



## Characterization of Educational Level, Fishing Experience and Income of Artisanal Fishing: Correlation and Crosstabulation Approaches of Evidence from Eastern Obolo LGA of Akwa Ibom State, Nigeria

<sup>1</sup>Oti, O. G., <sup>2</sup>Teran, A.D., <sup>3</sup>Okere, R.A. and <sup>1</sup>Nelson, G. N.

<sup>1</sup>Department of Agricultural Economics, Michael Okpara University of Agriculture, Umudike

<sup>2</sup>Department of Agricultural Economics, University of Agriculture, Makurdi

<sup>3</sup>Department of Agricultural Economics, National Oil-Palm Research Institute, Benin City

Corresponding Address: [oti.okpani@mouau.edu.ng](mailto:oti.okpani@mouau.edu.ng)

### Abstract

The study examined the characterization of educational levels, fishing experiences and fish incomes of fishermen in Eastern Obolo LGA of Akwa Ibom State, Nigeria. Purposive and random sampling techniques were used to select 90 respondents for the study from Educwink, Elekpon and Agan-asa fishing depots. Data were collected using a structured questionnaire and analysed with frequency distribution, cross-tabulation, charts, analysis of variance (ANOVA), chi-square and correlation analyses. Majority (89%) of the fishermen had formal education, their average level of education was 6 years, and their means across various educational levels were significantly ( $P < 0.01$ ) different. Their average fishing experience was 8 years, while their means across various levels of fishing experience were significantly ( $p < 0.01$ ) different. Majority (42.2%) of them had a fishing experience of 6 – 10 years. Their average fish income was N528,800.04, while the fish income group (N241,000.00 – N480,000.00) was the most predominated (28.9%). Their means across various fish income groups were statistically ( $p < 0.01$ ) different. The correlation between fish incomes and educational levels was positive (0.349) and significant ( $p < 0.01$ ), while their associations were also significant ( $|r| > 0.2$ ). The highest proportion (43.8%) of fishermen with primary education earned fish income of N12,000.00 - N240,000.00 p.a., while fishermen with secondary education predominated (33.3%) the fish income group, N481,000.00 - N720,000.00 p.a. Fish incomes and fishing experience correlation was significant ( $p < 0.01$ ) and positive (0.469). Their associations were equally significant ( $|r| > 0.2$ ). Majority (68.2%) of the fishermen with 1 – 5 years of fishing experience, had fish income of N12,000.00 – N240,000.00 p.a, while, fishermen with 6 – 10 years of fishing experience predominated the fish income groups of N241,000.00 - N480,000.00 (45.9%), and N481,000.00 - N720,000.00 (35.1%) p.a. The study recommended policies that train fishermen up to the secondary level of education while providing incentives for fishermen to remain in the trade.

**Keywords:** Correlation, Crosstabulation, Artisanal fishing, and Eastern Obolo LGA

### Introduction

Artisanal fishing has great prospects in Nigeria. This is due to the country's rich and enormous water resources, where artisanal fishing is carried out, in the inland, coastal and brackish waters, as well as in creeks, estuaries and inshore areas, in depths of not more than 40m (Agbeja, 2010). According to FAO (2007) and Anyanwu et al. (2022), Nigeria has a total water area of 140,000km<sup>2</sup> (including 13,000km<sup>2</sup> inland water bodies), 42,000km<sup>2</sup> continental shelf areas, 853km of coastline and 200 nautical miles of Exclusive Economic Zone. It is not surprising, therefore, that Nigeria plays a key and strategic role in artisanal fish production in Africa. According to the Regional Agency for Agriculture and Food [ARAA] (2023), Nigeria is the largest fish producer in West Africa with 1,169,480 tons per annum,

followed by Senegal (485,560 tons) and Ghana (393,800 tons) and Sierra Leone (202,190 tons).

Artisanal fishing according to Fisheries (2021), refers to fisheries and aquaculture production that use relatively small production units, with relatively low input and low output, and limited levels of technology and small capital investment. It is commonly managed at the family level, sometimes with a small group of employees, or at the community level, and the fish caught are commonly sold in local markets, but can also reach national and international markets. Artisanal fishing is a very important component of the fishery sub-sector contributing immensely to food (fish) production, employment and income generation. According to the FAO (2022) report, artisanal fishing accounts for about

40% of global fishery catch, and the fish provided by artisanal fishing is essential for healthy diets, providing protein and micronutrients such as omega-3 fatty acids, calcium, selenium, and zinc. UNCTAD (2017), noted that 50 to 90% of the protein consumed in small and vulnerable economies like Nigeria, comes from fish caught by artisanal fishers. Further, FAO reports show that 492 million people depend at least partially, on artisanal fishing for their livelihoods, out of which, about 45 million are women.

