ECONOMICS OF FRESH FISH MARKETING AMONG FISH FARMERS IN LAGOS STATE, NIGERIA

Yesufu O. A.[1]*, Adejobi A. O.*, Ekpo-Ufot U*., and Adeogun O. I [2]
Corresponding author's e-mail address: olufemi_yesufu@yahoo.com[1]
*Department of Agricultural Economics**
Department of Fisheries Resources, Nigeria Institute for Oceanography & Marine Resources, Victoria Island, Lagos[2]

ABSTRACT

Fish has gradually become a very important component in the diet of increasing population of the world. This has necessitated aggressive promotion of initiatives to increase its production. In spite of the various efforts to promote the sub-sector, there is still a gap in the demand and supply of the commodity, which marketing is expected to mitigate. Using proportionate sampling, data were collected from 66 fish farmers/marketers and were analyzed with the structure, conduct and performance (SCP) paradigm model. It was found that fresh fish market in the study area was male dominated with high start-up capital (N720,000) and limited (6%) access to credit; much disparity in profitability (- N 37,200 – N 7,183,433) among the firms, had a monopolistic competitive market structure (34.7%); individual farmer was a price giver, that is set their own price and low operational efficiency (37.8%).

It is recommended that there is need to promote a policy mix that will encourage adoption of new innovations in fish production to encourage efficiency; capacity building on management skills for the operators; and growth enhancement supports capable of improving the market performance in the study area.

Key Words: Fish Marketing, Structure, Conduct, Performance, Lagos, Nigeria

INTRODUCTION

Fish, provides not only high-value protein but also represents an important source of a wide range of essential micronutrients minerals and fatty acids which benefits human health (FAO, 2012). In many developing countries, fish is very much in demand because it is often the cheapest source of animal protein. Fish is also readily digestible and immediately utilizable by the human body which makes it suitable for complementing the high carbohydrate diets prevailing in almost all the developing countries of the world (FAO, 2008). It has sufficient amounts of all the essential amino acids required by the body for growth and maintenance of lean muscle tissue which also help to maintain an active metabolism. Fishes are rich in Omega-3 fatty

acids which play very important role for normal growth, particularly for the blood vessels and the nerves as well as keeping the skin and other tissues youthful. The consumption of fish has no social or religious taboo. On the average, fish provides about 20–30 kilocalories per person per day (WHO, 2011). Human consumption of fish and fishery products differ among countries, within countries and among segments of society (FAO, 2009). The world total human consumption of fish was estimated at about 131million tonnes while the non-food uses were estimated at about 23.2million tonnes in 2011 (FAO, 2012). The world per capita fish consumption increased steadily, from an average of 9.9 kg in the 1960s to 14.4 kg in the 1990s and reaching 17.0kg in 2000s to 18.4kg in 2009. Preliminary estimate for 2010 gave a further increase in fish consumption to 18.6kg. The increase has not been uniform across countries of the world, most especially in Africa where consumption was lowest at 8.3 kg per capita with 7.6 million tonnes food supply (FAO, 2008). Recent increases in per capita availability have been obtained from aquaculture production, from both traditional rural aquaculture and intensive commercial aquaculture (WHO, 2011).

In the Sub-Saharan African countries, statistics indicated that Nigeria is the largest African aquaculture producer, with production output estimated at about 85,000 metric tonnes in 2007 (FAO, 2009). The quantity of fish consumed has increased five-fold over the years. The domestic fish production in Nigeria is put at 780,000 metric tonnes as against the national demand of about 2.66 million metric tonnes estimated for 2012 (www.businessdayonline.com). However, the government of Nigeria resulted to importation of about 1.8 million metric tonnes to augment the insufficient supply from domestic production in which importation approximately accounts for over 50 per cent of local consumption (Odukwe, 2007). Despite the recent and progressive expansion of aquaculture and its commercialization in Nigeria, supply of fish still falls short of demand. The reason for the low production has been adduced to the use of poor quality seeds (fingerlings), high cost of feeds (Ugwumba et al., 2006); small size of holdings, low technical know-how (Inoni, 2007); inadequate information, limited infrastructural facilities due to mismanagement, low capital investment (Adeogun et al., 2007); and ineffective management (Miller et al., 2006). These problems show that the business environment wherein fish production takes place is not well organized. There is therefore a need to study the market organization of fresh fish farming for the availability of fish in the market. This study analyzed the marketing of fresh fish in Lagos State using the structure-conduct-performance paradigm approach (SCP).

