

# Perception of Environmental Management Practice and Ecosystem Sustainability in Africa: Examining the Case of Rivers State

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**Abstract:** The current study is on the perception of environmental management practice and ecosystem sustainability in rivers state. The study used the survey research design and primary data was generated using the developed copies of questionnaire. Data generated were presented in tables and statistical diagrams; while data analysis was achieved using the brown-Forsythe test. The result indicates the inhabitants (47.25%) are concerned about the way the environment in the study area is being managed. Similarly, the majority of inhabitants (68.9) suggest that the environmental management practice in the area is not sustainable; citing Species extinction (47.25%), pollution (48.5%), deforestation (52.25%) etc. the brown-Forsythe statistics showed that the perception of environmental management practice is not statistically different in the three senatorial districts of the study area at  $P > 0.05$ . As a result of findings, the study strongly recommends a holistic approach to environmental management in the study area, while creating policies that will engender sustainable environmental practices in the.

**Key words:** Perception, environmental-management, ecosystem, sustainability

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## I. Introduction

Sustainable development is one of the major interests of the United Nations (UN); which is also a major aim of the Millennium Development Goals (MDGs) (Bennett, et al., 2015; Bennett, et al, 2017). Generally, MDGs makes it somewhat compulsory for United Nations member countries to actualize the goals of sustainable development and therefore they as an entity also makes sure the ideas of sustainable development is pursued (Sagie, et al 2013; Schlüter, et al 2014; Venkanna, et al 2014; Verburg, et al 2015; Wangai, et al 2016; Wangai, et al 2017; Zaehring, et al 2017).

Montabon, Sroufe & Narasimhan (2007) defined environmental management practices in their paper as the techniques, guidelines and ways an environmental manager (could be Government, Organisations or individual) manages the environment and that are targeted at monitoring and controlling the effect of its actions on the natural environment. Whilst there may be many aspects of environmental management practices as can be noted from the literature (Evangelinos & Oku, 2006; Montabon et al., 2007; Liu, Liu, Shishime, Yu, Bi & Fujitsuka, 2010); Gibson & Collins (2014), suggested that environmental management practices refers to the action taken by organizations and firms to remedy environmental pollution as well as waste management, carbon emission reduction, efficient energy use and efficient water usage (Díaz, et al, 2015; Frank, et al, 2017; Greiner, 2017).

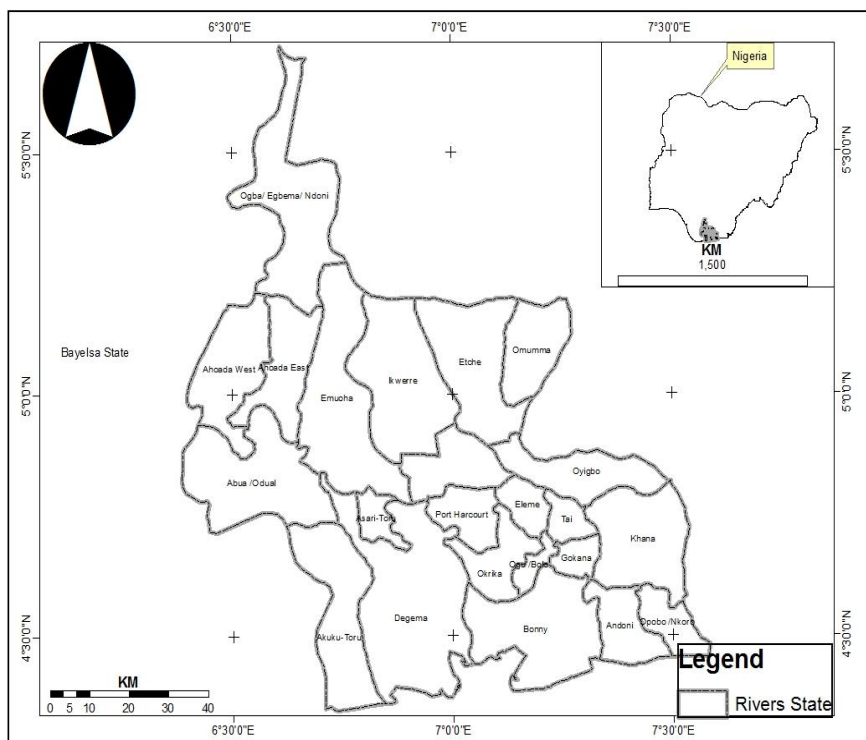
However the interrelationship between economic progress, environmental management and individual wellbeing is a complicated process (Ministry of Environment and Natural Resources, 2016; Ogutu, et al., 2017; Owuor, et al, 2017; Sachs, 2012), affecting both the quality and sustainability of the society in which we live (Sagie, et al 2013; Schlüter, et al 2014; Venkanna, et al 2014; Verburg, et al, 2015). There is a growing realization by the general public as well as practicing engineers, decision makers, environmentalists, and medical researchers, that these three areas are interconnected. In the past, the world's ecosystems were able to absorb the ecological damage resulting from extensive industrialization and development. However, with the rapid increases in global population and industrialization, as well as enhanced demands on natural resources such as fresh water supplies, the earth is no longer able to sustain a healthy and balanced ecosystem (Chan, et al, 2012; Costanza, et al, 2014; Cuni-Sanchez, et al, 2016; Cuni-Sanchez et al, 2017; De Groot, et al, 2010; Díaz, et al, 2015; Frank, et al 2017; Greiner, 2017).