These statistics notwithstanding, artisanal fishing is still operating sub-optimally in the country, producing well below local needs and demand. Nigeria has an annual fish production of 1.123 million metric tonnes, compared to its consumption of 3.6 million metric tonnes (Oritse, 2021). This implies that the country has a fish deficit of about 2.5 million metric tonnes per annum that is met through importation using scarce foreign resources. As a consequence, there are little or no resources to finance other basic and developmental needs in the country, resulting in widespread poverty, hunger, malnutrition, violent crimes and underdevelopment. Reversing this trend would require increasing the production and productivity of artisanal fishing through a proper understanding of the livelihood conditions of the fishers.

Educational level, fishing experiences and fishing income are some of the important livelihood conditions of fishers that greatly influence artisanal fishing. This is so because artisanal fishing is highly labour-intensive and subsistence, involving the use of simple, traditional and hand-operated tools and equipment, in the harvesting of fish and other aquatic life (Ekpo and Essien-Ibok, 2013; Bonjoru et al., 2019). As a result, it is largely driven by the livelihood conditions such as backgrounds, training, experiences, exposures and expectations of the fishers. Level of education refers to the length of time spent in formal schools and institutions, in pursuit of knowledge. Such institutions are usually regimented, and characterized by orderliness, discipline, timeliness, standardization, and uniformity. Exposure to such institutions prepares one for successful life endeavours, including artisanal fishing.

Fishing experiences refer to knowledge acquired by practically engaging in fishing activities. The more fishing activities a fisher engages in, the more fishing experience that is acquired, and this is expected to influence fishing output, positively. In like manner, fish income refers to the revenue derived from the sale of fish produced through artisanal fishing. This serves as the incentive and motivation to remain or enter the trade. A high fish income is expected to be a positive motivation for artisanal fishing. However, studies that investigated these characteristics and explored inter-relationships among them, are limited in literature. This is particularly important in the Eastern Obolo Local Government Area of Akwa Ibom State, where artisanal fishing is the predominant livelihood endeavour.

Nigeria is among the leading inland fish-producing countries in Africa, with 0.35 million tonnes of produce in 2020, which accounted for about 3% of world production (FAO, 2022), and 3.2% of the country's agricultural GDP (National Bureau of Statistics [NBS], 2020; Oyaniran, 2020)

### Methodology

The study was carried out in the Eastern Obolo Local Government Area (LGA) of Akwa Ibom State (Figure 1). The headquarters of the LGA is located at Okoroete town. It is located at the fringe of the Niger Delta between the Imo and Qua Iboe rivers' estuaries. Eastern Obolo LGA is located within latitudes 4°28' to 4°53' north of the Equator, and longitudes 7°50' to 7°55' east of the Greenwich Meridian. It has a landmass of 117,008 km<sup>2</sup> with about 184km shoreline length and the Obolo River. Eastern Obolo shares a boundary with Mkpato Enin LGA in the north, Onna LGA in the northeast, the Atlantic Ocean in the south, Ibeno LGA in the southeast and Ikot Abasi LGA in the west. The population of Eastern Obolo LGA is put at 169,202 inhabitants. The LGA has large forest reserves such as mangroves, iroko, raffia, rubber, kolanut, coconut, peas, and mangos. The average annual temperature of the area is 26°C with a relative humidity of 91%. The dry and rainy seasons are the two major seasons in the area. Fishing is the predominant livelihood activity in Eastern Obolo LGA, especially, with its many rivers and tributaries being rich in seafood. About 65% of the populace is involved actively in fishing. It is usually carried out at fishing depots. There are about six (6) fishing depots in the area. They include Educwink, Elekpon, Agan-asa, Iwoachang, Upenekang and Mkpatak fishing depots. Also, several crops are cultivated in the area such as cassava, maize, plantain, yam, citrus, and pineapple. The area has rich deposits of mineral resources such as crude oil and natural gas, with onshore and offshore oil wells at Elekpon, Iko, Otunene, Emere-oke1, and Iko-Nta/Obianga. The study employed both purposive and random sampling techniques in selecting 90 fish farmers. Firstly, three (3) fishing depots were purposively selected for the study due to the high level of fishing activities in the areas. They included Educwink, Elekpon and Agan-asa fishing depots. Subsequently, from a list of fish farmers in the depots, 30 fish farmers were randomly selected from each of the fishing depots. Data were collected with the aid of a structured questionnaire and analysed using descriptive statistics such as frequency distribution, percentages, mean and cross-tabulation analysis, correlation, chi-square and analysis of variance (ANOVA) techniques. The correlation model is specified in Equation. 1.

$$r = \frac{\sum xy \sum xy_i}{\sqrt{\sum x^2 \cdot \sum y_i^2}} \dots (1)$$

Where:

i = 1 and 2

x = fish income (N)

y<sub>1</sub> = level of education (years)

y<sub>2</sub> = fishing experience (years)

The chi-square test is specified as follows:

$$\chi^2 = \frac{(O-E)^2}{E} \dots (2)$$

Where:

$\chi^2$  = Chi-square

O = observed frequency

E = expected frequency

The cells with the most extreme adjusted residuals i.e. those with absolute values greater than two ( $|ar| \geq 2$ ) are used to identify the pattern of the association (relationship) that produced a significant result.

