IJAAR PUBLISHING®

American Research Journal of Contemporary Issues | ISSN: 3027-0189
Vol. 2, Issue 1 (January-March, 2024) | www.ijaar.org

COMPARATIVE ANALYSIS OF IMPACT OF RE-ECHOED ENVIRONMENTAL POLLUTION ON ECONOMIC DEVELOPMENT OF NIGER DELTA REGION, NIGERIA.

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Abstract;
Budgetary allocation is a projected monetary plan of the government. This paper conducts a comparative analysis of impact of re-echoed environmental pollution on economic development of Niger delta region, Nigeria. Focus of the paper is analysis of budget of hope. The work is anchored on "Zero Waste Theory". The investigation was conducted in two states of the South-South Geopolitical Zone with one from Niger Delta, one from non-oil producing state. The study was a comparative survey conducted through purposively random sampling technique, choosing a population with a validity and reliability of (ra=0.837) in a multi-stage technique. This study adopted a modified Likerts's Scale techniques which assign values to individual research questions with a criterion mean cut off of 2.50 acceptable score while t-statistics was used to test the hypothesis at 0.05 per cent level of significance. The study revealed that enormous challenges have been created by oil and gas pollution in the Niger Delta region both economic, development and health hazard impacts. There are no specialist hospitals, transportation difficulty, degradation farmlands depletion of rural income sources, poor infrastructural development increased health hazard. The paper revealed that there is significant impact of oil and gas pollution on Niger Delta environment. It was suggested that there should be a device to detect when there is oil spill for immediate response. Youths must avoid activities that will ignite fire within the pipeline or cause explosion of the pipes and adequate security surveillance must be installed to check activities of vandals alone the pipeline. Remediation of degraded environments must be carried out as fast as possible to ensure that the environment is made useful again by inhabitants of Niger Delta region.

Keywords; Environmental Pollution, Economic Development, Niger Delta Region.

Daibi-Oruene, W. D. & Nwanyanwu, H. D. (2024). Comparative Analysis of Impact of Re-Echoed Environmental Pollution on Economic Development of Niger Delta Region, Nigeria. *American Research Journal of Contemporary Issues*. 2(1), 107-122.

Introduction

Pollution of Niger Delta environment is an age long activity which became worse on the advent of oil exploration and exploitation in 1952. The contamination of the under-ground water acquirer is the most notorious aspect of the environmental pollution (Wright & Kurian, 2009). This arose the curiosity on the effects of oil spills and gas flaring on farmlands, swamps, rivers and farmlands contaminations in the region and eventual impact on the general economic development of the region. This is beside the refining and allied business impacts from subsidiary companies (Paki & Ebienfa, 2011). The space or environment is a habitat provided by nature with all the resources therein for the survival of human beings which if destroyed can result to extinction of human existence. Achieving environmental quality is important in improving the lives of the people in terms of movement, health, job safety, farming, fishing, business operations and general living standard of the people of Niger Delta. Adequacy in operational activities of the companies doing business with the Niger Delta region speaks volume of how well lives will be to the people. Safety of the environment guarantees job security, good health, farming activities and other business activities, reduction in disease out breaks, mobility of human beings including human, infrastructural developments and improvement of soil quality, reduction in perennial flooding, water and air quality. The overall benefit is that with the right standard of environmental quality as enshrined in the United Nations conference held between 5th and 16th June, 1992 in Stockholm, ecological imbalance resulting from the disturbances to the soil air and the environment brings disequilibrium in the quality of soil, air, water and other environmental behaviors to human existence (Duru, 2014). The pollution of Niger Delta environment has been explained as the contamination of land, soil and air through discharge of toxic substances into the water and radioactive pollution. Other types of pollution of the Niger Delta environment include; air pollution, soil pollution, water pollution, noise pollution, pollution through gas flaring, light pollution, thermal pollution, plastic pollution, electromagnetic pollution, industrial pollution, biomedical waste, climate change, garbage and nitrogen oxides pollutants. They are all harmful to the environment. All these are seen as human actions that reduce the quality of water, soil and air we breathe capable of causing sicknesses to human beings. Looking at the unrepentant nature of oil companies' activities in the Niger Delta, life span in the Niger Delta has greatly reduced due to radioactive related diseases such as cadiac arrest, cancer, kidney disease and others.