The case in Africa is that there is no holistic approach to sustainable development. The vast part of development is centered on political motivation and improperly thought out developmental plan(s), which leaves out plan for sustainable eco-system (Chan, et al, 2012; Costanza, et al, 2014; Cuni-Sanchez, et al, 2016; Cuni-Sanchez, et al., 2017; De Groot, et al, 2010; Díaz, et al, 2015; Frank, et al., 2017; Greiner, 2017; Hicks, et al., 2017; Ogutu, et al., 2017; Owuor, et al, 2017; Sachs, 2012; Sagie, et al., 2013; Schlüter, et al., 2014; Venkanna, et al., 2014; Verburg, et al., 2015., Wangai, et al, 2016; Wangai, et al., 2017; Zaehringer, et al, 2017). The problem with this type of development is that it is lopsided; which do not only cause social unrest, but also leads to species extinction. As of today combine with climate change and insurgency, poor environmental management has led to serious displacement of people, which in another vein leads to the problem of migration. The fact is that there is serious pressure on resources already; this can be exacerbated by climate change, which results in serious problems of scarcity of food, hunger, violence and even deaths (Ministry of Environment and Natural Resources, 2016; Ogutu, et al 2017; Owuor, et al 2017; Sachs, 2012; Sagie, et al 2013; Schlüter, et al 2014; Venkanna, et al 2014; Verburg, et al 2015; Wangai, et al, 2016; Wangai, et al., 2017; Zaehringer, et al., 2017).

Rivers State, though blessed with a lot of crude oil resource, the area is dotted with swamps, canals and surface water bodies. So that land resources is so scarce to cater for the ever expanding population. To cope with this challenge of land, a lot of sand filling of hitherto areas covered with swamps for building purposes, a case in point is the sand fill currently housing the NLNG building at the eastern by pass. Similarly, the successive administrations of the state have engaged in road constructions which in itself is good, but the lack of the basic paraphernalia such as, surface run off water channels along the routes, creates another problem of flooding in the area. Again, there is poor waste management across the state, whether it is industrial or house hold waste. This has resulted in atmospheric pollution, resulting in poor outdoor air quality, with serious health implications for not only locals but residents of the adjoining areas. If these problems continue unabated there will be serious consequences for the ecosystem and the inhabitants of same (such as humans). This study is set out therefore to examine the perception of the locals of Rivers State concerning environmental management practice and ecosystem sustainability.

## II. Materials and Methods

This study was carried out in Rivers State, Nigeria. This area is geographically bounded by latitudes 4°51' 30''N & 4° 57' 30''N and longitudes 6°50' 00''E & 7°00' 00''E (see figure 1). The state was established on May 27, 1967, due to the dissolution of the country structure hitherto. Rivers State is clipped to the south by the Atlantic Ocean, on the west by Bayelsa & Delta States, north by Imo, Abia and Anambra States and east by Akwa Ibom State. Rivers State has 23 local government areas presently.