The ANOVA model is specified in Equation 3 as follows:

$$F_{\text{ratio}} = \frac{MSA}{MSE} \dots (3)$$

Where:

$F_{\text{ratio}}$  = ANOVA test statistics

MSA = mean sum of squares due to factor A (variance between the sample means, i.e. explained variance)

Factor A = level of education, fishing experience and fishing income, respectively

MSE = mean sum of squares due to error (variance within the samples, i.e. unexplained variance)

## Results and Discussion

### Level of Education

The frequency distribution and analysis of variance (ANOVA) test on the level of education of the fishermen is shown in Table 1. The Table revealed that the average level of education of the fishermen was 6.16 years and that there were three levels of education among the fishermen. These included fishermen without any formal education, those with primary education and those with secondary education. Majority (~89%) of the fishermen had formal education, while only ~11% did not have any formal education, and out of those with formal education, 40% had primary education, while the rest (60%) had secondary education (Figure 2 & 3). Also, the means of the various levels of education of the fishermen were significantly ( $p < 0.001$ ) different from one another, implying that the length of time spent at the various levels of formal education was not the same. In other words, the length of time spent in the training of fishermen without formal education is statistically different from those with 1 – 6 years and 7 – 12 years of formal education, respectively, and vice versa. It could be inferred that the fishermen, although with secondary education as their highest educational training, are literate enough to engage in effective communication, and training and re-training programmes that would be useful to their trade. This is of great essence as education is the bedrock for national development, being a growth process that plays vital roles in technology adoption and taking of informed risks, for increased production and productivity. More so, artisanal fishing as a trade and craft, is learnt through apprenticeship, which does not necessarily require much formal education. Instead, increasing one's level of education increases the chances of leaving the trade. As such, the fishermen can productively, be engaged by extension agents who

disseminate research findings, innovations and weather information from universities, research and technology incubation institutes and meteorological agencies. This result is at variance with the findings of Inoni & Oyaide (2007) in Delta State, Ele (2008) in Cross River Basin, Aminu *et al.* (2017) in lower Ogun River Basin Areas of Lagos State, Ifeanyi-Obi & Iremesuk (2018) in Akwa Ibom State, Bonjoru *et al.* (2019) in the upper Benue River Basin and George *et al.* (2021) in Rivers State, where some of the fisher folks had higher educational qualifications such as National Diploma (ND), Adult and technical educations, Nigeria Certificate in Education (NCE) and Bachelor's degrees. More so, a large proportion (32.5%) of fishermen in the study of Anyanwu *et al.* (2022), had tertiary education. However, the result is similar to that of Lawal *et al.* (2016) in the West and East Axis of Lagos State, where 98% of the fishermen had secondary education or less.

### Fishing Experience

The frequency distribution and analysis of variance (ANOVA) test on the fishing experience of the fishermen is shown in Table 2. The result showed that the fishing experience of the fishermen, ranged from 1 to 15 years, and their average fishing experience was 8 years. The immeasurable wealth of fishing experience implies that the fishermen could manage their fishing activities and risks, and make sound decisions to enhance their performance. This is tenable given that longer fishing experiences give rise to better performances in fishing activities (Dambatta *et al.*, 2016). The result is in agreement with those of Inoni & Oyaide (2007), Aminu *et al.* (2017) and Anyanwu *et al.* (2022), where the fishermen had a considerable wealth of experience in fishing, even though their average fishing experiences differed from that of this study. An average fishing experience of 6 years was reported in the south of Delta State, 19 years in the lower Ogun River Basin Areas of Lagos State, and 12 years in Andoni LGA of Rivers State, respectively. The ANOVA test indicated that the means of the various classes of fishing experience of the fishermen were not the same statistically ( $p < 0.001$ ). This implies that the fishing experience of those with low fishing experience differed from those with average and high fishing experiences, respectively. More results indicated that fishermen with fishing experience (6 – 10 years) were in the majority (42.2%), while those with lower fishing experience (1 – 5 years) had the lowest proportion (26.70%). The rest (31.10%) of the fishermen had a high fishing experience of 11 – 15 years. Experience is an indispensable factor in every profession and trade, including artisanal fishing. It is the active acquisition of knowledge, skills and training which could be through observation, feeling, smelling, touching, tasting, hearing and/or undertaking tasks and responsibilities. As earlier stated, fishing is a trade that requires lots of hands-on knowledge. The water bodies where fishing activities take place, look the same, but indeed, they are not the same. Every water comes with its peculiarities. Not every part of it does fishing boats and vessels pass on safely; not also every part of the water that fish can be caught from. Similarly,



fishing is not carried out at every time of the day and night, and sessions in the year. A good fisherman is also a great swimmer, who knows how to handle and maneuver boats and fishing vessels effectively. All these require lots of experience and reflect in the safety, output and productivity of the fishermen. These could have influenced why the great majority of the fishermen had beyond-low fishing experiences.

