

Analysis of Structure and Conducts of Dried Fish in Benue State, Nigeria

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DOI 10.56201/ijebm.vol.11.no1.2025.pg93.107

Abstract

This study examined the marketing structure and conduct of dried fish marketers in Benue State, Nigeria. A multistage sampling technique was used to select 226 dried fish marketers from Makurdi, Otukpo, Guma, and Agatu LGAs in the State. Data collected were analysed with the aid of descriptive statistics and Gini coefficient. The study revealed that majority of the rural (84.0%) and urban (98.9%) dried fish marketers were females, aged 36-50 years for both rural (43.7%) and urban (49.4%) areas. Majority of the rural (88.2%) and urban (77.5%) dried fish marketers were married with household size of 5-12 persons. Majority (56.3% and 51.7%) of the rural and urban dried fish marketers respectively spent mean of seven years in formal education and had mean of 16 years and 14 years dried fish marketing experience for the rural and urban dried fish marketers respectively. Furthermore, it was revealed that majority (84.9% and 85.4%) of the rural and urban marketers respectively were members of dried fish marketers' association who had less than one million naira as their marketing return. Gini Coefficient for dried fish in the rural and urban areas were 0.45 and 0.57 respectively indicating that there was no competition in the areas and inequitable distribution of the income of the markers. Funding should be made available for the traders to expand their business; Cooperatives can aid to access credit facilities from banks in form of government intervention funds with low interest rates which will solve the problem of lack of capital.

Introduction

Fish is one of the most important sources of food and income to many people in Nigeria (Girei *et al.*, 2021). The quality of fish protein is comparable to that of meat, milk and poultry (Ezihe, 2013). Some of the very essential nutrients of fish include: lipids and vitamins among which are lysine, methionine and tryptophan, also known as essential amino acids absent in plant proteins. Other nutrients include: fat soluble vitamins, especially vitamins A and D, phosphorus, iodine, magnesium, copper, calcium and iron (Bureau, 2012). Fish has an edge over some of the animal protein sources because it is relatively cheaper and readily available in rural as well as urban areas. In most societies, fish occupies a prominent position as a major source of protein and as a highly preferred food. Over the years, increasing population and rising personal income have caused the demand for fish to grow rapidly both in absolute terms and in relation to the demand for most agricultural products (Falodun, 2011).

In Nigeria, fish is the cheapest animal protein source and dried fish, in particular, is regarded as possessing the potential to solve the pervasive protein malnutrition problem in the country because of its relative affordability compared with fresh fish (Mafimisebi, 2012). Thus, dried fish is the hope of the poor for increasing their consumption of animal proteins. Boosting the level of dry fish consumption will necessarily entail retail price reduction which is achievable only if the market operates perfectly and efficiently. This is essential for sustaining production and enhancing nutritional well-being of the populace (Mafimisebi, 2012). Fish is one of the most diverse groups of animals known to man with over 2,500 species and there are more species of fish than all other vertebrates (Ekine and Binaebi, 2018). The fishery sector is estimated to contribute about 3.5% to Nigeria's Gross Domestic Product (GDP), and also provides direct and indirect employment to over six million people (Kwara State Government, 2010). Employment opportunities come from different fishing activities such as production, processing, preservation and transportation (Ali *et al.*, 2008).

Marketing is an integral aspect of fish production because it is only when the fish gets to the consumers that production is said to be complete. Fish marketing is one of post-harvest activities, which is an avenue of improvement of family income (Olopade *et al.*, 2022). The availability of fish to consumers at the right time and at the right place requires effective marketing system. The level of efficiency and profitability of the market and marketing functions are very important for sustainable marketing of agricultural products like fish (Umoinyang, 2014). Effective and efficient marketing systems are those that will induce the production of those products and quantities which when sold to the consumer will result in maximum returns after the deduction of minimum marketing charges and farm production costs (Muhammed, 2011).

Market Structure refers to those characteristics of the market, which affect the traders' behavior and their performances (Salim *et al.*, 2005). Unlike marketing systems of agricultural products, fish marketing is characterized by heterogeneous nature of the products with respect to species, size, weight, nutritional quality, storage quality and price (Upadhyay and Pandey, 2009). Market structure is the physical appearance of the market in terms of the degree of product differentiation, market integration, concentration (number and size of buyers and sellers). Okereke and Anthonio, (1988) reported concentration as an important variable in market structure analysis (Yusuf *et al.*, 2003).

