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PERCEPTION OF ARTISANAL FISHERS ON THE POTENTIAL IMPACT OF OIL AND GAS OPERATIONS ON THE BLUE ECONOMY IN THE NIGER DELTA REGION OF NIGERIA

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ABSTRACT

This study investigates artisanal fishers' perceptions of oil and gas operations' impact on the blue economy in Nigeria's Niger Delta. It posits that unsustainable practices have led to significant environmental degradation in the region. The objectives include analysing fisheries activities, such as illegal and overfishing, and assessing the potential consequences of oil and gas operations on environmental sustainability. A sample of 400 respondents was selected using stratified sampling, with data collected via questionnaires and analysed using tables, arithmetic mean, and linear regression models. Results indicate a significant relationship between blue economy practices and environmental sustainability. The study concludes that fishing activities and oil extraction significantly affect sustainability. Recommendations include governance reform to tackle illegal fishing and overfishing, education on modern harvesting methods, and stricter enforcement of environmental regulations in the maritime and oil industries.

Keywords: Blue Economy, environmental sustainability, environmental degradation, oil extraction, Niger Delta.

1.0 INTRODUCTION

The oceans are indispensable to the global population, providing vast resources, supporting life on Earth, and serving as an effective climate regulator. There is the view that for decades, nations

have exploited marine and maritime resources without sufficient consideration for the long-term impacts on the economic system, thereby failing to take adequate measures to protect them. In Nigeria, the potential benefits of the blue economy are at risk due to unsustainable practices and misguided development methods in use like overfishing, illegal unreported and unregulated fishing, environmental mismanagement, maritime insecurity, climate change, habitat destruction, as well as inadequate government frameworks expose significant threats to the lifespan of the blue economy. It is important to reduce the degradation of "blue" resources so as to protect and regenerate the oceans, ensuring their ability to fulfil essential environmental functions for future generations and allow existing and new economic activities to survive. The blue economy represents a complete approach that leverages marine resources for economic development and ensures the sustainability of environmental resources for future generations (World Bank, 2013; Zhao et al., 2019; Li et al., 2021; Kedong et al., 2022; Xu & Gao, 2022; Ozili, 2022). This multifaceted concept spans various sectors, including business, economics, environmental stewardship, and maritime affairs. The main components of the blue economy involve investments in marine energy, seafood production, transportation, eco-tourism, medicinal resources, and recreation (Baker & Ricciardi, 2014; Nthia, 2021; Tettey, 2019; Sabela-Rikhotso et al., 2022). It is viewed globally that the blue economy is valued at more than $24 trillion by United Nations (2022). By this, fishing, aquaculture, shipping, tourism, and other related activities contribute at least $2.5 trillion in revenue annually (United Nations, 2022). Coastal tourism alone in countries with coral reefs is seen as one of the fastest-growing marine economic activities that generates significant income. The aquatic environments, oceans, seas, rivers, lakes, and wetlands, are home to approximately 2.2 million species of plants and countless other life forms that account for over 50% of all life on Earth (United Nations, 2022). These resources provide essential food, medicine, and livelihoods, contributing to global social and economic development. The Western Indian Ocean, which is made up of nations like Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania, and South Africa, has a combined "marine wealth" placed at $333.8 billion by the World Bank (2013). This region's annual seafood production alone is valued at $20.8 billion, underscoring the vast economic potential of marine resources (Zhao et al., 2019; Li et al., 2021; Kedong et al., 2022; Xu & Gao, 2022; Ozili, 2022). Currently, the blue economy has become central to discussions on sustainable ocean development, which has made it nearly not impossible to address ocean policy without considering this critical concept. In Nigeria, efforts to enforce the National Environmental Standards and Regulations Enforcement Agency (NESREA)

Act, 2007, is aimed at preventing, regulate, and controlling pollution of the nation's territorial waters. The aim of this study is therefore to examine the perception of artisanal fishers on the potential impact of oil and gas operations on the blue economy of the Niger Delta region of Nigeria. To achieve the aim, the specific objectives include to:

