



Value Chain Analysis of Artisanal Fishing in Ilaje Local Government Area of Ondo State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author OOI designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author JOI managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

To bridge the demand supply gap in the Nigerian fishing industry, the value chain analyses in artisanal fishing in the coastal area of Ondo States were investigated.

Primary data was used in the study. Purposive sampling technique was used to select four fishing communities in Ilaje local government, where 35 (fishermen, processors and marketers) were each selected randomly from the communities. Data were analyzed using Descriptive Statistics and Gross Margin Analysis.

The socioeconomic characteristic indicated that 68.6% of the fishermen, 77.2% processors and 65.7% marketers were less than 50 years of age. Result revealed that all the fishermen were male, 91.2 % processors and 97.10% marketers were female. 62.9% of the fishermen have household greater than 4, the processors has 54.3% household size above 4 and 60% of the marketers have household size above 4. 94.3% of the fishermen have one form of education or the other, 77.1% of the processors have one form of education or the other and 65.7% of the marketers were also educated. All the marketers are into one association or the other. Budgeting analysis indicated

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positive margin by the two categories of marketers was ₦300.54 and ₦1,866.00 per basket respectively, a net return of 1.04 and 1.30 respectively. Processors had a positive gross margin of ₦43.871.54 and a net return of 1.12. Most influential actor is the marketer.

Keywords: Value chain; artisanal; gross margin; analysis; fishing.

1. INTRODUCTION

Fishery production is significant to Nigerian economy in view of its importance in providing cheap source of food security, income, employment and serves as source of foreign exchange, particularly to those of the riverine communities [1]. The Fisheries sub-sector maintains a steady contribution of about 3.5 to 4% of total GDP between 2008 and 2012, translating to about 10% of total agricultural GDP, which itself contributed between 35 and 40 percent within the same period [2]. Nigeria fish supply is from four major sources; the artisanal fisheries, industrial trawlers, aquaculture and imported frozen fish [3]. Also the sector is made up of capture fisheries and aquaculture. Capture fisheries encompasses both marine and inland fisheries.

The artisanal fisheries in Nigeria provided more than 82% of the domestic fish supply giving livelihoods to one million fishermen and up to 5.8 million fisher folks in the secondary sector.

The Niger Delta region contributes more than 50% of the entire domestic Nigerian fish supply. Due to abundance of both fresh, brackish and marine water bodies that are inhabited by a wide array of both fin fish and non-fish fauna that supports artisanal fisheries. It equally provide essential source of sustenance, employment and financial well-being for coastal populations of developing countries [4].

Fish is highly susceptible to deterioration without any preservative or processing measure. Eyo [5]. immediately fish dies, numbers of physiological and microbial deterioration sets in, this invariably degrades the quality of fish [6].

Value chain refers to all activities necessary to bring a product or service from conception, through the different stages of production, distribution to final consumption and final disposal after use Adeoye [7] and [8]. Therefore, analysis of value chain involve identifying chain actors and discerning their functions; identifying value added in the chain and assigning costs to those activities [9].

Onemolease and Oriakhi [10] posited that value chain analysis is essential for understanding

markets, their relationship, the participation of different actors, and the critical constraints that limit the growth of livestock (fish) production and consequently the competitiveness of small holders' farmers. These farmers currently receive only a small fraction of the ultimate value of their output, even if, in theory, risk and reward should be shared down the chain. In agriculture they can be thought of as a farm to folk' set of processes and flows. Artisanal fish value chain analysis looks at every step, a fisheries business goes through, from captured fishes to the eventual end user. The goal is to deliver maximum value for the least possible total cost.

Value chains in artisanal and aquaculture fisheries differs and composed of several nodes the products pass through before meeting the consumers. However, Fish value chains in Nigeria are not yet developed to meet international market requirements as limited value addition is done in the industry, with the result that market for fish and fish products are limited to domestic markets [11] and the eagerness to raise immediate income from fish harvest. Actors in the chain comprises of the fishermen, (fish collector) marketer and processors.

