International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:03, Issue:09 "September 2018"

ENVIRONMENTAL DEGRADATION AND POVERTY INCIDENCE IN NIGERIA (1980-2016)

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ABSTRACT

For some decades now, attention of researchers has been shifted to the relationship between environmental degradation and poverty incidence. This research work investigated environmental degradation as a determinant of poverty incidence in Nigeria. The work established a relationship between poverty level and environmental degradation variables namely gas flaring, deforestation, water pollution and land degradation. Data for the study were sourced from multinational companies, United Nations Development Programme (UNDP), National Environmental Protection Agencies, and Federal Ministry of Agriculture in Nigeria, from 1980-2016. The data were tested for stationarity and this showed a mixed order of integration i.e. I(0) and I(1). Consequently, we applied the Bounds testing methodology and the results of which showed that environmental degradation variables are significant determinants of poverty incidence in Nigeria. The result further reveals that all the explanatory variables namely: Gas Flaring, Water Pollution, Deforestation, and Land Degradation cause Poverty in Nigeria (they affect mainly the poor) while in the long run Gas Flaring, Water Pollution and Deforestation are variables that determine Poverty incidence in Nigeria. The study recommends that greater environmental protection awareness is needed for poverty to be reduced.

Keywords: Deforestation, Environmental Impact Assessment (EIA), Environmental Degradation Variables (EDV), Gas Flaring, Land Degradation, Water Pollution.

1. INTRODUCTION

The year 1972 represents a significant land mark in the sphere of environmental consciousness the world over and this was also evident among the developing countries. It was the year in which the United Nation held a conference on the Human Environment in Stockholm and for many subsequent years, the developing countries needed to be persuaded that long-term and sustainable economic development could only be achieved through sound environmental management (UNDP:2016). The public's attitude towards the environment has in recent times, shown some positive changes; while pollution has remained a matter for concern, awareness of

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the scarcity of some natural resources, the necessity for conservation and in particular, the relationship between the environment and poverty incidence have continued to receive some attention.

Available evidence shows that the poor are the worst hit in environmental pollution. Nigeria has shared in this new consciousness, even though the level of awareness is considered to be relatively low while the rate of response to environmental issues has been slow. The first two National Development plans (1962-1968, 1970-1974) paid little or no attention to the environmental implications of projects. Ecological disaster continued to occur, the Sahellian drought, as well as accelerated rate of urbanization continued to have a serious impact on the quality of life while erosion also added its own problem by destroying human settlements and farm lands (Ibe, 2016).

There are also challenges of health hazards due to indiscriminate dumping of toxic wastes; gas flaring and oil spillage in the oil rich South-South and South-Eastern regions of Nigeria. Consequently, recent development plans have shown an increased consciousness between poverty incidence and quality of the environment (Okafor, 2017).

There is also the need to formulate legislative backing for integrating environmental imperative with developmental goals. The main objective of this paper is to examine how environmental degradation impacts the Nigerian poverty incidence and in particular to ascertain the role of environmental impact assessment (EIA) in achieving these goals.

2. LITERATURE REVIEW

2.1 Conceptual Review

One of the basic fact to note in poverty reduction is to recognize that environment and economic development are not exclusive of one another, but are complementary and interdependent and in the long run, mutually reinforcing (Ahmed and Sanny:2016). The complex nature of this relationship explains why it has always been difficult to give an operational context to the concept of sustainable economic development or to formulate practical guidelines for its realization. Yet there is evidence of excessive demands being made on the limited resources and on the carrying capacity of fragile and already weakened ecosystems. Under the condition of poverty prevalence which developing countries are noted for, the environment always exhibits ravages of long years of mismanagement as shown by overgrazing, erosion, deforestation and surface water pollution. In this situation, not just quality of life but life itself is endangered, many a time, it is difficult and sometimes, impossible to reverse these effects (World Bank: 2017).

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Poverty reduction process itself has some environmental problems associated to it for example, attempt to increase agricultural growth calls for the construction of irrigation and drainage system, the clearing of forest and use of fertilizers and pesticides all of which can and do cause environmental damage. Again, industrial strategic growth often leads to air pollution and other processing of raw materials. The big question is, should we stop development and equally cease to exploit natural resources?

