# STRUCTURAL ANALYSIS OF FISH MARKETING IN TARABA STATE, NIGERIA

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## ABSTRACT
The study analyzed the structure of fish marketing in Taraba State, Nigeria. Multi-stage sampling technique consisting of purposive and random sampling was used in selecting 188 respondents. Data were collected with the aid of structured. Frequency tables, percentage, gini coefficient were used to describe and analyze data. T-test was used to test the null hypothesis. Majority (62.2%) of the respondents were retailers while 37.8% were wholesalers. Respondents who sourced their initial capital for the business from their own savings made up 43.9%. About 53.3% were members of cooperatives, 87.8% were non-seasonal traders and 94.4% of the respondents set their price through haggling. Gini coefficient of 0.59 was found amongst the retailers indicating a moderately concentrated market while the wholesalers had a gini coefficient of 0.47 indicating that the market was not concentrated. Fish marketing was tested to be profitable at 5% level of significance. The major constraints associated with fish marketing in the study area were insufficient capital questionnaires, insecurity challenges, among others. Based on these findings, this study recommends that marketers should be effectively linked to available financial institutions so as to obtain soft loans. They should also collaborate with the vigilante group to combat some of the insecurity problems associated with theft.

**Keywords:** Fish marketing, Gini co-efficient, Hypothesis, Market structure and Questionnaires.

## INTRODUCTION
Nigeria is endowed with a large area of inshore waters, and a vast inland system comprising natural and man-made lakes, rivers, creeks, lagoons and wetlands all of which support good varieties of fisheries. Fish is a very important agricultural product in Nigeria, and is largely consumed in the country due to its rich nutritional and medicinal values. The total fish demand for Nigeria based on the 2014 population estimate of 180 million is 3.32 million metric ton. The domestic fish production from aquaculture, artisanal and industrial fisheries for 2014 is 1.123 million metric ton thereby necessitating a supply of 2.197 million metric ton through importation. The Central Bank of Nigeria [CBN] (2005) report showed that the contribution of the fishery sector to the GDP rose from ₦76.76 billion in 2001 to ₦162.61 billion in 2005. Also, in 2014, fisheries contributed 0.48% to the Agriculture GDP (FAO, 2014). About 90% of fish produced in Nigeria is sold in the local market as a source of protein to the growing population.

There is very little direct dealing between fishermen and fish consumers. Apart from the local consumers in villages along riverine areas, majority of consumers are found in local trading centers and in urban areas far away from the shores. In order to bring out larger quantities of fish, fishermen have tended to specialize on fish production leaving the marketing roles to be performed by fish traders. The above is the reason why marketing of fish is not usually on the basis of fisherman to consumer (Lawal and Idega, 2004). There are several

middlemen in the link between producers (i.e., fishermen) and consumers, who cause the price of fish to change as it passes through them such that by the time it reaches the final consumer, it has increased considerably. It is therefore important to evaluate marketing system of fish because they indicate how the various market participants are organized to accomplish the movement of the commodity from the producer to the ultimate consumer (Olukosi *et al.,* 2007). According to USAID (2008) Structure-Conduct-Performance is an analytical approach or framework used to study how the structure of the market and the behavior of sellers of different commodities and services affect the performance of markets, and consequently the welfare of the country as a whole. Structure relates especially to the degree of competition in a market, conduct relates to how the marketers behaves in the market while performance relates to the assessment of how well the process of marketing is carried out and how successfully its aims are accomplished. Efficient and good marketing can only operate where there is good market structure and conduct in place and it is fully utilized (Adegeye and Dittoh, 1985). In this regard, a study of this nature is required in order to: analyze the fish market structure; examine the market conduct; and identify the constraints faced by fish marketers in the study area. The study tested null hypothesis; Ho: Fish marketing is not profitable in the study area**.**

## MATERIALS AND METHODS
### The Study Area
The study area was Taraba State, Nigeria in West Africa. The state lies roughly between latitudes $6^020N$ and $9^040N$ of the Equator and between longitudes $9^000E$ and $12^000E$ of the Greenwich meridian (Oruonye and Bashir, 2011). ). It covers a land area of about 54,473km$^2$ with a projected population of 2.9 million people by 2013 (NPC, 2007). Taraba State is located at the North Eastern part of Nigeria. It has 16 Local Government Areas and two Special Development Areas. It is divided into four Agricultural Development Programmes (ADPs) zones; A, B, C and D. It is bounded in the west by Nasarawa and Benue State, North-west by Plateau State, North by Bauchi and Gombe State, North-east by Adamawa State and South-east by Republic of Cameroon.