Oil and gas activities have been at the forefront of Niger Delta environmental degradation and the eroded environment resulted to huge cost in infrastructural provision as the cost of building any structure is twice what it will cost within the other geopolitical zones in the country. States' budgetary allocations within the Niger Delta are higher since combating the environmental problems is a must if development must be achieved. It is selective when thinking of setting up any business within the Niger Delta, the cost of farming and even transportation and distribution of goods are on the rise daily. The Niger Delta has recorded more of the environmental pollution and degradation and oil crisis than any other part of Nigeria from Ogoni, Ikwerre, Bonny, Umuechem in Etche local government, Odi in Bayelsa state and other states in the South-South part of Niger Delta region. Deterioration of the Niger Delta remains unabated and increasingly spreading to other states within the Niger Delta such as Akwa Ibom, Delta State, and Cross Rivers state. Evidently, human activities have created undeliverable sufferings to the people of Niger Delta while the federal government is happily watching and enjoying the enormous revenue coming from the region. These issues raised important questions as to how devastating is the pollution of Niger Delta environment to economic development of the region. In a bid to provide answer to the question, it is pertinent to carry out a comparative analysis of impact of re-echoed environmental pollution on

economic development of Niger Delta Region in Nigeria. The level of damage done to the region arising from oil and gas activities are at varying categories in terms of environmental damage, health hazard, damage to sources of livelihood and employment derivation and denial of infrastructural longevity as infrastructural decays have been attributed to the same oil and gas activities. Objective of this paper is to determine the impact of re-echoed environmental pollution on economic development of Niger Delta Region in Nigeria. However, specific objective of this paper are;

(i) To ascertain the level of infrastructural development of the region in the face of environmental degradation.
(ii) To find out the extent of health implications of environmental pollution the people of the region.
(iii) To ascertain the types of health hazards caused by environmental pollution

Research Questions

The following questions were raised to understand the level of impact of environmental pollution to Niger Delta region. These questions are;

(a) What is the extent of infrastructural development of Niger Delta region as a result of environmental pollution?
(b) What is the extent of health implications of environmental pollution on the residents of Niger Delta region?
(c) To what extent are the types of health hazard Niger Delta region caused by oil and gas pollution?

Study Hypothesis

1. There is no significant relationship between oil and gas pollution and infrastructural development in Niger Delta region.
2. There is not significant relationship between environmental pollution and health hazard of residents of Niger Delta region.
3. There is no relationship between oil and gas pollution and health hazard in Niger Delta region.

This study brings to reality the impact of oil and gas activities on the people of Niger Delta region and their environments. From the findings of this study, the federal government stands to take precautions on how to handle the outcome of activities of oil and gas multinationals doing businesses in Niger Delta. It is pertinent to understand that federal government policies can be of help to the Niger Delta by monitoring the activities of multinational companies through the right policy framework. This study may sensitize multinational companies on the importance of sustainability of the environment in Niger Delta region. This paper helps in exploring the economic viability of sustainability of the business environment of Niger Delta region. The study will certainly create awareness on the environmental situation in Niger Delta region. Players in both public and private sector of the government will make use of this job. It will increase the stock of literature in this area of study.

Clarification of Concepts

Concept of Environmental Pollution

Distortion of the situations of the environment is a global phenomenon. It has been attributed to human activities not guided by environmental laws. Mostly where there is introduction of substances/contaminants into the natural environment without precautions. The presence of

these contaminants adversely result to damage of the environment and its possible damage to sustainable improvement in health, agricultural productivity and general destruction of lives and properties (Uwaoma & Gabriel, 2017). Contaminants can be gaseous, solid or liquid, radioactivity, sound or light. Where an occupant of an environment can no longer feel comfortable as a result of the presence of extra ordinary activity or object. Pollution sources can emanate from the activities of a company such as extractive industries, micro-plastics, poor management of waste, agriculture or agricultural runoff such as poultry discharge or waste, transportation or manufacturing

