

## Profitability and food safety measures adopted among dried fish traders Rivers State, Nigeria

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### ARTICLE INFO

### ABSTRACT

#### Key words:

Profitability,

food safety,

dried fish,

traders,

*The fisheries sector provides both food and employment for millions of people globally. Consumption of fish products is making important contribution to human nutrition and well being. Fish trading, especially dried fish is a common business among people in Rivers State. However, safety of fish products sold in the markets is uncertain among consumers in the area due to varying environmental challenges. Therefore, the study assessed the profitability and food safety measures adopted among dried fish traders in Port Harcourt City Local Government Area (PHALGA), Rivers State, Nigeria. Sixty 60 respondents were randomly selected from the market in the study area. Data collected were analysed using descriptive statistics and budgetary technique. Results indicated that majority of the respondents were females (83.3%) with a mean age of 45 years. The result further showed that net profit from the sales of small, medium and big sized fishes were ₦72,122.25, ₦52,254.50 and ₦91,865 per month respectively. Major safety measures adopted by the traders include; cleaning of display surface, drying using varying temperature, regular washing of utensils, sweeping of the surrounding, use of chemical substances etc. However, poor drying techniques, fluctuation in price, insect infestation among others are major challenges faced by the traders. Dried fish traders should be encouraged to adopt the use of hand gloves, sterilization of materials used in selling the product. Also, safe polythene bag should be used for packaging.*

## INTRODUCTION

Fish products are important components of human nutrition, sought and enjoyed by people for cultural and gastronomic reasons (Jennings, et al., 2016). The fisheries sector provides both food and employment for millions of people globally. More so, a lot of persons are economically engaged in fish processing and marketing activities. Fish consumption and trade has been accompanied by a significant development, in food quality and safety standards, improved nutritional attributes and loss reduction (FAO. 2020). They stated that stringent hygiene measures have been adopted in the past at the national, regional and international levels to meet the food safety and quality standards and ensure consumer protection. Nevertheless, many fish consumers still worry about the quality and the processes through which food products passed before reaching to the point of consumption. This is because inadequacies in food quality, safety, defence, and fraud surveillance have been identified as food integrity risks resulting to increasing sectorial, government and consumer concerns (Galimberti, et al., 2013).

Fishermen, fish processors and trader often rely on simple low-cost equipment in handling dried fish

products, majority reside in remote areas where basic services and facilities are not available. They also lack the necessary knowledge and skills and the ability to invest in new innovative techniques required in modern time fish storage. This means that fish is often handled and processed in unhygienic conditions causing spoilage, contamination with disease causing germs and loss of income as fish are sold for a low price.

Marketing being one of the vital aspects of agriculture ensures that goods and services produced get to the final consumer. Agriculture entails the production of goods and services for man's consumption. Hence, production is considered as being incomplete until the commodity reaches the final consumer (Oladejo, 2016). Considering the nature of fish which is highly perishable product, lack of organized marketing system would result in low profit. Fish marketing is constrained by low prices, low fish supply, sales of immature fish, inadequate fund, high transportation cost, inadequate storage facilities and high levy and other taxes. To be more profitable, fish trade requires every activity that increases sales revenue and as well decreasing the cost of marketing.

Profitability in fish trading is the measure of the business ability to earn profit. The reports of Adedeji, Osundare and Ajiboye (2019) indicated that fish marketing is profitable with a return on investment of 15 kobo. On same vein, Osarenren and Ojor (2014) indicated that dried fish marketing was a profitable venture. It is also, a common knowledge that safety measures in handling food products are necessary to ensure that contaminated food products are not sold to the consumers.

Safety in the food market is one of the key areas of focus in public health, because it affects people of every age, race, gender, and income level around the world Gizaw, (2019). Safety is defined as setting standards for toxicological and microbiological hazards, and instituting procedures and practices to ensure that the standards are achieved (FAO, 2010). Food safety therefore describes the handling, preparation and storage of food in ways that prevent food borne illness, and it is also the assurance that food will not cause harm to the consumer when it is prepared and eaten. This includes a number of routines that should be followed to avoid potentially severe health hazards.