Market conduct refers to the behavior of firms or the strategies used by the firms, for example, in their pricing, buying, selling, etc., these activities may require the firms to engage into informal cooperation or collusion (Teka, 2009). Definition of market conduct implies analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable.

The form in which markets are structured is almost assumed to rigidly determine each firm's conduct (output decisions and pricing behaviour), which yields an industry's overall performance (e.g. its efficiency and profitability) (Umoinyang, 2014). Several works have been carried out on fish marketing but there is scarce research on structure and conduct of dried fish in Benue State, hence, the need for this study which attempts to describe the socio-economic

characteristic of dried fish marketers and analyse the market structure and conduct of dried fish in Benue State.

Methodology

This study was carried out in Benue State, which is one of the 36 States of Nigeria located in the North-Central. The State has 23 Local Government Areas, and its Headquarters is Makurdi. Benue State lies in the middle belt region of Nigeria between longitudes $6^{\circ}35'E$ and $10^{\circ}E$ of the Greenwich meridian and latitudes $6^{\circ}30'N$ and $10^{\circ}N$ of the Equator. The State has a landmass of 30,955 square kilometers (Benue State Agricultural and Rural Development Authority (BNARDA), 1998) as well as estimated population of 7,992,784, and is also made up of 413,159 farm families (National Population Census, 2006). Most of the people in the State are farmers while inhabitants of the riverine areas engage in fishing as their primary or important secondary occupation. Benue State experiences two distinct seasons, the wet season and the dry season. The rainy season lasts from April to October with annual rainfall in the range of 150-180mm and the dry season begins in November and ends in March. Benue State is acclaimed the nation's food basket because of its diverse rich agricultural produce which includes yams, rice, beans, cassava, soya beans, benniseed, maize, millet, tomatoes and a lot of fruits. Poultry, goat, sheep, pigs and cattle are the major domestic animals kept.

Sampling Techniques

Multi-stage sampling technique was used for the study. The first stage was purposive selection of four Local Government Areas which include Makurdi, Otukpo, Guma and Agatu Local Government Areas because of their high level of dried fish marketing activities as well as their urban and rural status. Secondly, four markets were purposively selected from the urban areas. They include, Wadata, and Wurukum markets from Makurdi LGA, Otukpo main market and Ella markets from Otukpo LGA. Four markets were also selected from the rural areas. They include, Gbajimba and Abinsi markets from Guma LGA and Obagaji and Oweto markets from Agatu LGA, giving a total of eight markets for the urban and rural areas. Taro Yamene formula was used to determine the sample size of 226 from a population of 517 dried fish marketers, while Bowley's proportional allocation technique was used to allocate sample respondents to each of the selected LGAs based on their population. A total of 226 respondents were administered questionnaires but 208 questionnaires were retrieved and used in data analysis.

Data Analysis Techniques

Descriptive statistics (frequency, mean and percentages) were used to summarize and describe socio-economic characteristics and conduct of marketers and Gini Coefficient was used to analyse market structure.

Variable/Model Specification

Market Structure Analysis

Gini Coefficient

Gini coefficient was used to examine the market structure of dried fish to achieve specific objective (ii). Mathematically, the Gini coefficient computation adopted from Iheanacho (2005) is expressed as follows;

$$GC = 1 - \sum X Y \quad (1)$$

Where:

GC = Gini Coefficient,

X = Proportion of Sellers, Y = Cumulative Proportion of Sales,

\sum = Summation Sign, and 1 = constant or unity.

The GC varies from 0 to 1. If the coefficient is equal to 0, it implies perfect equality in the distribution, if the value is 1, it corresponds to perfect inequality. The closeness of Gini coefficient to zero, suggest a greater degree of equality, with a lower level of concentration and more competition in the markets. Consequently, as the GC approaches unity, the degree of inequality increases. The higher the level of concentration, the more imperfect the markets are and the lower the efficiency of such markets (Ojo, 2014).

Results and Discussion

Socio-economic Characteristics of Dried Fish Marketers

The respondents' sex, marital status, association membership, age, household size, marketing experience, years of formal education and marketing return were used to describe the socio-economic characteristics of dried fish marketers as presented in Table 1.

