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Assessment of the Spatial Compliance and Negligence of Environmental Laws on Waste Management Practices and Consequences in the South-South Region of Nigeria

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ABSTRACT: *This research work examined the spatial compliance and negligence of environmental laws on waste management practices and consequences in the south-south region of Nigeria. Data for this study were collected from primary and secondary sources, through the administration of one thousand, seven hundred and twenty eight (1,728) copies of questionnaire using the random sampling method on respondents. Simple percentages, charts, student's t-test, anova, and correlation statistical techniques were used in the analysis of the data collected. This study revealed that waste management practices and controlled dumpsites location in the study area were not in compliance with environmental laws. The null hypothesis one was rejected in favour of the positive hypothesis and concluded that, there is a significant relationship between the waste dumpsites in the study area, and the impacts of their health hazards on the immediate environment. The study therefore recommends that, in our pursuit of environmental protection and compliance of environmental laws, we should strive towards achieving a balance in the benefits we derive from activities that cause environmental pollution and the resultant harmful effects.*

Keywords: *Compliance, Consequences, Environmental Laws, Negligence and Waste Management.*

I. INTRODUCTION TO THE STUDY

Since the beginning of the 19th century, international law has played a significant role in the protection of the environment. Among the fields of law, the evolution of international environmental law stands out as fast-paced with chequered and tumultuous history, experiencing dramatic changes in emphasis and contents (Oludayo, 2004). He further noted that the idea on environmental laws began on a cautious bilateral note and was directed at conservation and protection of few species that were initially considered as valuable resources to humans or at the brink of extinction. Thus, the sources of international environmental law could be gleaned from Article 38 (1) of the Statute of the International Court of Justice. It provides:

"The Court, whose function is to decide in accordance with international law, such disputes as are submitted to it, shall apply:

i. International conventions, whether general or particular , establishing rules expressly recognized by the contesting States;
ii. International custom, as evidence of a general practice accepted as law;
iii. The general principles of law recognized by civilized nations;
iv. Judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of the rules of law.

Oludayo (2004) defined environmental law as the body of rules, both from the national and international perspectives, for the sustainable utilization of resources, for the social and economic development of the society. He further said that, although environmental protection proceeded from a simple premise; a moral, ethical belief that we should protect those things we all share, the air, water and land . Environmental law is the transformation of those

moral principles into legally enforceable norms. It may also be defined as the law governing the control of the effects of human activity on the physical environment in the overall interest of the public. It embraces the subject matter of several important international agreements and municipal laws, regulations, standards and institutional framework for the equitable and sustainable use of the natural resources (Oludayo, 2004). The primary consideration of environmental law is the provision of the legal platform upon which the environment could be protected and natural resources conserved through the sustainable use of natural resources, pollution control measures and the integration of environment considerations into development process.

Thornton and Beckwith (1997) defined environment to include natural resources both biotic and abiotic, thus covering not only the natural environment, but also the man-made landscapes, buildings and objects, which form parts of man's natural heritage. An environment represents the surrounding condition, influence on the whole complex of climatic, edaphic and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival (Gboyega, 1998).

Yar'Adua (2007) stressed that Nigeria has been a very active player in most of the global environmental initiatives. He further stressed that the country has also made efforts to operationalize the implementation of the various environmental agreements and other outcomes of these global initiatives at the country level. Events surrounding the unfortunate Toxic Waste Saga in the small town of Koko in Delta State in 1987 gave rise to the Harmful Waste Decree 42 of 1988. The incidence also facilitated the establishment of the Federal Environmental Protection Agency (FEPA) through Decrees 58 of 1988 and 59 (amended) of 1992. The agency was then charged with the overall responsibility of environmental management and protection across the country. This was on until 1999, when Federal Environmental Protection Agency (FEPA) and other relevant Departments in other Ministries were merged to form the then Federal Ministry of Environment, now Federal Ministry of Environment, Housing and Urban Development (Yar'Adua, 2007). This situation however created a vacuum in the effective enforcement of environmental laws, standards and regulations in the country. In order to address this, the Federal Government created, by law, a new institutional mechanism, the National Environmental Standards and Regulations Enforcement Agency (NESREA).

II. STATEMENT OF THE PROBLEM

The conservation and protection of environmental resources in poor nations like Nigeria result from inadequate political commitments, inadequate financial support, inadequate administrative and scientific capacities, and inadequate popular constituencies for the protection of nature (Environmental Watch, 2008). These problems persist because the conventional means for obtaining conservation, international environmental law, national environmental law, and environmental education have very seldom been able to overcome the high priority placed on environmental development in virtually all the developing countries. These generally accepted conservation measures have clearly failed to inspire effective conservation on a broad scale in developing nations and we believe they cannot succeed in comparison with the current pace of global ecological degradation (Hogan, 2010). Environmental protection is inherently a complex, expensive, difficult and uncertain process that must be undertaken on a continuous basis into the indefinite future (Glasson, et al, 1999). However, after more than two decades of international environmental law initiatives and countless environmental education programmes, the conditions needed for effective conservation programmes simply have not been created where they are needed most and there is no reason to imagine that conventional conservation strategies will ever succeed in fostering the essential political, social, economic, administrative and legal climate (Hogan, 2010).