1. Examine the impact of fisheries activities on the blue economy in the Niger Delta region of Nigeria;

2. Assess the impact of oil and gas operations on the blue economy in the Niger Delta region of Nigeria;

In Nigeria, Olawusi (2019) conducted a study titled "Assessment of Marine Pollution in Nigerian Coastal Waters," which examined pollution levels and their impact on marine organisms. The study found that pollution from sources like oil spills, industrial effluents, and solid waste disposal poses significant threats to marine biodiversity and ecosystem health, underscoring the need for improved waste management practices and stricter enforcement of environmental regulations. Sotolu (2011) focused on the challenges of achieving sustainable fisheries management in Nigeria, identifying issues such as overfishing, illegal fishing practices, inadequate monitoring, and weak institutional capacity. The study recommended measures including strengthening governance frameworks, promoting community-based management, and enhancing scientific research for informed decision-making. The Literature review has examined existing literature on blue economy practices and environmental sustainability, particularly in the Niger Delta region. The review revealed that many studies on the blue economy have not directly connected these activities to environmental sustainability. While much of the research has focused on economic growth, blue economy concepts, and associated challenges (Alharthi & Hanif, 2020; Cerciello et al., 2023; Liu et al., 2023; Martinez-Vasquez et al., 2021; World Bank, 2017), there is a notable gap in exploring how specific fishery activities and oil and gas operations impacts on blue economy in the Niger Delta region of Nigeria. This study aims to fill that gap by identifying and discussing practices such as illegal, unreported and unregulated fishing, over fishing, the use of traditional methods to harvest and dry fish and the potential impact of oil and gas operations in selected states of the Niger Delta.

Additionally, this study is unique in its geographical focus, utilizing specific local government areas within the Niger Delta region—such as Oron and Eket in Akwa Ibom State, and Eleme and Port Harcourt in Rivers State—as samples.

2.0 METHODOLOGY

2.1 Study Area

This study involves the Niger Delta region of Nigeria comprising nine states of Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers. However, the study was limited in scope to five states, namely, Akwa Ibom, Cross River, Bayelsa, Delta and Rivers state. Out of the five selected states, two local government areas each were equally selected from each state. The yardsticks used in selecting the five states and the two local government areas, ranges from proximity to the predominant nature of the states to fishing activities and oil and gas operations that made them prone to degradation of the Niger Delta environment. The Niger Delta region has a delicate mangrove swamp which covers a coastline of over 450km, that make up about two-thirds of the entire coastline and wetland in Nigeria. This region is traversed and crisscrossed by a large number of rivers, rivulets, streams, canals and creeks. The Niger Delta is located in the southernmost part of Nigeria within the wetlands of 70,000km^2 formed primarily by sediment deposition. It is the largest mangrove swamp and wetland in Africa, and regarded as the third largest drainage basin in the continent, and the third largest wetland in the world after Holland and the Mississippi (Agbeja, 2011).

2.2 Population of the Study

By the National Population Census (NPC) figure of 2006 and statistics from the National Bureau of Statistics (NBS), the population distribution of the selected local government areas of the selected Niger Delta states used in this study is as presented in the table as shown below.

Table 1: Population distribution of selected states and their Local Government Area

State	Local Government Area	Census Figure	Total
Akwa Ibom	Eket	172,557	
	Oron	87,461	260,018
Bayelsa	Brass	184,127	
	Southern Ijaw	321,808	505,935
Cross River	Calabar Municipal	183,681	
	Calabar South	191,515	375,196
Delta	Warri North	136,149	
	Warri South	311,970	448,119
Rivers	Eleme	190,194	
	Port Harcourt	538,558	728,752
Grand Total			2,318,020

Source: NPC, 2006; Field survey, 2025

2.3 Sample and Sampling Technique

The sample size of this study was 400 determined by using Yamane (1967) formula.

$$n = \frac{N}{1 + N(e)^2}$$

Where

n = The sample size required

N = The total (finite) Population

1 = Constant

e = Tolerable error (5%)

Therefore:

$$n = \frac{2,318,020}{1+ 2,318,020(0.05)2}$$

$$n = \frac{2,318,020}{5,796}$$

n = 399.9 approximated to 400

Using stratified random sampling, the samples as shown in Table 2 were taken from each of the local government areas.