Concept of Economic Development

Economic development cuts across all aspects of life in whatever is done by any society in the name of provision of infrastructure, such as roads bridges, hospitals and other aspects of life improving strategies that is influenced by positive government policies. Every improvement in the economic development influences economic growth (Hanis & Fei, 1961). In other words, there can be economic development without economic growth. This explains that economic development and economic growth are two different terminologies and two different things. However, economic development is phenomenal qualitative change in the state. It is viewed as the overall technological and socio-economic indicators for measuring the society's advancement and individuals and the state, life-expectancy, living standard and in self-regulating social institutions and industrial base and others (Ezeh & Nwachukwu, 2007):

Niger Delta Region

Situated at the apex of the Gulf of Guinea on the west coast of Africa is the Niger Delta found in the South-South geopolitical zone of Nigeria, a tropical rain forest called the Niger Delta Region with the Atlantic Ocean at the coastal line stretching across Nigeria (the southern part). Found within the environment are stagnant swamps, rivers, mangroves, creeks and others. It is occupied by about nine states of the Nigerian federation namely; Abia, Akwa-Ibom, Anambra, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers. (Anejionu et al, 2015). This region is richly endowed with natural resources such as crude oil and gas. Main occupation of the people is farming and fishing they are host to multinational companies that are eventually the main sources of pollution of her environment due to their oil exploration and exploitation activities. Other subsidiary companies are also culpable in the accusation of environmental pollution as a result of their toxic waste disposal into the Atlantic Ocean (Aluko, 2004).

Types of Environmental Pollution

Pollution of the environment has been observed to emanate from several sources activated by man due to nonprofessional application. Most times pollution can occur as a result of unconscious use of items around our environment. To this end, Atubi, Ogbija & Ojeh, (2015) pointed out that sources of environmental pollution are not limited to the following; air pollution, soil pollution, water pollution and noise pollution. Others are light pollution, radioactive pollution, thermal pollution, plastic pollution, electromagnetic pollution, industrial pollution, biomedical waste, climate change, garbage, and nitrogen oxides pollutants (Kadafa, 2012). Activation of these elements constitutes pollutions to the environment.

Causes of environmental Pollutions

According to Ebegbulem, Ekpe and Adejumo, (2013), pollution of the environment is activated through human contamination or interference with most elements that constitute human resources not limited to the following;

1. *Microbial Decaying process* –Releases methane gas through decaying soil microorganism.
2. *Mining Activities* – Release of dust and chemicals while extracting soil minerals.
3. *Volcanic eruptions*- Sulfur dioxide released into the air through volcanic eruption.
4. *Agricultural Activities* – Fumigation insecticides, pesticides chemicals and fertilizers during agricultural activities.
5. *Burning stubble and farm residue* - they also add to environmental pollution.
6. *Open burning of Garbage waste*- every waste burnt releases harmful gas into the atmosphere
7. *Burning of Fossil Fuels* – burning of fossil fuels such as coal, oil, gasoline to produce energy for electricity
8. *Domestic Sources* – cleaning of our houses and the use of cleaning products and paints contain toxic chemicals
9. *Automobiles* – gases emitted from vehicles gas emission from car exhaust pipes.
10. *Factories and Industries* – production process wastes such as; carbon monoxide, and other organic compounds such as hydrocarbons and emitted chemicals.
11. *Construction and Demolition* – raw materials such as bricks and concrete from construction sites.
12. *Mining waste land and mining pits* – when reclamations are not addressed as provided in the Minerals Acts. Examples are as in the mine fields of Nasarawa, Jos, Ilesa and Enugu;
13. *Non-enforcement of environmental regulatory laws* - inability of the agencies responsible for the environment to enforce laws and regulations, particularly with respect to urban planning and development,
14. *inappropriate agricultural practices*- silting of river beds and loss of water courses occur as a result of watersheds destruction and opening up of river banks

Environmental pollutions arising from oil spills and gas emission are considered as toxic and hazardous causing varied health challenges of varying degrees. These health hazards are majorly respiratory, heart and cancer diseases. Their causes have been traced to environmental and air pollutions. Most of the notable pollutions have been traced to contamination of underground water and air pollutions.