Structure, conduct and performance approach studies the market organization of fresh fish market by revealing those variables that characterize the industry and which influence strategically the nature of competition and pricing behaviour within the market, while the conduct will reveal the policies inherent in the fresh fish market. Furthermore, the study of the interaction of both structure and conduct will give useful insight on the performance of the fish market through its profitability. Inoni (2007) examined the efficiency of resource utilization in fish pond production in Delta State. It was reported that there was a gross inefficiency in the allocation of productive resources among fish farmers and that there is relatively lower technical know-how of fish farmers which indicated over-utilization of these inputs. The results obtained also indicated that pond size, feed, fingerlings, and labour exert a statistically significant effect on fish output in the study area. The author concluded that in order to achieve optimality in resource allocation, there is need to reduce the quantity of such inputs employed in fish

production, as it will raise the productivity of resources, increase output, and consequently improve revenue and net returns. The author also observed that in order to improve efficiency in resource allocation in pond fish production therefore, access to current technical and price information is needed by farmers. Okoye et al. (2007) investigated on the economics of commercial fish farming in earthen ponds in Nigeria using a 5-hectare fish farm as a model. Olagunju et al. (2007) investigated the economic viability of catfish production in the metropolis of Ibadan city, Oyo State. Emokaro and Ekunwe (2009) employed the use of stochastic frontier production function in the empirical analysis of efficiency of resources-use and elasticity of production among catfish farmers in Kaduna State and found that catfish farmers in the area were not efficient in their use of production inputs. The structure - conduct – performance – paradigm approach (SCP) has been used in several studies (e.g. Yesufu and Ayanwale, 2011; Yesufu et al., 2012) to characterize the industry's nature of competition; pricing, quantity and promotional behavior; and efficiency within the processed broiler market in the southwest and fresh fish market in Kaduna State respectively. Yesufu et al. (2012) found that fresh fish marketing in Kaduna State had the market structure of monopolistic competition, operationally efficient and profitable. It was, however, recommended that the capital entry barrier be addressed to encourage more participants and for increased production.

Structure-Conduct-Performance Approach

Caves (1982) states the philosophy behind this methodology that, market structure (environment) determines the market conduct (the behaviour of economic agents within the environment) and thereby sets the level of market performance (how close the industry comes to meeting the norm or standard of reference of social welfare). Market Structure is defined as the characteristics of the organization of a market, which seem to influence strategically the nature of competition and pricing behaviour within the market (Bain, 1968). The elements of structure will reveal the effect of the business environment on the management policies adopted by the fish farmers and its resultant influence on their production and profitability.

An alternative definition by Stigler (1968) calls it the production cost, which must be borne by the potential entrant but not by the existing firms. In developing countries like Nigeria, barriers to entry of critical importance are capital costs and scale economies.

Capital costs serve as a barrier because only those who can afford such a monetary outlay can enter the market. The existence of economies of scale is a condition permitting relatively large firms to market their products at considerably lower average costs than smaller firms.

Market Conduct is referred to as the patterns of behaviour that firms follow in adapting or adjusting to the markets in which they sell or buy (Bain, 1968). It includes pricing policies and related market policies that the sellers in the industry adopt. Viaene and Gellynck (1995) stated also that the conduct of firms refers to their competitive strategy and is influenced to a large extent by their structure. Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs and volume of output (Bressler and King, 1970). Two major indicators of market performance are net returns and marketing margins.

Methodology

Study Area and Sampling Technique

Lagos State is found in South-west Nigeria. Fish production in the state was mainly from

capture fisheries as fishing was carried out in the open waters of the rivers, creeks and lakes. With fish population declining heavily and with the discovery of 147,877 hectares of swamp suitable for aquaculture, fish farm (aquaculture) practices was included in the extension program of the state authorities; it was seen to have the possibility of increasing fish production, creating employment opportunities and providing an additional source of income.