The word development has come to mean different things to different people. The most popular conceptualization particularly at National level is one that defines economic development in terms of the Gross National Product or Per Capita Income. This approach has been criticized on the ground that it gives undue priority in the development process to increase in output while ignoring aspects of human welfare. The existing shift of emphasis, therefore, is a definition of development that is concerned, not with National income or capital formation per se but on a more comprehensive and meaningful approach which takes into account the quality of life.

The issue of quality of life brings into focus the concept of environment. Sada (2015) has defined environment as "a system within which living organisms interact with the physical elements". This system is referred to as the ecosystem, which others have termed as "principle of environmental unity". Human beings in the quest to satisfy their needs and desire, tend to disturb this unity, as the aftermath of aggressive industrial activities. Once this happens the human race gets the repercussion in the form of air pollution, water pollution, depletion of resources and possible irreversible damage to the environment.

Developmental activities to meet human needs (to reduce poverty) must proceed within acceptable environmental limits. A tradeoff between development and environmental conservation is the only way by which the objective of poverty reduction can be achieved. An attempt to put this tradeoff between poverty reduction process and environmental quality into proper perspective has led to the emerging concept of ecological-development. The concept of ecological development is based on the premise that the environment, be it rural or urban, has a maximum load of development that it can carry. If this maximum is exceeded, the environmental balance is disturbed, with grave consequences to the very existence of the populace.

2.2 The Nigerian Physical Environment

Due to its peculiar geographical, geological and geomorphological setting, the Nigerian environmental system is characterized by the combination of natural features that make it uniquely susceptible and highly fragile. In ecological terms, Nigeria is a land of extremes and has remained constantly at risk for ages, with the more recent phenomenon of global warming,

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further accentuating the rate of environmental degradation. Some of these unique features include:

a. Nigeria is bounded in the South by over 850km long active coastline and in the North by a similar length of the desert. The country is therefore continuously being ravaged by coastline erosion in the South and desertification in the North. Thus, while coastal inhabitants are under constant threats of sea-level rise, and coastal erosion, Nigerians that dwell along the fringes of the Sahara are under the unabated threats of desertification.
b. The low-lying nature of much of the coastal parts of Nigeria is a natural threat to the Nigerian environment. Generally, rising to less than 5 meters above sea level, these coaster regions are highly prone to flooding even with small rise in sea level.
c. Nigeria lies in the middle latitudes in the Gulf of Guinea; it is therefore characterized by generally high and strong wave systems which have more destructive impacts on the shoreline and constantly causing shoreline erosion.
d. Nigeria also lies within the equatorial belt characterized generally by high torrential rainfall. Annual rainfall in Nigeria ranges from over 3000mm along the coastal line to about 600mm in the extreme North.

2.3 Man-made Threats To The Environment

In addition to environmental threats posed by Nigeria's natural physical setting, there are a number of threats that are related to human activities which have further amplified the country's vulnerability to environmental degradation. Iwuoha (2014) stated the following as man-made threats to the Nigerian environment:

i. **Population Growth and Urbanization:** The current population of Nigeria is put at 180 million, representing 20% of the entire population of Africa. The population has therefore grown dramatically since the 1952/1953 census when it was 31.5million. Currently, we have a Total Fertility Rate (TFR) of 5.7 children per woman, child birth rate of 42 births per thousand, child death rate of 13 per thousand and a rapid population growth rate of 2.9% per year. The United Nations project a population of 289 million for the country by the year 2050.

Apart from population growth, Nigeria has been experiencing increased urbanization over the last five decades. The proportion of the population living in the urban centres has risen from 15% in 1960 to 43.3% in 2000 and has increased to 60% in 2016. Total area taken up by urbanization in Nigeria during the same period increased by 131% from 2,083sq.km in 1976 to 5,444 sq. km with an average rate of urbanization estimated to be 3.7% per year (National Population Commission:2014). The number of urban centres i.e. settlements with population of 20,000 or

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more increased from 56 in 1953 to 359 in 1991 and 750 in 2016. The drivers of urbanization in Nigeria include:

a. High population growth rate
b. Concentration of development activities in urban centres
c. Rapid growth of formal education
d. Rural-urban wage differentials.