Osibanjo (2009) observed that global and national environmental problems and human development activities have increased by leaps and bounds in the last century. He further stressed that albeit to improve the lives of billions of people, but at the same time, unintentionally produced adverse ecosystem changes, which have taken the planet earth to the edge of massive wave of species extinction and further threatening our own well-being. According to the Millennium Ecosystem Assessment Report (2005), natural resources depletion, pollution and environmental degradation constitute a significant barrier to the achievement of the Millennium Development Goals to reduce poverty, hunger and diseases in Nigeria and other developing countries. More vividly is the continuing deterioration of the environment, the depletion of the stratospheric ozone layer, loss of biological diversity, real threats of climate

change/global warming and the plethora of hazards to the environment, which are all traceable to unsustainable pathways of the past and present as mapped by human ecological foot prints.

Osibanjo (2009) stated that Nigeria is endowed with natural resources including forestry and other biodiversity, solid minerals, oil and gas to mention a few. Environmental problems, however, vary in different ecological zones of the country and include rapid urbanization (e.g. Lagos, Nigeria, will be one of the ten (10) mega cities in the world by 2015 with a population of more than twenty three (23) million people). Solid wastes, flood and erosion, drought and desertification, oil and gas pollution, industrial pollution and indoor air pollution in urban centers are possibly going to increase. He further stressed that rapid industrialization occurred in Nigeria, since independence in 1960 with inadequate attention to environmental considerations such that industrial pollution has caused and continue to cause depletion of natural resources and the impairment of human health.

III. AIM AND OBJECTIVES OF THE STUDY

The main aim of this study was to assess and examine the spatial variation in the compliance and non-compliance of environmental laws on waste management practices and consequences in the South-South Region of Nigeria.

The specific objectives of this study were to:

i. identify waste dumpsites in the study area and assess the potency of their health hazards on the immediate environment
ii. examine the causes of indiscriminate waste disposal in the study area
iii. assess the impacts of indiscriminate waste disposal in the South-South Region of Nigeria
iv. assess the areas of compliance and non-compliance of environmental laws in the location and operations of waste disposal sites in the study area
v. recommend possible remedial measures on environmental problems which emanates from the negligence of environmental laws, as well as strengthen the existing environmental laws in the study area.

IV. HYPOTHESES OF THE RESEARCH STUDY

For the purpose of this study, the following working hypotheses have been developed in line with the objectives of the study stated earlier.

i. There is no significant relationship between the waste dumpsites in the study area, and the impacts of their health hazards on the immediate environment.
ii. There are no significant causes of indiscriminate waste disposal in the South-South Region of Nigeria
iii. There is no significant impacts of indiscriminate waste disposal on the study area
iv. There is no significant variation in the compliance and non-compliance of environmental laws in the building of houses on erosion and flood prone areas in the South-South Region of Nigeria

V. THE STUDY AREA

1.5.1. Components and Location

The South-South Region of Nigeria / Geo-political Zones are made up of six states; these are Edo, Delta, Bayelsa, Rivers, Akwa-Ibom and Cross River States (Figs 1. and .2).

1.5.2. Climate

South-South Geo-political Zone of Nigeria has two seasons. These are the dry season and wet season. The dry season is accompanied by a dust laden airmass, while the wet season is heavily influenced by an airmass originating from the South Atlantic Ocean.

1.5.3. Drainage

The South-South Region of Nigeria / Geo-political Zones are low-lying region, through which the waters of the Niger River drain into the Gulf of Guinea. Characteristics landforms in this region include ox-bow lakes, river meander belts (Niger Delta, 2011) and prominent levees. Large fresh water swamps give way to brackish mangrove thickets near the sea-coast. River Ethiope and Ikpoba River are important rivers in the area known for fishing and water transportation activities. The South-South Region of Nigeria stretches for nearly 177 km (110 miles) from North to South and spread along the coast for about 257.4km (160 miles) (Rosenberg, 2011). Within the Delta, River Ethiope breaks up into an intricate network of channels called rivers. The Nun River is regarded as the direct continuation of River Ethiope and Ikpoba River (www.zodml.org, 2013).

1.5.4. Vegetation

The vegetation in the South-South Geo-political Zone of Nigeria, consist mainly of forest swamps. The forests are of two types, nearest the sea is a belt of saline/brackish mangrove swamp separated from the sea by sand beach ridges within the mangrove swamp. Numerous sandy islands occur with fresh water vegetation. Fresh water swamps gradually supersede the mangrove on the landward side (Rosenberg, 2011).

1.5.5. Natural Resources

Nigeria is regarded as the sixth largest oil producing country in the world today, due to the large volume of crude oil deposit in the South-South Region of Nigeria. Other solid mineral deposits in the South-South Region of Nigeria are industrial clay, silica, lignite, kaolin, tar, sand, decorative rocks, limestone etc (Park, 2004). These are raw materials for industries such as brick making ceramics, bottle manufacturing, sanitary wares and gas produces about 70% of Nigeria's income.

