



Perceived Risk of Climate Change on Artisanal Fish Supply in Andoni Local Government Area, Rivers State, Nigeria.

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Abstract

The research study on perceived risk of climate change on artisanal fish supply was carried out in Andoni LGA, Rivers State, with specific objectives to describe the socio-economic characteristics of fisher folk, examine the climate change factors affecting artisanal fish supply and to identify the risk of climate change on the respondents. Well structured questionnaire were used on 120 respondents drawn via the use of multi-stage sampling technique. Descriptive statistics and multiple regressions were used for data analysis. Results shows that more married(51.66%), male(89.16%) of active age mean of (44.05) dominated the business; it is a lucrative and economically dependable venture with monthly income mean of (N84,954). Both inverse and linear relationships exist between climate change factors e.g. rainfall, air-temperature, water pH, coastal erosion, tidal level, flooding, drought and artisanal fish supply with R² value of (0.681). Risks experienced were declined in fish supply and general declined on the welfare of the respondents. The study concluded that artisanal fishing is economically gainful, but there progressive trend is inhibited by the effects of climate change. It was recommended that economic activities of the coastal dwellers be diversified, and environmental friendly policies and practices be established.

Keywords: Perceived, Risk, Climate, Change, Artisanal, Supply, Fish.

Introduction

According to Ifeanyi-Obi et al (2012), climate change refers to all changes in climate as a result of both human activities and natural variation. Over the past 100 years, the measure of high temperature and precipitation globally for a long period of over 50 years resulting to flood, hurricanes, rise in sea level (IPCC 2007). Climate change is a major risk affecting food production and food security especially among the poor and mostly in developing countries. (Parry et al 2009). Climate change is presenting more risk than ever before in terms of food shortage, water crises, constrained economic growth, weather societal cohesion and increased security risk (Reyes, 2016). Sotolurve et al (2011) noted that African agriculture is negatively affected by climate change, with effect on artisanal fishing due to fluctuation of sea level and temperature. Adebo et al (2011) observed that fishing provides employment for up to ten million people in Africa and vital source of protein to over 200 million people. Ole et al (2009), predicted a fall in farm revenue with current climate scenario. Butt, et al (2015) stated that future

economic losses and increase risk of hunger due to climate change may be inevitable. Global climate changes are expected to affect coastal communities around the world, many of which are already considered vulnerable to ongoing climate variability (IPCC 2007, Monirul et'al 2003). Coastal species may show various responses to climate change including changing to physiology, phonology, distribution ranges and ecology (Perry et'al 2005; Cheung et'al 2009). Lam et'al (2012) noted that past researches have shown that climate change may lead to substantial reduction in marine fish production and decline in fish protein supply in West Africa by 2050 under the special report on emission scenarios (SRES). This report projected a 21% drop in annual landed value, 50% decline in fisheries related jobs and a total annual loss of US \$311 million in the whole economy of West Africa.

Indeed artisanal fishery has made tremendous socio-economic impacting influence on the maritime and coastal dwellers as well as the national economy, but its progressive trend is limited by the exerting effects of climate change ; it is on this backdrop, that this research is designed to investigate the perceived risk of climate change on artisanal fish supply, with specific objectives as to: (i) describe the socio-economic characteristics of fisher folk (ii) examine climate change factors that affect fish supply (iii) evaluate the risk of climate change on fisher folk in the study area.

Methodology Study Area:

The research work on perceived risk of climate change on artisanal fish supply was conducted in Andoni Local Government Area of Rivers State. The headquarters is Ngo Town. Andoni has a land area of over 233km square with population of over 311500 people as at the last census. The postal code is 90%, and coordinate of 4.48570N, 7.40870E. it has a latitude of 4028121.811north, and longitude of 7022157.511east. It has a boundary with Bonny at the west, Ogoni at the north, Akwa-Ibom and Opobo/Nkoro at the east and Atlantic Ocean at the south. The major occupation of the Andoni people is artisanal fishing. Andoni has many Towns, Villages, Hamlets and fishing settlements that are divided from each other by Rivers, Sea, Creeks as well as Land boundaries.

Sample Technique And Sample Size

Multi-stage sampling technique was employed to purposively select six fishing settlements/communities, (three settlements along the Atlantic Ocean and three settlements within the rivers and creeks in Andono). They are: Oyorokotor, Ama-Iworkpara, Agba-ama, Sobiekiri, ISiodum and Agba kuruma. Random sampling was used to select 20 fisher folks from each settlement given a total of 120 respondents that was used for the study. A well structured questionnaire was used to interview the respondents, data collected were analyzed using descriptive statistic, multiple regression, and mean (5-point likert scale was used to deduced the responses) on the risk of climate change.