### **Fishing Income**

The frequency distribution and analysis of variance (ANOVA) test on the fishing income of the fishermen is shown in Table 3. The average fish income of the fishermen was N584,800.04 p.a., translating to about N49,000.00 per month, including fishing expenses. Given the economic realities in the country, the fishermen had a very low income. This could serve as a great disincentive to the fishermen, in line with Anyanwu *et al.* (2022) observation that high fish income boosts interest in artisanal fishing. There is, therefore, the need for increased fish income for the fishermen. The result is at variance with that of Anyanwu *et al.* (2022), where the fishermen had an average fish income of about N90,000.00 per month. The Table further shows wide disparities in the fish incomes of the fishermen, ranging from N12,000.00 to N1,200,00.00. Five (5) distinct classes of fish income of the fishermen were identified, with average fish incomes of N212,160.00, N405,692.28, N637,263.12, N878,000.04, and N1,137,000.00, respectively (Figure 5). The means of these various groups of fish incomes were statistically ( $p < 0.001$ ) different from one another, respectively. Furthermore, the Table showed that majority (51%) of the fishermen belonged to the bottom two income classes, earning less than the average fish income (N528,800.04) of all the fishermen. Also, only about 9% of the fishermen belonged to the highest fish income group of N961,000 – N1,200,000, in the study. The implications for national development are disastrous, as it further depicts the prevalence of income inequality even among rural households in the country.

### **Correlation and Crosstabulation of Fish Incomes and Levels of Education of Fishermen**

The result of the correlation between the fish incomes of fishermen and their levels of education is shown in Table 4. The Table showed a positively weak and significant correlation. The Pearson correlation ( $r$ ) of 0.349 implies that more than 12% of the variance in fish income can be linked to the number of years spent in school, such that fishermen with higher fish incomes tend to have spent a longer number of years in school. Similarly, the crosstabulation result shown in Table 5, revealed weak and four (4) significant associations between fish income and level of education of the fishermen. The significant associations included N12,000.00 - N240,000.00 and 1 – 6 years; N12,000.00 - N240,000.00 and 7 – 12 years; N481,000.00 - N720,000.00 and 1 – 6 years; and N481,000.00 to N720,000.00 and 7 – 12 years. The highest proportion (43.8%) of fishermen with primary education (1 – 6 years) earned fish income of N12,000.00 to

N240,000.00 p.a., compared to 12.5% with secondary education (7 – 12 years) who earned the same income. On the other hand, fishermen with secondary education (33.3%) dominated the fish income group of N481,000.00 to N720,000.00 p.a., relative to the 9.4% of fishermen with primary education in the same group. These imply that fishermen with primary education tend to earn fish incomes of N12,000.00 to N240,000.00 p.a., in contrast to those with secondary education who tend to earn fish incomes of N481,000.00 to N720,000.00 p.a. These align with earlier findings of the study, which had shown significant differences in the means of various fish income groups and levels of education of the fishermen, respectively (Tables 1 and 3). They therefore underscore the important role of formal education in artisanal fish production, such that an average fisherman with a secondary education tends to earn three times more than an average fisherman with a primary education.

### **Correlation and Crosstabulation of Fish Incomes and Fishing Experiences of Fishermen**

Table 6 shows the results of the correlation between fish incomes and the fishing experiences of the fishermen. The result showed a moderately positive and significant correlation between fish income and fishing experience, implying that fish income and fishing experience increase and decrease at the same time, such that over 21% of variations in fish, income can be attributed to variations in fishing experience of the fishermen. In the same vein, the crosstabulation result in Table 7 indicated moderately strong and eight (8) significant associations between fish incomes and fishing experiences of the fishermen. They comprised N12,000.00 – N240,000.00 \* 1 – 5 years, \* 6 – 10 years; N241,000.00 - N480,000.00 \* 6 – 10 years; and N481,000.00 - N720,000.00 \* 1 – 5 years, \* 6 – 10 years. The rest are N721,000.00 - N960,000.00 \* 6 – 10 years, \* 11 – 15 years; and N961,000.00 - N1,200,000.00 \* 11 – 15 years (Figure 7).

A further result showed that the majority (68.2%) of the fishermen with fishing experience of 1 – 5 years, had fish income of N12,000.00 – N240,000.00 p.a., compared to 13.5% of those with 6 – 10 years fishing experience. Contrarily, fishermen with 6 – 10 years of fishing experience dominated fish income groups of N241,000.00 - N480,000.00 p.a., and N481,000.00 - N720,000.00 p.a., by 45.9% and 35.1%, respectively. Similarly, fishermen with fishing experience of 11 – 15 years were in the majority (29% and 19.4%) in fish income groups of N721,000.00 - N960,000.00 p.a., and N961,000.00 - N1,200,000.00 p.a., respectively (Figure 7).