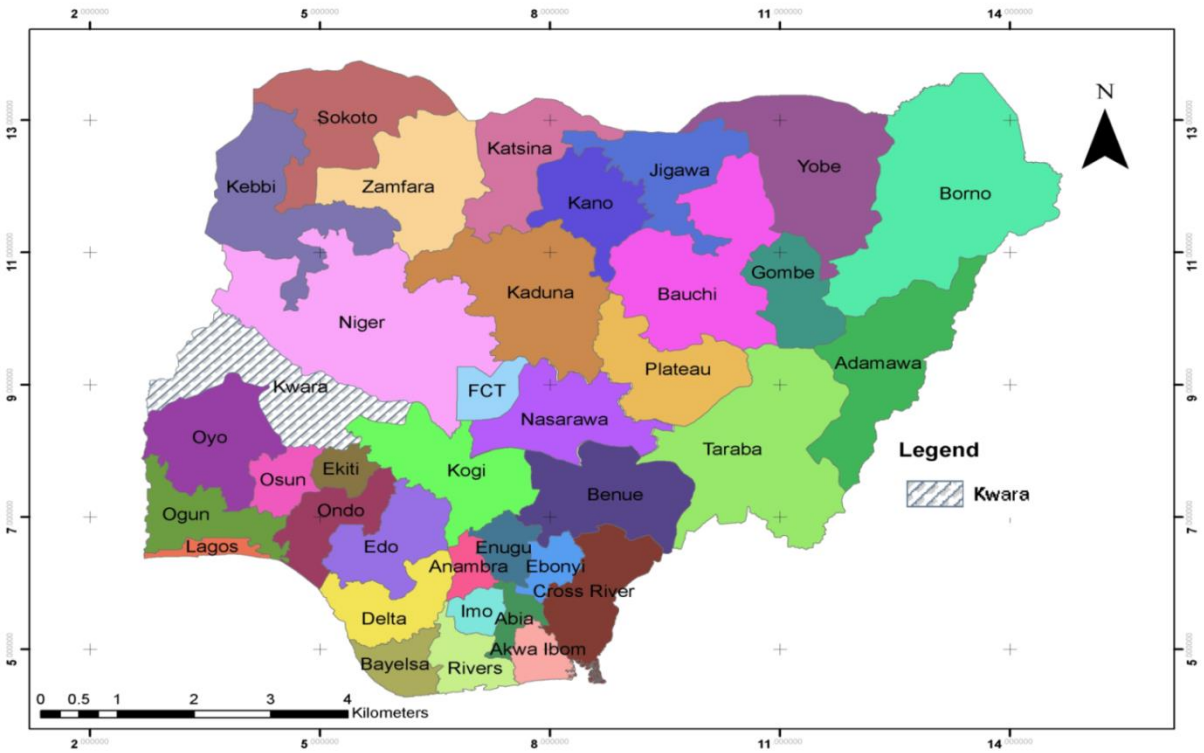

Figure 1: Map of Nigeria

Source: Kwara State Office of the Surveyor General, 2018

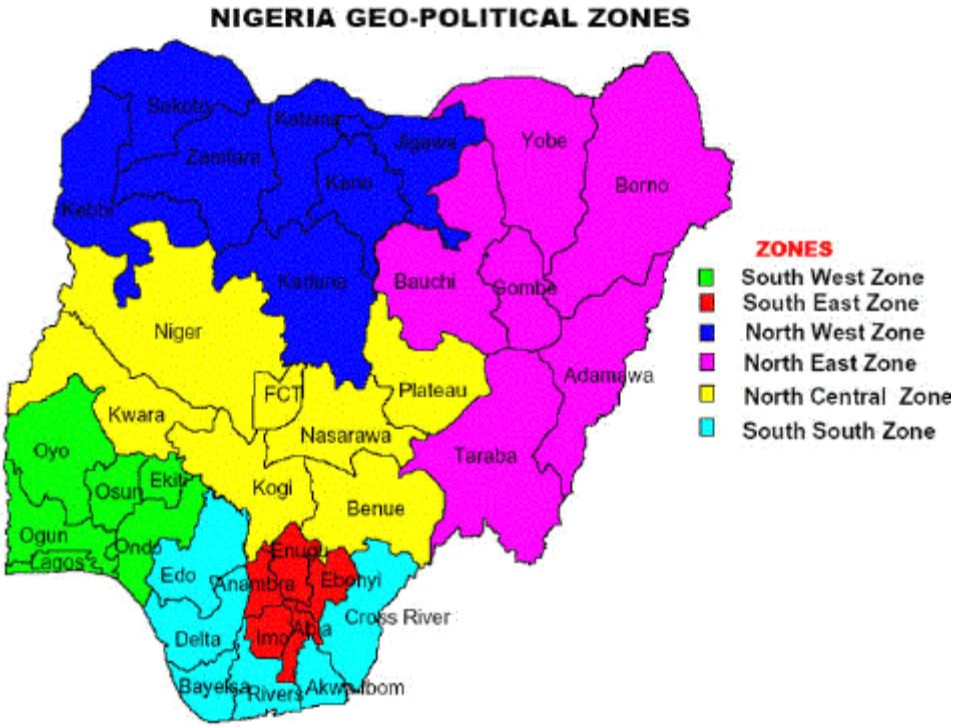

Figure 2: Map of Nigeria numerically Showing States in the South-South Region of Nigeria /South South Geo-Political Zone of Nigeria