One of the major negative impacts of high urbanization is massive waste generation (liquid, gaseous, industrial and domestic) and attendant disposal problems resulting in a threat to the quality of air we breathe and water we consume. In general, there is a clear vicious circle linking high population growth, poverty and ecological degradation. Nigerian cities and towns are mostly horrible examples of unplanned population growth, poor town planning methods, squalor and environmental degradation which cry for immediate action. Population growth has also put a lot of pressures on our forests as the rising farming population seeks for more land for survival.

ii. **Farming Practice:** In the tropics, the age-old practice of shifting cultivation (slash-and-burn) still persists. As soil fertility declines after a few years, the farmers move to another patch of land, thus decimating large parcels of land that should have been left undisturbed. Unfortunately, we do not have adequate farmer education and encouragement to massively move them to modern techniques.

iii. **Exploitation for Firewood:** The survival of rural dwellers and urban poor depends on finding enough wood to cook their meals. At present, fuel wood constitutes the main source of fuel for cooking by over 76% of the Nigerian population. UNDP figures for 2016 showed Nigeria, consuming 262,783 metric tons of fuel wood compared with 7,210 tons for South Africa and 35,313 tons for Thailand. While our dependence on fuel wood is rising in Nigeria, it has virtually ceased in the other two countries. At the present rate of fuel wood consumption, cutting may soon convert our forests to Savannahs and grasslands.

iv. **Uncontrolled Logging:** Global demand for tropical hardwoods is increasing daily. High intensity of logging and illegal exploitation of tree species have continued to pose serious threats to the country's forest resources and the environment. The use of modern machinery such as tractors, and trucks has made logging even faster and easier, resulting to increasing rate of illegal logging and flitching. These days, illegal loggers are often armed to confront forest guards that dare to stop them.

v. **Fire:** Bush fires have become a major environmental hazard in most parts of Nigeria. Indiscriminate bush burning is caused by farmers, smokers and hunters who look for game. Through these avoidable practices, thousands of hectares of our forest are lost

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every year especially during the dry seasons. Unfortunately, our fire services do not have enough capacity in most cases to cope with the intensity of the fires.

vi. **Petroleum Exploitation Activities:** Extensive exploitation and production of petroleum in Nigeria's sedimentary basins especially in the Niger Delta Area has opened up such areas to massive pollution. There is the recurring threat of pollution from normal exploration and production activities such as leakages from pipes and production platforms. The recent spate of activities in the Niger Delta region has further aggravated this threat as oil thieves now burst into pipelines leaving thousands of barrels of crude oil to flow into the swamps and creeks. The rickety and leaking barges used by the thieves to transport their loot also spill huge volumes of crude oil in the terrain. The high volume of associated red gas in the Nigerian light crude coupled with the huge investment associated with gas gathering utilization infrastructure has made the elimination of gas flaring difficult. The entire Niger Delta region of Nigeria is therefore still covered with gas flares with the attendant pollution of our atmosphere by huge volumes of combustion gases.

vii. **Open Cast Mining:** The history of poor open cast mining practice and lack of post-mining remediation measure have left large expanses of vast land in the Nigerian landscape. The Jos Plateau area and several other part of the country where activities of artisan miners flourish have been severely ravaged with the attendant risk to inhabitants of the areas.

2.4 Nigeria's Depreciating Environment

The preceding section clearly shows the preponderance of both natural as well as man-made features that have combined to make Nigeria one of the most environmentally stressed region in the world. The combined effect of these features have resulted in a visible and alarming rate of degradation on our environment, causing great damage to our land and brining sorrow and poverty to many of our people.

a. Deforestation

The continuous removal or destruction of significant areas of forest cover has resulted in highly degraded environment with attendant reduction in biodiversity. It also causes soil erosion and in marginal lands lead to desertification. Nigeria probably has the world's highest deforestation rate of primary forest today, having lost more than half in the last five years.