It is important to note that unsafe food which contains harmful bacteria, viruses, parasites, or chemical substance could cause more than 200 diseases ranging from diarrhea to cancers. An estimated 600 million people in the world fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million disability adjusted life years (DALYs) (Gizaw, 2019). This scenario is worsen with the problems of environmental pollution in the Rivers State occasioned by illegal oil refining ie burning of local "kpo-fire" crude oil for production of diesel and Kerosene which has resulted to black soot noticeable in the environment which constitutes serious threats to human survival. It is more worrisome as most food products are sold in the open markets with absence of safety practices exposing consumers to risks associated with consumption of contaminated food especially fish products with negative health implications. It is therefore, imperative to investigate food safety measures adopted by dried fish traders in the area. The study was designed to analyse profitability and food safety measures adopted among dried fish traders in Port Harcourt Local Government Area (PHALGA) River State, Nigeria.

## METHODS

### Study Area

This study was conducted in Port-Harcourt (PHALGA) Local Government Area in Rivers State, Nigeria. Rivers states lies between Latitude 4°30'N and 5°45'N approximately longitude 6°30'E of the

Greenwich meridian with a total area of 11,077km<sup>2</sup> with a mean annual rainfall which ranges from 4,700 mm on the coast to about 1,700 mm. The state occupies lowland area of Niger Delta with dense and thick tropical rainforest vegetation. It is characterized by high atmospheric (ambient) temperature that ranges between 25°C to 38°C. The projected population figure in 2016 was 756,600 persons National Population Commission of Nigeria NPC (2016).

### Sampling procedure and data collection

Three categories (small, big, medium) of dried fish traders were purposely selected from Creek Road Market in Port Harcourt LGA. Twenty dried fish traders were randomly selected from each category to give a total number of 60 respondents.

### Method of Data Collection

A well-structured questionnaire was administered to respondents in the study area which was used for primary data collection. The questionnaire was divided into four (4) sections; section A contained the socio-economic characteristics of dried fish sellers; Section B covered the food safety measures adopted among dried fish sellers; section C captured data on the costs and returns involved in dried fish selling while section D contained the constraints encountered by dried fish sellers in the study area.

### Data Analysis

Data was analysed using descriptive analysis and budgetary techniques.

Descriptive analysis was used to examine the socioeconomic characteristics, food safety measures and challenges faced amongst dry fish sellers in the study area. Budgetary technique was used to estimate the profitability among dried fish sellers in the study area.

### Model Specification

Budgetary technique was used for the study of cost and return analysis. This was used to determine the profitability of dried fish sales in the study area.

$$\text{Net profit} = \text{TR} - \text{TC} \dots\dots\dots 1$$

$$\Pi = \text{TR} - \text{TVC} \dots\dots\dots 2$$

$$\text{TR} = \text{P} * \text{Q} \dots\dots\dots 3$$

$$\text{TC} = \text{TFC} + \text{TVC} \dots\dots\dots 4$$

Where,  $\Pi$  = Total Profit; TR=Total revenue; TC= total Cost; TFC = Total Fixed Cost; TVC = Total Variable Cost; P= Unit price of output; Q= Total quantity of output; TFC= (Depreciation value of tables); TVC= (cost of storage + cost of transportation + cost of rent + cost of polythene bag + market fees).

## RESULTS AND DISCUSSION

**Table 1. Socioeconomic distribution of the respondents**

Items	Frequency (n - 60)	Percentage	Mean
<b>Age (Year)</b>			
21 – 30	8	13.3	
31 – 40	21	35	
41 – 50	8	13.3	
51 – 60	14	23.3	
60 Years and above	9	15	45years
<b>Gender</b>			
Male	10	16.7	
Female	50	83.3	
<b>Marital Status</b>			
Single	11	18.3	
Married	43	71.7	
Divorce or separated	6	10.0	
<b>Educational Status</b>			
No Formal education	4	6.7	
Informal education	4	6.7	
Primary	11	18.3	
Secondary	14	23.3	
Tertiary	27	45.0	
<b>Marketing Experience (Years)</b>			
1 – 10	32	53.3	
11 – 20	20	33.3	
21 – 30	6	10	
31 – 40	1	1.67	
40Years and above	1	1.67	12 years

Source: Field survey, 2021

The result as presented in the Table 1. shows that (35%) of the respondents were between the age of 31-40 years and the mean age of the respondents were 45 years which showed that most of the traders are in their economic active years. The result shows that majority (83.3%) of the respondents were female and married. This result agrees with Lawal and Idega (2014) who stated that female role was more in the marketing of dried fish than males. The result further indicated that majority (45%) of the respondents had tertiary education. The result agrees with Madugu and Edward (2011) who stated that high literacy level would positively influence the sales of dried fish. The result of marketing experience of the respondents shows that majority (53%) had experience between 1-10 years and the mean marketing experience of 12 years. This finding agrees with Ali, Gaya and Jampada (2008) who reported that marketing experience is important in determining the profit levels of the traders, the more the experience they are, the more they understand the marketing system, condition, price trends etc.

