



Research Article

Assessment of Fisher Folk's Vulnerability to Poverty Due to Oil Spillage in Niger-Delta Region of Nigeria

Omoniyi, L. O.*¹, Thompson, O. A. *² and Oseni, J. O.²

¹Department of Agricultural Extension and Management, Federal College of Agriculture, Akure, Ondo State, Nigeria.

²Department of Agricultural and Resource Economics, Federal University of Technology, Akure, Ondo State, Nigeria.

Corresponding author email: lawrence_omoniyi@yahoo.com,
oathompson@futa.edu.ng

Abstract

The Niger Delta local communities have been negatively affected by oil and gas production operations and their livelihoods disrupted and disorganized resulting into poverty. The study therefore assessed fisherfolks' vulnerability to poverty due to oil spillage in the Niger-Delta region of Nigeria. Data collected with the aid of a well-structured questionnaire from four hundred fisher folks selected through a multi-stage sampling technique were analyzed with Vulnerability as Expected Poverty Analysis and Logit Regression Model. Results showed that the average age of the sampled fisher folks was 40 years. Fishing was found to be a male dominated enterprise in the study area though with appreciable proportion (44.7%) of women involvement. Most (62.7%) of the fisher folks were educated and 86.0% still depended on informal sources of credit. Using vulnerability threshold of 0.5, 46.0% of the fishing households were vulnerable but the fishing households from oil bearing communities were however more vulnerable than those of oil impacting communities. The logit regression result showed that age, gender, household size, level of education, membership of cooperatives, fishing income, expenses on food, access to credit facilities, access to basic amenities, livelihood diversification, number of occurrence of oil spillage and location of occurrence of oil spillage significantly determined the fishing households' vulnerability to poverty in the study area. It is recommended that a comprehensive package of strategies that will ensure functional basic amenities, effective social protection programmes and other better risk management policies should be given special focus by the government and non-

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

government actors working in the Niger-Delta region as this is fundamental for mitigating vulnerability to poverty.

Keywords: Assessment, Fisher Folks, Vulnerability to Poverty and Oil Spillage

Received: 14 November 2024

Accepted: 24 February 2025

Citation: Omoniyi, L. O., Thompson, O. A., and Oseni, J. O. (2025). Assessment of Fisher Folk's Vulnerability to Poverty Due to Oil Spillage in Niger-Delta Region of Nigeria. *Continental J. Applied Science*, 20(1), 81–99. Doi: 10.5281/zenodo.15008428

Introduction

Fisheries are an integral part of agricultural sector in Nigeria and the resources represent the foci of the livelihood activities of most communities within the Niger Delta Region (NDR) of Nigeria (Baumuller *et al.*, 2011; Osuagwu and Olaifa, 2018). Fishing which is an act of harvesting fish is of economic benefits to human populations around the coastal and inland water areas. Infact, more than 90% inhabitants of coastal communities depend solely on fishing and fisheries related activities for their survival (Sogbesan and Kwaji, 2018). It is recognized for its huge potential in contributing to food security and nutrition, plays major role in the economies of developing countries as a basic source of local and foreign income, employment opportunities and enhancing socio- economic status of the Niger Delta (Tawari and Davies, 2010).

The Niger Delta local communities where crude oil and gas hydrocarbons are embedded have not fared well in terms of the socioeconomic development of the area and the sustainability of the livelihoods of households in these communities (Ibekwe, 2017). Their environments have been negatively affected by oil and gas production operations and their livelihoods disrupted and disorganized (Mbalisi and Okorie, 2020). For instance, the mangrove and rainforests which are prominent in this environment are gradually but steadily being decimated. There is equally contamination of both land and surface/underground water. Collectively, these have made life difficult for the people of these communities resulting in the reduction of household incomes (Ibekwe, 2017). These have exacerbated the conditions of being vulnerable to poverty under which the people of these communities presently live and grapple with. Specifically, the study described the socio-economic characteristics of the fisher folks, computed the fishing households' vulnerability to poverty and examined the influence of socio-economic factors on the fishing households' vulnerability to poverty in the study area.

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

Methodology

The Study Area

The study was carried out in Delta and Ondo States in the Niger Delta region of Nigeria. The region is located in the Atlantic coast of Southern Nigeria. It lies between latitude 4°2' and 6°2' north of the equator and longitude 5°1' and 7°2' east of the Greenwich Meridian. Nine of Nigeria's constituent states makes up the region; Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo, Rivers States, with an area of 112,000 sq. km, a population of 27 million people (Offor *et al.*, 2020).

The region has huge oil reserves with evidence of oil pollution due to oil exploration and exploitation. The major occupation of the people in the region are fishing and farming (Offor *et al.*, 2020).