**Figure 1:** Rivers State showing LGAs

The area enjoys the tropical type of climate, and rainfall occurs almost all year round. Temperature also ranges between 27<sup>0</sup>C and 30<sup>0</sup>C. Also, the vegetation is very luxuriant and produces a lot of timber for economic use hitherto. However, as a result of the unguided environmental management practices these forests have been severely depleted and the areas ecology altered. There is therefore the fear that if these go on unabated, there will be severe consequences for the locals and persons who live in the adjoining areas.

**Table 1:** the senatorial districts of Rivers States

Senatorial district	LGAs	Total population (NPC)	Taro Yamane size
Rivers West senatorial district	Ogba/Egbema/Ndoni, Ahoada West, Ahoada East, Abua/Odual, Degema, Akuku-Toru, Asari-Toru and Bonny	1924407	146
Rivers East senatorial district	Port-Harcourt, Ikwerre, Okirika, Ogu/Bolo, Obio-Akpor, Etche, Omuma and Emouha	2044060	155
Rivers South-East senatorial district	Opobo/Nkoro, Andoni, Oyigbo, Tai, Eleme, Gokana and Khana	1316780	99
Total	23	5285247	400

The study used the survey research design and primary data were gathered using the developed copies of questionnaire. The population of the area is fairly large (see table 1) as such the Taro Yamane equation was used to arrive at a sample size for the study (see equation 1) and a sample size of 400 was realized.

$$n = N / (1 + N(e^2)) \text{-----Equ 1}$$

where n = the sample size

N = the total population size

e = sampling error (in this case 0.05)

1= constant

After doing this, the copies of questionnaire were administered in the field using the systematic sampling technique. To effect an even and effective distribution of the research instrument, the researcher used the help of some field research assistants for the distribution of the copies of questionnaire. Data generated were presented in tables and statistical diagrams; while data analysis was achieved using the brown-Forsythe test.

### III. Results and Discussions

Table 2 presents the perception of the locals about how sustainable the environmental management is in the state. Generally, majority of the respondents do have the opinion that the environmental management practices in the study area are not sustainable. This assertion is hinged on the fact that 69% of the total respondents disagreed to the fact that, the environmental management practice in the area is sustainable. Whereas only 3.75% of the respondent suggested that they are cool with the environmental management practice in the area.

**Table 2:** The environmental management practice in this area sustainable

Options	Frequencies	Percentage (%)
Undecided	4	1
Disagree	87	21.75
Strongly disagree	276	68.9
Agree	18	4.5
Strongly agree	15	3.75
<b>Total</b>	<b>400</b>	<b>100</b>

The reason for this assertion of the respondents in table 2 is not farfetched. The area is poorly managed in terms of environmental management, industries after paying the compulsory government tax, are left to thrive almost on their own without stringent supervisions. Similarly, there is a lot of environmental displacement going on in the area. This is due to demand for land rent which is very high in the area. This is particularly dangerous for sustainable ecosystem management. This finding has been corroborated by (Chan, et al., 2012; Costanza, et al 2014; Díaz, et al, 2015; Frank, et al, 2017; Greiner, 2017).

Table 3 evaluates how concerned the locals are about the pattern of environmental management practice in the area. In the table it is lucid that the locals are very concerned about the environmental management pattern in the area. This assertion is based on the fact that 25.75% and 47.25% of the total respondents are very concerned and extremely concerned respectively about how the environment is being managed in the area.

**Table 3:** Concern about environmental management

Options	Frequencies	Percentage (%)
Not concerned at all	4	1
Slightly concerned	48	12
Moderately concerned	56	14
Very concerned	103	25.75
Extremely concerned	189	47.25
<b>Total</b>	<b>400</b>	<b>100</b>

On the other hand, only 1% is not concerned about the trend of environmental management in the area. This is a clear indication that there are some environmental issues already ravaging the area and is lucid to the local who may or may not be environmental manager themselves. This confirms the earlier fear allayed by (Weli & Ayoade, 2014) who suggested that the poor nature of environmental management practice in Rivers state is both conspicuous to the environmental experts and the ordinary dwellers. It therefore also follows logically, that the area is characterized by a lot of environmental miss-management that affect the day to day live of the local.