As at the time of this study, the Lagos State Agricultural Development Agency (LSADA) estimated the population size of fish farmers to be 2,200. This was based on the number of fish farms registered with the state and with whom the state extension officers liaised. The major areas of fish production were Agege, Alimosho, Ikeja, Surulere, Ifako-Ijaiye, Ojo and Badagry out of which four areas, Agege, Alimosho, Ikeja and Ifako-Ijaiye, were randomly selected. The sampling frame showed the number of fish farms in these four areas to be 120, 79, 52 and 86 respectively. Proportional sampling technique was used in selecting every 3rd, 4th, 5th and 3rd farm on the list in the four areas respectively. Thus the number of farms from each area included in the sample was 40, 20, 11 and 29 respectively. The sampling size interviewed was 100, but only 66 copies of completed questionnaire were analyzed.

Data Collection

Primary data were obtained from the fish producers using structured and semi-structured questionnaire. The types of data obtained from the fish producers included information on gender, marital status, literacy, degree of involvement in fish production, start-up capital and assets acquisition, cost incurred, inputs used, activities carried out, mode of operation, output, revenue obtained and problems encountered from production to marketing.

Data Analysis

Market Structure analysis was carried out by describing the brief history of the fish market through the socio-economic characteristics of the respondents using descriptive statistics (means, modes and percentages), estimating the Concentration Ratios and assessing the barrier to entry.

The concentration ratio (CR) is the share of the total size of a given market that is accounted for by a few largest firms. It is a partial index. The CR was calculated for the largest two (Cr2), largest four (CR4) and largest eight (CR8) firms according to Yesufu and Ayanwale, (2011).

$$CR_n = \sum X_n / X_i \quad (1)$$

Where $\sum$Xn = volume of fish handled by 'n' largest firms, $\sum$Xi = volume of fish handled by all the firms in the industry.

A summary concentration index called the Herfindahl index (HI) was also calculated to determine the extent of market concentration. This was done by squaring and summing the share of industry's size that is accounted for by every firm in the industry

$$HI = \sum (S_i)^2 = \frac{\sum (X_i)^2}{T} \quad (2)$$

Where S = share of a firm of the industry size, T = total industry size, Xi = quantity of fish produced (sold) by the ith respondent, i = 1,2,3,.....n (Yesufu and Ayanwale, 2011).

If all the firms are of equal size, HI will be 1/N. If otherwise, it will tend towards unit.

Investigation of the conduct of the fish markets was done using descriptive statistics. The elements of market conduct considered were the marketing outlets; the buying and

selling practices; presence or absence of formal/informal marketing or producing groups that affect bargaining power, pricing policy in terms of who sets prices, personnel policy in terms of type of workers employed and the level of wages paid.

The assessment of the performance of fish markets was done using the following indicators of market performance: Total Revenue per annum (TR), Net Revenue per annum (NR) and Operational Efficiency (OE).

Total Revenue per annum (Gross Returns) was calculated by multiplying the amount of fish sold, the price charged for the fish and the number of cropping seasons per year.

Net revenue per annum was calculated by subtracting the Total Costs from Gross Returns

$$NR = \sum P_i V_i - (FC + VC) \quad (3)$$

Where Pi = price per species handled, Vi = amount per species handled, VC is the variable cost and FC is the fixed cost. Fixed cost is obtained using the straight line depreciation method by obtaining the actual cost of the fixed items and their useful life.
Operational efficiency was calculated following Yesufu and Ayanwale (2013):

$$OE = [MC_i^{-1}](MC_L \; X \; 100) \quad (4)$$

Where MCi = unit marketing cost of each firm in the industry, MCL = unit marketing cost of the firm with the least unit cost in the industry.

Results and Discussion

Market Structure

History of the fresh fish market

This was discussed in relation to the gender and age of the respondents, education, marital status, reasons for involvement and the length of time in which they had been involved in fresh fish marketing. From Table 1, fish marketing in the study area was male dominated (57.6%) with a mean age of 42 years. This indicated that most of the respondents were within the economically active population who constitute a good labour force for fishery enterprise. These findings agree with the study of Olawumi et al. (2010) carried out in Ogun State, Nigeria. Their results showed that a greater percentage of the fish farmers fall between the ages of 40-49 with a bias towards the male gender who represented 92 percent of the fish farmers in the state.

Also, it is interesting to note that about 86% of the marketers had post-secondary school level of education depicting that the market is dominated by fairly educated people. Education, according to (Onyebinama and Onyejelem, 2010) predisposes farmers to be innovative and put them in a better position to cope with the intricacies of new factors and product markets that the adoption of new technologies introduces them to. Hence, information that could lead to improvement in the managerial decisions of the farmers could easily be transmitted to them by the extension agents. Most, (93.9%) of the respondents were married and most (91%) had 10 years of experience in fish marketing.