The State has a tropical climate marked by dry (November – March) and rainy (April – October) seasons. It has an average annual rainfall range between 800mm to 1950mm and the temperature ranges between $15^0C$ to $38^0C$. The major occupation of the people of Taraba State is Agriculture. Communities living on the banks of River Benue, River Taraba, River Donga and Ibi engage in fishing all year round.

### Method of Data Collection
Data were collected from primary sources, through the administration of well-structured questionnaire. A multi-stage sampling technique was employed to select a sample size of 188 respondents for the study. In the first stage, three Local Government Areas were purposively selected based on the preponderance of fishing activities. In the second stage, two fish markets were purposively selected out of each of the three Local Government Areas selected. This was done based on the intensity of fish marketers.

In last stage, a sampling frame was developed for each of the market and using proportional allocation of 40% (0.4) across broad, a sample size of 188 respondents was obtained. Random sampling was used in selecting the 188 respondents for this study.

### Analytical Techniques
Descriptive statistics (frequency table and percentage) and inferential statistics (Gini co-efficient) were used in the study; and T-test was used to test the null hypothesis.

## Variable Specification

Gini co-efficient was employed to analyze the structure of fish market. Mathematically, the gini co-efficient is expressed as;

$$GC = 1 - \sum XY \qquad \dots(1)$$

where;

X = proportion of sellers
Y = cumulative proportion of sales
∑ = summation sign

T-test was used to test the null hypothesis and it is mathematically expressed as

$$t = (U_1 - U_2)/ S.E \qquad \dots(2)$$
$$t = AR - AC/ S.E \qquad \dots(3)$$

where;

AR = Average revenue
AC = Average cost
S.E = Standard error

## RESULTS AND DISCUSSION

### Structure and Concentration of Fish Marketing

The result in Table 1 reveals that a total sales of ₦18,732,900.00 was generated among the retailers monthly, 27 retailers had sales ranging from ₦1.00 - ₦75,000.00 and contributed ₦1,508,300.00 of the total sales, which indicates a proportion of 8.05%. Furthermore, six retailers had sales ranging from ₦375,001.00 - ₦450,000.00 and contributed ₦2,480,800.00 of the total sales, which indicates a proportion of 13.24%. The gini coefficient calculated was 0.59 which is closer to one than zero, the market was moderately concentrated. This result agrees with the study of Ismail et *al.* (2014) who discovered that fish retailing in Borno State is moderately concentrated with gini coefficient of 0.52.

**Table 1:** Concentration of Retailers by Monthly Sales

| Monthly Sales Range(₦) | Freq. of sellers | % of sellers (X) | Cum. % of sellers | Total value of monthly sales(₦) | % of Total sales | Cum. % of Total sales (Y) | XY |
|---|---|---|---|---|---|---|---|
| 1 – 75,000 | 28 | 25 | 25 | 1,508,300 | 8.05 | 8.05 | 0.02012 |
| 75,001 – 150,000 | 32 | 28.57 | 53.57 | 3,421,400 | 18.26 | 26.31 | 0.07517 |
| 150,001 – 225,000 | 23 | 20.54 | 74.11 | 4,472,900 | 23.88 | 50.19 | 0.10309 |
| 225,001 – 300,000 | 12 | 10.71 | 84.82 | 3,097,500 | 16.54 | 66.73 | 0.07147 |
| 300,001 – 375,000 | 11 | 9.82 | 94.64 | 3,752,000 | 20.03 | 86.76 | 0.08502 |
| 375,001 – 450,000 | 6 | 5.36 | 100 | 2,480,800 | 13.24 | 100 | 0.0536 |
| **Total** | **112** | **100** | | **18,732,900** | | | **∑XY = 0.408475** |

Gini coefficient = 1 - ∑XY = 1 – 0.408475 = 0.59
Source: Field Survey, 2018

The result in Table 2 also shows that wholesalers generated a total sales of ₦97,958,000.00 monthly, 17 wholesalers had sales ranging from ₦500,001.00 - ₦1,000,000.00 and contributed ₦15,601,000.00 of the total sales, which indicates a proportion of 15.93%. Furthermore, three wholesalers had sales ranging from ₦2,500,001.00 - ₦3,000,000.00 and contributed ₦7,697,500.00 of the total sales, which indicates a proportion of 7.85%. The gini

coefficient calculated was 0.47 which is low; therefore the market is not concentrated. This implies that the activity of some wholesalers cannot affect the price and demand for fish in the market. This contradicts the finding of Lawerence *et al*. ( 2014 ) that indicated the estimated value of gini co-efficient to be 0.64 which implies inequality in market share ( i.e a concentrated market).

