JOURNAL OF AGRICULTURAL ECONOMICS, EXTENSION & SCIENCE ISSN (Print) 2545-5179, ISSN (Online) 2714-5018
Official Journal of the College of Agricultural Economics, Extension & Science JAEES Vol. 7 No. 2 2021, Pages 61 - 74
www.jaees.org

STRUCTURE AND PERFORMANCE OF FROZEN FISH MARKETING IN SULEJA LOCAL GOVERNMENT AREAOF NIGER STATE, NIGERIA

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Abstract

The study examined the structure and performance of the frozen fish marketing in Suleja Local Government Area of Niger State, Nigeria. A multi-stage random sampling procedure was used to select seventy frozen fish marketers. Data collected were analyzed using descriptive statistics, Gini coefficient, net margin analysis, and ordinary least square regression.Findings from the study revealed an average marketing experience of 10.53years and 91.4% of the marketers were female. The structure of the market was uncompetitive structure, and 19 frozen fish marketers had 46.9% of the total sales in the market. Frozen fish marketing is highly profitable with a net margin of ₦36,707.14, and the factors that influence the performance of frozen fish marketers include the age of the marketer, marketing experience, cooperative membership, purchase cost and marketing cost. Marketing of frozen fish was majorly constrained by high purchase cost, lack of storage facilities, spoilage of fish during handling, and poor pricing by customers. The study recommended frozen fish marketers should be educated and encouraged to use alternative sources of funding such as microcredit to finance their business. Also, wholesalers should sellon credit to retailers who are consistent in the market based on their creditworthiness.

Keywords: Structure, Performance, Frozen Fish, Marketing, Suleja LGA

Introduction

Fish is considered to be economically, socially and culturally important as a global dietary aspect for sustainable food security (Odebiyi*et al.,* 2013). It is important to the ever increasing world population, especially in most parts of Africa, as it is the major source of

cheap high quality animal protein. In Nigeria, it constitutes 40% and 60% of protein intake and total protein intake in adults especially in rural areas respectively (Adekoya& Miller, 2004).

Being animal proteins, fish is said to be superior to plant proteins because it contains all amino acids needed in the body which is contrary to plant protein which are always inadequate in one or more of the essential amino acids. When compared to other sources of animal protein such as poultry and beef, fish has the highest level of easily metabolized protein, fats, vitamins, calcium, iron and essential amino acids (Ayoola, 2010). Fish is a good source of sulphur and essential amino acids such as lysine, leucine, valine, arginine and thiamine; polyunsaturated fatty acids; fat soluble vitamins such as vitamins A, D E and K; water soluble vitamins for example, B complex; and minerals, such as, calcium, phosphorous, iron, iodine and selenium.

Fish products are highly traded and global fish trade has been increasing very rapidly in recent decades with an estimated 45% of the world catch now traded internationally (WorldFish, 2015). West Africa has a huge potential for trade in intra-regional terms (Torres & Van Seters, 2016) and vibrant markets for fish and fish products in Nigeria, Ghana and the Ivory Coast being the three major importers of fish products in the region (Ndiaye, 2013).

Recent study on fish market structure revealed high level of competition among fish marketers (Ekine&Binaebi, 2018). This is because at retail level in fish marketing channel, there is little or no government regulations, hence, fish marketers enjoy free entry and exit of the fish market which depict a perfect market structure situation. With free market exit, marketing experience of frozen fish marketers are affected due to quick decision to leave the market for any perceived unfavourable circumstances such as high cost of marketing and low return. This will subsequently affect performance as a result of short period of time spent in the market. Also, Ali *et al*., (2008) noted a continuous increase in the number of people involved in fish marketing as a result of growing population of the Nigeria. The free entry and exit have great potential to affect the existing market structure, thus this study aimed to examine the market structure of frozen fish.

Given that frozen fish marketing at retail level has a perfect market structure, the factors that influence its performance and efficiency remain unknown in Suleja LGA. Similarly, Gaya *et al* (2010) noted that the available few studies on fish marketing did not investigate the efficiency or otherwise of the process. Fish marketing efficiency has the

potentials to stimulate fish production in the country in view of the huge deficit between local consumption and production.