Table 2: Sample distribution

Local Government	Percentage of Sample	Actual Sample
Eket	$\frac{172,557}{2,318,020} \times \frac{400}{1}$	30
Oron	$\frac{87,461}{2,318,020} \times \frac{400}{1}$	15
Brass	$\frac{184,127}{2,318,020} \times \frac{400}{1}$	32
Southern Ijaw	$\frac{321,080}{2,318,020} \times \frac{400}{1}$	55
Calabar Municipal	$\frac{183,681}{2,318,020} \times \frac{400}{1}$	32
Calabar South	$\frac{191,515}{2,318,020} \times \frac{400}{1}$	33
Warri North	$\frac{136,149}{2,318,020} \times \frac{400}{1}$	23
Warri South	$\frac{311,970}{2,318,020} \times \frac{400}{1}$	54
Eleme	$\frac{190,194}{2,318,020} \times \frac{400}{1}$	33
Port Harcourt	$\frac{538,558}{2,318,020} \times \frac{400}{1}$	93
Total		400

Source: Filed survey, 2025

2.4 Instrumentation

Questionnaire was the instrument for data collection in this study. The instrument comprised sections A and B. Section A contained demographic and socio-economic information about the target population. Section B contained questions relating to the variables forming the study: fishing activities, oil and gas operations and blue economy. The instrument was self-administered and structured using a four-point Likert scale with the following scores: Strongly Agree (SA) = 4 points; Agree (A) =3 points, Disagree (D) = 2 points, and Strongly Disagree (SD) =1 point.

2.5 Data Analysis

Data for this study were presented using descriptive statistical tools such as frequency distribution tables. The linear regression model using SPSS was used to test the hypotheses postulated in this study. The hypotheses for the study as stated as follows:

$H0_1$: There is no significant effect of fishing activities on blue economy in the Niger Delta region of Nigeria;

Ha_1: There is a significant effect of fishing activities on blue economy in the Niger Delta region of Nigeria;

$H0_2$: There is no significant effect of oil and gas operations on blue economy in the Niger Delta region of Nigeria;

Ha_2: There is a significant effect of oil and gas operations on blue economy in the Niger Delta region of Nigeria

The linear regression model is represented by the regression line:

$$y = \beta O + \beta 1X1 + \varepsilon$$

Where

y = dependent variable (environmental sustainability)

βO = intercept/constant

$\beta 1$ = slope of the line (regression coefficient)

$X1$ = independent variable (fishing and oil and gas operations)

ε = random error

Decision Rule

The null and alternate hypotheses were represented as H0: B1 = 0; Ha: B1 ≠ 0.

The fit of the regression model for each of the hypotheses was considered at a 95% confidence level by relating the value of the t-test statistic with the critical t value at n1 + n2 -2 degree of

freedom. The null hypothesis was rejected if the t-statistic is greater than the critical t value and versa.

3.0 RESULTS AND DISCUSSION

3.1 Distribution of Questionnaire and Response Rate

A total of four hundred (400) copies of the questionnaire were administered to the respondents, out of which three hundred and forty-seven (347) were properly filled and returned, giving a response rate of 87 per cent as shown in Table 3.