**Table 2:** Concentration of Wholesalers by Monthly Sales

| Monthly Sales Range(₦) | Freq. of sellers | % of sellers (X) | Cum. % of sellers | Total value of monthly sales(₦) | % of Total sales | Cum. % of Total sales (Y) | XY |
|---|---|---|---|---|---|---|---|
| 1 – 500,000 | 1 | 1.47 | 1.47 | 500,000 | 0.51 | 0.51 | 0.00007 |
| 500,001 – 1,000,000 | 17 | 25 | 26.47 | 15,601,000 | 15.93 | 16.44 | 0.0411 |
| 1,000,001 – 1,500,000 | 16 | 23.53 | 50 | 18,216,000 | 18.60 | 35.04 | 0.08245 |
| 1,500,001 – 2,000,000 | 23 | 33.82 | 83.82 | 39,099,500 | 39.91 | 74.95 | 0.25348 |
| 2,000,001 – 2,500,000 | 8 | 11.76 | 95.58 | 16,844,000 | 17.20 | 92.15 | 0.10836 |
| 2,500,001 – 3,000,000 | 3 | 4.42 | 100 | 7,697,500 | 7.85 | 100 | 0.042 |
| **Total** | **68** | **100** | | **97,958,000** | | | **∑XY = 0.52736** |

Gini coefficient = 1 - ∑XY = 1 – 0.52736 = 0.47
Source: Field Survey, 2018

Furthermore, Figure 1 shows the lorenz curve for fish retailing and wholesaling in the study area, respectively. The lorenz curve for fish retailing is more convex than the lorenz curve for fish wholesaling indicating that there is inequality in income distribution among the retailers and consequently, establishing market concentration. This finding agrees with Lorenz (2005), who stated that more inequality in income distribution implies more convex lorenz curve. The observed inequality in earning may be a reflection of differences in the risk bearing capacity or due to difference in capital base of the respondents.

**Barriers to Entry and Exit and Product Differentiation**
The result in Table 3 reveals that 94.4% of the respondents agreed that there was no barrier to buying and selling in the fish market. Any interested person could engage in the trade and quit at will. This indicates that the market is not concentrated and there is no joint profit maximization among sellers. This finding agrees with Adamu (2016) that there is freedom to entry and exit in yam markets in Taraba State. The result in Table 3 further shows that fish were differentiated. About 63.8% of the fish marketers indicated that fish in the market were not similar. They were differentiated by color, variety or size. This implies that the consumer will have the opportunity to exercise preference of one fish over another.
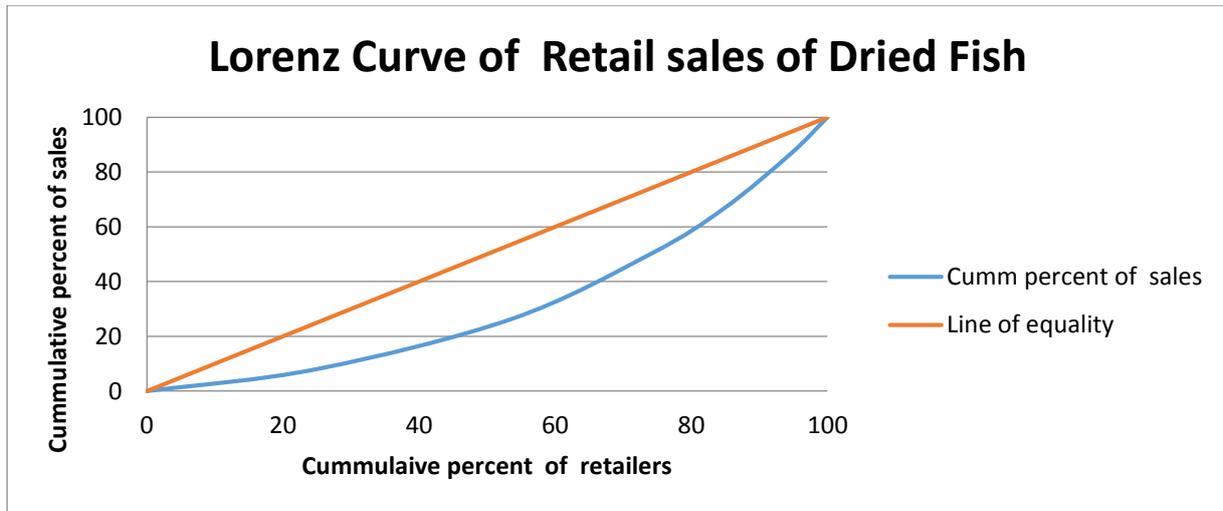
Figure 1: *Lorenz curve for fish retailing*