Additionally, despite the contribution of fishery to the agricultural GDP in Nigeria, the marketing of fish is being confronted with the problem of high rate of spoilage, shortage, price instability and high cost of transportation due to malfunctioning in the marketing chain. Also, marketers are constraints by inadequate processing skills, fish spoilage and lack of storage facilities (Eze *et al* 2010), which adversely affect the performance of frozen fish marketing. Based on the synthesized information, the objective of the study was to examine the structure and performance of frozen fish market in Suleja Local Government Area (LGA) of Niger State, Nigeria. Specifically, the objectives were to:

i. describe the socioeconomics characteristics of fish frozen marketers in the study area;
ii. describe the structure of fish frozen market in the study area;
iii. analyze the cost-return, efficiency and net margin of frozen fish market in the study area;
iv. estimate the determinants of performance of frozen fish market in the study area; and
v. identity the factors that constrain frozen fish marketing in the study area.

Methodology

This study was carried out in Suleja LGA of Niger State. Suleja LGA lies between latitude 9°6'13.8" and 9°17'49.35" North of the equator and longitude 7°6'58.6' and 7°12'18.41' East of the Greenwich Meridians. It has an area of 136.33 km^2 with an estimated population of 260,240 people (NBS, 2016). Suleja enjoys sub-humid climatic condition with mean annual rainfall of 1640mm and a raining season of over seven months in the year. The maxima rainfall regime is usually in the month of august. Temperature is generally high in the summer months, but cools during the harmattan months which last from November to March (Aminu, *et al*., 2013).

There are fourteen major towns in Suleja LGA which include Madalla, Madugu, Maje, Muran, Nabulic, Numewa, Padawa, RafinKaffi, Shingere, Suleja, TungaGwuntu, Yagun, Yaldna and Zahehna. The major occupations of the people are civil service, artisans, trading, and farming. The farming activities include livestock production such as poultry, cattle, goat, sheep, fish, rabbit etc. and the crops majorly produced in the area include yam, rice, beans, cassava, guinea corn, millet, cassava, garden egg, citrus, water

melon, garden egg, ginger, cucumber, mango, and cashew.

A two-stage random sampling procedure was used for the study. In the first stage seven (7) towns were randomly selected from the list of towns in Suleja LGA. In the second stage ten (10) frozen fish marketers were selected from the selected towns, giving a total of seventy (70) frozen fish marketers for the study. Primary data were collected with the aid of structured questionnaire and scheduled interview.

Method of analysis and model specification

Objective (i)wasachieved using descriptive statistics such as percentage and mean. Objective (ii) was achieved using Gini coefficient.

Gini Coefficient is given as:

$G = 1 - \Sigma$ - - - - - - - - - 3

Where:

G = Gini coefficient.

x = Percentage share of each class of seller.

y = Cumulative percentage of the sales.

Gona*et al.,* (2004) showed that the degree of concentration of marketers is indicated by the value of Gini coefficient. The Gini coefficient value ranges from 0 to 1. A perfect equality in concentration (low) of sellers is expected if Gini coefficient tends towards zero, while perfect inequality in concentration (high) of sellers is expected if Gini coefficient tends towards one. That is, if Gini coefficient equal to 1 market is imperfect, and if Gini coefficient equal to 0 market is perfect and competitive. Abah*et al.,* (2015) posited that Gini coefficient greater than 0.35, indicates inequitable distribution of sales income.

Objective (iii)was achieved using net return analysis, gross margin, and marketing efficiency.

Net return (profit) = TR – TC (₦) - - - - - - 4

TC = TFC + TVC - - - - - - - - - 5

TR = PQ - - - - - - - - - 6

Gross Margin = TR – TVC - - - - - - - 7

Where: TR = Total Return, TC = Total Cost, TFC = Total Fixed Cost, Total Variable Cost, P = Price and Q = Quantity

According to Olukosi & Isitor (1990) and Ozougwu (2002), and Ozougwu (2002), marketing efficiency (ME) is given as:

Where: TR = Total Revenue

TC = Total Cost

ME is expressed in percentage when it is multiple by 100.

$$ME = \frac{TR}{TC} \text{ (₦)} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 8$$

OLS was fitted into four functional forms namely linear, semi-log, double and exponential. OLS model is given explicitly as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_t \quad - \quad - \quad 9$$

Where:

Y = Net return (as defined in equation 4)

β_0 = Intercept or constant term

β_1 to β_{12} = Partial regression (Slope) coefficients

X_1 = Age of the marketer (years)

X_2 = Education level of the marketer (years spent in school)