Figure 1: Map of Nigeria showing Oil Producing States in Nigeria

Source: Nigeria Bureau of Statistics (2020)

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

Sampling Techniques and Sample Size

A multi-stage sampling technique was used for the study. In the first stage, the Niger Delta Region of Nigeria where there is evidence of environmental pollution due to oil spillage and fishing as a major source of livelihood was purposely selected for the study (Onyegeme-Okerenta *et al.*, 2017; Osuagwu and Olaifa, 2018). In the second stage, two (2) States: Delta (major oil producing state) and Ondo (minor oil producing state) were purposely selected. This was to ensure that both major and minor oil producing states of the Niger Delta region are represented in the study. In the third stage, two (2) oil producing Local Government Areas (LGAs) noted for fishing were purposely selected from each state. At the fourth stage, five (5) communities were randomly selected across the four (4) LGAs making twenty (20) communities. The communities were further stratified into Oil Bearing Communities (OBC) and Oil Impacting Communities (OIC) [Omoredede (2014) and OSOPADEC (2020)]. In stage five, a random sampling technique was used to select twenty (20) fishing households from each community to give a total of four hundred (400) fishing households which formed the sample size for the study.

Nature and Sources of Data

Primary data used for the study were collected through the administration of a well-structured questionnaire on fishing households in the study area. The data collected include; socio-economic characteristics, access to credit, markets, extension services and basic amenities, costs and returns associated with fishing, land ownership structure, expenditure and consumption patterns of respondents.

Data Analysis and Model Specification

Vulnerability as Expected Poverty (VEP) approach was used to determine the fishing households' future vulnerability to poverty in the study area. The probability of a fishing households falling below a given income level due to shocks experienced due to oil spillage was measured with VEP approach. This allows estimation of the proportion fishing households that are vulnerable to shocks from oil spillage, and hence may be used to support policies aimed at implementing safety measures or coping strategies.

Following Thompson (2017), the stochastic process generating the income of a household h is given by:

$$\ln C_h = X_h \beta + e_h \quad \dots\dots\dots (1)$$

Where,

C_h is per capita income of the fishing households,
 X_h represents a bundle of observable household characteristics (household size, location, educational attainment of the household head etc.) and shocks from oil spillage,
 β is a vector of parameters,
 e_h is a mean –zero disturbance term.

It was assumed that the variance of e_h is given by:

$$\beta^2_{e,h} = X_h \theta \dots\dots\dots(2)$$

where β and θ are parameters to be estimated from Three-step Feasible Generalized Least Squares (FGLS) procedure suggested by Deressa *et al.* (2009). Using the estimates β and θ , the expected log of income and the variance of log income for the fishing households h respectively will be estimated as:

$$E[\ln C_h / X_h] = X_h \beta \dots\dots\dots(3)$$

$$V[\ln C_h / X_h] = \beta^2_{e,h} = X_h \theta \dots\dots\dots(4)$$

By assuming that income is log-normally distributed (i.e. that $\ln C_h$ normally distributed), the above equations made it possible to estimate the probability that an artisanal fishing household with characteristics X_h will be vulnerable (i.e. fall below the household's vulnerability threshold level). If Φ denotes the cumulative density of the standard normal, the estimated probability is given by:

$$V_h = \Pr(\ln C_h < \ln z / X_h) = \Phi\{\ln z - X_h \beta\} / \sqrt{X_h \theta} \dots\dots\dots(5)$$

where $\ln z$ is the log of the minimum income level beyond which household would be called vulnerable. This analysis was based on the assumption that expressing shocks from oil spillage will increase the probability of fishing households falling below a given income level (Vulnerability threshold), or force him/her to stay under such a level if already below it.

Logit Regression Model (LRM)

Logit Regression Model (LRM) was used to examine the influence of socio-economic factors on the fishing households' vulnerability to poverty in the study area. LRM also called Logistic Regression, is used to model dichotomous variables. It is a non-linear

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

regression model that forces the output (predicted) values to be either 0 or 1. It is also used when dependent variable is binary. The model postulates the log likelihood that an individual will be vulnerable to poverty is a function of index Z_i . Z_i is also the inverse of the standard logistic cumulative function of:

$$P_i \text{ i.e. } P_i[v] = [V_{zi}], \text{ where } Z_i = \beta_0 + \beta_1 X_i \dots\dots\dots(6)$$

The logit model is expressed as:

$$\ln(v_i / 1 - v_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots\dots\dots + \beta_k X_{ki} \dots\dots\dots(7)$$

$$0iv \quad v^* < 0$$

$$v^* \text{ is unobserved but } v_i =$$

$$1iv \quad v^* \geq 0$$

Where:

V_i = Vulnerability to poverty status ith household

β_0 = Constant term

β = Vector of parameters to be estimated

X_i = Explanatory variables

Definition of variables and measurement

Dependent variable

V = Vulnerability to Poverty Status (1 = Vulnerable, 0 = Non-vulnerable)

Independent variables

X_1 = Age (Years)

X_2 = Gender (Male = 1; Female = 0)

X_3 = Marital status (Married = 1; otherwise = 0)

X_4 = Household size (Number of persons)

X_5 = Level of education (Years spent in school)

X_6 = Membership of cooperatives or fish farmers group (Member =1; otherwise = 0)

X_7 = Fishing income (Naira)

X_8 = Expenses on food (Naira)

X_9 = Access to credit facilities (Access = 1, non-access = 0)

X_{10} = Access to extension services (Access = 1, non-access = 0)

X_{11} = Access to basic amenities (Access = 1, non-access = 0)

X_{12} = Livelihood diversification (LD Index)

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

X_{13} = Number of occurrence of oil spillage (Actual number)
 X_{14} = Location of occurrence of oil spillage (Km)

Results and Discussion

Socio-Economic Characteristics of the Respondents

Age of Respondents

The summary of the descriptive statistics in Table 1 revealed that the average age of the respondents in the whole study area was 40.4 years with standard deviation of 12.6 years. The average age of the respondents in Oil Bearing Communities and Oil Impacting Communities were 38.2 and 42.5 years respectively. This implies that majority of the sampled fisher folks are still in their active and productive age. The finding is in agreement with those of Olaloye *et al.* (2012) and Ehirim *et al.* (2018) who found out that majority of the fisher folks are in their economic active age and could be able to increase fish catch and improve livelihood of their families therefore reducing their vulnerability to poverty due to the effect of oil spillage on fishing in the Niger-Delta region.

Table 1: Distribution of Respondents by Age

Age (Years)	Oil Bearing Communities		Oil Impacting Communities		Pooled Data
	Frequency	Relative	Frequency	Relative	Frequency
		Frequency (%)		Frequency (%)	[Rel. Freq. (%)]
< 30	62	31.0	50	25.0	112 (28.0)
30-39	57	28.5	42	21.0	99 (24.8)
40-49	40	20.0	60	30.0	100 (25.0)
50-59	28	14.0	40	20.0	68 (17.0)
≥ 60	13	6.5	8	4.0	21 (5.2)
Total	200	100.0	200	100.0	400 (100.0)
Mean	38.2		42.5		40.4
Std. Deviation	12.5		11.8		12.6

Sex of Respondents

Table 2 presents the distribution of respondents in the study area by sex. The distribution shows that 53.0% of the respondents were male and 47.0% were female in oil bearing communities while in oil impacting communities, 57.5% were male with 42.5% being female. The pooled data also showed that fishing is a male dominated enterprise in the whole study area as 55.3% of the sampled fisher folks were male while 44.7% were female. This is supported by Lawal *et al.* (2016) who also reported that males participated more than their female counterparts in fishing.

Table 2: Distribution of Respondents by Sex

Sex	Oil Bearing Communities		Oil Impacting Communities		Pooled Data
	Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	Frequency [Rel. Freq. (%)]
Male	106	53.0	115	57.5	221 (55.3)
Female	94	47.0	85	42.5	179 (44.7)
Total	200	100.0	200	100.0	400 (100.0)

Educational Level of Respondents

Table 3 presents the distribution of respondents by level of education attained. The result showed that 47.5% and 78% of the respondents had one form of formal education or the other in oil bearing communities and oil impacting communities respectively with pooled data having 62.7% educated respondents. In oil bearing communities, 52.5% of the respondents had no formal education while it was only 22% in oil impacting communities and 37.3% (pooled data) in the whole study area. In addition, as indicated in the Table 3, only 3.0% and 1.0% of the respondents were educated beyond secondary school level in Oil Bearing Communities and Oil Impacting Communities respectively. It should be noted that, the fisher folks in Oil Impacting Communities are more educated than their counterparts in Oil Bearing Communities. This may be attributed to the grossly underdevelopment in the oil producing communities of the Niger-Delta region as reported by Iloeje (2016). However, with 62.7% (pooled data) of the respondents in the whole study area being educated, this should avail them with range of opportunities to improve their livelihood strategies in order to reduce the probability of being poor as a result of oil spillage affecting fishing in the Niger-Delta region.