Zero Waste Theory

However, this study is predicated on the Zero waste. Zero waste theory according to Spiegelman, (2006) cited in Davidson, (2011) refers to waste management and planning approaches which emphasize waste prevention as opposed to end of pipe waste management. Zero waste encompasses more than eliminating waste through recycling and reuse; it focuses on restructuring production and distribution systems to reduce waste (Young *et al.*, 2010). An important consideration of the zero waste philosophy is that it is more of a goal, or ideal rather than a hard target. Even if it is not possible to completely eliminate waste due to physical constraints or prohibitive costs, zero waste provides guiding principles for continually working towards eliminating wastes (Snow and Dickinson, 2001) and there are many successful cases around the world which resulted from the implementation of the zero waste philosophy (Townend, 2010). The zero waste philosophy has been adopted as a guiding principle by several governmental organizations as well as industries (Snow and Dickinson, 2001; Townend, 2010). Zero waste involves the elimination of waste from the outset; it requires heavy involvement primarily from industry and government since they are presented with many advantages over individual citizens. In fact, zero waste will not be possible without significant efforts and actions from industry and government (Connett&

Sheehan, 2001). Meanwhile, governments have the ability to form policy and provide subsidies for better product manufacturing, design and sale; and the ability to develop and adopt comprehensive waste management strategies which seek to eliminate waste rather than manage it (Snow & Dickinson, 2001). Due to the heavy involvement of industry in eliminating waste, extended producer responsibility is often an essential component of zero waste strategies (Spiegelman, 2006).

Oil and gas exploration companies are mandated within the stipulated statutory regulatory extant laws to practice methods needed to carry out Hazardous and Solid waste management operations. The regulatory laws made it clear for any company that generates waste to (under compulsion) remove it. It also sets tasks and responsibilities to effectively focus on all relevant clients, and employees on appropriate handling, storage, collection, transportation, recovery, disposal, monitoring and reporting of waste generation within their areas of operation.

Empirical Review

Several scholars in their studies have attempted to draw a relationship between environmental pollution and the development of Niger Delta region of Nigeria; Paki & Ebienfa, (2011): Duru, (2014): Aluko, (2004): Ezeh & Nwachukwu, (2007). Ogunbode, Jazat and Akande, (2023) investigated the effect of environmental pollution on Economic factors the study focus was on sustainability of environmental quality. Data were analyzed using the techniques of descriptive inferential statistics and factor analysis. It was revealed that environmental pollutions such as noise, patterns of accommodations, living standard and wastes influenced economic factors. Oil spill effect on the production of fish in Niger Delta was studied by Osuagwu and Olaifa, (2018). The study focus was on contamination of fishes in the aquatic funa and flora. Cobb-Douglas production function was implored for the data analysis. It was discovered that oil and gas pollution negatively affected the productions of fish in Niger Delta region. Assess to loans for the production of fish was negatively related to environmental pollution.

Degradation of Niger Delta environment and its reciprocal process were studies by Süleyman, (2022). Focus of the study was on transitional crimes and environmental governance. The study adopted content analysis through the utilization of outcomes of previous studies relating to the topic investigated. It was revealed that inadequate governance of the environment was a major cause of crimes committed by multi-national companies in Niger Delta due to centralization of state functions with two levels of power at the macro level. Another investigation on the effect of production of fish in the Niger Delta was conducted by Osuagwu, Eze and Olaifa, Eseoghene, (2018).focus of the study was on the supportive nature of terrestrial aquatics funa and flora on fish production in Niger Delta. The study adopted Cobb-Douglas production function for the data analysis. The study revealed that there exist a negative relationship between production of fish and oil production and oil spills. Again, lack of credit facilities ad a negative effect on fish production

Bassey, et al, (2013) investigated environmental accounting and organizational performance in oil and gas firms. Focus of the study was on effect of gas pollution on firms' performance. The study adopted Pearson's product moment correlation co-efficient for the data analysis. It was discovered that the cost of maintaining the environment has a relationship with company's performance. Oil spillage effect on the development of communities in the Niger Delta was investigated by Adekola1, Mba, and Igwe, (2014). The study focus was on poverty and hunger eradication in Nigeria. Percentages and weighted mean and modified Likerts scale to assign values to the criterion mean were implored for the data analysis. Findings

revealed poverty in the affected communities were as a result of environmental pollution through oil and gas. Further finding also revealed that the community has the same pollution effect as experienced in states that produce oil in the in Niger Delta region.