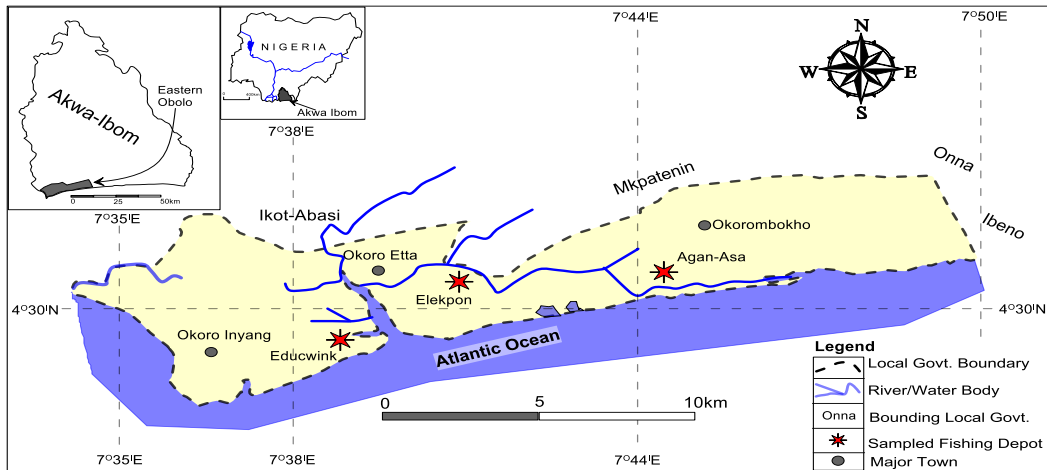
These imply that fishermen with 1 – 5 years of fishing experience tended to earn N12,000.00 – N240,000.00 p.a., those with 6 – 10 years of fishing experience tended to earn N241,000.00 to N720,000.00 p.a., while fishermen with 11 – 15 years of experience in fishing tended to earn N721,000.00 to N1,200,000.00 p.a. In other words, fishermen with higher levels of fishing experience belonged to higher fish income groups.

## Conclusion

The study examined the characterization of educational levels, fishing experiences and fish incomes of fishermen in Eastern Obolo LGA of Akwa Ibom State, Nigeria. The average level of education of the fishermen was 6 years, majority of them had formal education and their mean ages across different age groups were not statistically the same from one another. The fishermen had 8 years of average fishing experience with majority of them having 6 – 10 years of fishing experience. The means across their various groups of fishing experience were statistically different from one another. About N528,800.04 was the average fish income of the fishermen, which ranged from N12,000.00 to N1,200,000.00. Majority (29%) of them earned fish income of N241,000.00 – 480,000.00, and their means across varying fish income groups were significantly different, from one another. The fish incomes and educational levels of the fishermen were positively and significantly correlated and also had significant associations, such that fishermen with secondary education earned three times more than those with primary education. Also, the correlation between fish incomes and fishing experiences of the fishermen was positive and significant, even their associations were equally significant, such that higher levels of fishing experience resulted in higher levels of fish income. The study recommends policies that ensure fishermen acquire up to secondary education, while also providing incentives and enabling environment for fishermen to remain within the trade, to take maximum advantage of their experience.

## References

- Aminu, F.O., Ojo, O.O. and Adekunle, M.F. (2017). Socioeconomic analysis of artisanal fish production in Lower Ogun river basin areas of Lagos State, Nigeria. *Ghana Journal of Agricultural Science*, 51, 63–72.
- Anyanwu, S.O., Wilcox, G.I., Okafor, B.B. and Eneyo, C. (2022). Influence of socioeconomic characteristics on artisanal fishing in Andoni LGA of Rivers State, Nigeria. *African Journal of Biological, Chemical and Physical Sciences*, 1(1), 8–16.
- Dambatta, M.A., Sogbesan, O.A., Tafida, A.A., Haruna, M.A. and Fagge, A.U. (2016). Profitability and Constraints of Three Major Fisheries Enterprises in Kano State, Nigeria. *Global Journal of Science Frontier Research: Interdisciplinary*, 16, 1-8.
- Ele, I. E. (2008). An empirical analysis of fish production in the major fishing systems of the Cross River Basin, Nigeria. Unpublished Ph.D thesis, University of Calabar, Calabar
- FAO (2023). International Year of Artisanal Fisheries and Aquaculture closes with many concrete results. F A O . <https://www.fao.org/newsroom/detail/IYAF2022-closes-with-many-concrete-results-310323/en>. Retrieved on 4<sup>th</sup> April, 2023.
- Fisheries (November, 2021). Small in size – big in value. Small-scale artisanal fisheries and aquaculture in 2022. The International Journal for Rural Development (R U R A L 2 1) . <https://www.rural21.com/english/a-closer-look-at/detail/article/small-in-size-big-in-value-celebrating-small-scale-artisanal-fisheries-and-aquaculture-in-2022.html>. Retrieved 4<sup>th</sup> April 2023.
- George, A.D.I., Akinrotimi, O.A. and Nwokoma, U.K. (2021). Socioeconomic analysis of artisanal fisheries in three Local Government Areas of River State, Nigeria. *Journal of Research in Agriculture and Animal Science*, 8(2), 16–23.
- Ifeanyi-Obi, C.C. and Iremesuk, P. (2018). Environmental factors influencing artisanal fishing in Eastern Obolo Local Government Area of Akwa Ibom State. *Journal of Agricultural Extension*, 22(1), 55–66.
- Inoni, O.E. and Oyaide, W.J. (2007). Socioeconomic analysis of artisanal fishing in the south agro-ecological zone of Delta State, Nigeria. *Agricultura Tropica et Subtropica*, 40(4), 135–149.
- Lawal, J-S., Obatola, P.O., Giwa, E.J. and Alhaji, T.A. (2016). Socioeconomic analysis of artisanal fishing operation in West and East Axes of Lagos State, Nigeria. *World Journal of Agricultural Research*, 4(1), 31–35.
- Oritse, G. (March 03, 2021). “Nigeria has 2.5 million metric tonnes of fish deficit - Minister.” Vanguard online newspaper. Maritime Report. <https://www.vanguardngr.com/2021/03/nigeria-has-2-5m-metric-tonnes-of-fish-deficit-minister/>. Retrieved on Friday, 3<sup>rd</sup> February, 2023.
- Regional Agency for Agriculture and Food [ARAA] (2023). Facing the Challenges in the Fisheries and Aquaculture Sector in West Africa. ARAA. <https://araa.org/en/news/facing-challenges-fisheries-and-aquaculture-sector-west-africa>. Retrieved 4<sup>th</sup> April, 2023.
- United Nations Conference on Trade and Development [UNTCAD] (2017). Artisanal fishers are on the frontline of the overfishing crisis. UNCTAD. Artisanal fishers are on the frontline of the overfishing crisis | UNCTAD. Retrieved on 4<sup>th</sup> April, 2023.



