

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

3 **Abstract**

4 *The demand for fish like all other animal proteins in Nigeria has surpassed the supplies leaving the*
5 *general populace in sub-optimal protein consumption. In bridging this supply demand gap, Nigeria must*
6 *explore her artisanal fisheries and aquaculture resources which have been found to be under-utilized.*
7 *Hence, value chain analysis in artisanal fishing in the coastal area of Ondo States were investigated.*
8 *Primary data were collected with the aid of a well-structured questionnaire. A purposive*
9 *sampling technique was used to select four fishing communities in Ilaje local government, where*
10 *35 (fishermen, processors and marketers) were each selected randomly from the communities.*
11 *Data were analyzed using Descriptive Statistics and Gross Margin Analysis.*
12 *The socioeconomic characteristic indicated that 68.6% of the fishermen, 77.2% processors and*
13 *65.7% marketers were less than 50 years of age. The gender of the respondents revealed that all*
14 *(100%) of the fishermen were male, 91.2 % processors and 97.10% marketers were female. The*
15 *study also indicated that 62.9% of the fishermen has household greater than 4, the processors*
16 *has 54.3% household size above 4 and 60% of the marketers have household size above 4. The*
17 *educational status of the respondents indicated that 94.3% of the fishermen has one form of*
18 *education or the other, 77.1% of the processors have one form of education or the other and*
19 *65.7% of the marketers were also educated. The study equally showed that all the marketers are*
20 *into one association or the other. The budgeting analysis revealed that a positive margin*
21 *realized by the two categories of marketers were ₦300.54 and ₦1,866.00 per basket respectively*
22 *and a net returns of 1.04 and 1.30 respectively. The processors equally had a positive gross*
23 *margin of ₦43,871.54 and a net returns of 1.12. The most influential actor in the artisanal fish*
24 *value chain were the marketers, this is because of the strong associations involved in this*
25 *category, which prevent others from buying directly from the fishermen.*

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

27 **Introduction**

28 Fishery production is significant to Nigerian economy in view of its importance in providing
29 cheap source of food security, income, employment and serves as source of foreign exchange,
30 particularly those of the riverine communities (NBS 2016). The Fisheries sub-sector is an
31 integral part of agriculture sector in Nigeria. It maintains a steady contribution of about 3.5 to 4%

32 of total GDP between 2008 and 2012, translating to about 10% of total agricultural GDP, which
33 itself contributed between 35 and 40 percent within the same period (Oladimeji *et al.*, 2013b).
34 Fish supply is from four major source namely; artisanal fisheries, industrial trawlers, aquaculture
35 and imported frozen fish (Akinrotimi, Abu and Aranyo, 2011). The Nigeria fisheries sector is
36 made up of capture fisheries and aquaculture. Capture fisheries encompasses both marine and
37 inland fisheries. Artisanal fisheries sub-sector remains the most important sector, it accounts for
38 the major fish supply in the developing world (Ibrahim, et al., 2009)

39 Artisanal fisheries in Nigeria provided more than 82% of the domestic fish supply giving
40 livelihoods to one million fishermen and up to 5.8 million fisher folks in the secondary sector
41 (Faturoti, 2011). The total fish demand for Nigeria based on the 2014 population estimate of
42 about 181million is 3.32million metric tons, while the domestic fish production from
43 Aquaculture, Artisanal and Industrial fisheries for 2014 is 1.123million metric tons. Although,
44 aquaculture production increased considerably over the years, from152,796 metric tons in 2009
45 to 221,128 metric tons in 2011 and 3.32 million metric tons in 2014. (NBS 2016).

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

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

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

69 Value chain refers to all activities necessary to bring a product or service from conception,
70 through the different stages of production, distribution to final consumption and final disposal
71 after use (Kapslinky and Morris, 2000, Adeoye et al, 2013). Value chain promotion is an effective
72 way of encouraging rural-urban linkages and the perception provides a useful analytical
73 background for market and sub-sector analysis. Value chain analysis is the process of breaking a
74 chain into its constituent parts so as to have a better understanding of its structure and
75 functioning parts.