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)
ISSN: 3043-6087. Science and Education Development Inst., Nigeria

Table 3: Distribution of Respondents by Level of Education

Level of Education	Oil Bearing Communities		Oil Impacting Communities		Pooled Data
	Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	Frequency [Rel. Freq. (%)]
No formal Education	105	52.5	44	22.0	149 (37.3)
Primary Sch Education	29	14.5	49	24.5	78 (19.5)
Secondary Sch Education	60	30.0	105	52.5	165 (41.2)
Tertiary Education	6	3.0	2	1.0	8 (2.0)
Total	200	100.0	200	100.0	400 (100.0)

Sources of Credit of Respondents

The result in Table 4 revealed that there were different sources of credit to the respondents in the study area. 45.0% and 46.0% of the respondents in Oil Bearing Communities and Oil Impacting Communities respectively got their credit from Esusu/Thrift while 38.0% in Oil Bearing Communities and 40.5% in Oil Impacting Communities accessed credit from close friends and relatives. This was followed by cooperative society in both stratified communities; 14.0% in Oil Bearing Communities and 9.5% in Oil Impacting Communities. 2.5% and 3.0% of the respondents in Oil Bearing Communities and Oil Impacting Communities respectively sourced credit from commercial banks while just 0.5% in Oil Bearing Communities and 1.0% in Oil Impacting Communities obtained credit from Bank of Agriculture.

Similar trend was also observed for the pooled data in the whole study area (Table 4). The implication of the findings is that the majority of the fisher folks in the study area still depended on informal sources of credit where small amount of money could only be

accessed to finance and improve their fishing business even in the face of oil spillage challenges. This may be a bad signal to the possibility of not being vulnerable to poverty in the study area (Tasie *et al.*, 2020).

Table 4: Distribution of Respondents by Sources of Credit

Sources of Credit	Oil Bearing Communities		Oil Impacting Communities		Pooled Data
	Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	Frequency [Rel. Freq. (%)]
Friends/Relatives	76	38.0	81	40.5	157 (39.3)
Esusu/Thrift	90	45.0	92	46.0	182 (45.5)
Cooperative Society	28	14.0	19	9.5	47 (11.8)
Bank of Agriculture	1	0.5	2	1.0	3 (0.7)
Commercial Banks	5	2.5	6	3.0	11 (2.7)
Total	200	100.0	200	100.0	400 (100.0)

Vulnerability to Poverty Status of Respondents

The result in the Table 5 presents the distribution of household's vulnerability to poverty status in the study area. This study used a standard vulnerability threshold of 0.5 according to Adepoju and Yusuf (2012) and Sisay *et al.* (2016) to categorize them into non-vulnerable and vulnerable groups. Fishing Household whose vulnerability index is below 0.5 was considered non-vulnerable while fishing household whose vulnerability index is equal or above 0.5 was considered vulnerable. On this basis, 47.0% and 55.0% of households in Oil Bearing Communities and Ondo Oil Impacting Communities respectively were non-vulnerable while it was 51.0% for the whole study area (pooled data). On the other hand, across the categories of community, 53.0% and 45.0% were vulnerable in Oil Bearing Communities and Oil Impacting Communities respectively

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

while in whole study area, the pooled data showed that 49.0% were vulnerable in the whole study area.

It was observed that fishing households in Oil Impacting Communities were less vulnerable to poverty compared with fishing households in Oil Bearing Communities. This may likely be attributed to oil spillage prevalent in the Oil Bearing Communities as a result of oil exploration and exploitation (Ibekwe, 2017). However, the pooled data revealed that close to half (49.0%) of the fishing households in the whole study area were vulnerable. The result disagreed with Adepoju and Yusuf (2012) and Sisay *et al.* (2016) who reported that more than 50.0% of the households in Southwest, Nigeria and Ethiopia respectively were actually vulnerable to poverty. This may likely be due to the likelihood diversification drive of the respondents in the study area while trying to cope with the effect oil spillage on fishing which the main source of their income.

Table 5: Distribution of Respondents by Vulnerability Status

Vulnerability Status	Oil Bearing Communities		Oil Impacting Communities		Pooled Data
	Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	Frequency [Rel. Freq. (%)]
Non-Vulnerable (< 0.5)	94	47.0	110	55.0	204 (51.0)
Vulnerable (≥ 0.5)	106	53.0	90	45.0	196 (49.0)
Total	200	100.0	200	100.0	400 (100.0)

Standard Vulnerability Threshold: 0.58

Influence of Socio-economic Factors on the Fishing Households' Vulnerability to Poverty

Table 6 presents the influence of oil socio-economic factors on the fishing households' vulnerability to poverty. The strong explanatory power of the models was determined by the values of likelihood ratio which were symbolized by chi-square statistics of 62.45, 47.06 and 64.58 in Oil Bearing Communities, Oil Impacting Communities and the whole

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

study area (Pooled data) and all the models had a strong level of significance ($p < 0.001$). The log likelihood had corrected negative sign in the three models. This outcome suggested that the logit regression model is desirable for the study.