The ability to make fish relevant in the market is to ensure the flow of fish and fish product from the artisanal fisherman to the consumers in the form, time and place that will be convenient. This involves the participation of some actors along the fish distribution channel especially the middlemen [12].

This study is imperative because, most research work in the study area focus mainly on artisanal fishing and marketing, while the areas of value chain / value addition were uncovered. It is in the light of this that the research has been conceptualized to analyze value chain in artisanal fishing in the coastal area of Ondo State.

1.1 Objective of the Study

The main objective of the study is to analyze value chain in artisanal fishing production in the coastal area of Ondo States of Nigeria.

The specific objectives are to:

- i. Ascertain or determine the socio-economic characteristics of the actors in the fish value chain;
- ii. Identify the major players (actors) in artisanal fish value and;
- iii. Estimate the profit margin along the identified fish value chain;
- iv. Identify the major constraints to fish value chain actors in the study area.

2. METHODOLOGY

2.1 The Study Area

The study was carried out in Ilaje Local Government Area of Ondo State, Nigeria. The state lies between latitudes 5°4 S and 7°52 N and longitude 4°20 N and 6°05 E. Its land area is about 15,500 square kilometers. Ondo State is bounded in the East by Edo and Delta State in the south by Bight of Benin and Atlantic Ocean. Ilaje was purposively selected due to its predominant coastal wetland suitable for fish farming. It is situated within the mangrove rain forest and has an annual rainfall ranging between 2000-3000 mm per annum.

2.2 Data Collection and Sampling Technique

Data were collected through primary source with the aid of well-structured questionnaire.

Purposive sampling techniques were used in the selection of four fishing communities namely; Awoye, Odofado, Zion Pepe and Araromi sea side. The selection was based on their fishing intensity. From the selected communities, 35 fishermen, 35 processors and 35 marketers were randomly selected at the central market arena to give a total of 105 respondents.

2.3 Data Analysis and Analytical Procedure

Data were analyzed using descriptive statistics and gross margin model.

2.4 Descriptive Statistical Tools

Frequency tables, and percentage were used to describe the socio-economic characteristics of the respondents. The characteristics include the age, marital status, educational attainment, primary or major occupation, experience of the fishermen, marketers and the processors.

2.5 Gross Margin Analysis

The budgeting techniques was used to determine the gross margin and income at each stage of the chain.

The model for the estimation of the gross margin is as;

$$GMI = \sum TR - \sum TVC$$

Where;

$$\begin{aligned} TR &= Py \cdot Y_i, \\ TVC &= P \cdot X, \\ TC &= TVC + TFC, \\ NROL &= NFI / TR, \\ NFI &= GM - TFC \\ NPM &= NFI / TC, \\ BCR &= TR / TC \end{aligned}$$

GM = Gross Margin (₦)
TR = Total Revenue (₦)
TVC = Total Variable Cost (₦)
TC = Total Cost (₦)
NROL = Net Return on Investment (₦)
Py = Unit Price of Output (₦)
Y = Price of Output (₦)
PX_i = Unit Price of Variable Input Used (₦)
X_i = Variable Input (₦)
NFI = Net Farm Income (₦)
NPM = Net Profit Margin (₦)
BCR = Benefit Cost Ratio (%)

2.6 Depreciation

Depreciation on fixed assets used were calculated, using a straight line method (SLM) which assumed salvage value of zero naira. The formula is specified as; DS =

Where: DS = Annual depreciation, AC = Asset Cost, SV = Salvage Value, L = Useful Life Year.

3. RESULTS AND DISCUSSION

The actors in the artisanal fish value chain in the study were identified as; the fishermen, fish processors and fish marketers.

3.1 Socio-Economic Characteristics of the Fishermen in the Study Area

3.1.1 Gender of the respondents

The result as shown in Table 1 indicated that all fishermen in the study area were male (100%).