The issues that make the people concerned about environmental management practice in the area are displayed in table 4. In the table, the locals are concerned about global warming with 46.5% of the total respondents strongly agreed that global warming is giving them a great concern in the area and 41.75% of the respondents agree that there is the problem of global warming (temperature rise) in the area. On the other hand only 5.75% and 5.25% strongly disagreed and disagreed respectively. This implies that the locals are already experiencing high temperature in the area; of course the spate of development in the area without the recognition of the fact that there are other aspects of the environment that could suffer is worrisome. Deforestation alone can trigger the up to 0.5 degree rise in temperature in an area (Díaz, et al., 2015; Frank, et al., 2017; Greiner, 2017; Hicks,et al., 2017)

In the same vein, pollution is also a source of concern for the people that live in the area. This assertion is based on the 46.5% respondents that strongly agreed that pollution is a source of concern in the area, as compared to the very few respondents that have affirmed otherwise (7% strongly disagreed). From literature it is conspicuous that air pollution is a very serious issue in Port Harcourt (Weli & Ayoade, 2014); yet the carbon sinks that ought to reduce the pollutants in the atmosphere in the area are cleared regularly to pave way for either road construction, or building for either companies or residential lots (Ministry of Environment and Natural Resources, 2016). Obviously if development continues to occur the way and manner it is being carries out now and environmental management remains poor, there will be dire consequences for inhabitants of the area (Weli & Ayoade, 2014).

**Table 4:** Main Environmental issues of concern

Environmental problems	UD	D	SD	A	SA	Total
<b>Global warming</b>	3	23	21	167	186	400
%	0.75	5.75	5.25	41.75	46.5	100
<b>Air pollution</b>	17	10	28	150	195	400
%	4.25	2.5	7	37.5	48.5	100
<b>water contamination</b>	00	37	12	248	103	400
%	00	9.25	3	62	25.75	100
<b>food problems</b>	31	43	32	126	168	400
%	7.75	10.75	8	31.5	42	100
<b>Deforestation</b>	05	14	35	137	209	400
%	1.25	3.5	8.75	34.25	52.25	100
<b>loss of biodiversity (Extinction)</b>	01	21	06	183	189	400
%	0.25	5.25	1.5	45.75	47.25	100
<b>Waste related Problems</b>	00	11	21	159	209	400
%	00	2.75	5.25	39.75	52.25	100
<b>Population displacement</b>	00	18	35	129	218	400
%	00	4.5	8.75	32.25	54.5	100

N.B: UD refers to Undecided, D refers to disagree, SD refers to strongly disagree, A refers to agree, SA refers to strongly agree

Also, the locals are concerned about water contamination in the area. This is so because 62% and 25.75% agreed and strongly agreed that water quality is of huge concern in the area respectively. This is as compared to 9.25% that disagreed to the fact that water is polluted in the area. The concern is not bogus as other authors (Obisesan & Weli, 2019; Obisesan & Nwagbara, 2019) have already confirmed the issue of water pollution in the area. Similarly, the locals are also concerned about food becoming a problem in the area as 42% of the total respondents strongly agreed that food availability is of great concern in the area. Generally, the study area is surrounded by water with very few lands for agriculture. This land that is available is being encroached

every day for development purposes, while the part of the remaining lands is mostly flooded when the rains peak in the area (Efe, 2014).

The respondents also complained of deforestation (52.25% of the respondents strongly agreed that it's a great concern in the area) of course this can also lead to species extinction, as affirmed by the respondents that the spate of unplanned development and poor environmental management would lead to species extinction (47.25%). Furthermore, waste management is also a concern in the area. This is so because the majority of the respondents agreed (39.75%) and strongly agreed (52.25%) that waste management is a huge concern to the inhabitants of the study area. Well as one move through the major cities of the area especially early in the mornings one can see hips of waste liter along the routes and lasting hours if not days in some instances. This poor waste management issues have also been corroborated by Obisesan & Weli, (2019) in the area.

The locals also affirm the population displacement is also rampant in the area and as such is a huge concern too. This assertion is hinged on the fact that 54.5% of the total respondents strongly agreed that, the way the environment has been handled over time in the area population displacement has become an issue of huge concern as compared with the only 8.75% who strongly disagreed with the fact. From the foregoing, the issue of population displacement is possible since all the environmental paraphernalia that makes an environment habitable are not affordable, changing base to places where they can compete for life and wealth is always going to be appealing. This partly explain the over congestion of Port Harcourt metropolis as compared with the other area.