**Table 3:** Distribution of Fish Marketing by Structure (n = 180)

| Variables | Frequency | Percentage |
|---|---|---|
| **Freedom to entry and exit** | | |
| Freedom to entry and exit | 170 | 94.4 |
| There is no freedom to entry and exit | 10 | 5.6 |
| **Product Differentiation** | | |
| Based on color | 5 | 2.8 |
| Based on variety | 23 | 12.8 |
| Based on size | 37 | 20.6 |
| All of the above | 115 | 63.8 |

Source: Field Survey, 2018

**Market Conduct of the Respondents**

The distribution of fish marketers by conduct is shown in Table 4. The responses of the respondents indicate that the market structure drives their conduct. Majority (62.2%) of the fish marketers were retailers while 37.8% were wholesalers. This shows that with increased capital base, most of the retailers will expand their business by trading in larger quantities. The expansion of business will result in obtaining better profit which in turn improves the standard of living of the respondents.

The result in Table 4 also shows that 44.4% of the respondents sourced their initial capital for the business from friends and relatives, 43.9% from personal savings, 11.1% obtained loans from banks. This could be because most of the respondents do not have collateral securities to enable those obtained loans from the banks. The effect of this distribution on the marketers is the inability to expand their business.

The distribution of the respondents by cooperative membership as shown in Table 4 indicates that 53.3% of the respondents were members of cooperative while 46.7% of them were not. This shows that there is no barrier to entering the cooperative societies and that members of the cooperatives are more likely to have better access to loans since most banks and other financial institutions are most times reluctant in issuing loans to individual marketers. The cooperative also provide their members with important market information which helps

them in making rational decision in Table 4 also shows that 87.8% of the marketers were non-seasonal trader (all year round) while 12.2% of the marketers engage in the trade seasonally. This implies that fish will always be available at the right time, at the right place and at right form required by the consumers. This concurs with the finding that 72.1% of the fish marketers in Akwa Ibom State are non-seasonal ( Umoinyang, 2014).

Also 94.4% of the fish marketers set their price through haggling, 5.0% arrived through standardized fixed price and 0.6% set their based on the market price. This indicates that prices of fish in the market were determined by the forces of demand and supply. Implying that when prices are high, the producers or marketers will increase their supply and consumers will make more demand when prices are low. This finding agrees with Offor *et al.* ( 2018 ) who reported that majority ( 63.3% ) of the retailers set their prices based on bargaining.

**Table 4:** Market Conduct of the Fish Marketers (n = 180)

| Variables | Frequency | Percentage |
|---|---|---|
| **Type of trader** | | |
| Retailer | 112 | 62.2 |
| Wholesaler | 68 | 37.8 |
| **Source of capital** | | |
| Own savings | 79 | 43.9 |
| Loan from bank | 20 | 11.1 |
| Friends and relatives | 80 | 44.4 |
| Loan from cooperatives | 1 | 0.6 |
| **Cooperatives** | | |
| Membership | 96 | 53.3 |
| Non membership | 84 | 46.7 |
| **Participation** | | |
| Seasonal | 22 | 12.2 |
| Non seasonal | 158 | 87.8 |
| **Setting of price** | | |
| Standard fixed price | 10 | 5.6 |
| Haggling | 170 | 94.4 |
| **Information channel** | | |
| Telephone (GSM) | 102 | 56.7 |
| Personal contact | 78 | 43.3 |

Source: Field Survey, 2018

The distribution of the channel of getting market information reveals that 56.7% of the fish marketers used telephone (GSM) while 43.3% used personal contact. The significant use of telephone was attributable to the coverage of the area by different communication networks. Personal contacts are easily accessible and dependable because the marketers frequently come into contact with one another for market deliberations. This result is in contrast with the finding of Reuben and Reuben (2011) who reported that 73.17% of their respondents in study area got market information through other marketers such as family members, friends and neighbours.