UNEP in 2016 estimated that annual deforestation in Nigeria cover 663,000ha with an annual national deforestation rate of 0.7%. Deforestation rate in southwest geopolitical zone is as high as 1.36% which is double the national average. Data on vegetation and land use change between

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1976 and 1997 reveals that the areas covered by undistributed forest in Nigeria decreased by 53.5% from 25,951sq.km in 1976 to just 12,114sq.km in 2011.

The major driving factor for deforestation in Nigeria today is the rapidly growing population with attendant higher demand for agricultural land, livestock production and fuel wood. Unfortunately, these demands will continue to increase with the increasing population if nothing drastic is done. The persistence of age-old practice of shifting cultivation (slash and burn) will also continue to drive this threat as farmers will continue to move, plundering over forests as the soil fertility in the farm decline.

With the increasing global demand for tropical hardwoods, many hardwood species are being recklessly exploited from large areas of natural forest and sold in both local and international markets leading to an uncontrolled desimation of our forest resources. In Ondo State for example, more than 44 percent of the 3,07sq.km forest reserve has been lost in the last 20 years due to a combination of activities mentioned above.

b. Desertification

Between 50% and 75% of Bauchi, Bornu, Gombe, Kano, Kastina, Kebbi, Sokoto, Zamfara and Yobe States are under threat of desertification. These ten states, with a population of about 27 million people, account for about 38% of the country's total land area. In these areas, population pressure, resulting in overgrazing, over exploiting for fuel wood of marginal land and aggravated draught due to global warming has accelerated the rate of desertification.

c. Soil Erosion

In many part of Nigeria, people have observed with astonishment that due to flood and erosion some small rills which were crossed with a single footstep some 30 or 40 years are now so large as to expose the foundation of many houses and causing gorges in their neighborhoods.

Although erosion is one of the most critical environmental problems affecting many parts of the country, it is particularly severe in the areas of the country underlain by sandy formations. Classical erosion features are found in states like Edo, Anambra, Imo and Enugu. In Anambra State for example, it affects more than 70% of the state in form of sheet and gully erosion. Indeed over 550 gullies have been mapped in Anambra alone, with enormous soil loss and severe threat to agricultural production, home and other civil structures.

The degradation caused by erosion in Nigeria is occurring at an increasing and alarming rate, aggravated by such factors as increased agricultural activities, civil construction works,

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deforestation, bush burning, over grazing, drainage, poor water management, urbanization and increased population pressure.

d. Coastal Erosion

Most of Nigeria's 953km coastline is prone to erosion. This is a grave ecological concern because a large part of Nigeria's population and economic activities are located within the coastal zones. Nigeria has estimated population of over 25 million located in its coastal areas with economic activities which include oil and gas exploitation, agriculture, fishing, aquaculture, shipping, industries and tourism. Over fifty highly vulnerable sites have been identified along the Nigerian coast and all the eight coastal states are affected by erosion problem.

S/N	COASTAL AREA	EROSION RATE PER ANNUM
1.	Lagos bar beach	20 - 30m
2.	Awoye/Moluwe	13.2m
3.	Ugborodo/Escravos	14 – 18m
4.	Forcados South beach	20 – 22m
5.	Porass beach	16 – 19m
6.	Bonny beach	20 – 24m
7.	Kularua beach	15 – 29m
8.	Opobo river	10 – 14m

Table 1: Coastal Areas in Nigeria and rate of Erosion Per Annum (NESREA, 2016)

Many coastal communities in estuaries along the coast have had to move up land regularly to escape being washed away by the encroaching sea. For example, studies have revealed a shoreline retreat to 1.5km at Awoye/Molume coastline in Ondo State between 1991 and 2011 (Ibe, 2016). The driving force of coastal erosion includes:

i. Low-lying, relatively flat coastal topography which restrains proper drainage.
ii. Climate change leading to rise in sea level
iii. Reckless cutting down of mangroves which exposes the shoreline to increased energy and reduce sediment stability and
iv. Sand mining and dredging beaches which deplete sand volume.