Fourteen (14) explanatory variables were considered in the models. It was observed in Table 6 that 10 and 8 variables were statistically significant in Oil Bearing Communities and Oil Impacting Communities respectively while the results of the pool data showed that 12 variables had significant effect on the vulnerability to poverty in the whole study area. However, the parameter estimates of the Logit model provide only the direction of the effect of the independent variables on the dependent variable; estimates do not represent the actual magnitude of change or probabilities. Thus, the marginal effects from the model, which measure the expected change in probability of a particular choice being made concerning a unit change in an independent variable were used for discussion.

Age: The age of the fisher folks in Oil Impacting Communities and in the whole study area (Pooled data) were statistically significant at 1% and positively related to vulnerability to poverty. The marginal effect values of 0.012 and 0.009 imply that a unit increase in the age of the fisher folks will increase the probability of being vulnerable to poverty by 1.2% in Oil Impacting Communities and 0.9% in the whole study area (pooled data) respectively. This could be due to the fact that as fisher folks get older, they probably become economically inactive which in turn affects their productivity, income and consequently increase their vulnerability to poverty. This result aligns with that of Adepoju and Yusuf (2012) and Sisay *et al.*, (2016).

Gender: Gender of the fisher folks significantly and negatively influence vulnerability to poverty in Oil Bearing Communities and in the whole study area (pooled data) at 1% and 10% levels respectively. This may be as a result of the cultural belief that gender determines access to productive resources. Hence, males may have more access to productive resources than their female counterparts thereby making them to be less vulnerable to poverty in the future. This finding is supported by Adepoju and Yuusuf (2012); Edoumiekumo *et al.*, (2013).

Household Size: The household size of the fisher folks were significant and negatively related with vulnerability to poverty in Oil Bearing Communities, Oil Impacting Communities and the whole study area (pooled data) at 1%, 10% and 1% respectively. The marginal effect values of 0.018, 0.04 and 0.0162 imply that a unit increase in the household size of the fisher folks will reduce the probability of vulnerability to poverty of fisher folks by 1.8% in Oil Bearing Communities, 4.0% in Oil Impacting Communities

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

and 16.2% in the whole study area (pooled data). The possible reason for this may be that the fishing household head with a large family size is likely to have access to family labour thereby reducing the high cost of labour which in turn affects their productivity, income, profit and consequently reduce the likelihood of being vulnerable to poverty. This result is in line with the findings of Babatunde *et al.* (2019).

Level of Education: The level of education of the fisher folks was positive and statistically significant at 5% in Oil Bearing Communities but negative and statistically significant at 1% in Oil Impacting Communities and the whole study area (Pooled data). The marginal effect values of 0.209, 0.148 and 0.019 imply that an additional year spent in school will increase the probability of being vulnerable to poverty by 20.9% in Oil Bearing Communities but reduce the probability of being vulnerable to poverty by 14.8% in Oil Impacting Communities and 1.9% in the whole study area (Pooled data). The result obtained from Oil Bearing Communities negates the a-priori expectation probably due to inadequate access to standard school education in the area. However, as expected, increase in the level of education in Oil Impacting Communities and the whole study area will help the fisher folks to better cope with risk and uncertainty which translates to increased income thereby reducing the probability of falling into poverty in the future. The result is in line with that of Novignon (2010); Alemi and Dereje (2014).

Membership of Cooperatives: Cooperative membership of the fisher folks was negative and statistically significant at 1% in the three models. The result indicated that being a member of cooperative society will reduce vulnerability to poverty by 7.8% in Oil Bearing Communities, 0.8% in Oil Impacting Communities and 2.4% in the whole study area (Pooled data). This may be possible because being a member of cooperative society could avail the fisher folks relevant information or training on fishing and also access fund from the cooperative society to support their fishing business thereby reducing vulnerability to poverty in the study area. This result is supported by the findings of Adepoju and Yusuf (2012).

Fishing Income: The income from fishing by the fisher folks was positively and statistically significant at 1% in Oil Bearing Communities, Oil Impacting Communities and the whole study area (Pooled data). The values of the marginal effect imply that a unit increase in income from fishing will increase the probability of being vulnerable to poverty by 9.23e-06% in Oil Bearing Communities, 3.85e-06% in Oil Impacting Communities and 7.38e-06% in the whole study area (pooled data). This result negates the a-priori expectation and this perhaps may be attributed to the poor environmental and economic situations of the Niger-Delta region whereby the dwellers though may be

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

making reasonable income from fishing but are still poor by the day probably due to high cost of living and health care services in the area. This paradox cannot be unconnected with the menace of oil spillage prevalent in the Niger-Delta region.