X_3 = Marketing experience (years spent in marketing)

X_4 = Household size (number of persons)

X_5 = Cooperative membership (Yes=1, No=0)

X_6 = Marital status (Married=1, Otherwise=0)

X_7 = Gender (Female=1, Male=0)

X_8 = Purchase cost (₦)

X_9 = Marketing cost (₦)

e_t = error term

Objective (v)was achieved using five point Likert scale. This involved assigning numbers such as 5, 4, 3, 2, and 1 to responses in form of Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree respectively. The average score was used as the decision rule. Any response that scored above the average was accepted and below it was rejected. The average score 3.00 is specified as:

$$\text{Average score} = \frac{5+4+3+2+1}{5} = 3.00 \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 10$$

Results and Discussion

The socioeconomic characteristics of the frozen fish marketers

The results in Table 1 showed the socioeconomic characteristics of the frozen fish marketers in the study area.Mostof the respondents represented by 40.0% were within the age range of 45-54 years, while 12.9%, 28.6% and 18.6% of the respondents were within the age range of 25-34 years, 35-44 years and 55-64 years respectively. The mean age was 45.48 years which implies that most of the respondents were within their productive useful age.

The mean years spent in school by the respondents was 10.33 and most of them represented by 72.9% spent 8-14 years in school. This impliesmost of the frozen fish marketers had basic education which will enable them to communicate and manage their business effectively as well make decisions that would positively affect the performance of their business. While 27.1% of them spent 1-7 years in school.

Large percentage of the frozen fish marketers represented by 57.1% spent 0-9 years in frozen fish marketing, while 31.4% and 11.4% of them spent 10-19 and 20-29 years respectively in frozen fish marketing. This result implies that few fish marketers had more marketing experience and large proportion of them had low experience in the market. The mean marketing experience was 10.53 years. This implies that most of the frozen fish marketers had spent significant years in frozen fish marketing.

Most of the respondents represented by 65.7% maintained a moderate household size of 5-9 persons while 28.6% and 5.7% had small and large household size of 0-4 and 10-14 respectively. The mean household size was 6 persons. This reflects the situation of modern household living in sub-urban where the campaign for family planning is extensively reached out to families.

Large percentage of the respondents represented by 62.9% and 55.7% were cooperative members and married respectively, while 37.1% and 44.3% were non-cooperative members and not married respectively. in addition, 91.4% of the frozen fish marketers were female and 8.6% of them were male. This result is contrary to the result of Mebrate &Worku (2019) that revealed large proportion of male in fish marketing in Central Ethiopia.

Table 1 The socioeconomic characteristics of the frozen fish marketers

Variables	Frequency	Percentage	Mean
Age of Respondents			
25-34	9	12.9	45.48
35-44	20	28.6	
45-54	28	40.0	
55-64	13	18.6	
Education			
1-7	19	27.1	10.33
8-14	51	72.9	
Marketing Experience			
0-9	40	57.1	10.53
10-19	22	31.4	
20 and above	8	11.4	
Household size			
0-4	20	28.6	6
5-9	46	65.7	
10-14	4	5.7	
Cooperative membership			
No	26	37.1	
Yes	44	62.9	
Marital status			
Otherwise	31	44.3	
Married	39	55.7	
Gender			
Male	6	8.6	
Female	64	91.4	
Total	**70**	**100.0**	

Source:*Field survey data, 2020*

The structure of frozen fish market in the study area

Table 2 showed the structure of frozen fishmarket in the study area. The value of the Gini-Coefficient was 0.4888 which implied inequality in the sales revenue of frozen fish marketers. This implies some frozen fish marketers had some influence in the market, hence reflecting uncompetitive market structure such as perfect oligopoly. Whereas, at retail level in frozen fish marketing, there is free entry and exit, but this result revealed high level of inequality in the sale revenue. The inequality in the sale revenue could also be as a result of discrepancy in the investment level and marketing experience of the marketers.

The results further revealed 46.9% of the total sale revenue of frozen fish in the study area was accounted for by nineteen (19) frozen fish marketers while 53.1% of the total sale revenue was accounted for byfifty one (51) frozen fish marketers.The result from this study contradicts that of Ekine&Binaebi (2018) who revealed a perfect competitive market situation in fresh fish market structure inYenagoa LGA ofBayelsa State, Nigeria.