From the findings, though fresh fish marketing in the study area had been in existence for a period of about 25 years as revealed by the respondents but most of the marketers have less than 10 years in the industry; this indicates very low level of involvement initially. The fresh fish industry can thus be categorized as being in its early stage of maturity because a very large proportion of its participants were new entrants in the study area and just learning. However, experience according to Onyebinama (2004) in farm business would

Table 1: Description of Personal and Market Characteristics of Respondents

Variable	Dominant Indicator	Mean
Age	48.5% of the respondents were between 40 and 49 years; other respondents (30-39 and 50-59) were 21.2% each	42
Gender	57.6% of the respondents were male	-
Marital status	93.9% of respondents are married	-
Education	86.4% of the respondents had post-secondary school education.	-
Level and Reason for involvement in fish marketing	53% of respondents involved on full time; 60.6 % marketed fish for profit	-
Years of experience in fish marketing	91% had less than 10 years experience in fish marketing	-
Ownership structure	75.8% were sole proprietorship	-
Size of fish farm	72.7% had 20,000M^2 and below	19,087M^2
Mode of land acquisition	78.8% of respondents purchased their lands	-
Start-up capital	69.7% of respondents spent below ₦1,200,000 to start the business	₦720,000
Sources of start-up capital	6.1% from formal lending source while 65% from combinations of sources with personal savings common to all	-
Average unit marketing cost	Majority (68.2%) was between 0.001 and 2.000	₦1.989

Source: Data Analysis, 2007

enable the farmer to set realistic goals and time targets, allocate and utilize resources efficiently and identify production risk.

Barriers to Entry

This is discussed in relation to ownership structure, sizes of fishers' ponds, fixed items used, start-up capital required and sources of capital. Their sources of start-up capital were personal savings in combination with some other sources such as family, cooperatives and friends. Credit facility from formal sources to the industry was restricted as only about 6% of funds were sourced from the formal lenders. Majority (69.7%) had the start-up capital below N1.2m with an average of N720,000; suggesting a very high start-up capital for the enterprise thereby explaining the high number (72.2%) of the farmers operating within the predominant size of fish farms of 20,000M2 and below in the study area. The ownership structure predominant in the industry was the sole-proprietorship. This suggests the absence of bureaucracy as it may be in other forms of businesses. Furthermore, the main source of land for fish farming in the study area was by purchase (78.8%).

Concentration Ratio (CR)

The concentration ratio (CR) as calculated for the largest 2, 4 and 8 firms- (Cr2), (CR4) and (CR8) respectively were found to be 19.3%, 34.7% and 53.8% respectively (Table 2). Using the result obtained for CR4, the degree of concentration in the fresh fish industry was categorized as "moderately concentrated", depicting a market structure that was "monopolistic in competition". This means

Table 2: Summary of Concentration Indices

Concentration Index	Value	Interpretation
CR_2	19.3%	
CR_4	34.7%	Monopolistic competition in the Fresh fish industry
CR_8	53.8%	
HI	$9.05X10^{-8}$	Firms in fresh fish industry are of different sizes

Source: Data Analysis, 2007

that the producers were not very many in the market, produced and sold almost similar products, which they tried to differentiate to make them look different in the eyes of the consumers through advertisement in the radio or the use of flyers and varying sizes of fish which gave them some little flexibility in pricing. Only a few (3%) sold processed fish alongside of the fresh fish. Lack of storage and processing equipment made the farmers sell at lower prices, at times, in order to prevent spoilage after harvesting.

The Herfindahl Index (HI) was also found to be 9.05 x 10-8. A HI value equal to 1/N, where N = 66 would indicate that the firms are of the same size. Since the HI value obtained was not equal to 1/N, it was deduced that the firms in the fresh fish industry were of different sizes, prices (set by each producer) were almost similar with little differences because of the fear of losing their customers to their rivals. Hence each producer is conscious of the reaction of its rival.

Average Unit Marketing Cost (AUMC)

The average unit marketing cost was calculated by dividing the total marketing costs per producer by the volume of fish handled. From Appendix 1, the mean AUMC was N1,989, having a range from N 0.615 to N 9.449 and the figures indicate that the modal class for average unit marketing costs was 0.001-2.000, which suggests that the values of AUMC in the fresh fish market are relatively low. This was so because most sales were done at the farm gate with very minimal packaging, branding or transportation.

