Household Perception of Environmental Degradation and Its Impact in Rural Edo State, Nigeria

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Abstract: This study assesses the perceived impact of environmental degradation on the population of Ovia North East Local Government Area (LGA) of Edo State, Nigeria. It aims to identify typologies and analyse the impacts of environmental degradation on rural populations. Data for the study were obtained from a structured questionnaire administered to a sample of 200 household heads, selected using a two-stage sampling design. The first stage involved a random selection of four from 10 settlements. The second stage was a systematic random sampling of 50 households in the selected settlements. The questionnaire covers socio-demographic characteristics of the respondents, typology and level of impact of environmental degradation. Data were analysed using descriptive statistics, namely frequency, percentage, and simple mean. In addition, the null hypothesis that there is no significant variation in the perceived level of impact/effects of environmental degradation on the population was tested using the Analysis of Variance (ANOVA). The study identified gas flaring, gully erosion, flooding, deforestation, water, air, and soil pollution as major forms of environmental degradation, resulting in the loss of fertile land, infrastructure, employment, aquatic life, and biodiversity, and increasing insecurity and poverty. There were no significant variations in the perceived impacts of environmental degradation (F = 8.19; 12.519, P<0.05) among the selected settlements. The study recommends conducting an environmental impact evaluation of the causes of degradation, in addition to educating the local population on the need for sustainable development.

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1. Introduction

Man interacts with the Earth's surface in his quest for habitat and livelihood, and in the process degrades its components, namely the atmosphere, hydrosphere, lithosphere, and biosphere (Igben, 2019). According to the United Nations International Strategy for Disaster Reduction (UNISDR) (2007), environmental degradation refers to a decrease in the environment's capacity to perform its social and ecological functions. It comprises issues such as land degradation, deforestation, desertification, loss of biodiversity, land, water and air pollution, climate change, sea level rise and ozone depletion. In other words, it refers to a general deterioration in the quality of environmental resources resulting from both natural and anthropogenic factors.

Anthropogenic activities such as urbanisation, industrialisation, agriculture, mining, and transportation have often led to environmental degradation in the Niger Delta Region (NDR) (Igben, 2019; Brodowicz, 2024). For instance, unplanned and unbridled urbanisation has caused water, air, soil, and noise pollution (Olorode et al., 2015). Furthermore, indiscriminate felling of trees for agriculture and charcoal production contributes significantly to the degradation of the forest ecosystem (Igben and Ohiembor, 2015; Igben, et al., 2022). Lumbering without replanting measures and sawmilling activities degrade vegetation, land resources and riparian environments (Ekpe et al, 2011; Elijah and Elegbede, 2012; Ogunbode et al, 2012; Pat-Mbano and Nkwocha, 2012; Igben, 2014; Igben, et al., 2022).

Furthermore, mining of mineral resources, such as tin and columbite on the Jos Plateau, coal in Enugu, and petroleum and associated oil spills in the Niger Delta, have resulted in massive environmental degradation (Igben, 2012a; Afolayan, 1987; Afolayan, 1995). Osuntokun, 2001). The mining of sand and dredging of rivers also aggravate coastal erosion and river siltation (Igben, 2014). Nwadiaro (1993) identified land destruction, deforestation,

deprivation and degradation as the physical impacts of petroleum exploration. The huge land requirements for these activities culminate in unavoidable land deprivation for host communities, thus leading to social, physical, and ecological disasters (Owabukeruyele, 2000). Consequently, the people's primary occupations are adversely affected. These and many other environmental issues, including pollution, poverty, and a lack of environmental concern, have turned the Niger Delta into one of the "world's most endangered ecosystems" (Admin, 2010; Igben, 2012b).

Moreover, pollution, the release of toxic substances into the environment in quantities harmful to living organisms, reduces the quality of the environment's normal or natural state. These pollutants can include industrial, domestic, and other human waste. Moreover, degradation can occur as a result of ecological factors, such as habitat pressures, whereby animals are forced into a small area due to human activities or natural disasters, such as floods; thus leading to resource depletion.

Poverty, according to the World Commission on Environment and Development (1987) is a major cause of environmental degradation. The poor inhabitants of rural areas often overuse the limited resources available to them out of necessity, leading to environmental degradation and imposing further constraints on their livelihoods in a vicious circle (Igben, 2019).