2.5 Theoretical Review

The characteristics of production and abatement technology, and of preferences and their evolution with income growth, underline the shape of the poverty (income) – environment relationship. Some authors focus on shifts in production technology brought about by the structural changes accompanying economic growth in terms of poverty reduction. Others have emphasized on the characteristics of abatement technology while some others have focused on

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properties of preferences especially the poverty inducement for environmental quality. Few researchers formulated complete models with plausible assumptions about the properties of both technology and preferences from which they derived Environmental Kuznets Curves (EKCs) (Pana Yotou: 2016). The Environmental Kuznets Curve (EKC) proposes that there is an inverted U-shaped relation between environmental degradation and income per capita so that eventually growth reduces the environmental impact of economic activities (Stern and Barbier, 2017).

2.6 Empirical Review

A number of empirical EKC models have emphasized the role of the income elasticity of demand for environmental quality as the theoretical underpinning of the inverted U-shaped relationship between pollution and income.

Arrow et al state that because the inverted-U-shaped curve is consistent with the notion that people spend proportionately more on environmental quality as their income rises, economists have conjectured that the curve applies to environmental quality generally. A number of earlier studies found income elasticities for environmental improvements greater than one.

Kristrom (1976) reviewed the evidence from Contingent Valuation Method (CVM) studies that found income elasticities for environmental quality much less than one. Does the finding of a low-income elasticity of demand for environmental quality present a problem for EKC models?

McConnell (2016) examined the role of the income elasticity of demand for environmental quality in EKC models by adapting a static model of a infinitely lived household in which pollution is generated by consumption and reduced by abatement. He finds that the higher the income elasticity of demand for environmental quality, the slower the growth of pollution when positive, and the faster the decline when negative, but there is no special role assigned to income elasticity equal to or greater than one. In fact, pollution can decline even with a zero or negative income elasticity of demand, as when preferences are non-additive or pollution reduces output (e.g. reduced labour productivity because of damage to health, material damage due to acid rain or loss of crop output due to agricultural externalities). He concluded that preferences consistent with a positive income elasticity of demand for environmental quality, while helpful, are neither necessary nor sufficient for an inverted-U-shaped relationship between pollution and income. McConnell found little microeconomic evidence in non-valuation studies that support a major role for the responsiveness of preferences to income changes in macroeconomic EKC models.

Kristrom interpreting the EKC as an equilibrium relationship in which technology and preference parameters determine as exact shape, proposed a simple model consisting of:

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a. a utility function of a representative consumer increasing in consumption and decreasing in pollution; and
b. a production function with pollution and technology parameters as inputs.

Technology progress is assumed to be exogenous. He interpreted the EKC as an expansion path resulting from maximizing welfare subject to a technology constraint at each point in time; along the optimal path the marginal willingness to pay for environmental quality equals its marginal supply costs (in terms of forgone output). Along the expansion path the marginal utility of consumption, disutility of pollution (marginal willingness to pay for environmental quality) is initially low and rises. Technological progress makes possible more production at each level of environmental quality, which creates both substitution and income effects. The substitution effect is positive for both consumption and pollution. The substitution effect dominates at low-income levels and the income effect dominates at high-income levels producing an inverted-U-shaped relationship between pollution and income. Of course, the exact shape of the relationship and the turning point, if any, depend on the interplay of the technology and preference parameters, which differ among pollutants and circumstances.

3. METHODOLOGY

Environmental Degradations – Poverty Relationship:

The focus of the study is on the relationship between environmental degradation variable namely: Air Pollution (AP), Water Pollution (WP), Land Pollution (LP), Gas Flaring (GF), and Poverty Level (PL) in Nigeria between 1980 to 2016. The study adopted Autoregressive Distributive Lag (ARDL) model and the following linear relationship was obtained.

$$Log(PL_t) = a_0 + a_1AP_t + a_2LP_t + a_3WP_t + a_4GF_t + E_{it...(1)}$$

Where: i = a country, city, state or regional index

t = time index

AP = Air Pollution

LP = Land Pollution

WP = Water Pollution

GF = Gas Flaring Index

PL = Poverty Level

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Data: The data on poverty level was obtained from Nigeria Bureau of Statistics social data on severe deprivation while data on environmental degradation, namely: Air Pollution, Land Pollution, Water Pollution and Gas flaring were obtained from the National Environmental Protection Agency and the National Environmental Standards and Regulation Enforcement Agency (NESREA) Publications for various years.