Market Conduct and Performance

The analysis of market conduct was done by examining the buying and selling practices, use of various inputs and production practices. Other measures include harvest and post-harvest practices, pricing policy and labour utilization profile of the respondents.

From Table 3, fingerlings obtained for production were purchased as stated by 74.2%; this suggests that markets for fingerlings exist and are accessible to the producers, and also that few of them have the skill required for breeding. Fertilizer and lime application was not widespread as only 21.2% and 16.7% of the respondents applied fertilizer and lime respectively.

The study further revealed that the most widely used type of feed was floating pellets as reflected in Table 3. It is obvious that the use of pelletized feeds is widespread due to improved technology. The average number of times for feeding was 2 and only a few of the respondents fed up to four times daily.

The fish commonly cultured was Clarias spp. This species of fish has an average maturity period of six (6) months. About 60.6% of the respondents engaged in partial harvesting in order to spread return over time and to avoid glut. Although there was a record of few of the

Table 3: Description of Market Conduct and Performance Indices of Respondents

Variable	Dominant Indicator	Mean
Source of fingerlings	74.2% were purchased by respondents not bred.	
Fertilizer application	21.2% of the respondents applied fertilizer, 78.8 did not use fertilizer	
Lime application	Only 16.7% of respondents applied lime	
Types of feed used	84.8% of the respondents used floating pellets	
Frequency of feeding	Only 80.3% of respondents fed between three and four times daily	2
Periodicity of harvesting	68.2% of the respondents harvested at 6 months	4
Place of sales	51.5% sold on-farm	
Mode of sales	97% sold live fish	
Advertisement practices	66.7% of respondents advertised	
Channels of marketing	77.3% sold using all outlets	-
Average unit price of fish (Kg)	Majority (87.9%) sold between ₦300 and ₦400 per Kg	₦370.00
Membership of farmers' associations	66.7% of the respondents belonged to fish farmers' association	
Total revenue per farmer/annum	Majority (86.3%) made less than ₦1,000,000.00 per annum	₦772,699.00
Net revenue/farmer/annum	Majority (89.4%) made less than ₦450,000.00 per annum	₦414,760
Operational efficiency	88.5% of the firms had their OE below 50%	37.8%
Labour type	Only 4.5% used only skilled labour, 34.8% used only unskilled, while 40.9% used both	

Source: Data Analysis, 2007

respondents carrying out total harvesting; this was due to pressure from fixed demand for the product.

From Table 3, majority sold on farm and this could be in order to avoid handling and transportation costs. The table further revealed that 97% of the respondents sold their fish live and this is traceable to the customers' preferences for fresh fish coupled with the producers' desire to eliminate processing and/or storage costs. The most important post-harvest activity was found to be advertising. Majority of the respondents advertised and the most important means of advertising were via flyer/hand bills.

The most prevalent channel level was one and two level marketing channels. The study further revealed that the average price per kilogram of fish varied according to market factors, size of fish, time of year, production costs, location and presence of middlemen. However, the average selling price per kilogram in the study area was N370.00. Also 66.7% of the respondents belonged to fish farmers' associations. However, 100% of the respondents agreed that these associations played no role in price setting in the industry, neither were there any joint effort at combined sales of products. Individual farmer marketed his products in his own way, and set prices independently based on factors such as

prevailing market price, cost of production and marketing, and fish sizes. The farmers were however aware that demand for their products might fall if their prices were too high compared to those of other marketers. Farmers who belonged to association did so to obtain information on inputs and innovative technologies in the industry.

The performance of the market was measured using the revenue and operational efficiency of the respondents. Feeding was the highest (33.9%) of the total cost of production followed by the cost of fingerling (25.8%) and labour cost (17.4%). This supports the findings of Adewuyi et al. (2010) and Olawumi et al. (2010). The mean net revenue was found to be N414, 760. The minimum and maximum net revenue values were - N37,200 and N7,183,433 respectively suggesting a wide standard deviation. A reason for the low and negative values obtained by some of the firms was the relative newness of most of these firms. The figures obtained shows that 93.4% of the respondents had net revenues of less than N450,000 per annum. Though the ratio of the fixed cost to variable cost (0.26) reveals flexibility of the fish enterprise, it also suggests the lack of funds for some required assets on the farm. The average benefit to cost ratio (2.24) depicts that fish farming is profitable, meaning that with the investment of N1.00, the business returns N2.24, leaving a profit of N1.24. However, while the findings of Olagunju et al. (2007) agreed with the profitability of fresh fish farming, their rate of returns was 51k gained from every N1.00 invested.