Table 3: Response rate to questionnaire administration

Items	Frequency	Percentage
Number of questionnaire distributed	400	100
Number of questionnaire wrongly filled/misplaced	53	13
Total number of questionnaire returned	347	87

Source: Field survey, 2025

In Table 4 above, a total of 400 copies of the questionnaire were distributed to the ten Local Government Areas of study, out of which 347 were properly filled and returned, and 53 were not returned. 30 and 15 copies of questionnaire were administered to Eket and Oron Local Government Area in Akwa Ibom State, respectively, and all copies were properly filled and return. In Brass and Southern Ijaw Local Government Areas of Bayelsa State, 32 and 55 copies were administered respectively, 31 copies were returned, and 1 was not returned in Brass, while 48 and 7 copies were returned and not returned in Southern Ijaw, respectively. In Calabar Municipal and Calabar South Local Government Areas of Cross River State, 32 and 33 copies were administered, respectively, 29 and 31 were returned, while 3 and 2 copies were not returned, respectively. In Warri North and Warri South Local Government Areas of Delta State, 23 and 54 copies were administered respectively, 19 and 45 copies were returned, while 4 and 9 copies were not returned respectively. In Eleme and Port Harcourt Local Government Areas of Rivers State, 33 and 93 copies were

administered, respectively, 25 and 74 copies were returned, while 8 and 19 copies were not returned, respectively.

Table 4: Distribution of response rate based on the Local Government Area of the States under study

Local Government Area	Administered questionnaire	Returned questionnaire	Unreturned questionnaire
Eket	30	30	Nil
Oron	15	15	Nil
Brass	32	31	1
Southern Ijaw	55	48	7
Calabar Municipal	32	29	3
Calabar South	33	31	2
Warri North	23	19	4
Warri South	54	45	9
Eleme	33	25	8
Port Harcourt	93	74	19
Total	400	347	53

Source: Field survey, 2025

3.2 Demographic Variables of Respondents

Table 5 displays the demographic data of the respondents. The first item in the table shows the gender distribution of the respondents. The table depicts that 219 respondents, representing 62.1 percent of the total respondents, were male while 128 respondents, representing 36.9 percent were female. The second segment of Table 5 displays the age distribution of respondents. The respondents ranged from 18 years and above. 62 respondents representing 17.9 percent were within the age range of 18-30 years, 140 respondents representing 40.3 percent were within the age range 31-40 years, 113 respondents representing 32.6 percent were within the age range of 41-50 years, and 32 respondents representing 9.2 percent were within the age range of 51 years and above. The third segment of the Table 5 indicates the educational distribution of respondents, that 19 respondents, representing 5.5 percent, had SSCE, 62 respondents, representing 17.9 percent had OND/HND, 78 respondents, representing 22.5 percent had B.Sc, 110 respondents representing

31.7 percent had an MBA/M.Sc, 68 respondents representing 19.6 percent had a Ph.D and 10 respondents representing 2.9 percent had other qualifications. The fourth segment in Table 4.3 illustrates that 126 respondents, representing 36.3 percent, were single, 204 respondents representing 58.8 percent, were married, 1 respondents, representing 0.3 percent were divorced, 14 respondents, representing 4.0 percent were widows/widowers and 2 respondents representing 0.6 percent were separated. The last section of Table 5 shows the distribution of respondents by state of origin. The table depicts that 45 respondents representing 13 percent were from Akwa Ibom State, while 79 respondents representing 22.8 percent were from Bayelsa State. Also, 60 respondents representing 17.3 percent were from Cross River State. Furthermore, 64 respondents representing 18.4 percent were from Delta State while 99 respondents representing 28.5 percent were from Rivers State.

Table 5: Demographic features of respondents

Demographic	Frequency	Percent
Gender		
Male	219	63.1
Female	128	36.9
Total	347	100.0
Age		
18-30 years	62	17.9
31-40 years	140	40.3
41-50 years	113	32.6
51 and above	32	9.2
Total	347	100.0
Education		
SSCE	19	5.5
OND/HND	62	17.9
B.sc	78	22.5
MBA/M.Sc	110	31.7
Ph.D	68	19.6
Others	10	2.9
Total	347	100.0
Marital status		
Single	126	36.3
Married	204	58.8
Divorce	1	.3
Widow/Widower	14	4.0
Separated	2	.6
Total	347	100.0
State of Origin		
Akwa Ibom	45	13