Source: Author's Fieldwork, 2020

VI. THEORETICAL FRAMEWORK / LITERATURE REVIEW

The Concept of Environmental Regulation by United States Environmental Protection Agency (USEPA) (2000) is equally useful to this study. The concept states that environmental regulations are rules and requirements that generally spelt-out, the ethics and ethos, principles, practices and procedures that guide the actions of man in our environment. Thus, environmental regulations cover two things:

a. Pollution control: regulating how much pollution (chemicals or other undesirable materials such as "heat", "suspended particulates") a facility releases.
b. Conservation management: maintaining health of ecosystems, protecting land, and assuring diversity of species etc.

Pollution refers to undesirable outputs or byproducts being released into the environment. Chemical compounds are a common form of pollution, but pollution also includes things like: waste heat (e.g., discharging heated water into a river), or suspended particulates (e.g., creating a lot of air-borne dust). Even harmless compounds like $C0_2$ can be considered pollution, depending on the effect on the environment (e.g. $C0_2$ contributes to global warming).

Pollution Control Cover

It is important to understand that pollution control covers both actual releases and potential releases of pollution to the environment. That is, you may be regulated based on what you actually release up on air stacks, and for what you might potentially release (i.e., if you don't handle the materials properly). Here is what is covered:

Regulation of actual release of environmental pollution covers what have occurred through:

i. Direct releases, e.g., an air stack or waste water pipe.
ii. Waste disposal, e.g. solid or hazardous waste being taken to a landfill or treatment plant.
iii. General escape, e.g. "fugitive" emissions into air, water-runoff from your parking lot, or spills or leaks of chemical products or waste regulation of potential releases is focused on materials that would cause a problem if accidentally released. In this case, regulations can cover:

    i. What materials you have on site
    ii. How you store them
    iii. How you handle and manage them
    iv. How workers are protected from them

Regulation of Environmental Pollution Control

There are major and minor players in the regulatory world. Here are those we call the major players:

i. The federal agency that regulates pollution control is the Federal Ministry of Environment.
ii. In addition, each state has its own environmental agency, that may enforce standards that are a compliment to or even stricter than the federal standards. In some cases, a state will also be the one to enforce the national regulations: if the Federal Ministry of Environment agrees that their programme is strong enough, it will "delegate" the federal programme to them.
iii. Finally, regional and or metropolitan agencies are also common, particularly for air quality management and sewer management.

How to Know Environmental Regulations

As you might imagine, it is your responsibility to determine, if you are covered and to learn the requirements you must meet in order to comply with environmental laws. However, not all facilities are regulated all the time.

- One major criterion for being regulated is the amount of waste generated (or chemicals used). For example, if your waste level falls within certain threshold of about 70%, you may have reduced or no regulation. This is a major incentive for minimizing your waste streams in order to get out of the regulatory loops.
- Other criteria for being regulated, the type of industry your facility is into. The chemical industry is covered under environmental standard fully within the framework of environmental regulations and compliance of environmental laws.
- Other criteria can include

- The size of the facility (e.g. number of workers, depending on the size of the facility).
- The general environmental quality of the area. For example, a facility in an air shed with bad air quality may be subjected to stricter emissions standards, than if, it were in an area of better air quality.

Honarkhah and Caers (2010) observed that complex issues arise in spatial analysis, many of which are neither clearly defined nor completely resolved, but form the basis for further research. They further noted that the most fundamental of such issue is the problem of defining the spatial location of an entity. For example, a study on human health could describe the spatial position of humans with a point located where they live, or with a point located where they work, or by using a line to describe their weekly tips. They further stressed that each choice has dramatic effects on the techniques which can be used for the analysis and on the conclusion which will be obtained. Benenson and Torrens (2004) in their view noted that the definition of the spatial presence of an entity constrains the possible analysis which can be applied to that entity and influences the final conclusion that can be reached. While this property is fundamentally true of all analysis, it is particularly important in spatial analysis because the tools to define and study entities being studied. Thus, Geographic Information System (GIS) tools favour the spatial definition of objects as homogeneous and separate elements, because of the limited number of database elements and computational structures available, and the ease with which these primitive structures can be created. This study

therefore tends to look at the spatial compliance and non-compliance of environmental laws through the application of Geographic Information System on more than one feature in the study area.

Environmental law is a complex body of laws made up of global, international, national, state and local statutes, treaties, conventions, regulations and policies which seek to protect the environment and natural resources affected, impacted or endangered by human activities (United Nations Environmental Protection, 2005). Environmental law as a discipline is the field of legal study concerned with the establishment of legal framework for the protection of man's environment. The discipline deals with the law regulating the activity of man, and all other activities in the outer space that may have an impact on the physical environment of man (Abegunde, et al, 2007). The discipline has given us insight on the components of the human environment. The discipline has afforded legislators, legal practitioners and the judiciary at both domestic and international level, a sufficient understanding of the concept of environment with a view of providing the necessary laws to protect the environment. To the legal practitioners, it has given them the deep understanding of the rights, which a man is entitled to in the environment, with a view of redressing the wrongs in the face of the violation of such rights.