Several studies have examined the causes and impacts of environmental degradation on the population, particularly in rural areas of Nigeria. For instance, Igben's (2019) study identified poverty as one of the major causes of environmental degradation in the Udu Local Government Area of Delta State, Nigeria, within the Population-Environment (P-E) framework. The study reveals that 56.4% of 1,782 households in the sampled settlements are three-dimensionally poor, 27.8% are two-dimensionally poor and 15.8% are one-dimensionally poor and this is perceived by the respondents to impact on the environment in form of deforestation, water and air pollution, flooding, land and soil degradation, and bio-diversity loss; thus, indicating a causal linkage between poverty and environmental degradation.

Gbadamosi and Aldstadt (2025) opined that the Nigerian Niger Delta region is still faced with underdevelopment and environmental degradation as a result of petroleum exploitation activities and associated oil spillages, which have negatively impacted land and air quality, water sources, and hence influenced local populations, mostly women, who depend on these resources for farming and fishing activities. A scoping review of the literature by the authors reveals that 29% of studies documented the severe agricultural impacts of oil pollution, including heavy metal contamination (e.g., lead in crops) and 240,000 annual oil spills that degrade 60% of arable land. Women are reported to be disproportionately affected by socioeconomic disruption, with 70%–80% of small-scale farmers and fishers facing livelihood losses. (Joab-Peterside, 2009).

Most studies on environmental degradation focus mainly on its causes with little or no attention on the perception of the population on its impact on the rural population; hence, this study aims to assess the perception of the impact of environmental degradation on the population of Ovia North East Local Government Area (LGA) of Edo state. Its specific objectives include identifying the typologies of environmental degradation and their impacts, as perceived by the rural population. Furthermore, the study is predicated on the hypothesis that there is no significant variation in the level of impact/effects of environmental degradation on the population.

2. Materials and methods

2.1 Study Area

The study area, Ovia North-East, is one of the eighteen (18) Local Government Areas (LGA) of the Edo State in the Niger Delta Region of Nigeria. It is located roughly between Latitude $6^000'$ and $6^040'$ North and Longitude $5^040'$ and $5^050'$ South, covering an area of approximately 2,301 km². The headquarters of the LGA is Okada Town. Other settlements in the area include Uhen, Utese, Gelegele, Okokhuo, Ekehuan, Uhiere, Isiuwa, Ibaro, Ekiadolor, Oluku, Iguoshodin, Ikpako, Utoka, Oghede, Egbeta, Oduna, Ofunm-Wengbe, Ora, and Ogbese, as depicted in Figure 1.

The area experiences a tropical climate characterised by dry and rainy seasons. While the dry season lasts from November to April, the rainy season runs from April to October. In the middle of this season, there is a brief spell of dryness in August, which is commonly referred to as "August break". Consequently, two rainfall maxima are recorded in the area. According to Koppen's climatic classification, the southern part of the study area belongs to Af category, while the northern part belongs to the Am category (Igun and Igben, 2018)

Temperatures are generally high throughout the year, with a mean of 24°C (75.20°F). However, a slight seasonal variation occurs with an average of about 25°C (82°F) in the dry season. Relative humidity is normally over 90 per cent in the early morning, but falls to between 60 and 80 per cent in the afternoon (Udo, 1970). Furthermore, the area lies within the rainforest vegetation zone, which is wet evergreen rainforest with trees in three layers. The first layer comprises mostly climbers; the second comprises trees of between 2 and 10m, while the third layer comprises trees of over 10m tall. The rainforest contains valuable lumber trees such as mahogany (Khaya Spp), african walnut (Lovoa trichilioides), iroko (Chlorophora excelsa), abura (Mitragyna ciliata), sapele wood (Entandrophragma cylindricum), obeche (Triplochiton scleroxylon) and other hardwoods; hence the preponderance of lumbering activities in the area (Igben and Ohiembor, 2015).

The population of the area is mostly rural and was 153,849 in 2006 (NPC, 2006). The LGA is host to the first private university y in Nigeria, Igbinedion University, Okada. Other educational institutions include 174 secondary and primary schools. Lumbering and saw milling are the most prominent economic activities in the area.
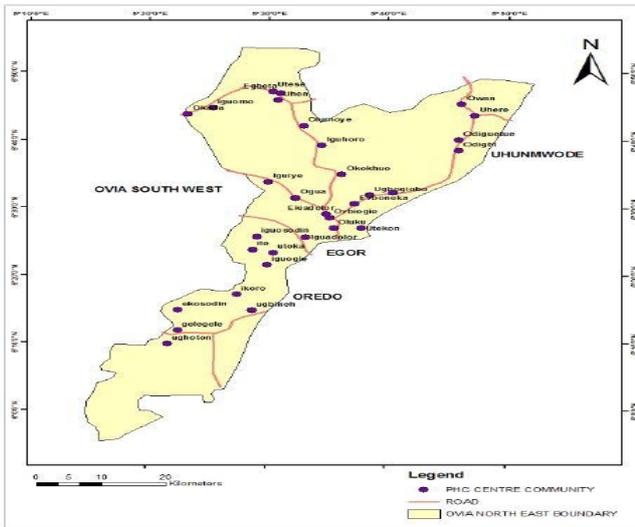
Figure 1: Study Area