Bayelsa	79	22.8
Cross River	60	17.3
Delta	64	18.4
Rivers	99	28.5
Total	347	100.0

Source: Field survey, 2024

3.3 The Activities of Fishing and the Sustenance of Blue Economy in the Niger Delta Environment in Nigeria.

Table 6 depicts respondents' opinion on fishing activities. The first item reveals that 109 respondents strongly agreed that Illegal, Unreported and Unregulated (IUU) fishing practices are threats to the sustainability of the Niger Delta environment, 150 respondents agreed and 40 respondents disagreed, 33 respondents strongly disagreed while 15 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.88 which shows that more than the average number of respondents agreed that they are Illegal, Unreported and Unregulated (IUU) fishing practices are threats to the sustainability of the Niger Delta environment. The second item in the table shows that 120 respondents strongly agreed that inadequate fisheries monitoring, control and surveillance systems at both national and regional levels is a threat to environmental sustainability, 118 respondents agreed 54 respondents disagreed, 43 respondents strongly disagreed, while 12 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.84, which shows that more than the average number of respondents agreed that inadequate fisheries monitoring, control and surveillance systems is a threat to environmental sustainability. The third item in the table shows that 122 respondents strongly agreed that over-exploitation of living marine resources is a threat to loss of biodiversity in the Niger Delta region., 123 respondents agreed, 52 respondents disagreed 33 respondents strongly disagree and 17 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.86 which shows that more than the average number of respondents agreed that over-exploitation of living marine resources is a threat to loss of biodiversity in the Niger Delta region. The fourth item in the table shows that 106 respondents strongly agreed that the traditional methods of drying fish by fish traders is a threat to the pollution of the Niger Delta region., 143 respondents agreed 49 respondents disagreed, 41 respondents strongly disagree and 8 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.86 which shows that more than the average number of

respondents agreed that the traditional methods of drying fish by fish traders is a threat to the pollution of the Niger Delta region. The fifth item in the table shows that 116 respondents strongly agreed that the traditional methods of harvesting fish by fishermen in the region are a threat to the loss of species, 104 respondents agreed, 74 respondents disagreed, 42 respondents strongly disagreed, while 11 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.78, which shows that more than the average number of respondents agreed that the traditional methods of harvesting fish by fishermen in the region are a threat to loss of species in the region.

Table 6: Respondents' opinions on Fishing activities

S/N	Items	SA	A	D	SD	U	M	Std. Dev.
1	Illegal, Unreported and Unregulated (IUU)fishing practices are threats to the sustainability of the Niger Delta environment	109	150	40	33	15	3.88	1.090
2	Inadequate fisheries monitoring control and surveillance systems at both national and regional levels is a threat to environmental sustainability.	120	118	54	43	12	3.84	1.134
3	Overexploitation of living marine resources is a threat to loss of biodiversity in the Niger Delta region.	122	123	52	33	17	3.86	1.144
4	The traditional methods of drying fish by fish traders is a threat to the pollution of the Niger Delta region.	106	143	49	41	8	3.86	1.054
5	The traditional methods of harvesting fish by fishermen in the region is a threat to loss of species.	116	104	74	42	11	3.78	1.129

Source: Field work, 2025. Strongly Agree (SA) = 4; Agree (A) =3, Disagree (D) = 2, and Strongly Disagree (SD) =1