VII. RESEARCH METHODS

1.7.1 Research Design

The research design for this study was based on the careful gathering, analysis and application of facts in order to achieve the stated objectives and to test the acceptability or otherwise of the hypotheses stated in this study.

1.7.2. Data Type and Sources

1.7.2.1. Primary Data

Geographic Information System (GIS) and the underlying thematic mapping arc-view device were applied, as well as the administration of questionnaires. The first stage was the procurement of the maps of the six states in the South-South Geo-political Region of Nigeria (Akwa-Ibom, Bayelsa, Cross River, Delta, Edo and Rivers States) which is the coverage area for this study. From the six states in the South-South Region, one Local Government Area was selected from each of the eighteen Senatorial Districts using stratified sampling technique.

A 49-item Questionnaire was administered to elicit useful information from categories of respondents on environmental problems which emanate from the building of houses on erosion and flood prone areas, extraction of crude oil by oil companies, existing road transportation land use pattern, as well as health hazards which emanates from waste dumpsites in the study area. A total number of one thousand, eight hundred (1,800) copies of questionnaire were administered in this research; one hundred (100) copies of the questionnaire were administered to each of the randomly selected 18 Local Government Areas in the six states in the South-South Region of Nigeria. The one thousand eight hundred (1,800) copies of questionnaires were administered within the space of two (2) months in the 18 randomly selected Local Government Areas in the South-South Region of Nigeria. The questionnaires were administered by the researcher and 18 research assistants domiciled in the randomly selected 18 Local Government Areas. Copies of the questionnaires were administered during working days from Mondays to Thursdays and retrieved every Friday from civil servants and public servants in their offices in the study area. Copies of questionnaires administered on market men and women were administered daily and retrieved the following day. Why copies of questionnaires administered on members of the National Union of Road Transport Workers (NURTW) were done on daily basis from Monday to Friday and collected on Saturday, with the assistance and co-operation of the Union Chairmen. Out of which, one thousand seven hundred and twenty eight (1,728) copies of the questionnaires were retrieved from the field, making it 96% retrieval rate. Seventy-eight (78) copies of the questionnaire; which is 4% of the questionnaire were either mis-placed or mistakenly torn by the respondents.

Table 1. States Surveyed

	Frequency	Percentage
Akwa-Ibom	280	16.2
Bayelsa	287	16.6
Cross River	294	17.0
Delta	291	16.8
Edo	292	16.9
Rivers	284	16.4
Total	1728	100.0

Table 1.shows that 16.2% of the respondents were from Akwa-Ibom State, 16.6% of the respondents were from Bayelsa State, 17.0% of the respondents were from Cross River State, 16.8% of the respondents were from Delta State, 16.9% of the respondents from Edo State and16.4% of the respondents were from Rivers State. This indicates that the response of the respondents were considerably very high and reliable, since the total returned rate of the questionnaires administered was 96.0%. This tells us that the data generated from this research work is reliable.

1.7.2.2. Secondary Data

The secondary source of data collected in this study were collected on waste disposal methods and practices, pipeline vandalization, illegal bunkery activities, oil explosion and spillage within the study area from the offices of Waste Management Agencies and the National Oil Spill Detection and Response Agency (NOSDRA) etc.

The data obtained in the study area were subjected to statistical analysis using descriptive and inferential statistical tools and these include the use of maps, tables, charts, and graphs, while the Student's t-test, Analysis of Variance and Spearman Rank Correlation Co-efficient were used as inferential statistical tools to test the stated hypotheses.

1.7.3. Method of Data Analysis

The Statistical Package for Social Sciences (SPSS) was used in the descriptive analysis of the data collected in this research work. This was done by describing and comparing areas of compliance and non-compliance of environmental laws in the assessment of the potency of waste dumpsites health hazards on the immediate environment.

Inferential Analysis and Descriptive Analysis: Both were employed in this study

Student's t-test Data Analysis: The formular for student's t-test is

$$t = \frac{\sum D}{\sqrt{N\left(\sum D^2 - (\sum D)^2\right)}{N-1}} \quad \text{.....(1)}$$

N = Number of Observations (compliance and non-compliance of environmental laws). This was done with the aid of Statistical Package for Social Sciences (SPSS).

∑= Summation

D = Degree of frequencies

1 = Constant

The student's t-test was employed, since, two different samples of dependent and independent variables were involved.

In this research, the dependent variables, which are the results obtained from the non-compliance of environmental laws were matched with the independent variables; the compliance of environmental laws in the study area and a measure taken on both pairs of variables. Thus, the validity of the results obtained were tested at alpha level of 0.05 level of significance, using the two-tailed statistical table to validate its measurement, with due

consideration to the degree(s) of freedom.

Analysis of Variance (ANOVA)

The one way Analysis of Variance (ANOVA) was also employed. This is done, where and when, there are variations of groups of scores and each of the subjects yielding the score participates in the various groups matched in such a way that each subject is similar to one another (matched design).