Table 2 Market structure of frozen fish in the study area

Range of Sales Revenue	Frequency of Marketers	Proportion of Marketers (X)	Cumulative Proportion of Marketers	Total Sales	Proportion of Sales	Cumulative Proportion of Sales (Y)	XY
=150,000	3	0.0429	0.0429	405760	0.0178 (1.8%)	0.0178	0.00076
150,001-250,000	12	0.1714	0.2143	2545660	0.1116 (11.2%)	0.1294	0.02218
250,001-350,000	29	0.4143	0.6286	6065970	0.2659 (26.6%)	0.3953	0.16377
350,001-450,000	7	0.1	0.7286	3102960	0.1360 (13.6%)	0.5313	0.05313
450,001 and above	19	0.2714	1	10690680	0.4687 (46.9%)	1	0.27140
Total	**70**	**1**		**22811030**	**1**		**0.5112**
			Gini-Coefficient				**0.4888**

Source:*Field survey data, 2020, the values in parenthesis are percentages.*

Cost and return analysis and marketing efficiency of frozen fish in the study area

Table 3 showed the average monthly cost, return, net return and marketing efficiency of frozen fish in the study area. The monthly average cost and return for frozen fish marketing in the study area were ₦475,840.40 and ₦512,547.60 respectively. Purchase cost was the highest cost for frozen fish marketing, followed by transportation cost ₦3094.29 and processing & storage cost ₦2948.57. The monthly average net return and gross margin were ₦36,707.14 and ₦38,101.90 respectively and it implies that frozen fish marketing was profitable. Furthermore, the marketing efficiency was 108%which implies frozen fish marketing is highly efficient in the study area. This agrees with the study of Adewale, (2005) who also have efficiency greater than one. Additionally, since the efficiency was greater than one, it indicates good performance in frozen fish marketing in the study area.

Table 3 Average monthlycost and return analysis and marketing efficiency from marketers frozen fish

Items	Amount (?)	
Sales		**512,547.60**
Variable cost		
Purchase	467710.7	
Transport	3094.29	
Storage & processing	2948.57	
Marketing chargers	692.14	
Total Variable Cost		**474,445.70**
Fixed cost		
Rent	672.86	
Depreciation	721.87	
Total Fixed Cost		**1394.73**
Total cost		**475,840.40**
Net Margin (Profit)		**36,707.14**
Gross Margin		**38,101.90**
Marketing Efficiency		**108%**

Source:*Field survey data, 2020*

The determinants of frozen fish marketers' performance in the study area

The results in Table 4 showed the OLS regression estimates for the determinants frozen fish marketers' performance in the study area. The linear functional form was chosen as the lead equation based on a high R^2 value, number of significant factors and agreement with *a priori* expectation. The R^2 value was 0.957 showed that 95.7% of variability in profitability of frozen marketing was explained by the independent factors in Table 4. The F value was significant at 1% level indicating goodness of fit of the regression line.

Age haspositive coefficient at 5% significant level. This implies as ageincrease, the performance of frozen fish marketers also increase. The result is in line with *a priori* expectation because older people are more experience, thus they can make decisions that will increase their performance in the frozen fish market.

Marketing experience has a positive coefficient at 1% significant level. This implies an increase in marketing experience of frozen fish marketers in the study area will increase their net margin by ₦295.957. The result is in line with *a priori* expectation

because marketing experience has a positive effect on the performance of frozen fish marketer. Marketing experience is vital factor for decision making in the marketing system because it enhances effective financial management and risk that may occur.

Cooperative membership has a positive coefficientat 5% significant level. This is consistent with *a priori* expectation. Cooperative membership has been a contributing factor to the growth of small scale businesses because members can share ideas of marketing and also give loan to members for investment thus increase their profit level. However, though membership of an association might be viewed as a club good rather than a public good (Boughton*et al.,* 2007). But this result suggests that frozen fish marketers' performance can be increased through cooperative membership in the study area.

Marital status has a negative coefficient at 5% significant level which implied married frozen fish marketers performed less than the unmarried. This is contrary to *a priori* expectation because married people were expected to have support either in financial term or other form of assistance from their spouse which will give them edge over their competitors in the market.