Table 7 sought respondents' opinions on how blue economy can be sustained in the Niger Delta using environmental pollution, ecosystem and climate change mitigation as indicators. The table indicated that out of 347 respondents, 121 respondents strongly agreed that effective management of gas flared by IOCs can mitigate climate change towards preserving the Niger Delta region, 99 respondents agreed, 77 respondents disagreed, 33 respondents strongly disagreed and 17 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.79 and standard deviation value of 1.163 which shows that effective management of gas flared by IOCs can mitigate climate change towards preserving the Niger Delta region. On the second item, the table reveals that out of 347 respondents, 79 respondents strongly agreed that protecting and restoring biodiversity as well as promoting sustainable fishing practices can lead to the conservation of the ecosystems, habitats, and species, 133 respondents agreed, 96 respondents disagreed, 30 respondents strongly disagreed and 11 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.73 and a standard deviation value of 1.058, which shows that more than the average number of respondents agreed that protecting and restoring biodiversity, as well as promoting sustainable fishing practices, can lead to the conservation of the ecosystems, habitats, and species. On the third item, the table reveals that out of 347 respondents, 111 respondents strongly agreed that taking actions to reduce greenhouse gas emissions can promote resilience in the face of environmental challenges, 116 respondents agreed, 72 respondents disagreed, and 32 respondents strongly disagreed, and 16 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.79 and a standard deviation value of 1.127, which shows that more than the average number of respondents agreed that taking actions to reduce greenhouse gas emissions can promote resilience in the face of environmental challenges. On the fourth item, the table reveals that out of 347 respondents, 94 respondents strongly agreed that encouraging responsible consumption patterns by promoting sustainable and ethical production methods, reducing resource consumption, and minimizing waste throughout the lifecycle of products and services can enhance environmental sustainability, 128 respondents agreed, 90 respondents disagreed 24 respondents strongly disagreed and 11 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.78 and a standard deviation value of 1.023, which shows that more than the average number of respondents agreed that encouraging responsible consumption patterns by promoting sustainable and ethical production methods, reducing resource consumption, and minimising waste throughout the lifecycle of products and services can enhance

environmental sustainability. On the fifth item, the table reveals that out of 347 respondents, 98 respondents strongly agreed that minimising waste generation, practising recycling, and adopting responsible waste management strategies can prevent pollution of the coastal areas, 119 respondents agreed, 77 respondents disagreed, 45 respondents strongly disagreed, and 8 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.73 and a standard deviation value of 1.078, which shows that more than the average number of respondents agreed that minimising waste generation, practising recycling, and adopting responsible waste management strategies can prevent pollution of the coastal areas.

Table 7: Respondents' opinions on blue economy sustainability

S/N	Items	SA	A	D	SD	U	M	Std. dev.
1	Effective management of gas flared by IOCs can mitigate climate change towards preserving the Niger Delta region	121	99	77	33	17	3.79	1.163
2	Protecting and restoring biodiversity as well as promoting sustainable fishing practices can lead to the conservation of the ecosystems, habitats, and species.	97	113	96	30	11	3.73	1.058
3	Taking actions to reduce greenhouse gas emissions can promote resilience in the face of environmental challenges.	111	116	72	32	16	3.79	1.127
4	Responsible consumption patterns and waste reduction in the lifecycle of products and services can enhance environmental sustainability.	94	128	90	24	11	3.78	1.023
5	Minimizing waste generation, practicing recycling, and adopting responsible waste management strategies can prevent pollution of the coastal areas.	98	119	77	45	8	3.73	1.078

Source: Field work, 2024. Legend: Strongly Agree (SA) = 4; Agree (A) =3, Disagree (D) = 2, and Strongly Disagree (SD) =1