Analysis: Estimation of the model specified by our study was preceded by examination of the data properties of the series, which include:

1. Tests of the stationarity of the data
2. Test of long run properties of the data
3. Form of causality between Environmental Degradation Variables and Poverty Incidence in Nigeria.
4. Short-run and Long-run estimates of the variables

3.1 Unit Root Test

The table below shows the Unit Root Test of the variables used for the study in a logged form.

Table I: Unit Root Test Result

Variables	I(0) Critical values	I(1) Critical values	Order of Integration
Air Pollutants (AP)	-2.310567	-4.01246	I(1)
Water Pollutants (WP)	-1.728641	-5.04855	I(1)
Land Pollutants (LP)	-0.814274	-5.612156	I(1)
Gas Flaring (GF)	-0.912000	-12.301291	I(1)
Poverty Incidence	-5.260571		I(0)
Critical Values:			
1%	-4.252878	-4.262770	
5%	-3.548490	-3.552973	
10%	-3.207094	-3.209642	

The table reveals that the environmental degradation variables (Air Pollutants, Water Pollutants, Land Pollutants, and Gas Flaring) are stationary at first difference i.e. integrated of order one I(1) while the poverty incidence is stationary at level i.e. it is integrated of order zero I(0). Having found the order of integration of the variables to be mixed at I(0) and I(1), we next test for the long run relationship amongst the variables using the ARDL Bounds test approach as shown below:

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Table 2: ARDL Bounds Test for Cointegration

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	9.299744	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Extracted from the Eviews9 Output

The bounds test shows that the F-statistic value of 9.299744 is greater than the 5% critical value bounds at I(0) and I(1), therefore, we reject the null hypothesis and conclude that there exists a long run relationship between environmental degradation and poverty incidence in Nigeria.

Table 3: Form of Causality between Environmental Degradation Variables and Poverty Incidence

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
AP does not Granger Cause PL	35	8.13600	0.0002
PL does not Granger Cause AP		2.34144	0.1135
LP does not Granger Cause PL	35	6.28940	0.0052
PL does not Granger Cause LP		1.18591	0.3194
WP does not Granger Cause PL	35	4.95869	0.0138
PL does not Granger Cause WP		0.59749	0.5566
GF does not Granger Cause PL	35	5.03943	0.0014
PL does not Granger Cause GF		0.88798	0.4220

Source: Extracted from Eviews9 Output

The result of the Causality test above reveals a one way causality running from Air Pollutants, Water Pollutants, Land Pollutants, and Gas Flaring respectively to Poverty incidence. That is,

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environmental degradation variables cause poverty incidence in Nigeria within the period of study.

Table 4: Short Run Estimates of the Model

Included observations: 33

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PL(-1))	0.211893	0.170153	1.245312	0.2321
D(AP)	0.556555	0.215885	2.578018	0.0210
D(AP(-1))	1.504404	0.679019	2.215557	0.0426
D(LP)	0.102362	0.046783	2.188033	0.0449
D(LP(-1))	0.029641	0.054600	0.542867	0.5952
D(LP(-2))	0.029693	0.052689	0.563551	0.5814
D(LP(-3))	0.057513	0.042144	1.364681	0.1925
D(WP)	0.079902	0.035437	2.254779	0.0395
D(GF)	0.012847	0.020004	0.642238	0.5304
D(GF(-1))	0.014691	0.019074	0.770222	0.4531
D(GF(-2))	0.033490	0.021176	1.581514	0.1346
D(GF(-3))	0.036051	0.023004	1.567136	0.1379
CointEq(-1)	-0.743293	0.154635	-4.806775	0.0002

Source: Extracted from Eviews9 Output

The result above shows that the short run coefficients of Air pollution (AP) increase poverty level (PL) significantly by 0.5566 and 1.5044 in the short run. Also, there is a positive relationship between land pollution and poverty level in the current year and the three lag periods. Furthermore, water pollution has no lag period and affects poverty level significantly while gas flaring (GF) has positive effect on poverty level but the positive effect is not found to be significant for the whole of the three lagged periods.