Purchase cost has a positive coefficient at 1% significant level. This is contrary to *a priori* expectation because it is expected that increase in purchase cost will reduce the performance of frozen fish marketing. Although, the result agrees with Ekine & Binaebi (2018) who found positive effect of cost of purchasing fish on profitability status of fresh fish marketers in Yenagoa Local Government Area of Bayelsa State, Nigeria, but it revealed exploitative practice of marketers who take advantage of increase in purchase cost to make higher profit.

Similarly, marketing cost has a positive coefficient at 10% significant level. This is not in line with *a priori* expectation because as marketing cost increase it was expected that profit level will decrease. However, the coefficients of education level and household size were negative and positive signed respectively, but were not significant.

Table 4 Determinants of performance of frozen fish marketing

Variables	Linear+	Exponential	Semi-log	Double-log
(Constant)	14348.438***	9.604***	-208739.317***	1.727*
	(2.557)	(74.014)	(-3.251)	(1.164)
Age of the	185.512**	-0.002	-4961.950	-0.119
marketer	(2.144)	(-0.991)	(-0.740)	(-0.767)
Education level	-110.187	-0.003*	-316.320	-0.016
	(-0.937)	(-1.223)	(-0.193)	(-0.429)
Marketing	295.957***	0.002	591.091**	0.017
Experience	(2.467)	(0.670)	(2.356)	(0.453)
Household size	108.879	-0.004	2453.647	0.029
	(0.365)	(-0.534)	(0.870)	(0.450)
Cooperative	1312.511**	0.058**	998.890	0.050*
Membership	(2.294)	(2.485)	(0.629)	(1.372)
Marital Status	-1575.932**	-0.013	-3224.946***	-0.055*
	(-2.4144)	(-0.756)	(-2.991)	(-2.199)
Purchase cost	0.067***	1.782E-006***	23960.589***	0.658***
	(19.167)	(22.061)	(10.498)	(12.485)
Marketing Cost	1.434*	1.922E-005	-5767.572	0.063
	(1.960)	(1.596)*	(-0.755)	(0.359)
R^2	**0.957**	**0.937**	**0.847**	**0.895**
Adjusted R^2	**0.950**	**0.927**	**0.824**	**0.88**
F-ratio	**146.627*** **	**98.512*** **	**36.954*** **	**57.046*** **

Source:*Field survey data, 2020*. *, ** and *** is significant at 10%, 5% and 1% level figure in parenthesis are t-value + is lead equation.

The factors that constrain frozen fish marketing in the study area

The result in Table 5 showed the factors that constrain frozen fish marketing based on Likert scale. The major factors identified by frozen fish marketers as constraint to frozen fish marketing according to ranking were high purchase cost, lack of storage facilities, spoilage of fish during handling, and poor pricing by customers. Others factors were fish smoking and its cost, distance to cold room, fish price fluctuation and cost of transportation.

Table 5 The factors that constrain frozen fish marketing

Constraints faced by frozen fish marketers	Means	Ranks	Decision
High purchase cost	3.98	1st	Accepted
Spoilage of fish during handling	3.74	3rd	Accepted
Poor pricing by customers	3.64	4th	Accepted
Fish price fluctuation	3.20	7th	Accepted
Distance to cold room	3.27	6th	Accepted
Fish smoking and its cost	3.31	5th	Accepted
Cost of transportation	3.19	8th	Accepted
Lack of storage facilities	3.92	2nd	Accepted
Marketing charges	2.98	9th	Rejected

Source: *Field survey data, 2020*

Conclusion and Recommendations

Based on the findings of the study, the structure of frozen fish marketing was uncompetitive market structure. Frozen fish marketing was highly profitable, and the factors that influence the performance of frozen fish marketers include age of the marketer, marketing experience, cooperative membership, marital status, purchase cost and marketing cost. Marketing of frozen fish was majorly constrained in the area by high purchase cost, lack of storage facilities, spoilage of fish during handling, and poor pricing by customers.

In view of the findings from the study, the following recommendations were made:

1. Frozen fish retailers should be educated and encouraged to use alternative sources of funding such as microcredit to finance their business. This will help to increase the investment level of the marketers, thus ensuring equal distribution of sale revenue. Also, wholesalers should sell on credit to retailers who are consistent in the market based on their credit worthiness.
2. Wholesalers should establish cold room in places that are accessible to frozen fish marketers.
3. Government should provide training and guidelinesfor handling of frozen fish to frozen fish marketer through extension agents in the ministry of agriculture as well as storage facilities to reduce spoilage.

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