**Table 2: Monthly cost and returns in small sized dried fish products (40 pcs = 1kg)**

Variables	Items	Average total (₦)
Variable cost	Cost of rent	5000
	Cost of storage	10350
	Cost of transportation	32700
	Cost of market dues	4800
	Cost of polythene bags	3720
	Cost of fish purchased	196290
Total variable cost	TVC	252,860
Total fixed cost	Depreciation value of tables	142.75
Total Cost	TFC + TVC	253,002.75
Revenue	Sales from small sized dried fish	325,125
Gross Margin	TR – TVC	72,265
Net Margin (Profit)	TR – TC	72,122.25

Source: Field survey, 2021

The result in Table 2 showed that the sales from small sized dried fish (Revenue) is Three hundred and twenty-five thousand one hundred and twenty-five naira (₦325,125) but incurred a total variable cost of two hundred and fifty-two thousand eight hundred and sixty naira (₦252,860). This indicated that an average trader earned seventy-two thousand two hundred and sixty-five naira (₦ 72,265) as gross margin monthly suggesting that sales of small sized dried fish is a profitable venture. It can also be deduced that net margin (profit) was seventy-two thousand one hundred- and twenty-two-naira twenty-five kobo (₦72,122.25). This result agrees with Madugu and Edward (2011) found that dried fish marketing was a profitable venture.

**Table 3: Monthly cost and return of medium sized dried fish monthly (26 pcs = 1kg)**

Variables	Items	Average total ( ₦ )
Variable cost	Cost of rent	6,440
	Cost of storage	8,600
	Cost of transportation	36,200
	Cost of market dues	4,680
	Cost of polythene bags	3,200
	Cost of fish purchased	228,307.5
Total variable cost	TVC	287,427.5
Total fixed cost	Depreciation value of tables	334
Total Cost	TFC + TVC	287,970.5
Revenue	Sales from small sized dried fish	340,225
Gross Margin	TR – TVC	52,797
Net Margin (Profit)	TR – TC	52,254.5

Source: Field survey, 2021

The result in Table 3 showed that the sales from medium sized dried fish was three hundred and forty thousand, two hundred and twenty-five naira (₦340,225.00) but incurred a total variable cost of two hundred and eighty-seven thousand, four hundred and twenty-seven naira (₦287,427.00). This indicated that an average trader earned fifty-two thousand, seven hundred and ninety-seven naira (₦52,797.00) as gross margin monthly suggesting that sales of medium sized dried fish is a profitable venture. It can also be deduced that net margin (profit) is fifty-two thousand, two hundred and fifty-four naira five kobo (₦52,254.50).

**Table 4: Monthly cost and return of big sized dried fish product (4-8 pcs = 1kg)**

Variables	Items	Average total ( ₦ )
Variable cost	Cost of rent	5,000
	Cost of storage	10,200
	Cost of transportation	32,700
	Cost of market dues	4,800
	Cost of polythene bags	4,500
	Cost of fish purchased	205,575
Total variable cost	TVC	262,775
Total fixed cost	Depreciation value of tables	110
Total Cost	TFC + TVC	262,885
Revenue	Sales from small sized dried fish	354,750
Gross Margin	TR – TVC	91,975
Net Margin (Profit)	TR – TC	91,865

Source: Field survey, 2021

The result in Table 4 showed that the sales from big sized dried fish was three hundred and fifty-four thousand, seven hundred and fifty naira (₦354,750.00) but incurred a total variable cost of two hundred and sixty-two thousand seven hundred and seventy-five naira (₦262,775.00). This indicated that an average trader earned ninety-one thousand nine hundred and seventy-five naira (₦91,975.00) as gross margin monthly suggesting that sales of big sized dried fish is a profitable venture. It can also be deduced that net margin (profit) was ninety-one thousand eight hundred and sixty-five naira (₦91,865.00).