The error correction coefficient CointEq(-1) shows that the speed of adjustment of the model to long run equilibrium is 74% estimated annually. This means that the environmental degradation variables decreasing at a speed of 74%, there will be reduction in poverty level in Nigeria all things being equal.

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Table 5: Long-run Estimates of Environmental Degradation in Nigeria

The result of long-run estimate of environmental degradation in Nigeria within the period under review is presented below

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AP	1.637207	0.654773	2.500420	0.0245
LP	0.044452	0.008405	5.288757	0.0402
WP	0.088947	0.047084	1.889132	0.0784
GF	-0.169132	0.047951	-3.527153	0.0030
C	3.507475	0.660071	5.313787	0.0001

R-squared	0.826437
Adjusted R-squared	0.629733
F-statistic	4.201419
Prob(F-statistic)	0.003817
Durbin-Watson stat	2.008434

Source: Extracted from Eviews9 Output

The long run estimates of the model shows that Air pollution (AP), Land pollution (LP) and Water pollution (WP) all have positive and direct effects on Poverty level in Nigeria increasing it by 1.6372, 0.0445 and 0.0889 units respectively. This means that for any increase in Air pollution (AP), Land pollution (LP) and Water pollution (WP) rates, poverty level in Nigeria increases by the respective rates. It can also be seen that Air pollution and Land pollution indices have significant effects on poverty level given the p-values of 0.0245 and 0.0402 respectively. Water pollution, however, did not have a significant effect on poverty level for the period of study.

Gas flaring index on the other hand has a negative coefficient of -0.1691 meaning that as gas flaring increases, poverty level decreases. This shows an indirect effect of gas flaring on poverty level in Nigeria. However, gas flaring was found to have a significant effect on poverty level given its p-value of 0.0030. What this implies is that even though gas flaring has an inverse relationship with poverty level in Nigeria, its effect is largely and significantly felt in Nigeria.

The constant value shows that given that the environmental degradation variables are held constant at zero, poverty level increases by 3.5075 units.

Also, the adjusted R-squared of the model is 0.6297 meaning that the environmental degradation variables account for up to 63% of the variations in poverty level. The joint test of significance shows that the variables jointly impacts on poverty level with an F-statistic value of 4.201 and p-

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value of 0.0038. The model error terms are not serially correlated since the Durbin Watson value (2.0084) lies close to 2 than to 0.

4. CONCLUSION AND RECOMMENDATIONS

The conclusion to be drawn from our study is that Nigeria is still grappling with the problem of environmental degradation occasioned by water, air and land pollutants. The positive and significant effects of the indices used to represent these three variables points to this very fact. Nigeria is ill-equipped and unable to effectively combat the destructive impact of her immediate environment which makes the issue of gas flaring to be a significant contributor to environmental degradation in the Niger Delta region of the Nigeria. We are almost totally at the mercy of nature with very low institutional capacity to respond to environmental threats. There is therefore, the need to integrate environmental concerns within the country's development plans, programmes and projects. Consequently, we make the following recommendations:

1. Adequate funding and effective management of the country's environmental protection agency to combat the massive depletion of the environment.
2. The National Environmental Standards and Regulations Enforcement Agency (NESREA) must be strengthened by way of ensuring a very strong legal framework to monitor and regulate the activities of industries and waste management practices.
3. Impose and implement appropriate sanctions on oil companies that continue to flare gas in the Niger Delta region. The need to control gas flaring in order to maintain a safe environmental space for man cannot be over-emphasized.
4. Some man-made threats to the environment must be controlled and put in check. Such threats as bush burning, indiscriminate felling of trees, illegal excavation of the soil, and other activities that cause blockage of waterways must be put in check. This also calls for attitudinal change on the part of the populace.

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