Uwaoma and Gabriel, (2017) studied environmental accounting and development sustainability in Niger Delta region. Focus of the study was on environmental degradation, redress and consequences of oil pollution. Chi-square, Spearman's coefficient correlation were utilized for the data analysis. The findings showed that stability of the economy and sustained development has a relationship and therefore, environmental accounting should be adopted by multinational oil and gas companies in Niger Delta. Egbejule, (2021) conducted an empirical investigation on degradation of the environment and poverty in Nigeria. Focus of the study was on poverty and degradation of the environment. Econometric technique of unit root testing using the Augmented Dickey Fuller (ADF) was adopted for the data analysis. The study discovered that poverty and degradation of the environment are directly related. There is also a direct relationship between level of poverty and greenhouse emission while poverty also has a direct relationship with population growth.

Methodology

Study Design

This study is a comparative survey. It helps in determining the effect of an action on two groups or sets of items or group of people. The study draws its population from two states, one from oil producing state (Niger Delta region) and the other from non-oil producing state. The essence is to compare the impact of environmental pollution on oil producing region when compared to non-oil producing region. We use the group from oil producing region as non-treatment group while the group from non-oil producing region as non-treatment group also known as factual and counter-factual groups.

Population

Out of the nine states of Niger Delta, two states Abia and Rivers State were selected randomly. Six local government areas were selected from the two states through purposive random sampling technique, choosing a population of 22,006 for the study.

Sampling Procedure

Six Local Governments comprising 146 communities from the two states were chosen communities with a population of 26,410. Purposively selected were 157 communities while 18 communities were also purposively chosen indicating 12 per cent of the 2006 population using a multi-stage technique.

Research Design

The study was investigated using descriptive survey method. This method helps in the investigation especially when study involves numerical value analysis.

Validity of the instrument

In order to ensure the face and content validity of the questionnaire, a draft of the instrument was given to the researcher's supervisors and two other lecturers of the Department. To establish the efficacy of this exercise, the researcher provided the lecturers with clear guidelines on what to do in a letter that accompanied the instrument.

Reliability of Instrument

The Cronbach Alpha method was used to establish the reliability of a non cognitive instrument. The Cronbach alpha method was used in the computation of the internal consistency of the items of the instrument. The instruments were retrieved and pretested using Cronbach Alpha. The [Pretested Cronbach Alpha computation gave a result of Cronbach Alpha (r_a) method to establish the reliability or the internal consistency of the instrument (r_a=0.837).

Instrumentation of Data Collection

A well structured questionnaires were formulated with viability and reliability index of 0.83 and in-depth interviews. These questionnaires were analyzed using mean standard deviation

Method of Data Analysis

This study adopted a modified Likert's Scale techniques which assign values to individual research questions with a criterion mean cut off of 2.50 acceptable score while t-statistics was used to test the hypothesis at 0.05 per cent level of significance. The formula of t-statistics for computing two means of independent samples is given below;

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1 - 1} + \frac{S_2^2}{n_2 - 1}}}$$

Where;

$\bar{X}_1$ = mean of the 1st group (Niger Delta Indigenes)

$\bar{X}_2$ = mean of the 2nd group (Non-Niger Delta indigenes

S_1 = standard deviation of the 1st group (Niger Delta indigenes)

S_2 = standard deviation of the 2nd group (Non-Niger Delta indigenes

n_1 = sample size of the 1st group (Niger Delta indigenes

n_2 = sample size of the 2nd group (Non-Niger Delta indigenes

In order to answer this question, the mean and standard deviation for each of the ten items (1-10) were computed. The result got were summarized and presented as shown in table 1 below.

Research Question (1) on extent of infrastructural development of Niger Delta region as a result of environmental pollution?