2.2 Research Design

The research design employed in this study is descriptive in nature. It involved an analysis of the household heads' perception of environmental degradation in the area. This was done to find the meaning and obtain understanding of the present conditions through a careful study and methodical observation of event in the study area. Data utilized in this type of research, according to Ogundipe et al. (2006), may be collected by observation and measurement, which has to do with active utilization of all senses.

2.3 Population and Sample

The population for the study includes all persons, male and female, who are resident in the study area. A two-stage sampling procedure was used in the study. The first stage involved a random selection of four settlements that are experiencing environmental degradation from a list of 10 settlements. The selected settlements are Gelegele, Ibaro, Ekehuan and Ikpako. The second stage involved a systematic random sampling 50 households in the four selected settlements. This method involved the selection of a household randomly from a list of the entire households in a settlement and subsequent ones chosen at specific interval. In all, 200 household heads or their representatives were interviewed for the study.

2.4 Data Collection

The instrument used for data collection was a research questionnaire, which covers socio-demographic characteristics such as age, sex, marital status, household size, educational attainments and occupations of the respondents. It also includes the various types of environmental degradation experienced by residents, the level of impact, and the responses, with scores ranging from

1 to 4, indicating not serious, slightly serious, serious, and extremely serious, respectively.

2.5 Data Analysis

Data derived from the questionnaire were coded, tabulated, and analysed using descriptive statistics such as frequency tables, percentages, and mean scores. The Statistical Package for Social Sciences SPSS version 23 was used to facilitate the process of data analysis. In addition, the null hypothesis that there is no significant variation in the perceived level of impacts/effects of environmental degradation on the population was tested using the Analysis of Variance (ANOVA).

3. Results and Discussion

3.1 Socio-economic and demographic Characteristics of Respondents

Age and Sex Composition

Table 1 shows that majority of the total sampled population, 124 persons representing 64.5 per cent were between 21-50years. Out of this percentage, 26.5 per cent of them were in the age cohort of 31- 40 years, closely followed by those between 21-30 years (23.5%) and those in the 41- 50 years with 15.5 per cent. While those respondents less than 20years were 11.5%, those above 60years were 11%. 26 respondents or 13% were between 51- 60years. The mean age of the sampled household heads is 50.3 years, indicating an aging population.

Table 1: Age and Sex Composition of Respondents

Age Group	A		B		C		D		Total	Percentage
	M	F	M	F	M	F	M	F		
Less than 20	4	4	4	3	2	3	2	1	23	11.5
21-30	5	8	3	7	5	7	4	6	45	23.5
31-40	6	9	4	6	5	7	7	9	53	26.5
41-50	2	4	3	4	4	5	4	5	31	15.5
51-60	2	1	3	5	3	5	3	5	26	13
60 and above	2	3	4	4	2	3	2	2	22	11
Total	21	29	21	29	21	29	22	28	200	100%

Source: Field work, 2023

Key: A - Gelegele, B - Ekehuan, C – Ikpako and D – Ibaro

In addition, the majority of the heads of households were females, representing 54.5 per cent, in contrast to a lower percentage of 45.5 per cent males. The predominance of female-headed households is inconsistent with the National Population Commission (NPC)- documented Household

statistics for 2000. The statistics showed that 83 per cent of households in Nigeria are headed by males, while only 17 per cent are headed by females. However, the deviation from these statistics in the study area is because many women bear the burden for the survival of their household unit, either as a primary breadwinner within a polygamous homestead.

