VALUE CHAIN ANALYSIS OF ARTISANAL FISHING IN ILAJE LOCAL GOVERNMENT AREA OF ONDO STATE, NIGERIA

Abstract

The demand for fish like all other animal proteins in Nigeria has surpassed the supplies leaving the general populace in sub-optimal protein consumption. In bridging this supply demand gap, Nigeria must explore her artisanal fisheries and aquaculture resources which have been found to be under-utilized. Hence, value chain analysis in artisanal fishing in the coastal area of Ondo States were investigated. Primary data were collected with the aid of a well-structured questionnaire. A 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. The gender of the respondents revealed that all (100%) of the fishermen were male, 91.2 % processors and 97.10% marketers were female. The study also indicated that 62.9% of the fishermen has household greater than 4, the processors has 54.3% household size above 4 and 60% of the marketers have household size above 4. The educational status of the respondents indicated that 94.3% of the fishermen has 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. The study equally showed that all the marketers are into one association or the other. The budgeting analysis revealed that a positive margin realized by the two categories of marketers were ₦300.54 and ₦1,866.00 per basket respectively and a net returns of 1.04 and 1.30 respectively. The processors equally had a positive gross margin of ₦43.871.54 and a net returns of 1.12. The most influential actor in the artisanal fish value chain were the marketers, this is because of the strong associations involved in this category, which prevent others from buying directly from the fishermen.

Keywords: Value Chain, Artisanal, Gross Margin, Analysis, Fishing.

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 those of the riverine communities (NBS 2016). The Fisheries sub-sector is an integral part of agriculture sector in Nigeria. It maintains a steady contribution of about 3.5 to 4%

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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 (Oladimeji *et al.*, 2013b). Fish supply is from four major source namely; artisanal fisheries, industrial trawlers, aquaculture and imported frozen fish (Akinrotimi, Abu and Aranyo, 2011). The Nigeria fisheries sector is made up of capture fisheries and aquaculture. Capture fisheries encompasses both marine and inland fisheries. Artisanal fisheries sub-sector remains the most important sector, it accounts for the major fish supply in the developing world (Ibrahim, et al., 2009)

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 (Faturoti, 2011). The total fish demand for Nigeria based on the 2014 population estimate of about 181million is 3.32million metric tons, while the domestic fish production from Aquaculture, Artisanal and Industrial fisheries for 2014 is 1.123million metric tons. Although, aquaculture production increased considerably over the years, from152,796 metric tons in 2009 to 221,128 metric tons in 2011 and 3.32 million metric tons in 2014. (NBS 2016).

The opportunity of bridging the widening demand- supply gap of fish in Nigeria through domestic production offers a great investment potential to the Nigerian populace and also the inflow of foreign direct investment into the country.

The Niger Delta region contributes more than 50% of the entire domestic Nigerian fish supply. This is as a result of 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. Nigeria has a great potential of fish resources whose distribution and value chain needs to be strengthened and developed to bridge the gap between demand and supply of fish in Nigeria. According to (Adeleke, 2013), the acceptability of fish in most communities of the world is due to fish high digestibility compared to beef, mutton, chicken and bush meat. (Adeleke, 2011) also observed that fish consumption is free from taboos as is the case for most meat products. Artisanal fisheries are important and contributed at least 40% of fish production from all sources in Nigeria between 1995 and 2008 (FAO, 2010). Artisanal marine fisheries provide essential source of sustenance, employment and financial well-being for coastal populations of developing countries (Andrew et al., 2012)

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Fish is highly susceptible to deterioration without any preservative or processing measures (Okonla and Ekelemu, 2015). Immediately fish dies, numbers of physiological and microbial deterioration sets in, this invariably degrades the quality of fish (Eyo, 2001). The deterioration that sets in makes it unfit for human consumption within about one day of capture, unless it is subjected to some form of processing, particularly if traditional methods have been pro-used, thus, subjecting the fish to many forms of loss and spoilage. Fish being a highly perishable substance needs to be transported to the consumer who is the final user on time to avoid post-harvest spoilage through a coordinated marketing channel.

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 (Kapslinky and Morris, 2000, Adeoye et al, 2013).Value chain promotion is an effective way of encouraging rural-urban linkages and the perception provides a useful analytical background for market and sub-sector analysis. Value chain analysis is the process of breaking a chain into its constituent parts so as to have a better understanding of its structure and functioning parts.