**Table 5: Food safety measures adopted among dried fish sellers in the study area**

Items	Frequency (N=60)	Percentage
<b>Cleaning of display surface</b>		
Never	1	1.7
Always	38	63.3
Sometimes	21	35.0
<b>Drying using varying temperature</b>		
Low heat (stove)	6	10
Medium heat (drum)	29	48
High heat (fire wood)	24	40
<b>Use of gloves</b>		
Yes	4	6.7
No	56	93.3
<b>Regular washing of utensils</b>		
Yes	45	75
No	15	25
<b>Sweeping of the surrounding</b>		
Yes	55	91.7
No	5	8.3
<b>Method of reducing insect infestation</b>		
Fumigation	7	11.7
Insecticide	27	45
Proper storage	10	16.7
Sun drying	14	23.3
Smoking	2	3.3
<b>Estimated shelf life of dried fish in weeks</b>		
1 week	34	56.7
2 Weeks	16	26.7
3 Weeks	10	16.7

Source: Field survey, 2021:

The result as presented in Table 5 shows the various safety measures adopted among dried fish traders in the study area. The result shows that majority (63.3%) of the respondents cleaned their surface where the fish was displayed daily. Majority (48%) of the respondents use medium heat temperature (drums) to dry the fish thereby reducing the moisture content in order to increase the shelf life of the fish and avoid spoilage. This result agrees with Payra, (2016) who reported that drying methods of preservation to prevent spoilage is essential for preservation and utilization of fish products. It was further found that 93.3% of the respondents do not use gloves in handling the dried fish. Majority (91.7%) of them sweep the shop environment daily and (45%) of the respondents applied insecticide to reduce the infestation of insects. This result agrees with Ayuba and Omeji (2006) who reported that insect infestation and lack of proper storage facilities is the cause of the most prominent losses in quality of stored dried fish which leads to decrease in profit.

**Table 6: Identified problems associated with stored dried fish products for in the area**

Dangers	N	minimum	Maximum	Mean
Discolouration	60	1.00	4.00	2.6333
Presence of mould	60	1.00	4.00	2.9500
Insect infestation	60	1.00	4.00	3.1333
Presence dirt	60	1.00	4.00	2.9167
Change in taste	60	1.00	4.00	2.8667
Change in smell	60	1.00	4.00	2.9167
Decrease in price	60	1.00	4.00	2.9167

Source: Field survey, 2021 Decision rule: Accept as a danger associated with storing dried fish for long period of time if the mean score is  $\geq 2.5$

The result in Table 6 shows that insect infestation, the presence of mould and change in smell, were the three major dangers associated with storing dried fish for a long period of time.

## Challenges faced by dried fish traders in the study area

The challenges faced by dried fish sellers in the study area are presented in Table

Table 7: Challenges faced by dried fish traders

Challenges	N	Minimum	Maximum	Mean	Rank
Poor transportation	59	1.00	4.00	2.6949	6 <sup>th</sup>
Inadequate Storage facility	59	1.00	4.00	2.9153	4 <sup>th</sup>
Insect infestation	59	1.00	4.00	3.1695	3 <sup>rd</sup>
Poor drying method	59	1.00	4.00	3.4068	1 <sup>st</sup>
Bad smell	59	1.00	4.00	2.7797	5 <sup>th</sup>
Fluctuation in price	59	1.00	4.00	3.2542	2 <sup>nd</sup>

Source: Field survey, 2021. Decision rule: Mean score is  $\geq 2.5$  is problem, otherwise reject.

From Table 7, the result shows that poor drying techniques, fluctuation in price, insect infestation among others are challenges encountered by dried fish traders in the area. This is not surprise because the high humidity and other environmental challenges in the area could promote quick spoilage of stored fish products.

## Conclusion

This study analysed the profitability of dried fish business and food safety measures adopted among the traders Port Harcourt City Local Government Area, Rivers State, Nigeria. Majority of the respondents involved in the sales of dried fish were females. Dry fish trading is highly profitability. Food safety measures adopted by the traders include; cleaning of the surface before display of the products, drying fish using varying temperatures, storing in bags, baskets, basin, regular washing of utensils, sweeping of the surrounding, use of chemical substances etc. However, poor drying techniques, fluctuation in price, insect infestation among others are major challenges faced by the traders.

## Recommendations

Based on the findings from this study, the following suggestions were made:

1. Since the business is profitable, unemployed youths are advised to venture into dried fish marketing as a source to generate income.
2. Dried fish traders should be encouraged to adopt the use of hand gloves, sterilization of materials used in selling the product and also the use of polythene bag for packaging.
3. Fish should be dried properly with appropriate temperature to avoid the presence of mould and insect infestation.
4. Dry fish sellers are advised to adopt precautionary measures such as good sanitation practices and the use of suitable packaging to prevent insect infestation.

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