Marital Status

Figure 2 shows that the majority of residents in the study area were married, at 49.5%. This suggests that families were predominant in the study area, and 30.5% were single, 11% were widowed, and 9% divorced.
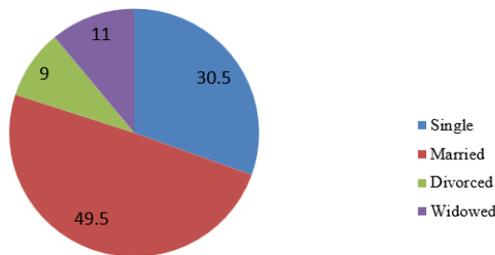

Figure 2: Marital Status of Respondents

Furthermore, all the sampled settlements for the study are rural and indigenous; the majority of the indigenous populations in these settlements are Christians, who accounted for 80 per cent. While 15 per cent practise African Traditional Religions (ATR), only 5 per cent are Moslems.

Household Size

Table 2: Household Size of Sampled Population

Size	Frequency	Percentage
1	10	5
2	14	7
3	19	9.5
4	28	14
5	35	17.5
6	30	15
7	20	10
8	19	9.5
9	13	6.5
10 and above	12	6
Total	200	100

Source: Field work, 2024
A – Gelegele, B – Ekehaun, C – Ikpako and D - Ibaro

Table 2 shows that 35 households or 17.5 per cent had average household size of five persons. This was closely followed by 30 households (15%) with average size of six persons. However, 71 households had average sizes of 1 to 4 persons, and 54 had sizes of 6 to 9 persons. While 12 households had household sizes of over 10 persons. The

minimum household size is 1 person, while the maximum is over 10 persons. The mode, median size and standard deviation of the sampled household size are 6.0, 7.0 and 1.6 respectively.

Educational Attainments

Figure 3 indicates that 7.5 per cent of the sample had no formal education. While 26.0 per cent and 16.5 per cent had primary and secondary education respectively, 40.0 per cent of the sample had vocational training in motor-cycle and motor repairs, welding, tailoring and hair dressing, only 10.0 per cent had tertiary education.
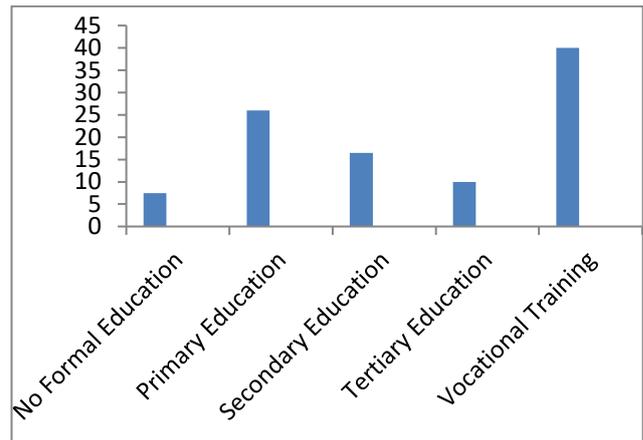

Figure 3: Educational Attainments of Respondents
Source: Field Work, 2024

Occupational Composition

Table 3: Occupational Status of Respondents

Occupation	Frequency	Percentage
Farming	60	30
Trading	50	25
Hair Stylist	10	5
Tailors	15	7.5
Fishing	40	20
Lumbering	20	10
Others	5	2.5
	200	100

Source: Field work, 2024
A – Gelegele, B – Ekehaun, C – Ikpako and D - Ibaro

Table 3 shows that as many as 120 households (60%) were engaged in the primary occupations. Out of this number, 60 households or 30 per cent of the total sample population were in arable farming growing crops, such as cassava, yams, cocoyam, potatoes, maize, sugar cane and vegetables. The next important activity is fishing with 20 per cent of the total size; followed by lumbering (10%). A factor which might be responsible for the high percentage of people in the primary sector of the study area is the geographical nature, which is mostly rural and the over dependence of people on land for survival in addition to the presence of the Ovia River and fellable trees for timber. Trading employed 50 households (25%). Only 5 per cent were engaged in other occupations, mostly teaching. Four

(4) households (2%) were hair stylists, and 7.5 % were tailors, respectively.

Types of Environmental Degradation

Table 4 below shows the various types of environmental degradation and the percentage of respondents who identified them. Overall, over 70 per cent of respondents believe that the listed forms of degradation are prevalent in the area.