This could be attributed to strenuous and tasking nature of their operations which the male gender could possibly handle better than the weaker female counterpart. These findings is in line with the finding of [13,14,15,16] Majority of the processors (91.2%) and marketers (97.10%) were female, indicating the dominance of women in processing and marketing of fish in the study area. This result is in line with the findings of [17] who opined that the role of women in fishing cannot be over emphasized.

3.1.2 Age of respondents

The study revealed that majority of the actors in the value chain was below 50 years of age. This implied that majority of people involved in fishing operations are in their active age. This finding agreed with [18,19] that age had a positive correlation with agricultural productivity.

3.1.3 Household size

The relatively large and medium household sizes of majority of the actors in the study area may reduce expenses incurred on hired labour for the operations.

3.1.4 Educational status/ membership of association

The study also revealed that majority of the actors (94.3% of fishermen, 54.3% of processors and 51.4% of marketers) had one form of education or the other. Therefore the number of years spent in formal education enhances the knowledge ability to adopt modern technology in improving their fishing activities.

The study further indicated that all (100%) of the marketers were in one form of union/ association or the other, while the fishermen and the processors were not into any form of association.

From Table 2, the average cost of purchase of a standardized basket of fresh fish from the fishermen in the study area was ₦6, 193.75.00, immediately after purchase, and without any value addition, the same quantity of fish were sold at an average of ₦6, 994, 29 and ₦8, 060.00 outside the environment. The implication of this is that non- member of fish marketers association have no direct contact with the fishermen, hence must pass through them for the purchase of fish, while a profit margin of about ₦801.29 is realized from immediate purchase

within the same environment and an average of ₦1866.25 from the sale of same basket outside the environment.

3.2 Profit Margin of Marketers

Average purchasing price of fish from fishermen = ₦6193.75.

Average selling price immediately in the same location = ₦6494, 29.

Average selling price outside the location = ₦8060.00.

3.2.1 Profit margin of marketers on same location

Average revenue from sales in same location = ₦6494, 29 - ₦6193.75 = ₦300.54.

Net return on investment (benefit/ cost) = 6494, 29/ 6193.75 = 1.04.

That is on every ₦1 invested in fish marketing in the same location and sell within the location 4kobo is realized.

3.2.2 Profit margin of marketers outside the location

Average revenue from sales outside the location = ₦8060.00 - ₦6193.75 = ₦1866.25.

Net return on investment = benefit/ cost = 8060.00 / 6193.75 = 1.30.

The implication of this finding is that on every ₦1 invested, 30kobo is realized

3.3 Gross Margin Analysis for Fish Processor

3.3.1 Average variable cost

Average cost of fish purchased = ₦260, 508. 10

Average Cost of firewood = ₦27,437.14.

Average transportation cost = ₦1,018.57

other variable cost = ₦2,146.57

Average labour cost = ₦10,925.71

Average variable cost = ₦302,036.09

Table 1. Socio-economic characteristics of the respondents

Variables	Fishermen		Processors		Marketers	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gender						
Male	35	100	2	8.8	1	2.90
Female	0	000.	33	91.2	34	97.10
Total	35	100	35	100.0	35	100.00
Age						
Less than 30	5	14.3	5	14.3	4	11.4
31-50	19	54.3	22	62.9	19	54.3
51-60	7	20.0	3	8.5	12	34.3
61-65	4	11.4	5	14.3	0	0.00
Total	35	100.0	35	100.0	35	100.0
Marital status						
Singled	4	11.4	1	2.83	2	5.7
Married	21	60.0	28	80.0	27	77.1
Divorced	5	14.3	6	17.17	4	11.4
Widow/ widower	5	14.3	0	0.00	2	5.7
Total	35	100.0	35	100.00	35	100.00
Household size						
1-3	13	37.1	16	45.7	14	40.0
4-7	17	48.6	19	54.3	18	51.4
Greater than 7	5	14.3	0	0.0	3	8.6
Total	35	100.00	35	1000.00	35	100.00
Educational status						
No formal	2	5.7	8	22.9	12	34.3
Pry	10	28.6	15	42.8	9	25.7
Sec	7	20.0	5	14.3	9	25.7
tertiary	16	45.7	7	20.0	5	14.3
Total	35	1000.00	35	100.00	35	100.0
Association						
Yes	---	--	---	----	35	1000.0
No	----	---	---	---	0.00	0.00