The analysis of value chain involve identifying chain actors and discerning their functions; identifying value added in the chain and assigning costs to those activities (United Nation Industrial Development Organization 2009).

Files (2007) 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. Moreover, fishery value chain can be defined as interlinked value-adding activities that convert inputs into outputs, which in-turn add to the bottom line and help to create competitive advantage.

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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 (Investopedia, 2011), 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. (Lawal and Idega, 2004). According to (Adekanye, 1988), marketing is a method used to bring the interpersonal forces of demand and supply together irrespective of the location of the market. The different criteria used in sales of fish depend on efficiency with which the marketing system transmits information among the fish mongers or marketers and thus, prices of fish changes as it passes through middlemen such that by the time it finally get to the consumers, it becomes expensive (Dolapo, 2011).

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.

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.

Methodology

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The Study Area.

The study was carried out in Ilaje Local Government Area of Ondo State, Nigeria. The state lies between latitudes 5^0 4S and $7^0$52N and longitude 4^0 20^0N and 6^0 05E. 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 2000-3000mm per annum.

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.

Data Analysis and Analytical Procedure

Data were analyzed using descriptive statistics and gross margin model

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.

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; TR = Py. Yi, TVC = P x X, TC = TVC + TFC, NROL = NFI/ TR, NFI = GM – TFC

NPM = NFI / TC, BCR = TR / TC

GM = Gross Margin (₦) TR= Total Revenue (₦)

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TVC = Total Variable Cost (₦)

TC = Total Cost (₦)

NROL = Net Return on Investment (₦)

Py = Unit Price of Output (₦)

Y = Price of Output (₦)

PXi = Unit Price of Variable Input Used (₦)

Xi = Variable Input (₦)

NFI = Net Farm Income (₦)

NPM = Net Profit Margin (₦)

BCR = Benefit Cost Ratio (%)

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.

Results and Discussion

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

Socio-Economic Characteristics of the Fishermen in the Study Area

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 Onemolease and Oriakhi (2011). Olubanjo et al (2007), Olaoye and Odebiyi (2011), Olawunmi et al (2010). 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 Inioni and Olayide (2007), who opined that the role of women in fishing cannot be over emphasized.

Age of Respondents

The study revealed that majority of the actors in the value chain were below 50 years of age. This implied that majority of people involved in fishing operations are in their active age. This

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findings agreed with Bello, (2000) and George et al (2010) that age had a positive correlation with agricultural productivity.

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.

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.

Table 1; **Socio-Economic Characteristics of the Respondents**

Variables	**Fishermen**		**Processors**		**Marketers**	
	Freq.	**percent**	**Freq.**	**percent**	**Freq.**	**percent**
Gender						
Male	35	100.0	2	8.8	1	2.90
Female	0	000	33	91.2	34	97.10
Total	**35**	**100.0**	**35**	**100.0**	**35**	**100.0**
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	0.00	0.00

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Total	**35**	**100.0**	**35**	**100.0**	**35**	**100**
Marital status						
Single	4	11.4	1	2.83	2	5.7
Married	21	60.0	28	80.0	27	77.1
Divorced	5	14.3	6	17.14	4	11.4
Widow/widower	5	14.3	0	0.00	2	5.7
Total	**35**	**100.0**	**35**	**100.0**	**35**	**100.0**
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**	**100.0**	**35**	**94.6**	**35**	**100.0**
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**	**100.0**	**35**	**100.0**	**35**	**100.0**
Association						
Yes	-	-	-	-	**35**	**100**
No	-	-	-	-	-	-

191 **Source; field survey, 2019**

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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

From table 2 above, 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.

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

i. 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

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

ii. 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 findings is that on every ₦1 invested, 30kobo is realized

Gross Margin Analysis For Fish Processor

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

Fixed cost

Cost of drum = ₦14,271.42 Cost of basket = ₦25,485.71

Cost of wire = ₦9,868. 57 Average fixed cost = ₦49625.70

Average total cost (ATC) = AVC+ AFC = 303,036.09 + 49, 625.70 = ₦352,661.79 = ₦352,661.79 Average revenue = Px*QX, AR = ₦396, 533.33

Profit = AR - ATC = 396, 533. 33 – 352,661.7 = ₦43, 871, 54

Fish processing is a profitable venture worth investing because it has a positive margin of ₦43,871.54.

Net return on investment for fish processing =

= = 1.12

The return on investment is 1.12, meaning that on every ₦1 invested in fish processing, 12kobo is realized.