The formula for one way analysis of variance is:

$$x_1 = x_2 = x_3 \ldots\ldots\ldots\ldots x_n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The one way Analysis Of Variance (ANOVA) was also adopted in this study.

The t-test is employed when two samples are different, or are not independent, that is, when one of the pairs is independent and the other pair is dependent. Thus, when they come from the same or related individuals or objects, but are not the same pair.

In this research, the dependent variables, which are the results which were obtained from environmental compliance and non-compliance of environmental laws in the study area, were matched on the independent variables and a measure taken on both pairs of variables. Thus, the validity of the results obtained were tested at alpha level of 0.05 level of significance, using the two-tailed statistical table to validate its measurement, with due consideration to the degree(s) of freedom.

Pearson's Product Moment Correlation Co-efficient

The Pearson's Product Correlation Co-efficient was used to test hypothesis four. This states that there is no significant relationship between waste dumpsites in the study area and the observed impacts of health hazards on the immediate environment.

The formular for Pearson's Product Moment Correlation Co-efficient is;

$$R_{XY=} \quad {}_N \sum (XY) - (\sum X)(\sum Y)$$

$$\sqrt{[n(\sum x^2) - (\sum x)^2 . (n\sum y^2 - (\sum y)^2]}$$

Where X= Outcome of non-compliance of environmental laws from the indiscriminate waste dumpsites in the study area.

Y= Outcome of compliance of environmental laws on waste dumped in the study area.

N =this is the number of observations made. Thus, this is the number of environmental problems, which emanates from the non-compliance of environmental laws resulting from indiscriminate waste dumpsites in the study area.

In this approach, the dependent variables, which were the non-compliance of environmental laws results from waste dumpsites in the study area, were subtracted from the compliance of environmental laws in the dumping of waste.

Decision Rule

The null hypothesis (Ho) will be rejected, if the "t" calculated value is greater than the "t" table value at (alpha level of 0.05). If otherwise, the alternative hypothesis (Hi) will be accepted.

VIII. RESULTS AND DISCUSSIONS

Table 2. How Waste is emptied in the Study Area

	Frequency	Percentage
Into the gutter	375	21.7
Into the bush	504	29.2
Dumpsites	483	28.0
Waste bin	366	21.1
Total	1728	100.0

Table 3. Approved Dumpsites in the Study Area

	Frequency	Percentage
Yes	576	33.3
No	1152	66.7
Total	1728	100.0

Table 4. Adequate Equipment/Facilities of Waste Management Workers

	Frequency	Percentage
Yes	801	46.4
No	927	53.6
Total	1728	100.0

Table 2. shows that 21.7% of the respondents stated that they empty their waste into the gutter, 29.2% stated into the bush, 28.0% noted dumpsites, while 21.2% of the respondents stated waste bin. Thus, the degree of non-compliance of environmental laws in the disposal of waste in the area is 50.9%.This implies that majority of the respondents in the study area dispose their waste indiscriminately, thereby littering the environment due to shortage of waste dumpsites.

Table 3. shows that 33.3% of the respondents stated that there were approved dumpsites in their area, while 66.7% of the respondents stated that there were no approved dumpsites in their area. This accounted for the high level of land pollution and unhealthy environment within the study area. Thus, the level of non-compliance in the approval of waste dumpsites in the study area is 66.7%.

Table 4. shows that 46.4% of the respondents stated that the equipment and facilities of waste management workers in their area were adequate, while 53.6% of the respondents stated inadequate. This implies that, the level of non-compliance of Waste Management Authourities in the acquisition of adequate equipment for the evacuation of waste is comparatively very high. Thus, the high incidence of waste problem in the study area is connected to the inadequate waste management evacuation equipment and facility in the area.

Table 5. Average Distance of the End-Point of Waste Disposal Sites

	Frequency	Percentage
About 1km	426	24.7
About 2km	285	16.5
About 3km	294	17.0
About 4km	285	16.5
Above 4km	438	25.3
Total	1728	100.0

Table 6. Those In-charges of Waste Evacuation in the Area

	Frequency	Percentage
State government	696	40.2
Local government	390	22.6
Private Organization	642	37.2
Total	1728	100.0

Table 5. revealed that 24.7% of the respondents stated that the average distance of the end-point of waste disposal sites to where they live is about 1km, 16.5% of the respondents stated about 2km, 17.0% stated about 3km, 16.5% stated about 4km, while 25.3% stated above 4km. This tells us that, there is a high degree of spatial negligence in the location of waste dumpsites in the area. The implication of this is that the respondents that live about 1km away from dumpsites are bound to be affected by health hazards; such as cholera, dysentery and malaria infection, while majority of the respondents who lives above 4km away from the controlled dumpsites are bound to dispose their waste indiscriminately due to distance, cost of transportation and time factor.

Table 6. shows that 37.2% of the respondents stated that the State Government is in-charge of waste evacuation in their area, 22.6% of the respondents stated Local Government Authorities, while 40.2% of the respondents stated private organizations. Thus, the degree of non-compliance in the setting-up of Waste Management Authourity in the area is considerably very high, since, the Local Government Authourities, who are closer to the people at the grassroots' is scarcely in-charge of waste evacuation in the study area and as such left it in the hands of private organizations, which was economically and spatially not in-compliance to environmental laws to ensure high patronage of people in the area.