Expenses on Food: The expenses on food by the fisher folks was negative and statistically significant at 5% in Oil Bearing Communities, 1% in Oil Impacting Communities and the whole study area (pooled data). The values of the marginal effect imply that a unit increase in food expenses will increase the probability of being vulnerable to poverty by 8.05e-05% in Oil Bearing Communities, 5.02e-05% in Oil Impacting Communities and 4.38e-06% in the whole study area (pooled data). This could be due to the fact that as more income are spent on food for the family, little or nothing is left for investment either into fishing or other viable ventures thereby increasing their vulnerability to poverty.

Access to Credit Facilities: Access to credit facilities was negatively correlated with vulnerability to poverty and statistically significant at 1% in Oil Bearing Communities and the whole study area (pooled data). The result indicated that access to more credit will reduce vulnerability to poverty by 83.5% and 31.9% in Oil Bearing Communities and the whole study area (pooled data) respectively. This may be possible because access to more credit minimizes a household's financial constraint to acquire inputs and enough productive resources, which enables them to have diversified income sources and hence lower the probability of being vulnerable to poverty. This result is in conformity with the findings by Tsehay and Bauer (2012); Tesfaye (2017).

Access to Basic Amenities: Access to basic amenities had negative relationship with vulnerability to poverty and statistically significant at 1% both in Oil Impacting Communities and the whole study area (Pooled data). The marginal effect values of 0.022 and 0.131 imply that access to more basic amenities by the fisher folks will reduce the likelihood of being vulnerable to poverty by 2.2% in Oil Impacting Communities and 13.1% in the whole study area (pooled data) respectively. It is generally believed that improved basic amenities will enhance the standard of living and economic activities of the people. Therefore, access of fisher folks to more of these facilities would definitely lead to high productivity and increased income thereby reducing their vulnerability to poverty. The result is in line with that of Novignon (2010); Tesfaye (2017).

Livelihood Diversification: Livelihood diversification was negative and statistically significant at 10% in Oil Bearing Communities and Oil Impacting Communities but at 5% in the whole study area (Pooled data) respectively. The marginal effect values of 0.129, 0.046 and 0.239 imply that a unit increase in livelihood diversification index will reduce

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)

ISSN: 3043-6087. Science and Education Development Inst., Nigeria

the probability of being vulnerable to poverty by 12.9%, 4.6% and 23.9% in Oil Bearing Communities, Oil Impacting Communities and the whole study area (Pooled data) respectively. This may be possible because combination of one or two enterprises with fishing in the oil polluted area will increase income of the fisher folks thereby reducing their vulnerability to poverty.

Number of Occurrence of Oil Spillage: The number of time oil spillage occurred was positive in the three models but significant at 1% level in Oil Bearing Communities and the whole study area (Pooled data). The values of the marginal effect imply that a unit increase in the number of times oil spillage occurred will increase the probability of being vulnerable to poverty by 2.33e-05% in Oil Bearing Communities and 24.0% in the whole study area (Pooled data). This is expected because the more oil spillage occurred in the area, the more the adverse effect on the livelihoods of the fisher folks thereby making them more vulnerable to poverty. This result is similar to that of Babatunde *et al.* (2019).

Location of Occurrence of Oil Spillage: The location of occurrence of oil spillage had negative relationship with vulnerability to poverty and statistically significant in Oil Bearing Communities and the whole study area (Pooled data) at 1%. The marginal effect values of 0.203 and 0.003 imply that a unit increase in the distance of location of oil spillage occurrence to fishing communities will reduce the probability of being vulnerable to poverty by 0.3% in Oil Bearing Communities and 20.3% in the whole study area (Pooled data). This could be attributed to the fact that the farther the location of oil spillage occurrence to fishing communities, the milder the effect on fishing activities compared to neighboring communities. Consequently, fisher folks in Oil Impacting Communities are likely to be less vulnerable to poverty.

Table 6: Logit Regression Model for Influence of Socio-economic Factors on the Fishing Households' Vulnerability to Poverty