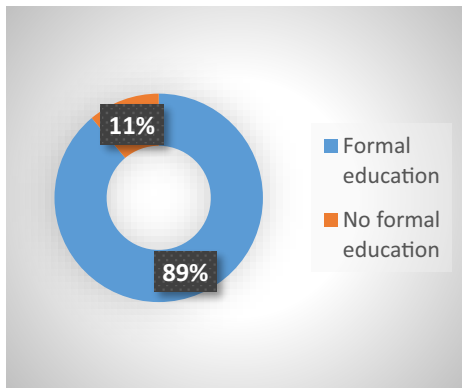
**Figure 1: Map of Eastern Obolo LGA of Akwa Ibom State showing sampled fishing depots**

**Table 1: Frequency distribution and ANOVA test on the level of education of the fishermen**

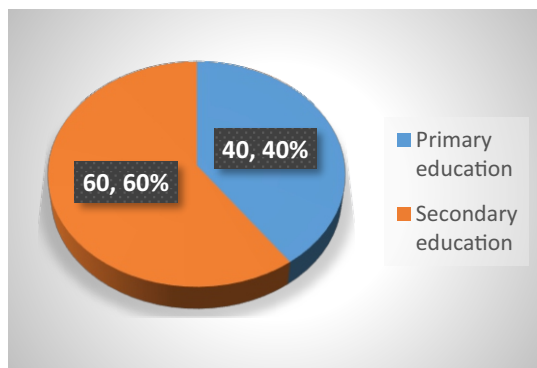
Level of education	Frequency	Percentage (%)	Mean ( $\bar{x}$ )	F-value	Scheffe-test
i. No formal education	10	11.11	0.00	183.427***	ii*; iii*
ii. 1 – 6 years (Primary Education)	32	35.56	4.19		i*; iii*
iii. 7 – 12 years (Secondary Education)	48	53.33	8.75		i*; ii*
Total	90	100%	<b>6.16</b>		

**Key: \* and \*\*\* - significant at 0.05 and 0.01 levels of probability, respectively**

**Source: Computed from field survey, 2021**



**Figure 2: Percentage distribution of the fishermen based on their level of education**



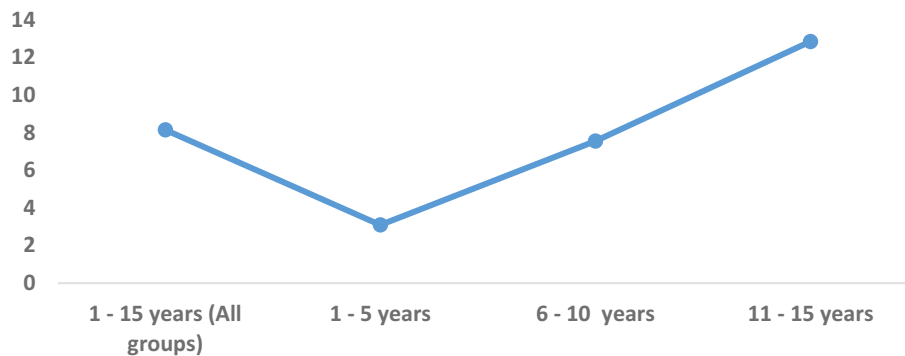
**Figure 3: Percentage distribution of fishermen with formal education**

**Table 2: Frequency distribution and ANOVA test on the fishing experience of the fishermen**

Fishing Experience	Frequency	Percentage (%)	Mean ( $\bar{x}$ )	F-value	Scheffe-test
i. 1 – 5 years	22	26.70	3.09		ii*; iii*
ii. 6 – 10 years	37	42.20	7.54		i*; iii*
iii. 11 – 15 years	31	31.10	12.45		i*; ii*
Total	90	100%	<b>8.14</b>	360.847***	