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

79 Files (2007) posited that value chain analysis is essential for understanding markets, their
80 relationship, the participation of different actors, and the critical constraints that limit the growth
81 of livestock (fish) production and consequently the competitiveness of small holders' farmers.
82 These farmers currently receive only a small fraction of the ultimate value of their output, even
83 if, in theory, risk and reward should be shared down the chain. In agriculture they can be thought
84 of as a farm to folk' set of processes and flows. Artisanal fish value chain analysis looks at every
85 step, a fisheries business goes through, from captured fishes to the eventual end user. The goal is
86 to deliver maximum value for the least possible total cost.

87 Value chains in artisanal and aquaculture fisheries differs and composed of several nodes the
88 products pass through before meeting the consumers. Moreover, fishery value chain can be
89 defined as interlinked value-adding activities that convert inputs into outputs, which in-turn add
90 to the bottom line and help to create competitive advantage.

91 However, Fish value chains in Nigeria are not yet developed to meet international market
92 requirements as limited value addition is done in the industry, with the result that market for fish
93 and fish products are limited to domestic markets (Investopedia, 2011), and the eagerness to raise
94 immediate income from fish harvest. Actors in the chain comprises of the fishermen, (fish
95 collector) marketer and processors.

96 The ability to make fish relevant in the market is to ensure the flow of fish and fish product from
97 the artisanal fisherman to the consumers in the form, time and place that will be convenient. This
98 involves the participation of some actors along the fish distribution channel especially the
99 middlemen. (Lawal and Idega, 2004). According to (Adekanye, 1988), marketing is a method
100 used to bring the interpersonal forces of demand and supply together irrespective of the location
101 of the market. The different criteria used in sales of fish depend on efficiency with which the
102 marketing system transmits information among the fish mongers or marketers and thus, prices of
103 fish changes as it passes through middlemen such that by the time it finally get to the consumers,
104 it becomes expensive (Dolapo, 2011).

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

109 **Objective of the Study**

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

112 The specific objectives are to:

- 113 i. ascertain or determine the socio-economic characteristics of the actors in the fish value
114 chain;
- 115 ii. identify the major players (actors) in artisanal fish value and;
- 116 iii. estimate the profit margin along the identified fish value chain;
- 117 iv. identify the major constraints to fish value chain actors in the study area.

118 **Methodology**

119 **The Study Area.**

120 The study was carried out in Ilaje Local Government Area of Ondo State, Nigeria. The state lies
121 between latitudes $5^{\circ} 4S$ and $7^{\circ}52N$ and longitude $4^{\circ} 20^{\circ}N$ and $6^{\circ} 05E$. Its land area is about
122 15,500 square kilometers. Ondo State is bounded in the East by Edo and Delta State in the south
123 by Bight of Benin and Atlantic Ocean. Ilaje was purposively selected due to its predominant
124 coastal wetland suitable for fish farming. It is situated within the mangrove rain forest and has an
125 annual rainfall ranging between 2000-3000mm per annum.

126 **Data Collection and Sampling Technique**

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

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

132 **Data Analysis and Analytical Procedure**

133 Data were analyzed using descriptive statistics and gross margin model

134 **Descriptive Statistical Tools**

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

138 **Gross Margin Analysis**

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

141 The model for the estimation of the gross margin is as; $GMI = \sum TR - \sum TVC$

142 Where; $TR = Py \cdot Y_i$, $TVC = P \times X$, $TC = TVC + TFC$, $NROL = NFI / TR$, $NFI = GM - TFC$

143 $NPM = NFI / TC$, $BCR = TR / TC$

144 $GM =$ Gross Margin (₦)

145 $TR =$ Total Revenue (₦)

146	TVC = Total Variable Cost (₦)	151	PXi = Unit Price of Variable Input Used
147	TC = Total Cost (₦)	152	(₦)
148	NROL = Net Return on Investment (₦)	153	Xi = Variable Input (₦)
149	Py = Unit Price of Output (₦)	154	NFI = Net Farm Income (₦)
150	Y = Price of Output (₦)	155	NPM = Net Profit Margin (₦)
		156	BCR = Benefit Cost Ratio (%)

157 Depreciation

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

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

161 Results and Discussion

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

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

165 Gender of the Respondents

166 The result as shown in table 1 indicated that all fishermen in the study area were male (100%).
 167 This could be attributed to strenuous and tasking nature of their operations which the male
 168 gender could possibly handle better than the weaker female counterpart. These findings is in line
 169 with the finding of Onemolease and Oriakhi (2011). Olubanjo et al (2007), Olaoye and Odebiyi
 170 (2011), Olawunmi et al (2010). Majority of the processors (91.2%) and marketers (97.10%) were
 171 female, indicating the dominance of women in processing and marketing of fish in the study
 172 area. This result is in line with the findings of Inioni and Olayide (2007), who opined that the
 173 role of women in fishing cannot be over emphasized.