**T-test Results**
The result of Table 5 (testing the null hypothesis) shows that the calculated t-value is greater than the critical t-value. This implies that fish marketing in the study area was

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profitable. Therefore, the study rejected the null hypothesis that fish marketing is not profitable and accepts the alternative hypothesis.

t = AR - AC /S.E

= 2,475.30 – 2,141.20/110.92

= 334.10/110.92

= 3.0119. The critical t value at 0.05 level of significance is 1.660

**Table 5:** Comparative Analysis of Marketing Cost and Revenue of Fish

| Variables | Mean(₦) | Mean difference | Std. Error Mean | t |
|---|---|---|---|---|
| Revenue | 2,475.30 | | | |
| | | 334.10 | 110.92 | 3.0119* |
| Cost | 2,141.20 | | | |

**Constraints Faced by Respondents in Fish Marketing**

The result in Table 6 identifies the major problems faced by the fish marketers in the study area. Out of the 188 respondents, 143 mentioned insufficient capital as the most serious constraints they faced. Capital is an essential and a veritable input in any enterprise, without which the success of the enterprise could be hampered. Money is needed for day-to-day running of fish marketing beginning from purchasing to transportation and other marketing activities.

**Table 6:** Constraints faced by the Respondents

| Variables | Frequency | Percentage | Rank |
|---|---|---|---|
| Insufficient capital | 143 | 17.7 | 1st |
| Insecurity | 129 | 15.4 | 2nd |
| Seasonality of fish | 92 | 11.5 | 3rd |
| Poor road network | 79 | 9.8 | 4th |
| Poor storage facilities | 62 | 7.7 | 5th |
| Pest infestation | 57 | 7.0 | 6th |
| Fluctuation in prices | 55 | 6.8 | 7th |
| High cost of labour | 52 | 6.5 | 8th |
| Consumer choice | 50 | 6.3 | 9th |
| Poor market information | 34 | 4.3 | 10th |
| Poor technical extension services | 30 | 3.7 | 11th |
| Low demand/patronage | 26 | 3.3 | 12th |

*Multiple responses were recorded
Source: Field Survey, 2018

The marketers in the study area also reported that insecurity challenges were a threat to their business and lives. These challenges have led to the closing down of some of the markets for some period of time thereby hindering marketing activities. Seasonality in fish supply ranked third. Fish is seasonal, it is usually abundantly available during the rainy season and the demand for it is constant all year round. Therefore, marketers had to contend with supply imbalance. Other notable problems included pest infestation, fluctuation in prices, consumer choice, poor road network, poor patronage, poor market information, high cost of labour and poor storage facilities.

## CONCLUSION AND RECCOMMENDATIONS

The structure of fish marketing system in the study area exhibited an imperfect market of monopolistic nature. Majority of the respondents were retailers and prices were arrived at through haggling. Fish trading in the study area is profitable at 5% level of significance. However, fish marketing in the study area is majorly affected by insufficient capital, insecurity and seasonality of fish. Based on the findings from this research the following recommendations were made:

1. The study found that insufficient capital was a major problem confronting the activities of the fish marketers. Funds in forms of aids and soft loans should be provided by the Government, banks or other financial institutions to the marketers. This action will help increase the capital base of the individual fish marketer and also attract more people into the business.

2. The marketers can employ the services of the vigilante group to combat some of the insecurity problems associated with theft. On the other hand Government can assist the marketers by providing and posting security agents to the market so as to reduce the insecurity challenges they face. There should also be checking point at both the entrance and exit of the markets. Also Non-Govermental Organisatons (NGOs) can also help by organising programs that will help in educating the marketers on how to face insecurity challenges.

3. Government should also provide modern and more efficient processing methods and facilities at strategic locations at affordable prices so as to combat the problem of seasonality of fish by making it available all year round.

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