As defined in terms of long run unit cost minimization, the most efficient farm firm is the one with the lowest unit cost and this was found to be N0.615. This information is shown in Appendix 1. The operational efficiency (OE) was calculated with respect to the global optimum performance and calculated for all the firms (also shown in Appendix 1). The study revealed that 88.5% of the firms had their OE below 50%. On the average, the firms in the industry are characterized by low efficiency of 37.8%.

The market structure of the fresh fish industry in Lagos state has considerably positive attributes which would provide a good foundation for effectiveness and growth in the industry. However, the positive and negative characteristics found in the market conduct seem to have a stronger influence on the performance. This combined influence is thus responsible for the below average performance found in the Lagos state fresh fish industry. Dey et al. (2005) reported that aquaculture production can be increased through more efficient use of farmer's resources and of existing inputs and technology, development of new technology and the transfer of these technologies to farmers and an increase in the area of dedication to fish production.

Appendix 1: Operational Efficiency of Fresh Fish Marketing in Lagos State.

Firm	MC_i	MC_i^{-1}	MC_L	OE	Firm	MC_i	MC_i^{-1}	MC_L	OE
1	2.088	0.479	0.615	29.5	34	1.295	0.772	0.615	47.5
2	1.309	0.764	0.615	50.0	35	1.321	0.757	0.615	46.6
3	2.883	0.347	0.615	21.3	36	0.928	1.077	0.615	66.3
4	3.177	0.315	0.615	19.4	37	0.615	0.625	0.615	100.0
5	1.348	0.742	0.615	45.6	38	1.315	0.761	0.615	46.8
6	1.491	0.671	0.615	41.2	39	2.372	0.421	0.615	25.9
7	2.025	0.494	0.615	30.4	40	1.246	0.803	0.615	49.4
8	5.620	0.178	0.615	10.9	41	1.500	0.667	0.615	41.0
9	2.715	0.368	0.615	22.7	42	4.142	0.241	0.615	14.8
10	1.865	0.536	0.615	33.0	43	1.188	0.842	0.615	51.8
11	1.065	0.939	0.615	57.7	44	1.607	0.622	0.615	38.3
12	9.449	0.106	0.615	6.5	45	1.606	0.623	0.615	38.3
13	1.766	0.566	0.615	34.8	46	1.804	0.554	0.615	34.1
14	2.034	0.492	0.615	30.2	47	1.721	0.581	0.615	35.7
15	2.895	0.345	0.615	21.2	48	1.528	0.654	0.615	40.2
16	1.178	0.849	0.615	52.2	49	1.248	0.801	0.615	49.3
17	3.221	0.310	0.615	19.1	50	1.448	0.691	0.615	42.5
18	1.293	0.774	0.615	47.6	51	1.268	0.789	0.615	48.5
19	1.589	0.629	0.615	38.7	52	1.292	0.774	0.615	47.6
20	2.459	0.407	0.615	25.0	53	1.122	0.891	0.615	54.8
21	1.151	0.869	0.615	53.4	54	1.635	0.612	0.615	37.6
22	1.730	0.578	0.615	35.5	55	1.323	0.756	0.615	46.5
23	1.380	0.725	0.615	44.6	56	1.714	0.583	0.615	35.9
24	1.567	0.638	0.615	39.2	57	1.643	0.608	0.615	37.4
25	1.518	0.659	0.615	40.5	58	4.269	0.234	0.615	14.4
26	2.108	0.474	0.615	29.2	59	3.189	0.314	0.615	19.3
27	2.341	0.427	0.615	26.3	60	1.394	0.717	0.615	44.1
28	1.246	0.802	0.615	49.4	61	1.878	0.533	0.615	32.7
29	1.684	0.594	0.615	36.5	62	2.568	0.389	0.615	23.9
30	2.286	0.437	0.615	26.9	63	1.302	0.768	0.615	47.2
31	1.739	0.575	0.615	35.4	64	1.286	0.777	0.615	47.8
32	3.298	0.303	0.615	18.6	65	1.261	0.793	0.615	48.8
33	2.232	0.448	0.615	27.6	66	1.463	0.684	0.615	42.0
Mean				37.8					
Min				6.5					
Max				100.0					