174 Age of Respondents

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

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

179 **Household Size**

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

182 **Educational status/ Membership of Association**

183 The study also revealed that majority of the actors (94.3% of fishermen, 54.3% of processors and
 184 51.4% of marketers) had one form of education or the other. Therefore the number of years spent
 185 in formal education enhances the knowledge ability to adopt modern technology in improving
 186 their fishing activities.

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

190 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

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

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

192 **Source; field survey, 2019**

193 From table 2 above, the average cost of purchase of a standardized basket of fresh fish from the
194 fishermen in the study area was ₦6, 193.75.00, immediately after purchase, and without any
195 value addition, the same quantity of fish were sold at an average of ₦6, 994, 29 and ₦8, 060.00
196 outside the environment. The implication of this, is that non- member of fish marketers
197 association have no direct contact with the fishermen, hence must pass through them for the
198 purchase of fish, while a profit margin of about ₦801.29 is realized from immediate purchase
199 within the same environment and an average of ₦1866.25 from the sale of same basket outside
200 the environment.

201 **Profit Margin of Marketers**

202 Average purchasing price of fish from fishermen = ₦6193.75

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

204 Average selling price outside the location = ₦8060.00

205 **i. Profit margin of marketers on same location**

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

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

208 That is on every ₦1 invested in fish marketing in the same location and sell within the location
209 4kobo is realized.

210 **ii. Profit margin of marketers outside the location**

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

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

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

Gross Margin Analysis For Fish Processor

214 **Average variable cost**

215 Average cost of fish purchased = ₦260, 508. 10, Average Cost of firewood = ₦27,437.14

216 Average transportation cost = ₦1,018.57, other variable cost = ₦2,146.57

217 Average labour cost = ₦10,925.71, Average variable cost = ₦302,036.09

218 **Fixed cost**

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

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

221 Average total cost (ATC) = AVC+ AFC = 303,036.09 + 49, 625.70 = ₦352,661.79 =

222 ₦352,661.79 Average revenue = $P_x * Q_X$, AR = ₦396, 533.33

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

224 Fish processing is a profitable venture worth investing because it has a positive margin of
225 ₦43,871.54.

226 Net return on investment for fish processing =

227 = = 1.12

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

230

231 **Depreciation on fixed equipment**

232 $OC = 41,903.78, \quad SV = 0$

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

234 $41,903.78/ 3 = 13,967/ \text{ annum}$

235 $\text{Monthly depreciation} = 13,967/ 12 = 1,163. 99$

236 $= \text{₦}1,163. 99$ must be set aside as depreciation value.

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

240 **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

241

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

243 All the actors have a positive gross margin therefore each of the enterprise is profitable. Also all
244 the net return on investment are greater than one therefore the sales of fish immediately at the
245 environment was 1.04 indicating at every ₦1 invested, 4 kobo is realized, marketers outside the
246 environment has a net return of ₦1.30kobo. Meaning that at every ₦1 invested 30kobo is
247 realized while for processing net return of ₦1.12kobo is achieved meaning at every ₦1 invested
248 12kobo is gained. The implication is that the marketers particularly sales after the environment
249 has higher gross margin of ₦1866.25 kobo and a net return of ₦1.30 kobo.

250

251

252 **Conclusion**

253 Artisanal fish farming is a profitable venture with all the actors in the value chain enjoying
254 different degree of profit. The two categories of marketers made a profit of ₦300.54 and
255 ₦1,866/basket and a net returns of 1.04 and 1.30 respectively. The processors equally had a
256 positive gross margin of ₦43.871.54 and a net returns of 1.12.

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

262 **Recommendation**

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

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

271

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