*Key: \* and \*\*\* - significant at 0.05 and 0.001 levels of probability, respectively*

*Source: Computed from field survey, 2021*



**Figure 4: Mean scores of various groups of fishing experience of the fishermen**

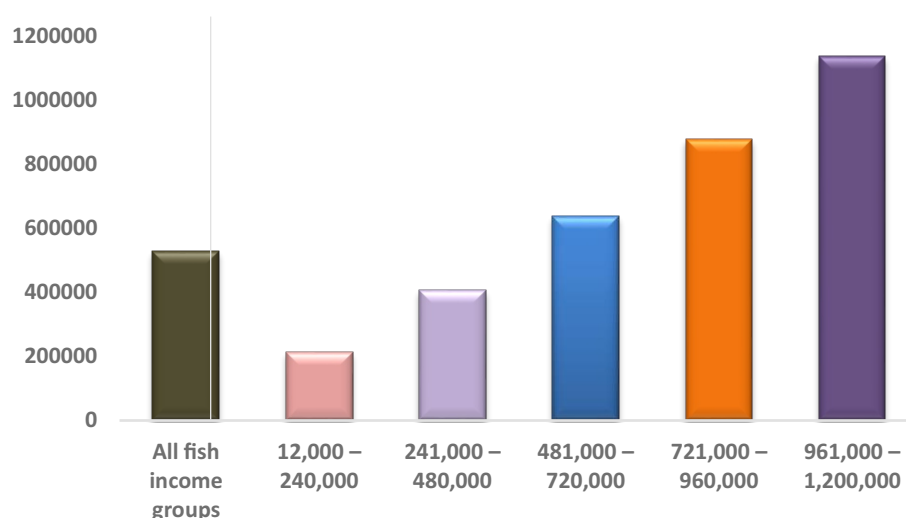
*Source: Computed from field survey, 2021*

**Table 3: Frequency distribution and ANOVA test on fishing income of the fishermen**

Fishing Income/ annum (₦)	Frequency	Percentage (%)	Mean ( $\bar{x}$ )	F-value	Scheffe-test
i. 12,000 – 240,000	25	27.80	212,160.00		ii*; iii*; iv*;
ii. 241,000 – 480,000	26	28.90	405,692.28		v*
iii. 481,000 – 720,000	19	21.10	637,263.12		i*; iii*; iv*;
iv. 721,000 – 960,000	12	13.30	878,000.04		v*
v. 961,000 – 1,200,000	8	8.90	1,137,000.00		i*; ii*; iv*; v*
Total	90	100%	<b>528,800.04</b>	614.451***	i*; ii*; iii*; v* i*; ii*; iii*; iv*

*Key: \* and \*\*\* - significant at 0.05 and 0.01 levels of probability, respectively*

*Source: Computed from field survey, 2021*



**Figure 5: Average incomes of various fish income groups of the fishermen**

*Source: Computed from field survey, 2021*

**Table 4: Correlation of fishermen’s fish income and their years spent in schooling**

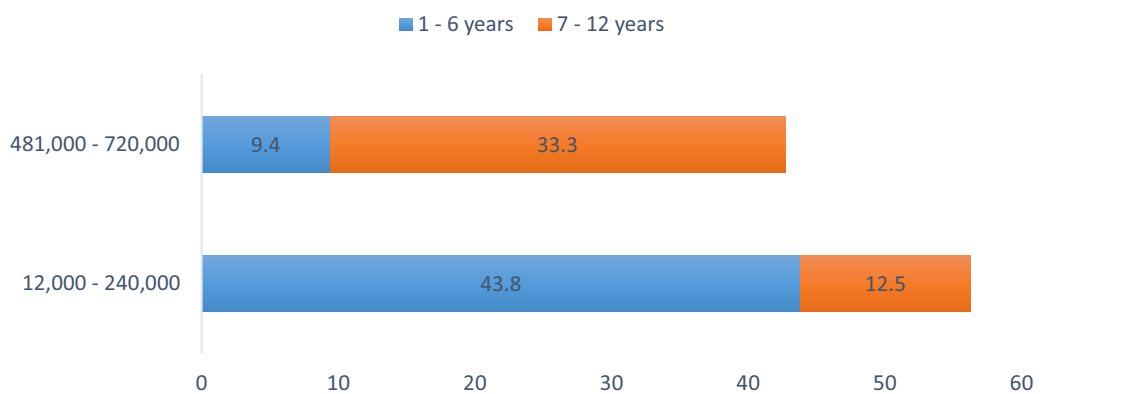
		Fish income	Years of schooling
Fish income	Pearson correlation	1	0.349**
	Sig. (2-tailed)		0.001
Years of schooling	Pearson correlation	0.349**	1
	Sig. (2-tailed)	0.001	