Table 1. Mean standard Deviation for the research questions

		Rivers (oil producing)			Imo State (non-oil producing)		
	Total no. 22006	**N = 12,205**			**N9,801**		
SN	**Instrument**	**Mean**	**SD**	**Remark**	**Mean**	**SD**	**Remark**
1.	No good hospitals within the host communities where the companies are operating .	3.02	0.67	Accepted	2.92	0.78	Accepted
2.	Oil pollution has prevented transportation movement	2.78	0.81	"	2.46	0.71	Rejected
3.	Presence of Multinationals did not guarantee good health care for host communities.	2.57	0.56	Accepted	2.33	0.85	Rejected
4.	Oil spillage degraded lands for farming and fishing.	2.59	0.73	"	2.47	0.59	Rejected
5.	Environmental pollution affected incomes negatively.	2.67	0.91	Accepted	2.41	0.62	Rejected
6.	Underground drinking water is polluted.	3.07	0.62	"	2.79	0.71	"
7.	Greater numbers of inhabitants are terminally ill.	2.77	0.82	Accepted	2.35	0.83	Rejected
8.	Govt. encouragement to farm produce is poor	3.04	0.78	"	2.60	0.67	Accepted
9.	No good road network	2.93	0.95	Accepted	2.79	0.79	Accepted
10.	General economic development is low	2.70	0.96	"	2.49	0.57	Rejected

Aggregate mean (Grand mean) for the two states were = 2.84, for Rivers State = 2.86, for Bayelsa state = 2.98

Comparatively, from table 1 above, it is revealed that hospitals within the vicinity are available but showing (3.02) for Rivers state and ((2.92). For Imo state which not Niger Delta is. Transportation movement revealed accepted for both Rivers and Imo states with (2.78) and (2.46) respectively. For health insecurity, both states revealed (2.57) and (2.33) rejected for Imo state and Rivers state respectively. On the impact on farming and fishing, analysis of table 1 revealed that for Rivers state, it was accepted at (2.59) while it is rejected for Imo state at (2.47). On the impact on income, Rivers state showed accepted at (2.67) but rejected at mean score of (2.41) showed rejection for Imo state while mean score for Imo. Under ground water pollution had a mean score of (3.07). On pollution of underground water indicating accepted for Rivers state while Imo state had a mean score of (2.79) indicating rejection this means there was no clear notice of underground water pollution in Imo state arising from the activities of multi-national oil companies there. Farm produce lack of good roads and economic development all had mean scores of (3.04), (2.93) and (2.70) indicating accepted respectively while Imo state revealed mean scores of (2.60), (2.79) and (2.49) indicating accepted and rejected respectively.

Research Question (2) on health implications of environmental pollution on the residents of Niger Delta region

Table 2. Mean standard Deviation for the research questions

SN		Rivers (oil producing)			Imo State (non-oil producing)		
	Total – N22006	**N12205**			**N9,801**		
	Instrument	**Mean**	**SD**	**Remark**	**Mean**	**SD**	**Remark**
1.	There are several people suffering from cancer in the host communities	2.59	0.98	Accepted	2.28	0.67	Rejected
2.	Oil pollution has caused terminal sickness such as caused cough in many indigenes	2.70	0.68	"	2.42	0.87	"
3.	There are several fibroid cases among women within the state.	2.65	0.58	Accepted	2.45	0.92	Accepted
4.	Oil pollution is responsible for the miscarriages among women within the state.	2.91	0.77	"	3.50	0.89	"
5.	Environmental pollution is responsible for cervical cancer among women.	3.68	0.93	Accepted	2.37	076	Rejected

Aggregate mean (Grand mean) for the two states were = 2.84, for Rivers State = 2.86, for Bayelsa state = 2.98

Comparatively, analysis results in table 2 showed that for Rivers State, mean score for people suffering from cancer had mean score of (2.59) indicating accepted while Imo state had mean score of (2.28) indicating rejected. For people suffering from fibroid, Rivers State had mean score of (2.65) indicating "accepted" while Imo State had a mean score of (2.45) indicating "rejected". Cough related diseases due to pollution revealed a mean score of (2.70) indicating accepted while for Imo State, there was a mean score of (2.42) indicating "rejected". For miscarriages and cervical cancer, Rivers State had mean scores of (2.91) and (2.68) indicating "accepted" while for Imo State. They had mean scores of (3.50) and (2.37) respectively indicating accepted and rejected.