The analysis in Table 8 shows the ability of fisheries activities to influence environmental sustainability in the Niger Delta region. R-value of .981 reveals that the relationship between the variables is 98.1 percent. The adjusted R-squared value (.962) signifies that, up to 96.2 percent of environmental sustainability is predicted by fisheries activities. The f-test (8733.628, P<.005) of the relationship indicates that, the overall prediction of the independent variable to the dependent variable is statistically significant, therefore, the regression model is a good fit for the data and provides evidence to conclude that, fisheries activities have a positive and significant relationship with environmental sustainability in the selected Niger Delta states. Therefore, the alternative hypothesis is accepted which states that there is a significant effect of fishing activities on the environmental sustainability of the selected Niger Delta states of Nigeria. The outcome of the hypothesis revealed that there is a significant and negative impact of fisheries activities on environmental sustainability in the Niger Delta region of Nigeria. The above-average responses to the questionnaire to address the impact of fishing activities on the environmental sustainability of the region under study further affirm to the above statement. This research highlighted (among others) that Illegal, Unreported and Unregulated (IUU) fishing practices, inadequate fisheries monitoring, control and surveillance systems at national and regional levels, overexploitation of living marine resources, traditional methods of drying fish by fish traders and traditional methods of harvesting fish by fishermen in the region are some of the fishing activities that pose as threats to environmental sustainability of the region. The outcome of this study further affirms the assertions by the studies of FAO (2016) and Sotolu (2011), that the long-term sustainability of fisheries in coastal areas has been threatened by over-exploitation of living marine resources, land-based pollution, and inadequate fisheries monitoring, control and surveillance systems at both national and regional levels. The study by the United Nations (2016) showed that fish stocks and the loss of species are affected by illegal, unreported, and unregulated fishing.

Table 8: Regression results on the relationship between fishing activities and blue economy

Variables	Estimated co-efficient	Standard error	T	Sig
Constant	.414	.204	2.027	.043
Fisheries activities	.956	.010	93.454	.000
R	.981			
R^2	.962			
Adjusted R^2	.962			
F-statistic	8733.628			
Sig	.000			

a. Dependent variable: Environmental sustainability
b. Predictors: Fisheries activities

Source: SPSS, 2025

3.4 Assessing the Contribution of Oil and Gas Operations on Blue Economy in the Niger Delta Region of Nigeria

Table 9 sought respondents' opinions on Oil and Gas operations. The table indicated that out of 347 respondents, 115 respondents strongly agreed that gas flaring by oil and gas extraction is a threat to climate change in the Niger Delta region, 113 respondents agreed, 61 respondents disagreed 41 respondents strongly disagreed and 17 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.77 and standard deviation value of 1.172 which shows that more than the average number of respondents agreed that gas flaring by oil and gas extraction is a threat to climate change in the Niger Delta region. On the second item, the table reveals that out of 347 respondents, 97 respondents strongly agreed that inadequate waste management practices by IOCs contribute to the pollution of coastal waters and estuaries, 128 respondents agreed, 71 respondents disagreed, 39 respondents strongly disagreed, and 12 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.75 and a standard deviation value of 1.088 which shows that more than the average number of respondents agreed that inadequate waste management practices by IOCs contribute to the pollution of coastal waters and estuaries.

On the third item, the table reveals that out of 347 respondents, 101 respondents strongly agreed that artisanal refining in the Niger Delta area leads to environmental degradation of the region, 115 respondents agreed, 70 respondents disagreed and 50 respondents strongly disagreed and 11 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 3.71 and standard deviation value of 1.128 which shows that more than the average number of respondents agreed that artisanal refining in the Niger Delta area leads to environmental degradation of the region.

On the fourth item, the table reveals that out of 347 respondents, 135 respondents strongly agreed that destruction of illegal bunkering sites by law enforcement agencies contributes to environmental pollution of the Niger Delta region, 118 respondents agreed, 66 respondents disagreed 19 respondents strongly disagreed and 9 respondents were undecided. There was no missing value on this item. The responses gave a mean value of 4.01 and standard deviation value of 1.017 which shows that more than destruction of illegal bunkering sites by law enforcement agencies contributes to environmental pollution of the Niger Delta region. On the fifth item, the table reveals that out of 347 respondents, 105 respondents strongly agreed that dumping of drilled mud by IOCs is a threat to environmental sustainability of the Niger Delta area, 116 respondents agreed, 73 respondents disagreed, 46 respondents strongly disagreed and 7 respondents were undecided.

There was no missing value on this item. The responses gave a mean value of 3.77 and standard deviation value of 1.083 which shows that more than the average number of respondents agreed that dumping of drilled mud by IOCs is a threat to environmental sustainability of the Niger Delta area.