Model Specification

This model was developed to establish the climate change factors relationship with artisanal fish supply.

$$F_s = f(X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + ut)$$

$$F_s = f(B_0X_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + ut)$$

$$F_s = f(B_0 + B_1RF + B_2AT + B_3WPH + B_4TL + B_5FF + B_6CE + B_7DT + ut)$$

Explicitly: B is Beta that is constant

Fs is Fish Supply
 RF is Rainfall
 AT is Air Temperature
 WPH is Water Acidity/Akalinity Content
 TL is Tidel Level
 FF is Flood Frequency
 CE is Coastal Erosion
 DT is Drought
 Ut is Error term

Socio-Economic Characteristics of Fisher Folk (Respondents)

Characteristics	Freq.	Percentage	Mean
Gender			
Male	107	89.16	
Female	13	10.83	
Age Range (Years)			
Less than 30	8	6.66	
31-40	28	23.33	44.05
41-50	56	46.66	
51-60	21	17.5	
61 and above	7	5.88	
Marital status			
Single	34	28.33	
Married	62	51.66	
Divorced	13	10.83	
Widow/widower	11	9.16	
Fishing Experience (Years)			
Less than 10	12	10.0	
11-15	9	7.5	22.7
16-20	10	8.33	
21-25	38	31.66	
26-30	39	32.5	
31 and above	12	10.0	

Educational status

Not Educated	38	31.66
Primary education	46	38.33
Secondary education	22	18.33
Post secondary education	14	11.66

Monthly Income Range (₦)

Less than 50,000	31	25.83	84,954
51,000-100,000	49	40.83	
101,000-150,000	26	21.66	
151000 and above	14	11.66	

Source: Field Survey, 2021

Table 1, show that male were 107 while female were 13, with 87% of male indicated that, they dominated the artisanal fishing activities. The age range of 41-50 had 46%, 31-40 had 23%, 51-60 had 17.5%, less than 30 had 6% while above 61 had 5.8%. The age distribution showed that people within age bracket of 41-50 are the majority; this implies that, they are within the economical active and productive age, with a mean score of 44.05%. The table 1, affirmed that 51.66% are married, 28.33% are single, 10.83% are divorced while 9.16% were either widow or widowers; this implies that, it is an economically dependent activities to sustain families.

The table 1, indicated that 32.5%, 31.66% had fishing experience within 26-30 and 21-35 years respectively with a mean score of 22.7. This implies that majority of the people rely on this venture for their sustainability. Their experienced had aid them to improve in the artisanal fishing activities.

Table 1, showed that majority of the fisher folks had formal education at certain level with 38.33% primary, 18.33% secondary, 11.66% post-secondary while 31.66 had no formal education, this implies that, they will be efficient in managing their resources.

Table 1, showed the monthly income range of the respondents with N51,000-N100,000 having 40.83%, less than N50,000 had 25.83%, N101,000-N150,000 had 21.66% while N151,000 and above had 11.66%, with mean score of N84,954. This implies that, the artisanal fishing is incoming generating and lucrative, but the continuous effect of climate change limited their extent of progress in the business.

Table 2: Result of Multiple Regressions, of Artisanal Fish Supply and Climate Change Factors

Variables	Co-efficient	Std. error	T-stat.
Constant	.2.461	1.023	2.362
Rainfall	-0.038	0.026	-1.441
Air temperature	0.225	0.211	1.561
Water pH	0.619	0.143	6.334
Tidel level	0.233	0.091	1.873
Flooding freq.	-0.174	0.064	-0.065
Coastal erosion	-0.331	0.321	-0.678
Drought	0.146	0.681	0.114

R² = 0.681

Adjusted r = 0.672

F-cal = 22.41

T- tab = 12.62

Sources: E-view 2021

The explanatory variables with goodness of fit (R²) 68% is satisfactory, this implies that 68% of the dependent variable is explained by the independent variables, the co-efficient values for rainfall, flooding frequency and coastal erosion had negative values explaining their inverse relationship, their increase will lead to decrease in the supply of fish from artisanal source.

While air temperature, water pH, tidel level and drought had positive values, implying the establishment of linear relationship between them and the dependent variable (fish supply). They are statistically significant at 5% level of confidence. The 32% will be attributed to the error term (extraneous variables that are not climate change factors, hence, not inclusive in the study e.g. sea pollution, fishing methods etc).

Table 3: perceived risk of climate change on the artisanal fishers folk

Risk of climate change	Mean score	Remark
Decline in fish supply	4.2	A
Environmental encroachment	3.9	A
Environmental pollution	3.1	A
Increased in price of fish and fish products	3.8	A
Reduction in fishers folks income	4.6	A
Declined in standard of living	4.3	A
Increased in hunger among fisher folk	4.1	A
Declined in economic activities	3.7	A
Declined in social development	4.0	A
Poor fish marketing system	4.4	A
rural– urban migration	3.3	A
Rural – unemployment	3.4	A
Food insecurity	3.2	A
Increase in crimes and social insecurity	4.1	A
Increase in health problems	4.2	A

Source: Field Survey, 2021

Criterion Mean = 3.0

Table 3, showed that all the enlisted risk of climate change in the study were experienced by the respondents in the study area. These include declined in fish supply, environmental encroachment, environmental pollution, increased in price of fish and fish products, reduction in fisher folk income, declined in standard of living, hunger, declined in economic activities, declined in social development, poor fish marketing system, rural-urban migration, rural-unemployment, food insecurity, increase in crimes and social insecurity and increase in health problems.

Conclusion and Recommendation

The study concluded that male dominated the artisanal fishing activities, within an active average age of 44 years. It is a lucrative business that many families depend on for their livelihood for longer period of time, climate change factors such rainfall, water Ph, coastal erosion, drought, tidal level and flood had relationship with artisanal fish supply. Risks emanating from climate change are numerous; they are declined in fish supply, high price of fish and fish products, food insecurity, increase in crime rate, health problems, low welfare of the fisher folk etc. The study recommended for diversified economic activities among the coastal habitants, environmental friendly policies and practices should be established.

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