Explanatory Variables	Oil Bearing Communities		Oil Impacting Communities		Pooled Data	
	Marginal Effect	P-value	Marginal Effect	P-value	Marginal Effect	P-value
Age	0.001	0.614	0.012***	0.011	0.009***	0.003
Gender	1.012***	0.003	-0.025	0.652	-0.071*	0.096
Marital Status	-0.315	0.751	-0.018	0.832	-1.245	0.302
Household Size	-0.018***	0.000	-0.040*	0.093	-0.162***	0.000
Level of Education	0.209**	0.002	-0.148***	0.005	-0.019***	0.000
Membership of Cooperatives	-0.078***	0.006	-0.008***	0.019	-2.362***	0.000
Fishing Income	9.23e-06***	0.000	3.85e-06***	0.005	7.38e-06***	0.000
Expenses on Food	8.05e-05**	0.018	5.02e-05***	0.000	4.38e-06***	0.000
Access to Credit Facilities	-0.835***	0.000	0.642	0.401	-0.319***	0.000
Access to Extension Services	0.045	0.566	0.002	0.706	0.301	0.212
Access to Basic Amenities	-0.077	0.223	-0.022***	0.000	-0.131***	0.000
Livelihood Diversification	-0.129*	0.072	-0.046*	0.097	-0.239**	0.019
Number of Occurrence of Oil Spillage	2.33e-05***	0.000	0.105	0.520	0.240***	0.000
Location of Occurrence of Oil Spillage	-0.003***	0.005	-0.557	0.488	-0.203***	0.000
Constant	3.063	0.072	-16.388	0.963	5.838	0.000
N	200			200		400
LR chi2 (15)	62.45			47.06		64.58
Prob > chi2	0.0000			0.0025		0.0000
Log likelihood	-117.066			-104.852		-242.9103

***, **, * means significant level at 1%, 5% and 10% respectively

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)
 ISSN: 3043-6087. Science and Education Development Inst., Nigeria

Conclusion

It could be concluded that majority of the sampled fisher folks are still in their active and productive age. Fishing was found to be a male dominated enterprise in the study area though with appreciable proportion of women involvement. Also, the study revealed that majority of the fisher folks still depended on informal sources of credit which may be a bad signal to the possibility of not being vulnerable to poverty in the study area. The study concluded that fishing households that were vulnerable in Oil Bearing Communities were more than that of Oil Impacting Communities.

Recommendations

- i. A comprehensive package of strategies that ensure functional basic amenities (such as roads, portable water sources, electricity, schools, storage facilities, market centers and public health facilities), effective social protection programmes, innovations, technologies and other better risk management policies is fundamental for mitigating vulnerability to poverty and moving the poor rural fishing households out of poverty trap in the Niger-Delta region. Thus, these services need special focus from the government and non-government actors working in the area.
- ii. Promotion of the availability of financial services by encouraging savings should be considered. Informal savings groups could be more appropriate for the rural Niger-Delta dwellers who would not normally meet the requirements of formal lending institutions. Government's policy efforts should be directed towards stimulating accessible savings for the region. Here, the fisher folks could consolidate on the already existing cooperatives or fishing group(s).
- iii. Extension agents along with fishery specialists from relevant government agencies should organize training programmes for the rural fisher folks in the Niger-Delta on modern production techniques in aquaculture to arouse their interest in commercial fish production rather than relying solely on fishing from natural water bodies. The adoption of concrete tanks, fibre/plastic or collapsible or mobile ponds (rather than earthen ponds) for fish production should also be encouraged in the region.

References

- Adepoju, A. O. and Yusuf, S. A. (2012): Poverty and Vulnerability in Rural South-West Nigeria. Asian Research Publishing Network (ARPN) Journal of Agricultural and Biological Science. Vol. 7, No. 6, June 2012. P430
- Alemi, N. M. and Dereje, F. D. (2014): Determinants of Vulnerability to Poverty in Female Headed Households in Rural Ethiopia. Global Journal of Human Social Science: Economics Volume 14 Issue 5 Version 1.0, Year 2014. Global Journals Inc.
- Babatunde, R. O., Opeyemi, G. and Zubair, I. (2019): Determinants of Vulnerability to Poverty among Rice Farmers: A Case Study of Nasarawa Rice Hub, Nigeria International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs) Available online on: <http://ijasrt.iau-shoushtar.ac.ir> 9(1):35-41
- Baumuller, H., Donnelly, E., Vines, A. and Weimer, M. (2011): *The Effects of Oil Companies' Activities on the Environment, Health and Development in Africa*. Chatham House, United Kingdom, P61.
- Edoumiekumo, S. A., Tamarauntari, M. K. and Stephen S. T. (2013): Determinants of Households' Poverty and Vulnerability in Bayelsa State of Nigeria. International Journal of Humanities and Social Science Invention Volume 2 Issue 12. December, 2013. PP.14-23.
- Ehirim, N. C., Gbolagun, A. O. and Mgbeahurike, C. M. (2018): Catch Performance and Household Poverty among Artisanal Fisherfolks in Rivers State. Nigerian Journal of Agricultural Economics (NJAEE). Volume 8(1), 2018: Pp 20- 30
- Ibekwe, I. K. (2017): *FDI in the Oil and Gas Industry and Sustainable Livelihoods in Nigeria*. Balti,Moldova: Lambert Academic Publishing Livelihoods, New York, IT publishers, B25: 9-13.
- Iloeje, A. F. (2016): Crude Oil Exploitation: The Environmental and Economic Implications to the Niger Delta People. IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) Volume 10, Issue 7 Ver. II (July 2016), PP 47-53.
- Lawal, J. S, Obatola, P. O. Giwa, E. J. and Alhaji, T. A. (2016): Socio-Economic Analysis of Artisanal Fishing Operation in West and East Axes of Lagos State, Nigeria. World Journal of Agricultural Research, 4(1): 31-35
- Mbalisi, O. F. and Okorie, C. U. (2020): Implementation of Corporate Social Responsibility by Oil Companies in the Niger Delta Region of Nigeria: Myth or Reality. African Research Review:An International Multidisciplinary Journal, Ethiopia AFRREV Vol. 14 (1), Serial No 57, January, 2020: 119-132.

