste shall minimize the toxicity and amount of the waste generated also deliver the waste to a licensed waste disposal facility. Also that the respondent are aware of Government agencies that manage waste in Port Harcourt as the mean value exceed 2.5

**Table 2: Methods of Managing Solid Waste in Port Harcourt Metropolis**

| Variables | SA | A | D | SD | Total | Mean |
|---|---|---|---|---|---|---|
| Daily adherence to clearing of refuse dump | 39 | 41 | 39 | 25 | 144 | 2.65 |
| Recycling(Informal) | 46 | 42 | 38 | 18 | 144 | 2.80 |
| Removal of illegal structures | 38 | 39 | 52 | 15 | 144 | 2.69 |
| Monitoring/surveillance of drainage | 28 | 34 | 58 | 24 | 144 | 2.47 |
| Citizen mobilization and environment education on solid waste management | 59 | 27 | 27 | 31 | 144 | 2.79 |

*Source: Field Survey 2017.*

Table 2 showed methods that have helped in managing solid waste; all variables above 2.5 mean levels. The respondents agreed that daily adherence to clearing of refuse dump, recycling (informal), removal of illegal structure, monitoring/surveillance of drainage system and citizen mobilization and environment education on solid waste management are accepted methods through which waste management can be maintained.

**Table 3:  Economic benefits of solid waste management in Port Harcourt Metropolis**

| Variables | SA | A | D | SD | Total | Mean |
|---|---|---|---|---|---|---|
| Generate revenue to the state | 48 | 33 | 28 | 35 | 144 | 2.65 |
| Provides employment | 57 | 29 | 36 | 22 | 144 | 2.84 |
| Saves landfill space/costs | 35 | 45 | 33 | 31 | 144 | 2.58 |
| Reduction of cost of waste disposal | 38 | 52 | 30 | 24 | 144 | 2.72 |
| Creates more industry | 40 | 53 | 26 | 25 | 144 | 2.75 |
| Others | 32 | 49 | 27 | 36 | 144 | 2.53 |

*Source: Field Survey 2017*

Analysis of the study in table 3 showed economic benefits of solid waste management and all the variables are above 2.5 mean. Majority of the respondents agreed that solid waste management through recycling, composting etc creates more industry in the state which will in turn provide employments to her citizens. Some of the respondents from findings have it that, it generate revenue, saves landfill space/costs and reduce the costs of waste disposal & others such as, saves money to the agency

**Table 4:  Problems of Solid Waste Management in Port Harcourt Metropolis**

| Variables | SA | A | D | SD | Total | Mean |
|---|---|---|---|---|---|---|
| Poor funding | 51 | 33 | 29 | 31 | 144 | 2.72 |
| Environmental culture of the people | 33 | 28 | 31 | 52 | 144 | 2.29 |
| Limited infrastructures and professionals | 33 | 49 | 31 | 31 | 144 | 2.58 |
| Social and political factors | 34 | 39 | 42 | 29 | 144 | 2.54 |
| Poor strategies for raising environmental awareness | 48 | 42 | 37 | 17 | 144 | 2.84 |
| Poor legislation and implementation of policy | 37 | 43 | 52 | 12 | 144 | 2.73 |

*Source: Field Survey 2017.*

The result showed response that poor funding, limited infrastructure/technology, social & political factors, poor strategies for raising environmental awareness, poor legislation & implementation of policy cause serious  problems in managing solid waste since their mean level is between 2.5 and above. However, they agree that environmental culture is not a serious problem as its mean level is below 2.5

**Table 5: Regression**

| Mode 1 | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .870ᵃ | .758 | .717 | 13.48607 |

a. Predictors: (Constant), Inadequate Public Awareness on Environmental Policies

The result showed the model summary result which indicates strong and positive correlation between inadequate public awareness on environmental policies and indiscriminate waste disposal in Port Harcourt metropolis, Rivers State. This is evidenced on the value of the co-efficient of the correlation (R) which is 0.870

| | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|---|
| **Coefficients** | | | | | | |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | 127.625 | 59.624 | | 2.141 | .076 |
| | Inadequate Public Awareness on Environmental Policies | .660 | .152 | .870 | 4.331 | .005 |
| a. Dependent Variable: Indiscriminate Waste Disposal | | | | | | |

The computed t-statistics for the study showed t-computed as 4.33 at a significant value of 0.005. Using the conventional 5% level of significance, the critical value of t-statistic at 7 degree of freedom (df) is 2.31. Since the t-calculated is greater than t-critical value (4.33>2.31) the null hypothesis is rejected and it is accepted that there is a significant relationship between inadequate public awareness of environmental policies

and indiscriminate waste disposal in Port Harcourt metropolis, Rivers State. Again, F-computed value 18.25 at significant value of 0.005 is an indication that the model is significant. Thus we conclude that the model is statistically fit, significant and reliable for decision making.

The empirical result showed that inadequate public awareness of environmental policies influences indiscriminate waste disposal significantly.

## IV. Conclusion

The result showed that many of the respondents are informed of existing government agencies in Port Harcourt metropolis but are not aware of existing policies guiding solid waste management. This is revealed as majority strongly agreed that poor strategies for raising environmental awareness are the problem in managing solid waste. The regression analysis result also showed that there is significant relationship between inadequate public awareness on policies and indiscriminate waste disposal in Port Harcourt metropolis.

Recommendation are made base on the above findings, which are as follow;

* Establishing of monitoring team who will make sure that there is strict adherence to the regulation of the Rivers State Waste Management Board (RIWAMA).
* Government should fund public environmental education programmes using     electronic, which should be translated in local languages.

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