**Key:** \*\* - correlation is significant at 0.01 level (2-tailed). Source: Computed from field survey, 2021

**Table 5: Crosstabulation of fishermen’s fishing income \* level of education**

			Level of Education (years)			
			NFE	1 – 6	7 – 12	Total
Fish Income (₦) “000”	12 – 240	Freq. count	5	14	6	25
		% within the level of education	50	43.8	12.5	27.8
		Adjusted residual	1.7	2.5 <sup>S</sup>	-3.5 <sup>S</sup>	
	241 – 480	Freq. count	4	8	14	26
		% within the level of education	40.0	25.0	29.2	28.9
		Adjusted residual	0.8	-0.6	0.1	
	481 – 720	Freq. count	0	3	16	19
		% within the level of education	0.0	9.4	33.3	21.1
		Adjusted residual	-1.7	-2.0 <sup>S</sup>	3.0 <sup>S</sup>	
	721 – 960	Freq. count	1	4	7	12
		% within the level of education	10.0	12.5	14.6	13.3
		Adjusted residual	-0.3	-0.2	0.4	
	961 – 1,200	Freq. count	0	3	5	8
		% within the level of education	0.0	9.4	10.4	8.9
		Adjusted residual	-1.0	0.1	0.5	8.9
Chi-Square			18.121***			
Cramer’s V			0.317			

**Key:** <sup>S</sup> – significant cells (ar > |2|); \*\*\* - significant at 0.01 levels of probability; NFE – No Formal Education; Source: Computed from field survey, 2021



**Figure 6: Frequency distribution (%) of significant associations between fish incomes and educational levels of fishermen. Source: Computed from field survey, 2021**

**Table 6: Correlation of fishermen’s fish income and their years of fishing experience**

		Fish income	Fishing experience
Fish income	Pearson correlation	1	0.469**
	Sig. (2-tailed)		0.000
Fishing experience	Pearson correlation	0.469**	1
	Sig. (2-tailed)	0.000	

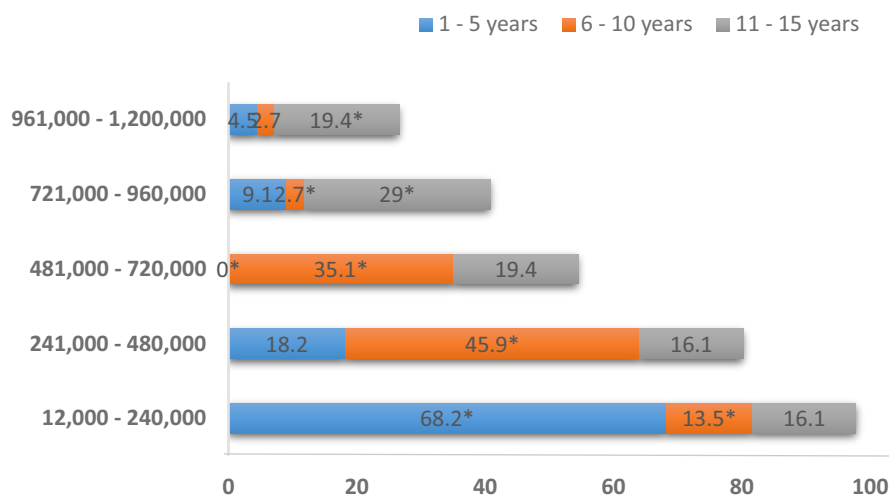
**Key:** \*\* - correlation is significant at 0.01 level (2-tailed). Source: Computed from field survey, 2021



**Table 7: Crosstabulation of fishermen’s fish income and fishing experience**

		Fishing Experience (years)				
			1 – 5	6 – 10	11 – 15	Total
Fish Income (₦) “000”	12 – 240	Freq. count	15	5	5	25
		% within the fishing experience	68.2	13.5	16.1	27.8
		Adjusted residual	4.9 <sup>S</sup>	-2.5 <sup>S</sup>	-1.8	
	241 - 480	Freq. count	4	17	5	26
		% within the fishing experience	18.2	45.9	16.1	28.9
		Adjusted residual	-1.3	3.0 <sup>S</sup>	-1.9	
	481 – 720	Freq. count	0	13	6	19
		% within the fishing experience	0.0	35.1	19.4	21.1
		Adjusted residual	-2.8 <sup>S</sup>	2.7 <sup>S</sup>	-0.3	
	721 – 960	Freq. count	2	1	9	12
		% within the fishing experience	9.1	2.7	29.0	13.3
		Adjusted residual	-0.7	-2.5 <sup>S</sup>	3.2 <sup>S</sup>	
	961 – 1,200	Freq. count	1	1	6	8
		% within the fishing experience	4.5	2.7	19.4	8.9
		Adjusted residual	-0.8	-1.7	2.5 <sup>S</sup>	
	Chi-Square		46.860***			
	Cramer’s V		0.509			

**Key:** <sup>S</sup> - significant cells ( $ar > |2|$ ); \*\*\* - significant at 0.01 levels of probability; Source: Computed from field survey, 2021



**Key:** \* - significant crosstabulations

**Figure 7: Fish income \* fishing experience of fishermen crosstabulations**