- National Bureau of Statistics (2020): Map of Niger Delta States Nigeria. Retrieved April, 18, 2020 from <http://www.nigeriamasterweb.com>.
- Novignon, J. (2010): Estimating Household Vulnerability to Poverty from Cross Section Data: Empirical Evidence from Ghana: Department Of Economics, University Of Ibadan, Nigeria.
- Offor, O. S., Idiong, I. C. and Archibong, B. E. (2020): Effect of Access to Microcredit on Food Security Status of Farm Households in Niger-Delta, Nigeria. *Nigerian Agricultural Journal*. Volume 51 Number 3, December 2020. Pp 227-232.
- Olaoye, O. J., Idowu, A. A., Omoyinmi, G. A. K., Akintayo, I. A., Odebiyi, O. C., and A.O, Fasina, (2012): Socio-Economic Analysis of Artisanal Fisher Folks in Ogun Water-Side Local Government Areas of Ogun State, Nigeria. *Global Journal of Science Frontier Research Agriculture & Biology* 12(4):9-22.
- Omoredede, C. K. (2014): Assessment of the Impact of Oil and Gas Resource Exploration on the Environment of Selected Communities in Delta State, Nigeria. *International Journal of Management, Economics and Social Sciences* 2014, Vol. 3(2), pp.79 -99. ISSN 2304 - 1366 <http://www.ijmess.com>
- Ondo State Oil Producing Area Development Commission (2020): OSOPADEC Bulletin.
- Onyegeme-Okerenta, B. M., Oharisi, A. O. and Wegwu, M. O. (2017): Impact of Oil Spillage on Water and African Catfish in Uzere, Isoko South LGA of Delta State Nigeria. *European Journal of Earth and Environment*. Vol.4 (1), Pp 1-3.
- Osuagwu, E. S. and Olaifa, E. (2018): Effects of Oil Spills on Fish Production in the Niger Delta. *PLoS ONE* 13(10): e0205114. <https://doi.org/10.1371/Journal.pone.0205114>.
- Sisay, T., Wondaferahu, M., and Yilkau, W. (2016); "Rural Households Vulnerability to Poverty in South West Ethiopia: The Case of Gulgel Gibe Hydraulic an Area of Sokoru and Tiro Afeta Woreda". *Global Journal of Human Social Science E: Economics*. 16(3), 44-54.
- Sogbesan, O. A. and Kwaji, B. P. (2018): Sustainable Artisanal Fisheries Practices in Nigeria. *Oceanogr Fish Open Access J*. 6(1): 555677.
- Tasie, C. M., Wilcox G. I. and Kalio, A. E. (2020): Analysis of Artisanal Fishing Operations in Degema Local Government Area of Rivers State, Nigeria. *N Y Sci J* 2020; 13 (2):85-91.
- Tawari, C. C. and Davies, O. A. (2010): Impact of Multinational Corporations in Fisheries Development and Management in Niger Delta Nigeria. *Agriculture and Biology Journal of North America*, 1(2): 146-151.
- Tesfaye, G. W. (2017): Determinants of Vulnerability to Poverty in Amhara Region, Ethiopia: Evidences from Rural Households of Gubalafto Woreda *Journal of Economics and Sustainable Development* www.iiste.org Vol.8, No.21, 2017.

This work is licensed under a [Creative Commons Attribution 4.0 Unported License](https://creativecommons.org/licenses/by/4.0/)
ISSN: 3043-6087. Science and Education Development Inst., Nigeria

- Thompson, O. A. (2017): Assessment of Maize Farming Household's Vulnerability to Climate Change in South Western, Nigeria. *Journal of Meteorology and Climate Science. NmetS/JMCS/2017/01 Pp1-15*
- Tsehay, A. S. and Bauer, S. (2012): Poverty Dynamics and Vulnerability: Empirical Evidence from Smallholders in Northern Highlands of Ethiopia: Selected Paper prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Fozdo Iguaçu, Brazil, 18-24 August 2012.