Source: Data Analysis, 2007

CONCLUSION AND RECOMMENDATION

The study found that fresh fish marketing has low operational efficiency though profitable with a wide range of disparity among the fish farmers in Lagos State. The conduct of the fresh fish market reveals that the most important variable inputs are fingerlings, feed and labour, while the use of fertilizers, lime and other chemicals is very low with majority of the farmers not using fertilizer and lime. The start–up capital is high and could be a barrier to new entrants. The market environment could be better organized for increased fish production and profitability. This organization should be geared towards making more finance available for new entrants and for acquisition of other supporting (e.g storage and processing) resources for expansion. The low operational efficiency suggests that training must be given to the fish farmers on a regular basis in other to enhance good management towards better performance. It is, therefore, recommended that there is need to promote a policy mix that will encourage adoption of new innovations in fish production to encourage efficiency; capacity building on management skills for the operators; and growth enhancement supports capable of improving the market performance in the study area.

REFERENCES

Adeogun O.A., Ogunbadejo H.K., Ayinla O.A., Oresegun A.,Oguntade O.R., Alhaji Tanko and Williams S.B (2007): Urban Aquaculture: Producer Perceptions and Practices in Lagos State, Nigeria. Middle-East Journal of Scientific Research 2 (1): 21-27 ISSN 1990-9233

Adewuyi S.A, Phillip B.B., Ayinde I.A. and Akerele D. (2010): Analysis of Profitability of Fish Farming in Ogun State, Nigeria. Kamla-Raj, Journal of Human Ecology, 31(3): 179-184

Bain, J.S. (1968), Industrial organization. Second edition. John Wiley & Sons, New York.

Bressler, R.G. and King, R.A. (1970). Markets, prices and interregional trade, Ny, USA: John Wiley & son.

Business day online (2012): www. Businessdayonline.com

Castle, E.N. and Becker, M.H. (1962): Farm Business Management. The Decision Making Process, The Macmillan Company, pp 133 – 135.

Caves, R. (1982): American industry: structure, conduct and performance Fifth edition. Eaglewood cliffs. NJ, USA: Prentice Hall.

Dey, M.M., Prien, A.B.M.M, Haque, S.Sultana, N.C, Dan and Hao, N.V. (2005): Economic feasibility of community based fish culture in seasonally flooded rice fields in banglandesh and Vietnam. Aquaculture Economics and Management 3(5):1 – 10.

Emokaro, C.O. and P.A. Ekunwe (2009): Efficiency of Resource-Use and Elasticity of Production Among Catfish Farmers in Kaduna, Nigeria. Journal of Applied Sciences Research, 5(7): 776-779.

FAO (2008): Report Of The FAO-Worldfish Center Workshop on Small-Scale Aquaculture in Sub- Saharan Africa: Revisiting the Aquaculture Target Group Paradigm. FAO Rome Publication.ftp://ftp.fao.org/docrep/fao/008/a0038e/a0038e00.pdf.

FAO (2009): Food & Agriculture Organization: The State of World Fisheries and Aquaculture 2008.

FAO (2012): Summary of SOFIA report 2012. www.seafish.org/media

Inoni O.E. (2007): Allocative Efficiency in Pond Fish Production in Delta State, Nigeria: A Production Function Approach. Research Journal of Agricultura Tropicaet Subtropica 40 (4) 435-45.

Miller, J., Atanda, T., Asala, G. and Chen, W.H. (2006): Integrated Irrigation Aquaculture Opportunities in Nigeria: The special Programme for Food Security and Rice-Fish Farming in Nigeria AIFP. FAO-Natural Special Programme for Food Security Office, Abuja, Nigeria.

Odukwe, A. (2007): Fish Farming in the Tropics: A Functional Approach. Maxiprints, Awka, Nigeria. Book Review.

Okoye, F.C and Ayanda, J.O. (2007): Economics of Commercial Fish Farming in Earthen Ponds in Nigera: Privatization of Fish farms. National Institute for Freshwater Fisheries Research P.M.B. 6006, New Bussa Niger State

Olagunju F.I, Adesinyan I.O, Ezekiel A.A (2007): Economic Viability of Cat Production in Oyo State. Journal of Human Ecology, 21(2): 121-124.