Research question (3) on the types of health hazard Niger Delta region caused by oil and gas pollution

Table 3. Mean standard Deviation for the research questions

SN		Rivers (oil producing)			Imo State (non-oil producing)		
	Total = 22006	**N= 12205**			**N = 9,801**		
	Instrument	**Mean**	**SD**	**Remark**	**Mean**	**SD**	**Remark**
1.	Oil & gas pollution has degraded environment for infrastructural development	2.95	0.89	Accepted	2.43	0.94	Rejected
2.	Oil pollution has prevented transportation movement	2.78	0.76	"	2.56	0.77	Accepted
3.	Pollution has impacted dangerously on our environment	3.51	0.87	Accepted	2.43	0.81	Accepted
4.	Oil spillage prevented good farm yields	2.98	0.65	"	2.38	0.73	"
5.	In the face of pollution incomes are very low	3.06	0.81	Accepted	3.49	0.59	Accepted

Aggregate mean (Grand mean) for the two states were = 2.84, for Rivers State = 2.86, for Bayelsa state = 2.98

In a comparative analysis on the hazard effect of oil and gas pollution, table 3 analysis result revealed mean scores of (2.95) indicating accepted for Rivers State for infrastructural degradation as a result of environmental pollution. For Imo State, it had a mean score of (2.43) indicating "rejected". Transportation difficulty revealed a mean score of (2.76) for Rivers State while in Imo State, it showed a means score of Infrastructural degradation as a result of environmental pollution had mean score of (2.56) indicating "accepted". The bad situation of roads in Imo State is not attributed to oil and gas pollution rather due to bad governance and erosion topography of some parts of the state. General consideration of dangerous environment had a mean score of (3.51) indicating accepted while Imo State had a mean score of (2.43) indicating rejected. Prevention of farm good yields and low income had (2.98) and (3.06) indicating accepted respectively while for Imo State, it showed mean scores of (2.38) and (2.49) respectively.

Test of Hypotheses

Analysis and Discussion of Results

Research Question 1. There is no significant relationship between oil and gas pollution and infrastructural development in Niger Delta region.

Table 4. Summary of t-test on the difference in the mean rating between oil and gas pollution and infrastructural development in Niger Delta region.

Activity Type	Rivers State	N	$\bar{X}$	SD	df	t-cal.	t-crit.	Decision at p >.05
Oil exploitation	Total Fina, ELF	12205	12.93	1.51	1.062	-2.166	1.960	P=0.033 **S**, p< .05
	Imo State							p=0.436
Rd. construction	Julius Bagger	9,801	12.98	1.47	1.008	0.782	1.960	**NS**, p>.05

Decision rule: *if p<.05 reject H_o, else retain H_o.* ***S****= Significant, p<.05* ***NS****= Not Significant p>.05*
Source: *Computed from field data, 2023.*

Table 4. Analysis in table 4 revealed that for Rivers State, which is a Niger Delta State, there is significant difference in the overall mean rating on infrastructural provision between the impact of oil exploitation compared to construction activities ($t_{\mathbf{1.51,\ 0.033}}$ = -1.062, p>.05) while there is no significant difference was also found in the mean rating infrastructural provision in Imo state as a result of construction companies activities ($t_{\mathbf{1.47,\ 0.025}}$ = 0.782, p>.05). However, there is a mean difference of (1.008) when compared to the impact of activities of oil exploitation. Comparatively, infrastructural development in Rivers State is affected negatively due to damage done by these companies. For instance, the cost of constructing a road in Rivers State is not the same cost including logistics.

Research Question 2. There is not significant relationship between environmental pollution and health hazard of residents of Niger Delta region.

Table 5. Summary of t-test on the difference in the mean rural farm outputs between environmental pollution and health hazard of residents of Niger Delta region.

Activity Type	Rivers State	N	$\bar{X}$	SD	df	t-cal.	t-crit.	Decision at p>.05
Oil exploitation	Total Fina, ELF.	12205	4.08	1.97	1.203	-4.385	1.960	P=0.009 **S**. p<.05
Rd. construction	**Imo State**							p=0.280
	Julius Bagger	9,801	3.80	1.95	0.78	-1.087	1.960	**NS**, p>.05

Decision rule: *from our probability value, if p<.05 reject H_o, else retain H_o: **S**= Significant, p<.05 **NS**= Not Significant p>.05).*
Source: *Computed from field data, 2011*

Table 5 analysis result revealed that there is a significant difference in the overall mean rating on health hazard to residents as a result of oil exploitation activities ($t_{1.203,\ 0.025}$ = -4.385, p<.05) with a mean difference of (-0.428), while for Imo state there was no significant difference in health hazard on residents as a result of construction activities of Julius Bagger when compared to the oil exploitation activities. However, there was a mean difference of (0.428). The essence is that there are more health hazards in Rivers state when compared to technicians in the Imo state.