Table 7. Maintenance of Dumpsites in the Study Area

	Frequency	Percentage
By burning	501	29.0
Through chemical decomposition	336	19.4
Evacuation for farm use	261	15.1
Left fallow to decompose	348	20.1
By compost	282	16.4
Total	1728	100.0

Table 8: Waste Evacuation Sequence by Waste Management Personnel in the Area.

	Frequency	Percentage
Daily	330	19.1
Twice a week	321	18.6
Weekly	450	26.0
Once a month	258	14.9
Not functional	369	21.4
Total	1728	100.0

Table 7. shows that 29.0% of the respondents stated that dumpsites in their area were maintained through burning, 19.4% stated through chemical decomposition, 15.1% of the respondents stated evacuation for farm use, 20.1% of the respondents stated that they allow the waste materials to decompose itself, while 16.4% of the respondents noted by burial. This suggests that the major method for the maintenance of waste in the area, which is by burning and fallow decomposition results into health hazards; such as cancer, weakening of the respiratory system of man, cholera, dysentery and malaria out-break and therefore not in-compliance with environmental law.

Table 8. shows that 19.1% of the respondents stated that waste management personnel evacuate waste materials in their environment on daily basis, 18.6% of the respondents stated twice a week, 26.0% of the respondents stated weekly, 14.9% of the respondents stated once a month, while 21.4% of the respondents said not functional. This implies that the evacuation of waste mechanism in the study area was largely not in-compliance with environmental laws and consequently resulted into indiscriminate waste disposal and health hazards in the study area.

Table 9. Adequate Knowledge of Environmental Laws

	Frequency	Percentage
Yes	1077	62.3
No	651	37.7
Total	1728	100.0

Table 10. Environmental Problems Experienced in the Area.

	Frequency	Percentage
Flooding and erosion	873	50.5
Indiscriminate waste disposal	279	16.1
Pollution from gas flaring/oil explosion & spillage	258	15.0
Poor road networks	318	18.4
Total	1728	100.0

Table 9. shows that 62.3% of the respondents stated that they have good knowledge of environmental laws, while 37.7% of the respondents stated that they do not have adequate knowledge of environmental laws in the study area. This suggests that majority of the respondents in the study area were enlightened, and as such useful in providing information on the subject matter in the area.

Table 10. shows that 50.5% of the respondents stated that the major environmental problem experienced in their area was flooding and erosion, 16.1% of the respondents stated indiscriminate waste disposal, 15.0% of the respondents stated pollution from gas flaring/oil explosion and spillage, 18.4% stated poor road networks. This suggests that the major environmental problems that have mostly affected the people in the study area were flooding and erosion. Thus, the level of non-compliance of environmental laws in addressing the causes and problems of flooding and erosion in the study area is considerably very high.

Table 11. The Role of Environmental Protection Agency in Ensuring Environmental Compliance.

	Frequency	Percentage
Strongly Agreed	306	17.7
Agreed	354	20.5
Disagreed	588	34.0
Strongly Disagreed	480	27.8
Total	1728	100.0

Table 12. Residents' Compliance with Environmental Laws.

	Frequency	Percentage
Strongly Agreed	540	31.2
Agreed	309	17.9
Disagreed	549	31.8
Strongly Disagreed	330	19.1
Total	1728	100.0

Table 11, shows that 17.7% of the respondents in the study area strongly agreed that Environmental Protection Agencies within the study area ensured compliance of environmental laws, 20.5% of the respondents agreed, 34.0% of the respondents disagreed, and 27.8% of the respondents strongly disagreed. This suggests that environmental protection agencies in the study area are not living up to expectation in ensuring compliance of environmental laws.

Table 12, shows that 31.2% of the respondents strongly agreed that they comply with the instructions of environmental protection agencies, 17.9% also agreed with the policy oo environmental protection agencies, 31.8% disagreed with the policies of environmental protection agencies, 19.1% strongly disagreed with the policies of environmental protection agencies. This implies that majority of the people in the study area does not comply with environmental rules and regulations, which consequently results into various kinds of environmental problems in the area.

Table 13. The Need to Ensure the Punishment of Violators of Environmental Laws.

	Frequency	Percentage
Strongly Agreed	330	31.1
Agreed	507	29.3
Disagreed	354	20.5
Strongly Disagreed	537	19.1
Total	1728	100.0

Table 14. Competent Authorities under Environmental Laws to be Held Responsible for Environmental Problems.

	Frequency	Percentage
Strongly Agreed	336	19.4
Agreed	507	29.3
Disagreed	330	19.1
Strongly Disagreed	555	32.2
Total	1728	100.0

Table 13, shows that 31.1% of the respondents strongly agreed that there is need to ensure the punishment of violators of environmental laws to discourage others, 29.3% agreed, 20.5% disagreed and 19.1% strongly disagreed. The implication of this is that there is need for the punishment of violators of environmental laws in the study area, so as to serve as a deterrent to others and consequently desist from such actions.