Olawumi A.T., Dipeolu A.O. and Bamiro O.M (2010): Economic Analysis of Homestead Fish Production in Ogun State Nigeria. J Hum. Ecol, 31(1): 13-17

Onyebinama U.A.U. (2004): Farm business management for smallholder farm firms in Nigeria Owerri. Alphabet publishers Nigeria

Onyebinama and Onyejelem (2010): Comparative Analysis of determinant of income of cassava farmers in rural and urban area of Abia State. Nigeria. Agricultural journal, 5(2):57-62.

Ugwumba, C.O.A., M.O. Ugboaja and E.C. Orji (2006): Sustanable Catfish Seeds Production in Anambra State. In: Asumugha, Olojede, Ikeorgu, Ano and Herbert (eds.), Repositioning Agriculture for Sustainable Millenium Development Goals in Nigeria: Proc.Agricultural Society of Nigeria (ASON) 40th Annual Conference, pp: 512–514. Umudike, Umuahia, Nigeria Stigler, G.J. (1968). The Organization of Industry. Chicago, IL, USA. Richard D. Irwin Inc.

Viaene, J. and Gellynck, X. (1995). Structure, conduct and performance of the European Food Sector. European Review of Agricultural Economics, 22; 282-295.

WHO (2011): Protein Requirements: Report of a joint FAO/WHO Expert Group, FAO and WHO, Switzerland.

Yesufu, O. A. and Ayanwale, A. B. (2011): Structure, Conduct and Profitability of Broiler Processing Enterprises in Southwestern Nigeria, Learning Publics Journal of Agriculture and Environmental Studies, Vol. 2 (2), pp1-20.U.S.A.

Yesufu, O. A. and Ayanwale, A. B. (2013): Analysis of the Operational and Pricing Efficiencies of the Broiler Processing Enterprises in Southwestern Nigeria, Learning Publics Journal of Agriculture and Environmental Studies, Vol. 3 (3), pp 1-12. U.S.A.

Yesufu, O. A., Awoyefa, S. O. and Sholademi A.P (2012): An Economic Analysis of Fresh Fish Marketing in Kaduna State, In Idowu, E. O., A. B. Ayanwale, A. S. Bamire and A. O. Adejobi (eds): Proceedings of the 2012 Annual Conference of Nigerian Association of Agricultural Economists (NAAE), Obafemi Awolowo University, Ile-Ife, Nigeria, pp 811 – 819. NIGERIA.

Table 4: Distribution of the Operational Efficiency of the Fresh Fish Farmers in Lagos State, Nigeria

Operational Efficiency	Frequency	Percentage
0 – 10	1	1.5
11 – 20	7	11
21 – 30	13	20
31 – 40	16	24
41 – 50	21	32
51 – 60	6	9
61 – 70	1	1.5
71 – 80	0	0
81 – 90	0	0
91 – 100	1	1.5
Total	66	100

Source: Data Analysis, 2007

Table 5: Cost and Returns per Fish Farmer for 2007 Production Season

S/N	Item		Value (₦)	
A.	*Total Variable Cost*	*(80.6 % of C)*	*278,485*	
1	Labour		60,212	(17.4%)
2	Feed		117,302	(33.9%)
3	Fingerling		89242	(25.8%)
4	Transportation		11288	(3.3%)
5	Fuel		15501	(4.5%)
6	Miscellaneous		4,412	
B.	*Total Fixed Cost*	*(18.6 % of C)*	*64,303*	
7	Depreciation on Land		10,004	(2.9%)
8	Depreciation on Pond		16758	(4.8%)
9	Depreciation on Aerator		298	(0.001%)
10	Depreciation on Borehole		6782	(2.0%)
11	Depreciation on Vehicle		11492	(3.3%)
12	Depreciation on Generator		11455	(3.3%)
13	Depreciation on Water pump		5050	(1.5%)
14	Depreciation on Fish Net		1317	(0.4%)
15	Repairs		2772	(0.8%)
C	*Total Cost (A + B)*		345,550	
D	*Total Revenue)*	*772,699*		
E	*Net Revenue (D – C)*	*414,760*		
F	*Fixed cost/Variable cost*	*0.26*		
G	*Benefit/Cost*	*2.24*		

Source: Data Analysis, 2007