The results of the sex of respondents show that majority of the rural respondents (84.0%) and urban respondents (98.9%) were females. Dried fish marketing in the study area was dominated by the female gender. This could be attributed to the fact that women play a central role in fish processing and marketing due to their gender role as a result of their culture and also because women have better bargaining power than men. Women engage mainly in post-harvest activities (processing, selling, marketing of fisheries resources) resulting in some empowerment. Women have tendency to be more labour efficient than males (Onubuogu *et al.*, 2014). The study is in line with the study of Agbebi and Adetuwo (2018) which showed that 88.7% of the fish marketers were female while 11.3% were male. It is also in line with the study of Adeosun and Bankole (2012) which revealed that most of the fish marketers were female (94.0%) while only 6.0% were male.

Majority of the dried fish marketers in the rural (88.2%) and urban (77.5%) areas were married. This suggests that dried fish marketing in the study area was dominated by married couples and it is attributable to the fact that dried fish marketing serves as a source of livelihood for the family, hence they work hard and devote their energy and time to the business so as to be able to meet their family needs such as food, shelter, clothing, children's school fees and so on.

High percentage of married individuals is also an indication that the respondents are permanent settlers in the area and all their economic activities revolve around the area, so migration is not a case to be considered. This is in consonance with the study of Onubuogu *et al.* (2014) which indicated that about 5.0% were Single, 91.3% were married and 3.7% were widowed. Similarly, the study of Girei *et al.* (2021) showed that 73.7% of the respondents were married.

Most of the rural (84.9%) and urban (85.4%) respondents were members of the dried fish marketers' association. This could be attributed to their knowledge on the importance of belonging to a group through which revenue and other tax payments are subsidized and credit easily made available rather than on individual basis. Membership of a cooperative society enables marketers to interact with themselves, share their experiences and assist themselves. The implication of these results is that most of the marketers in the study area enjoy the assumed benefits accruing to cooperative societies through pooling of resources together for a better expansion and effective management of resources, which in most cases could not be derived individually. According to Waziri *et al.* (2014) marketers belonging to a cooperative association will likely be protected from exploitation, hence encouraging efficient marketing system. This study is opposed to the findings of Agbebi and Adetuwo (2018) which showed that majority (71.3%) did not belong to any fish marketer's association while only 28.7% belonged to the cooperative association.

The results revealed that most of the rural (43.7%) and urban (49.4%) respondents were within the ages of 36-50 years. This implies that most of the dried fish marketers were in their productive years, which is an important factor in marketing activities. They are still in their economically active age, which could have a positive effect on productivity and profitability. This is in line with the study of Olopade *et al.* (2022) which states that respondents were within the age range of 31–50 years old, constituting 62.5% of the total respondents. It is also similar to the findings of Esiobu *et al.* (2014b) who reported that this age group constitutes the major productive work force and that young individuals have more potential to withstand stress, strain, risk and have more strength to face tedious task associated with fish marketing than the too young or too old individuals.

Analysis of household size showed that a larger percentage (57.1%) and (58.4%) of the rural and urban fish marketers respectively had a household size of 5-12 persons which is an indication that fish marketers in the study area have a large household size and cheap access to un-remunerated family labour. This, therefore, explains why the use of hired labour in small-scale agribusiness enterprise is very low. This is in consonance with the study of Agbebi and Adetuwo (2018) which states that a larger percentage (46.3%) of fish marketers had a household size of 6-10 persons which is an indication that fish marketers in the study area have a large household size. The study of Girei *et al.*, (2021) similarly showed that most (58.7%) of the respondents had household size that ranged from one to five persons with the mean household size of six individuals. It stated that greater household sizes provide free labour but subject to the willingness to support the family in its fish marketing. This result is also in consonance with Nwaleji *et al.* (2014), who opined that large household size ensures availability of labour for marketing activities.

Dried fish marketers had a mean marketing experience of 16 years and 14 years in the rural and urban areas respectively. This implies that the marketers were well experienced in their business. This will make them know when the price of fish becomes higher and lower and directs

them from whom and where to buy. They can also identify possible problems and are likely to proffer solutions. This agrees with the study of Njoku and Offor (2016) which showed that catfish marketers had a mean marketing experience of 13 years. Also, this study agrees with the study of Girei *et al.* (2021) which showed that the mean marketing experience was estimated at 15 years, indicating that the marketers were experienced in their business and should, therefore, be able to carry out fish marketing through adhering to some precautions thereby helping in maximizing profit.