Research Question 3. There is no relationship between oil and gas pollution and rural income generation in Niger Delta region.

Table 6. Summary of t-test on the difference in the mean rural income between oil and gas pollution and rural income generation in Niger Delta region.

Activity Type	Rivers State	N	$\bar{X}$	SD	Df	t-cal.	t-crit.	Decision at p>.05
Oil exploitation	TotalFina, ELF	12205	16.67	601.53	1-063	-1.570	1.970	P=0.000 **S,** p>.05
	Imo State							P=0.120
Rd. construction	Julius Bagger	9801	58.33	68.95	0,699	-3.961	1.970	**NS**, P<.05

Decision rule: *if p<.05 reject H_o, else retain H_o. **S**= Significant, p<.05: **NS**= Not Significant p>.05*
Source: *Computed from field data, 2024*

Result of analysis on table 6 showed that there is a significant difference in the mean rural income (Naira) generation between residents of Rivers State ($t_{1.063,\ 0.025}$ = -.570, p<.05) when compared to residents of Imo state, it revealed a mean difference of (0.364). However, for Imo state, there is a mean rating difference, revealing a significant difference of ($t_{9,801,\ 0.025}$ = 3.961, p>.05). The explanation is that rural incomes of residents Rivers State were affected when compared to residents of Imo state.

Impact on the Economy

Activities of multinational oil companies' pollution have exerted so much negative impacts on Niger Delta economy. These impacts range from fiscal infrastructural denial, economic, and health related hazards. Corporate social responsibilities of the multinational companies are not enough. There no hospitals to adequately take care of the health of the residents of the region. Hospitals are still within the domain of "general" instead of "special". In regions like that of Niger Delta, there is supposed to be specialist hospitals to carter for certain diseases emanating from polluted environment such as cancer, cough, miscarriages, fibroid, kidney, meningitis and other major diseases. Besides sickness, other dangers such as explosions, gas explosions, illegal bunkering and other social vices have erupted from the presences of multinational companies and their activities. These types of diseases have killed potential

bread winners from the host communities, Farm lands have been affected leading to low food production and low productivity. Rural incomes from agriculture have totally diminished as lot many farmers are able to cultivate on lands or practice fish farming due to polluted soil and water. Most of the diseases contacted are terminal; meaning will certainly lead to death such as cancer, kidney diseases. Erosion is a major cause of lack of good roads within the region. Multinational oil companies' activities have led to erosion and made most roads impassable. Transport cost is higher in the region due to bad road. It has also increased the cost of building. In all, general economic development of the region is slow and not encouraging for a developing nation and environmental activities not interfere with livelihood of the people. A part from playing an indispensible part in the overall strategy of sustaining federal government budget, presence of oil is an essential condition for empowerment and job creation but its ills is more dangerous than whatever

Conclusion

This paper established there are enormous challenges have been created by oil and gas pollution in the Niger Delta region both economic, development and health hazard impacts. It was found that there are no specialist hospitals, transportation difficulty, degradation farmlands depletion of rural income sources, poor infrastructural development increased health hazard. The paper revealed that there is significant impact of oil and gas pollution on Niger Delta environment.

Recommendations

Based on the findings if the Niger Delta environment is to be secured, the following recommendations should be applied;

(i) There should be a device to detect when there is oil spill for immediate response.

(ii) Youths must avoid activities that will ignite fire within the pipeline or cause explosion of the pipes.

(iii) Adequate security surveillance must be installed to check activities of vandals alone the pipeline.

(iv) Remediation of degraded environments must be carried out as fast as possible to ensure that the environment is made useful again by inhabitants of Niger Delta region

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Appendices







Source: Adapted from Ogoni UNEP Report 2011