Table 9: Respondents' opinion on Oil and Gas operations

S/N	Items	SA	A	D	SD	U	M	Std. Dev.
1	Gas flaring by oil and gas extraction is a threat to climate change in the Niger Delta region	115	113	61	41	17	3.77	1.172
2	Inadequate waste management practices by IOCs contribute to the pollution of coastal waters and estuaries of Niger Delta Region	97	128	71	39	12	3.75	1.088
3	Artisanal refining in the Niger Delta area leads to environmental degradation of the region	101	115	70	50	11	3.71	1.128
4	Destruction of illegal bunkering sites by law enforcement agencies contributes to environmental pollution of the Niger Delta region.	135	118	66	19	9	4.01	1.017
5	Dumping of drilled mud by OCs is a threat to environmental sustainability of the Niger Delta area.	105	116	73	46	7	3.77	1.083

Source: Field work, 2025. Legend: Strongly Agree (SA) = 4; Agree (A) =3, Disagree (D) = 2, and Strongly Disagree (SD) =1

Table 10 shows the ability of oil and gas extraction activities to influence climate change to the preservation of the Niger Delta region. R-value of .982 reveals that the relationship between the variables is 98.2 percent. The adjusted R-squared value (.964) signifies that up to 96.4 percent of environmental sustainability is predicted by oil and gas extraction activities. The f-test (9374.090, P<.005) of the relationship in table 4.12 indicates that, the overall prediction of the independent variable to the dependent variable is statistically significant, therefore, the regression model is a good fit for the data and provides evidence to conclude that, oil and gas extraction activities has a positive and significant relationship with environmental sustainability in the region. Therefore, reject the null hypothesis and accept the alternative hypothesis which states that there is a significant effect of oil and gas extraction activities on the climate change to the preservation of

the selected Niger Delta states of Nigeria. The outcome of the hypothesis revealed that there is a significant and negative impact of oil and gas extraction activities on environmental sustainability in the Niger Delta region. The above-average responses to the questionnaire to address the impact of oil and gas extraction activities on the environmental sustainability of the region under study further affirm to the above finding. This research highlighted (among others) that gas flaring by oil and gas extraction companies, inadequate waste management practices by International Oil Companies (IOCs), artisanal refining in the Niger Delta area, destruction of illegal bunkering sites by law enforcement agencies and dumping of drilling mud by IOCs are all contributors to climate change and the preservation of the Niger Delta environment. The findings of this study also aligns with the study of Sarker, Hussain, Firdaus, & Failler (2019), that climate change caused by oil and gas extraction leads to coral belching, species migration, biodiversity loss, altered species lifestyle, disruption in marine food chain, clogging of air bladder of fish, loss of coastal resources, and degradation of coastal habitats, among others.

Table 10: Regression result on relationship between Oil and Gas operations and blue economy sustainability in the Niger Delta region of Nigeria

Variables	Estimated co-efficient	Standard error	T	Sig
Constant	1.269	.189	6.707	.000
Oil and Gas extraction	.926	.010	96.820	.000
R	.982			
R^2	.965			
Adjusted R^2	.964			
F-statistic	9374.090			
Sig	.000			

a. Dependent variable: environmental sustainability

b. Predictors: Oil and Gas extraction activities

Source: SPSS, 2025

Conclusion and Recommendations

Following the findings of the study which showed that strong relationships exist between the key components of blue economy vis-a-vis fishing activities and oil and gas operations and blue economy sustainability such as environmental sustenance, protection of marine environment, preservation of ecosystem, climate change mitigation, the study concluded that there is a significant and negative effects of artisanal fishers and oil and operations on blue economy in the selected Niger Delta states of Nigeria. The study recommended that, since fishing activities that are well governed and managed can make a long-term contribution to the blue economy sector, there should be a governance reform in the fishing industry to curb Illegal, Unreported and Unregulated (IUU) fishing practices in the region. Enforcement of strict environmental laws, such as limiting emissions and mandating cleanup of contaminated sites by IOCs among others, was also recommended.

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