Table 5 displays the perceived consequences of poor environmental management practice in the area. In the table the locals suggested that poverty will escalate (46%). This is particularly so because, the people will be forced to lose their properties as a result of the problems that the environment gives back to the people such as flooding, health effects from pollution, etc. Another problem that the locals have said is a consequence of poor environmental management practice is the problem of slums generation (46%, Agree & 28.75% strongly agreed). The reason for this is not farfetched, more and more people will be displaced as a result of environmental challenges, so they will have to survive in environments that they do not have the resources to stay in, hence slum develops. This partly explains the proliferation of slums and shanties in Port Harcourt metropolis.

**Table 5: Consequences of doing nothing now**

Consequences	UD	D	SD	A	SA	Total
<b>Escalation of poverty</b>	21	12	25	158	184	400
%	5.25	03	6.25	39.5	46	100
<b>Proliferation of slums in urban areas</b>	03	42	56	184	115	400
%	0.75	10.5	14	46	28.75	100
<b>Food/vegetables shortage</b>	31	23	39	142	165	400
%	7.75	5.75	9.75	35.5	41.25	100
<b>Destruction of the natural environment</b>	01	14	08	215	162	400
%	0.25	3.5	2	53.75	40.5	100
<b>Air and water pollution</b>	04	34	23	114	225	400
%	1	8.5	5.75	28.5	56.25	100
<b>Spreading of epidemics</b>	00	49	81	125	145	400
%	00	12.25	20.25	31.25	36.25	100

*N.B: UD refers to Undecided, D refers to disagree, SD refers to strongly disagree, A refers to agree, SA refers to strongly agree*

Other consequences of the poor environmental management practice highlighter by the inhabitants of the study area are food and vegetable shortage (41.25%), destruction of the natural environment (53.75%, Agree), air and water pollution (56.25%), spread of epidemics (36.25%). This confirms the findings of Bouahim, *et al* (2011).

Table 6 presents the suggested level of strictness the locals expect of the government in the area. From the table, one thing is conspicuous that the people are not satisfied about how the environment of the area is being managed, as none of the respondent suggested that they are cool with the way the environment is being managed now. However, 3.25% of the total respondents do suggest that, the government should be slightly stricter with the environmental protection laws.

**Table 6: Suggested level of strictness of the management laws of government**

Options	Frequencies	Percentage (%)
Not stricter than it is now	0	00
Slightly stricter than it is now	13	3.25
Moderately stricter than it is now	59	14.75
Very strict	30	7.5
Extremely strict	298	74.5
Total	400	100

Nevertheless, the majority of the respondents suggest that the environmental protection laws be made extremely stricter than they are now. This is an indication that the locals are already agitating for a better managed environment, as such the government must improve on the current practice.

Furthermore the Welch & Brown-Forsythe statistics in table 7 showed that, the perception of environmental management practice is not statistically different in the three senatorial districts of the study area at  $P > 0.05$  (Welch  $F = 43.345$ ; Brown-Forsythe  $F = 23.113$ ).

**Table 7:** Output of the Welch and Brown-Forsythe test  
**Robust Tests of Equality of Means**

Independent	Statistic <sup>a</sup>	df1	df2	Sig.
Welch	43.345	2	24823.811	.056
Brown-Forsythe	23.113	2	41278.143	.063

a. Asymptotically F distributed.

#### IV. Conclusion and Recommendation

This study examined how the environmental management practice in Rivers State is perceived by locals. The survey research design was used to gather data from the locals about how sustainable the environmental management practice in the area is. Analysis showed that environmental management practice was poor in the area. Similarly, findings showed that the perception of the people were not different across the senatorial districts of the state. As a result of these finding and the danger they portend, this study therefore strongly advocates as follows:

- a). A holistic approach to environmental management should be the approach to development and environmental management; while creating policies that will engender sustainable environmental practices in the study area.
- b). Also existing laws should be made stricter for the purpose of actualizing a cleaner environment in the area.
- c). There is need for a green city approach to urban development, while reforesting the already depleted forest resources in the area. This will help ameliorate the GHGs heated up environment of the study area.

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