Source; field survey, 2019

Table 2. Descriptive statistics on cost and returns of marketers

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Price/ basket fish	35	3,000.00	15,000.00	216,781.75	6,193.7500	2,544.68928
Price after purchase	35	3,500	17,000	244,800	6,994.29	2,981.901
Price outside the environment	35	4,000	20,000	282,100	8,060.00	3,245.830

Source; field survey, 2019

3.3.2 Fixed cost

Average fixed cost = ₦49625.70

Cost of drum = ₦14,271.42

Average total cost (ATC) = AVC+ AFC =

Cost of basket = ₦25,485.71

303,036.09 + 49, 625.70 = ₦352,661.79 =

Cost of wire = ₦9,868. 57

₦352,661.79 Average revenue = PX*Q = AR =

₦396, 533.33

$$\text{Profit} = \text{AR} - \text{ATC} = 396,533.33 - 352,661.7 = \text{N}43,871.54$$

Fish processing is a profitable venture worth investing because it has a positive margin of N43,871.54.

$$\text{Net return on investment for fish processing} = 1.12$$

The return on investment is 1.12, meaning that on every N1 invested in fish processing, 12kobo is realized.

3.4 Depreciation on Fixed Equipment

$$\text{OC} = 41,903.78$$

$$\text{SV} = 0$$

It is assumed that equipment has a shelf life of 3years

$$41,903.78 / 3 = 13,967 / \text{ annum}$$

$$\text{Monthly depreciation} = 13,967 / 12 = 1,163.99$$

= N1,163.99 must be set aside as depreciation value.

The main actor in the value chain are the marketers because of the strong association that prevent others from buying directly from the fishermen, even the processors sometimes do not have direct access to the fishermen except through the marketers.

The Table 3, shows the categories of the gross margin of the actors in the value chain.

Table 3. Gross margin and net return of actors

Variable	Gross margin	Net return
Sales/Marketing at immediate environment	300.54	1.04
Sales/Marketing outside the environment	1866.25	1.30
Processor	43871.54	1.12

All the actors have a positive gross margin therefore each of the enterprise is profitable. Also all the net return on investment are greater than one therefore the sales of fish immediately at the environment was 1.04 indicating at every N1 invested, 4 kobo is realized, marketers outside the environment has a net return of N1.30kobo. Meaning that at every N1 invested 30kobo is

realized while for processing net return of N1.12kobo is achieved meaning at every N1 invested 12kobo is gained. The implication is that the marketers particularly sales after the environment has higher gross margin of N1866.25 kobo and a net return of N1.30 kobo.

4. CONCLUSION

Artisanal fish farming is a profitable venture with all the actors in the value chain enjoying different degree of profit. The two categories of marketers made a profit of N300.54 and N1,866/basket and a net return of 1.04 and 1.30 respectively. The processors equally had a positive gross margin of N43.871.54 and a net return of 1.12.

However, among the three actors in artisanal fish value chain in the area, the marketers are the main and most influential group. This is due to the strong associations of the group which prevent others (even processors) from buying directly from the fishermen. The over bearing influence of this marketers group reduces the gross margin and net returns of other actors in the chain.

5. RECOMMENDATION

Based on the findings of this study, it is recommended that;

- Fishermen and processor in artisanal fish value chain should form a strong association in other to reduce the effect and influence of the marketers on their profit.
- Fishermen should join cooperative societies in other to get needed inputs rather than getting financial assistance from middlemen/marketers who always use that to determine their faith in the business.
- Government and other relevant organizations should be involved in training and retraining of the different categories of the artisanal fish value chain players.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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