The results show that majority (56.3%) rural respondents spent less than six years in formal education while 51.7% urban respondents spent less than six years in formal education, with both areas having respondents who spent seven years as the mean years in formal education. This implies that there is a level of literacy in the study area that allows for communication and acceptance of new ideas to boost performance. Yonas and Aemro (2019) had a similar assessment which showed that most of the traders were literate and 50% and 5% of them completed primary and secondary school respectively. It also agrees with the study of Njoku and Offor (2016) which showed that 93.3% of the respondents had formal education and about 68% of the sampled catfish marketers had tertiary education, opining that the marketers were very literate and were positioned to take advantage of new marketing techniques and innovation that could boost their businesses. FAO (2006) states that higher education level is synonymous with higher level of business attainment and higher income.

The results indicate that majority (63.9%) and (53.9%) of the respondents within the rural and urban areas respectively had less than ₦1000,000 annual income. This implies that majority of the respondents are low-income earners and explains why there is high concentration of markets in the study area. This differs from the study of Nwabunike (2015) which showed that majority of fish marketer's gain annual income of ₦1,000,000-₦5,000,000 per annum.

Table 1: Percentage Distribution Socio-economic Characteristics of Dried Fish Marketers in Rural and Urban Markets (n=119, 89)

Socio-economic characteristics	Percentage*		Mean	
	Rural	Urban	Rural	Urban
Sex				
Female	84.0	98.9		
Male	16.0	1.1		
Marital status				
Married	88.2	77.5		
Single	11.8	22.5		
Association Membership				
Members	84.9	85.4		
Non-members	15.1	14.6		
Age (years)			50	38
≤ 20	-	12.4		
21 – 35	21.8	24.7		
36 – 50	43.7	49.4		
≥ 51	34.5	13.5		
Household size (persons)			8	5
≤ 4	28.6	39.3		
5 – 12	57.1	58.4		
13 – 20	13.4	2.2		
≥ 21	0.8	-		
Marketing experience (years)			16	14
≤ 10	35.3	44.9		
11 – 20	40.3	34.8		
21 – 30	19.3	14.6		
≥ 31	5.0	5.6		
Formal education (years)			7	7
≤ 6	56.3	51.7		
7 – 12	37.8	38.2		
13 – 18	5.0	10.1		
≥ 19	0.8	-		
Marketing return (₦' 00,000)			1,004	1,358
≤ 10	63.9	53.9		
11 – 20	27.7	22.5		
21 – 30	6.7	12.4		
≥ 31	1.7	11.2		

Source: Field survey data, 2024

*Multiple response existed, hence percentage > 100

Market Structure and Conduct of Dried Fish Marketers

Market structure for the rural and urban markets was examined using Gini Coefficient and degree of product differentiation. The G.C for rural and urban markets are presented in Table 2 and Table 3 respectively.

Market Structure

The computed Gini Coefficient (G.C) for dried fish in the rural and urban areas of Benue state are estimated as 0.45 and 0.57 respectively, and G.C greater than 0.3 implies inequitable distribution of sales. This shows that the concentration of the market is marginally high, indicating the existence of in efficiency and non-competitive behaviour in the market structure. Thus, the market share of dried fish in the area was dominated by few marketers. This was possible through product differentiation, the respondents differentiated their dried fish in terms of sizes, types and quality. It can be deduced that it was an imperfect market, and that there was a high degree of inequality and high level of concentration within the markets. This finding is similar to the results obtained by Eronmwon *et al.* (2014) and Folusho and Taiwo (2018). Mohammed *et al.* (2014) in their finding in consonance with this study stated that the value of Gini coefficient greater than 0.35 is high, indicating inequitable distribution of sales income/sales and that dried fish products in the markets were classified into grade A, B and C. However, the study of Irhivben *et al.* (2015) on structure and performance of catfish market in Ibadan metropolis contrasts that there were no product differentiations.

Table 2: Gini Coefficient for Dried Fish Sales by Marketers in Rural Markets (n = 119)

Income category (N'00,000)	No of Marketers	Proportion of marketers (x)	Total sales (N)	proportion of total sales	Cumulative proportion of sales (y)	Σxy
≤ 10	76	0.639	47,637,000	0.399	0.399	0.255
11 – 20	33	0.277	45,413,100	0.380	0.779	0.216
21 – 30	8	0.067	19,412,000	0.162	0.941	0.063
≥ 31	2	0.017	7,065,000	0.059	1	0.017
Total	119		119,527,100			0.551

Source: Field survey data, 2024

Mean sales: 1004,429.41

G.C = $1 - 0.551$

= 0.45

Table 3: Gini Coefficient for Dried Fish Sales by Marketers in Urban Markets (n = 89)