Table 4: Types of Environmental Degradation

Types of Degradation	A	B	C	D	Total	Percentage
Gas flaring	50	48	45	40	183	91.5
Flooding	40	35	50	28	153	76.5
Gully Erosion	43	30	48	22	143	71.5
Deforestation	50	50	37	39	176	88
Water Pollution	42	47	36	34	159	79.5
Soil Erosion	30	35	41	47	153	76.5
Air Pollution	41	44	48	39	172	86
Oil Spillage	50	48	47	49	194	97

Source: Field work, 2024

A – Gelegele, B – Ekehaun, C – Ikpako and D - Ibaro

Perceived Effects of Environmental Degradation

Table 5: Types of Environmental Degradation

Effects	A	B	C	D	Total	%
Bad Roads	36	30	45	47	158	79
Loss of Infrastructure	30	35	33	34	132	66
Loss of Employment Opportunities	40	41	42	44	167	83.5
Loss of Fertile Soil	44	40	45	41	170	85
Migration of Youths	47	48	44	42	181	90.5
Loss of Aquatic Life	45	47	46	48	186	93
Increase in Poverty Rate	47	48	45	49	189	94.5
Loss of Natural Resources	48	47	46	45	186	93
Food Insecurity	40	39	41	42	162	81
Loss of Biodiversity	29	30	30	31	120	60
Acid Rain	30	25	35	32	122	61

Source: Field work, 2024

A – Gelegele, B – Ekehaun, C – Ikpako and D - Ibaro

Table 5 shows the impact of the identified types of environmental degradation, expressed as the percentage of respondents.

Bad roads: This accounts for 79.0 % of respondents and these findings are in line with Afinotan & Ojakorotu (2019) study, which revealed that environmental degradation is the reason why oil-producing rural communities' roads are impassable in all seasons of the year; thus contributing to the high cost of moving persons, goods or services to various destinations.

Loss of infrastructure: Sixty-six per cent of respondents in the area believe that environmental degradation leads to the loss of infrastructure, corroborating Anyakora & Coker's (2019) study, which found that environmental degradation causes oil-well blowouts, which often result in the collapse of buildings.

Loss of employment opportunities: Eighty-three and a half per cent (83.5%) of respondents support the view that environmental degradation causes land pollution due to oil-well blowouts, pipeline corrosion, and consequent loss of employment opportunities. This finding is supported by the findings of Atakpo & Ayolabi (2019) study, which showed that environmental degradation results in soil pollution and destruction of vegetation, which in turn leads to loss of employment opportunities and financial sustainability

Loss of fertile soil: Eighty five percent (85%) agreed that environmental degradation results in loss of soil fertility. This study supports the findings of Okpo and Eze's (2006) study, which showed that in an aquatic environment, oil sometimes flows on the water surface, encroaching on shorelines through wind and wave action, invariably affecting the soil.

Increase in poverty rate: 94.5% of respondents. This supports the findings of Imobighe's (2011) study, which revealed that environmental degradation in oil-producing areas leads to high levels of poverty.

Loss of aquatic life: This accounts for 93%, in line with Raven et al (1998), who found that water pollution kills fish and other aquatic animal organisms.

Food Insecurity: 81% of the respondents agreed that food insecurity is one of the effects of environmental degradation in tandem with the findings that the continuing quest for oil without the requisite Environmental Impact Assessment (EIA) adversely affected the quality, size, and shape of traditional staples, such as cassava, yam, and plantain (Akpomuvie, 2018). Furthermore, crops cultivated on farmlands produce low yields, and their nutrient status is reduced due to their proximity to gas flaring sites (Edino et al., 2019; Ekpoh & Obia, 2018). The degradation caused by oil exploration in the Niger Delta has also severely affected the nutritional status of local communities. The pollution of water sources and agricultural land has affected the availability and quality of food. This has led to food insecurity and malnutrition in many areas.

Migration of youths: Ninety per cent (90%) of the respondents in this study support the view that environmental degradation is a key driver of rural distress migration. The Human Development Report (UNDP, 2015) recognises that, in many developing countries, internal migration from rural areas to cities is at least in part driven by natural disasters, land degradation, and desertification.

Loss of natural resources and biodiversity: These accounted for 93% and 60%, respectively. This finding is in line with the World Wildlife Fund, which claims that over 90 per cent of Nigeria's natural vegetation has been cleared, and that over 350,000 hectares of forest and natural vegetation are lost annually.

Acid rain: Environmental degradation also leads to acid rain, as indicated by 61% of the respondents. This finding is similar to that of Wei et al.'s (2017) study, which posited

that acid rain occurs due to climate change and oil exploration.

Perceived Level of Impact

The responses to the various levels of impact were scored so that responses indicating an extremely serious situation received the highest mean score. The level of impact was considered serious by respondents, with a mean score above 3.00, and extremely serious if it exceeded 3.50.