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Depreciation on fixed equipment

OC = 41,903.78, SV = 0

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

41,903.78/ 3 = 13,967/ annum

Monthly depreciation = 13,967/ 12 = 1,163. 99

= ₦1,163. 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

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

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

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 ₦1 invested, 4 kobo is realized, marketers outside the environment has a net return of ₦1.30kobo. Meaning that at every ₦1 invested 30kobo is realized while for processing net return of ₦1.12kobo is achieved meaning at every ₦1 invested 12kobo is gained. The implication is that the marketers particularly sales after the environment has higher gross margin of ₦1866.25 kobo and a net return of ₦1.30 kobo.

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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 ₦300.54 and ₦1,866/basket and a net returns of 1.04 and 1.30 respectively. The processors equally had a positive gross margin of ₦43.871.54 and a net returns 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.

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.

References

Adekanye, T.O. (1988). Readings in Agricultural Marketing Longman Publishers, Nigeria, Pp 11-12

Adeleke, M.L. (2013). The Socio Economic Characteristics of the Artisanal Fisher Folks (Presentation at Procida, October, 2013)

Akinrotimi, O.A., Abu, O. M. G. and Aranyo, A.A. (2011). Environmental friendly Aquaculture key to sustainable fish farming Development in Nigeria. Continental Journal of Fisheries and Aquatic Science 5(2).17 31

Bryceson, D.F. (1993). Liberalization of Tanzania food trade: Public and Private Faces of urban marketing policy (1938-1988).United Nations research institute for social development. Geneva, Switzerland.

UNDER PEER REVIEW

Dolapo, O.T. (2011), "Marketing structure of fresh fish at Olomore fresh water fish market in Abeokuta Ogun State", available at: http://www.unaab.edu.ng/ugprojects/2011baquacomoanwatd.pdf (accessed 30 January, 2013).

Eyo, A.A, (2001). Inventory of Storage Life of Fresh Africa Fish on Ice, 11pp

FAO (2010). Fisheries Statistics of Nigeria, Federal Development of Fisheries.

Faturoti, O. (2011). Nigeria Fisheries Contribute $US1 billion to Economy. 25th Annual Conference of Fisheries Society of Nigeria, Badagry, Lagos, Nigeria.

George, F.O.A, Olaoye, O.J, Akande, O.P and Oghobase, R.R. (2010).Determinants of Aquaculture Fish seed production and Development in Ogun State, Nigeria. *Journal of Sustainable Development in Africa, (4) 12 - 15*

Inoni, O. E. and W. J. Oyaide, 2007. Socio-economic analysis of artisanal fishing in the South Agro Ecological Zone of Delta State, Nigeria. *Journal of Agriculture Subtropical, 40 (4 135–149*

Kaplinsky R, Morris M (2000).A handbook for value chain Research, international Development Research center (IDRC) Canada. Lam *et.al*, (2011). Status of Food Security, Trade and the Economic Health of Fisheries.

Lawal, W.L and Ldega, E.O. (2004). Analysis of Fish Marketing in Benue State. A paper Presented at 2001 annual Conference of Association of Agricultural Economists (NAAE) Held at Ahmadu Bello University Zaria November 3-7

Olaoye,O.J.and Odebiyi,O.C. (2011). Economic Viability for the Use of Microfinance Bank Loan on Aquaculture Development in Ogun State, Nigeria. International Journal of Fisheries and Aquaculture, 3(4), 70-77.

Olubanjo, O.O .Akinleye, S.O and Balogun, M.A. (2007). Occupation Characteristics, Technology Use and Output Determinants among Fishers Folk in Ogun Waterside Area, Ogun State. Farm Management Association of Nigeria Journal, 8(2).

Okonla, A.A and Ekelemu, J. K (2015), November. A Preliminary Study of Micro-organisms Associated with Fish spoilage in Asaba, southern Nigeria pp 557-560

Oladimeji, Y.U., Abdulsalam, Z, and Damisa, M.A. (2013b). Socio- economic

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Characteristics and Returns to Rural Artisanal Fishery Households in Asa and Patigi LGAs of Kwara State, Nigeria. *International Journal of Science and Nature.* 4(3): 445-455.

Onemolease, E.A and H.O. Oriakhi (2011) Prospects and constraints of artisanal fishing in selected communities in Delta State, Nigeria, Advances in Applied Science Research, 2011, 2 (6):55 -61. Available online at www.pelagiaresearchlibrary.com.

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