Income category (N'00,000)	No of Marketers	Proportion of marketers (x)	Total sales (N)	proportion of total sales	Cumulative proportion of sales (y)	Σxy
≤ 10	47	0.528	27,147,000	0.224	0.224	0.118
11 – 20	22	0.247	31,169,000	0.258	0.482	0.119
21 – 30	11	0.124	27,706,000	0.229	0.711	0.063
≥ 31	9	0.101	34,920,000	0.289	1	0.017
Total	89		120,942,000			0.426

Source: Field survey data, 2024

Mean sales: 1, 358,898.88

G.C = 1 – 0.426

= 0.57

Market Conduct

The market conduct was examined using mode of sale, price fixing behaviour, advertising, training and source of capital as presented in Table 4.

The results reveal that majority (93.3%) and (98.9%) of the rural and urban areas respectively subscribed to cash payment as their mode of payment. This is to enable them buy more for sale so as to continue in business as most of them complained that selling on credit runs down their business and has pushed many of their counterparts out of business. The study of Ataboh (2019) supports this finding revealing that about 80% of the respondents sold on cash and carry basis.

Majority of the respondents (96.6%) in the rural areas and all the respondents in the urban areas fixed their price by bargaining with the buyers. This is attributed to the fact that inflation is high and most buyers lack purchasing power to buy what they need at the moment, which has led to much bargaining and low patronage, and has made the sellers to sell at break even in order to remain in business. It is supported by the study of Irhivben *et al.* (2015) that the prices of catfish were determined through bargaining powers of the parties involved (buyers and sellers) since there is non-uniformity of the prices of catfish in the study area. Also, Yonas and Aemro (2019) observed that majority (50%) of the traders had their price set by the interaction of supply and demand fish of the markets.

Analysis of advertising reveals that majority of the rural (63.0%) and urban (92.1%) respondents do not practice advertisement. This is because dried fish is a delicacy and a cheaper means of protein in the study area, where the demand is high and buyers move around the market to buy from sellers who openly display them. This finding is contrary to that of Yesufu *et al.* (2014)

which revealed that majority of the respondents advertised, and the most important means of advertising dried fish were via flyer and hand bills.

About 62.2% (majority) of the rural respondents did not attend training while majority (93.3%) of the urban respondents attended training. This is because in the urban areas most respondents ventured into the business as a means of livelihood and as such were deliberate to learn the intricacies of the business in order to succeed and remain in the business, taking it as a means of personal initiative for self-development. Contrarily, the rural respondents adopted fish marketing techniques from their parents, ancestors and neighbors contributing their labour to support the business as members of the household. This result of the rural respondents agrees with the study of Das *et al.* (2018) which observed that most of the fish farmers (80%) did not get any kind of scientific fish culture training and contradicts the result of the urban respondents.

Majority of the rural (78.2%) and urban (56.2%) respondents had their personal savings as the source of capital. This is because most respondents are afraid of loans and try as much as they can to stay away from them due to high interest rates as well as penalty meted in cases of default. This is in line with study of Fapohunda *et al.* (2021) that the major sources of fund for financing marketing activities were from their personal savings.

Table 4: Percentage Distribution of Marketers by Conduct Characteristics in Rural and Urban Markets

Conduct Characteristics	Rural Market (n=119) *	Urban Market (n=89) *
Mode of sale		
Cash	93.3	98.9
Advanced payment	28.6	9.0
Credit sale	43.7	53.9
Price fixing behaviour		
Bargaining	96.6	100.0
Market price	67.2	6.7
Group decision	40.3	4.5
Advertising		
Advertised	37.0	7.9
No advertisement	63.0	92.1
Training		
Attended training	37.8	93.3
Did not attend training	62.2	6.7
Source of capital		
Loan	44.5	15.7
Personal savings	78.2	56.2
Friends/family	54.6	22.5

Source: Field survey data, 2024

* Multiple responses existed.

Conclusion and Recommendations

The study area was dominated by females who were married with large household size. They were young and strong enough to withstand the stress of dried fish marketing. Most dried fish marketers in the area belonged to dried fish marketers' association and were experienced, literate enough to give room for effective communication in doing their business, adoption of innovations and proper record keeping for better business management even though they had low marketing return. The dried fish market in Benue state is inefficient with few dried fish marketers who dominate the market. Funding should be made available for the traders to expand their business; Cooperatives can aid to access credit facilities from banks in form of government intervention funds with low interest rates which will solve the problem of lack of capital.

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