Oil spillage, air pollution, loss of fertile soil x= 3.53; SD = and an increase in poverty rate with a mean score of x = 3.75; SD = 1.25, X = 3.89; SD= 1.25 and x = 3.71; SD= 1.25, respectively had the most serious level of impact in the study area. This could be due to oil exploration and gas flaring in the region, which degrade the environment and increase the poverty rate. Other serious level of impact includes gas flaring (3.25), gully erosion (3.09), loss of employment opportunities (3.06), deforestation (2.83), water pollution (2.58), loss of infrastructure (2.51), soil erosion (2.51), bad roads (2.34), flooding (1.99), others such as increased difficulty in accessing points of economic activities, occupational dynamics etc. (1.69).

The perceived impacts of environmental degradation are interconnected and affect different dimensions of the environment, namely physical, social, economic, political, and aesthetic. For instance, lumbering is adversely affected by deforestation, which in turn results in job losses and poverty. In a similar vein, loss of infrastructure has an overall effect on the socio-economic lives of the rural population.

Table 6: Perceived Impacts of Environmental Degradation

Variables	Extremely Serious	Serious	Slightly Serious	Not Serious	Mean	SD
Gas flaring	50	31	15	5	3.25	1.30
Flooding	10	20	30	41	1.99	1.44
Gully Erosion	50	21	20	10	3.09	1.31
Deforestation	20	55	15	11	2.83	1.35
Water Pollution	30	20	30	21	2.58	1.37
Soil Erosion	11	50	20	20	2.51	1.39
Air Pollution	80	16	10	5	3.89	1.25
Oil Spillage	85	10	3	3	3.75	1.25
Bad Roads	5	30	60	6	2.34	1.43
Loss of Infrastructure	7	51	30	13	2.51	1.40
Loss of Employment Opportunities	51	20	15	15	3.06	1.31
Loss of Fertile Soil	70	20	6	5	3.53	1.27
Increase in Poverty Rate	80	15	41	2	3.71	1.25
Others	10	10	20	01	1.69	1.43

Source: Field work, 2024

Test of Hypothesis

The tables below show the results of the Analysis of Variance (ANOVA) used to determine variation in the perceived level of impact of environmental degradation across the four selected communities in the study. The f-value of 8.19 and a level of significance of 0.055, as seen in Table 7, and the f-value of 12.519 and significance level of 0.076, as depicted in Table 8, indicate that there is no statistically significant variation in the level of effect of environmental degradation across the selected communities.

Following from the above, the null hypothesis that there is no significant variation in the level of impact/effects of environmental degradation on the population of the selected settlement is accepted at the 0.05 confidence level. Consequently, there was no statistically significant variation in the level of impact of environmental degradation on the population of selected communities in Ovia North LGA of Edo State. This finding can be attributed to the proximity of the different communities to sources or epicentres of the environmental degrading activities in Ovia North-East LGA.

Table 7: One-way Analysis of Variance

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	363.667	8	79.208	8.194	0.55
Within Groups	29.000	3	9.667		
Total	662.667	11			

Source: Field work, 2024

Table 8: One-way Analysis of Variance

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	366.67	9	40.685	12.519	0.76
Within Groups	6.5	2	3.5		
Total	372.667	11			

Source: Field work, 2024

4. Conclusion

Though environmental degradation is a very common phenomenon in the Niger Delta Region (NDR), the study area inclusive, the perception of its impact on the rural population varies considerably; hence, this study assessed the perceived impact of environmental degradation on the population of Ovia North East Local Government Area (LGA) of Edo state. Its objectives include identifying the typologies and impacts of environmental degradation on the rural population. Primary data for this study were obtained from a sample of 200 household heads from four settlements. A two-stage sampling procedure was used to select four settlements from a list of 10 settlements. The second stage involved a systematic random sampling of 50 households in the four selected settlements. The research questionnaire covered the respondents' socio-demographic characteristics and the type and level of impact of environmental degradation. The study identified gas flaring,

gully erosion, flooding, deforestation, water, air, and soil pollution as major forms of environmental degradation, resulting in the loss of fertile land, infrastructure, employment, aquatic life, and biodiversity, and increasing insecurity and poverty. There were no significant variations in the perceived impacts of environmental degradation among the selected settleme

Following the above, the study recommends conducting an environmental impact evaluation of the degradation identified to mitigate the adverse consequences of the causative agents, in addition to educating and empowering the local population.

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