Table 14, shows that 19.4% of the respondents strongly agreed that competent authorities should be held responsible for erroneous act/non-enforcement of environmental laws which results to environmental problems, 29.3% agreed, 19.1% disagreed, 32.2% strongly disagreed with it. This suggests that the major cause of environmental problems, which emanates from the non-compliance of environmental laws in the study area, were the lackadaisical attitude of the people and not the mistakes of the competent authorities.

IX. DISCUSSIONS

Physical Survey Analysis

The physical survey of some randomly selected sites within the study area was carried-out to obtain and physically observe the level of compliance and non-compliance of environmental laws in the building of houses on erosion and flood prone areas, problems of flooding and erosion on the existing road transportation land-use pattern within the study area and the level of compliance with the urban master plan. Also, environmental problems, which emanate from the non-compliance of environmental laws through the extraction of crude oil by the oil companies and assess waste dumpsites in the study area and the impacts of their health hazards on the immediate environment. The following observations:

Illegal Waste Dumpsites

It was discovered during the physical survey of the study area, that waste materials were dumped illegally inside the bushes, drainage channels, along route courses and road networks. Some of the illegally dumped waste materials were discovered very close to residential buildings, this of course resulted into environmental health

hazards such as malaria, dysentery, cholera and air borne diseases on residents living close by. And again, the waste products dumped into the drainage channels prevented free flow of water run-off and as such, consequently results into flooding and erosion problems. The waste materials illegally dumped along the road networks truncate free flow of road traffic and capable of causing traffic jam, traffic congestion and increasing accident rate in the area. *See plates 1, 2 and 3.*

Plate 1: Illegal waste dumpsite along the road

Plate: 2: Illegal waste dumpsite inside the bush

Plate 3: Road transport network degraded by the problems of indiscriminate dumping of waste materials, flooding and erosion.

X. RECOMMENDATIONS

In view of the findings in this study, it will be of great benefits, if the following recommendations are given serious attention and consideration. In our pursuit of a new mechanism for environmental protection, we must strive towards achieving a balance in the benefits we derive from activities that cause environmental pollution and the resultant harm.

Our long range plans must encompass other areas of our national life, such as policy formulations, enforcement of regulations, the reversal of pollution activities, the response to emergencies, the import of machineries for the operation of our industries and the regulation of all such actions. Moreover, there is need for the application of integrated measures to embrace technological improvements, appropriate operating procedures, and proper organization of enforceable regulations and control mechanisms to avoid environmental hazards.

There is need for the National Assembly to partner with all stakeholders in the environmental sector as it performs its statutory role of enhancing relevant legislation. This is important, because some laws have become obsolete and most international conventions signed by Nigeria, are waiting to be domesticated. Furthermore, there is need for a Bill on the setting up of a National Centre for Environmental Research, Community Education and Training to promote information towards preventing environmental disasters. Also, Environmental Impact Assessment (EIA) should be undertaken as a compulsory precedence to proposed activities that are likely to have any adverse effects on the environment.

Agents of pollution should bear the cost and consequences of their pollution. Domestic garbage and toxic industrial waste should be a concern in national legislations, in a way that stringent unambiguous pronouncements are embedded regarding agents of pollution or other environmental damages, liabilities and possible compensation. In addition, there should be a safe, timely, effective and appropriate response to major or disastrous oil pollution activities in the area.

It is imperative to identify high-risk and priority areas for environmental protection and clean-up. The establishment of environmental mechanism to monitor and assist or, where expedient, direct the response, including mobilizing the necessary resources to save lives, protect threatened environment and clean up to the best practical extent of the impacted areas should be of utmost concern to Government at all levels in the study area.

Community participation in the collection of waste, selection of waste dumpsites and design of facilities is inherently essential for sustainability. There is need to strengthen the work force by recruiting more personnel in the Waste Management Authority.

Government should provide adequate funds for waste management personnel for the purchase of more

evacuating vehicles and waste disposal containers. It is necessary to carry-out periodic environmental and public health education exercise on the danger of indiscriminate waste disposal in the study area.

The waste management personnel should be well remunerated to motivate them to be more dedicated to their duty.

Strict environmental laws should be legislated, to ensure an appreciable participation in the general environmental sanitation, as well as to bring violators to book in the area. The enforcement mechanism should involve visits to facilities for compliance monitoring, facilities work through, finding-out challenges for non-compliance, examining monitoring records where they exist, undertaking in-situ environmental monitoring of some parameters and discussing findings with the faculty manager and proffer appropriate advice, that could promote compliance or issue warning, where non-compliance is persistent.

Covered containers and controlled dumpsites should be provided by the Town Planning Authority, so as to discourage the dumping of refuse on drainage channels. Vegetated open space should be allowed to flourish in the study area, and the urban water course channelized to improve the drainage systems.

XI. CONCLUSION

The importance of the spatial compliance of environmental laws in the monitoring and enforcement of environmental integrity and sustainable development cannot be over-emphasized. For an environmental compliance and enforcement programme to be effective, it must visibly demonstrate to the regulated communities, that environmental laws and standard are enforceable. Stakeholders must be carried along as public acceptance is central to the promotion of compliance, deterrence and enforcement.

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