ASSESSMENT OF MARKETING EFFICIENCY OF SMOKED FISH AMONG ARTISANAL FISHERFOLKS IN OGUN WATERSIDE LOCAL GOVERNMENT AREA OF OGUN STATE, NIGERIA

***[1]OLAOYE, O. J., [2]ADELAJA, O. A., [3]ASHAOLU, O. F., [2]IKENWEIWE, N. B. & [2]S.S. ASHLEY-DEJO**

1. Agricultural Media Resources and Extension Centre, Federal University of Agriculture, P.M.B. 2240, Abeokuta, Ogun State, Nigeria
2. Department of Aquaculture and Fisheries Management, Federal University of Agriculture, P.M.B. 2240, Abeokuta, Ogun State, Nigeria
3. Agricultural Economics and Farm Management, Federal University of Agriculture, P.M.B 2240, Abeokuta, Ogun State, Nigeria

*Correspondence: olaoyeoj@funaab.edu.ng

ABSTRACT

This study assessed marketing efficiency among artisanal fisher folks in Ogun waterside. Purpose sampling method was used to select fish processors from fishing communities in Ogun waterside. One hundred and twenty eight fish processors were randomly sampled using interview schedules. Data collected were analyzed using descriptive statistics, profitability indices and inferential statistics. The study revealed that the mean age, household size and processing experience of fish processors were 35 ± 0.76, 5 ± 0.12 persons and 16 ± 0.53 years respectively. Hundred percent of the fish processors were female, 84.4% were married, and 67.9% were educated. Profitability indices were: Benefit Cost Ratio 1.73, Rate of Return on Investment 0.73, Net Profit Margin 0.42 and Marketing Efficiency 0.58. Over 60.0% of the processors sold their processed fish directly to wholesalers. Major constraints faced include inadequate finance, lack/high cost of modern processing facilities and high cost of transportation. It was show that there was no significant association between marketing efficiency and marital status ($\chi^2 = 6.543$, $p > 0.05$), educational level ($\chi^2 = 10.994$, $p > 0.05$) and there was a significant association between marketing efficiency and mode of fish processing ($\chi^2 = 47.842$, $p < 0.05$). Significant relationship existed between constraints faced by fish processors and marketing efficiency at $p < 0.05$. Fish processors should be encouraged to form themselves into viable cooperative societies, and this will enable them enjoy economics of scale, freedom from exploitation by the middlemen.

Keywords: marketing efficiency, smoked fish, fisher-folks, Ogun waterside.

INTRODUCTION

The fisheries sub-sector plays a crucial role in food and nutrition security and in providing for the livelihood of millions of people. It produced a record of 128 million tonnes of fish for human food (an average of 18.4 kg per person), providing more than 4.3 billion people with about 15.0 percent of their animal protein intake (Food and Agriculture Organization - FAO, 2012). Hence, improving food security requires reducing post-harvest losses and increasing the percentage of fish used for direct human consumption. The sub-sector has been affected by problems, which have limited its growth and hindered self-sufficiency in local fish production (Federal Department of Fisheries - FDF, 2005).

Some of the problems facing domestic fish production in Nigeria are innovation adoption, inadequate research and extension, high cost of fisheries inputs, social conflict and post-harvest losses due to poor handling, processing, preservation, storage technologies, fish seed, lack of credit and insurance cover for fisheries enterprises as well as improper marketing outlets (Olaoye, 2010). One of the problems associated with fish in Nigeria is its high rate of perishability, since the relative ease of preservation is not readily attainable.

Generally, the different preservation methods are: drying, smoking, freezing, chilling and brining but the common method in Nigeria is smoking (Akinola *et al*., 2006). Smoking is one of the most important fish processing methods aimed at preventing or reducing post-harvest losses. Smoking has the effect of imparting pleasant flavour to the product besides the preservative effect of smoke (Ako and Salihu, 2004). The longer fish is smoked, the longer is the shelf-life (Arthur and Osei-Somuah, 2004) and post-processing as well as marketing techniques impact on smoked fish shelf life (Ashamo and Ajayi, 2001).

Marketing and distribution channels are important characteristics in the process of getting produce from source to consumers (Madugu and

Edward, 2011). Marketing of fish passes through various market participants and exchange points before they reach the final consumers (Ali *et al*., 2008). Availability of fish to the consumers at the right time and right place requires an effective marketing system. Fish marketing involves the performance of all business activities involves in the flow of fish products and service from one point of initial production until they are in the consumers hand or users in order to satisfy consumption and accomplish the company objectives. Fish marketing is however not with some setbacks such as shortage of supply, price fluctuations due to drying up of source, poor distribution and length of chain and spoilage in transit (Tomek and Robinson, 1981). Marketing efficiency was seen by Adegeye and Dittoh (1985) as the movement of goods and service from the producer to the consumer at the lowest cost consistent with the provision of the service that consumers desire and are able to afford. Marketing efficiency is expressed as the ratio of output to input.

The following specific objectives were addressed in order to achieve the broad objective. These objectives are, to:

i. describe the socio-economic characteristics of fish processors in the study area;

ii. describe the various distribution channels involved in the study area;

iii. estimate the cost structure, profitability and marketing efficiency of fish processors; and

iv. identify the constraints faced during processing, packaging and marketing in the study area

Hypothesis

The hypothesis tested in the null forms, are

H_{01}: There is no significant relationship between socio-economic characteristics of fish processors and marketing efficiency.

MATERIALS AND METHODS

The study area

The area of study is Ogun Waterside Local Government Area (LGA) in the Ijebu Division of Ogun State. The (LGA) is located in the eastern part of Ogun State sharing boundaries with Ondo State in the north, Lagos State in the south and Ijebu East Local Government in the west. About half to three-quarter of the length of the local government is surrounded by water extending from Lagos State to Ondo State; this peculiar feature gave birth to the name "Waterside" (Idowu *et al.,* 2012). The area comprises over 50 towns and villages with headquarter at Abigi at 6°29′N 4°24′E /6.483°N 4.4°E (Idowu *et al*., 2012). It has an area of 1,000 km² and a population of 72,935 at the 2006 census. It is the only area of the State with a coastline on the blight of Benin and also borders Lagos lagoon. Coastal areas include Igbeki, Olusumeta, Igbosere, Elefon and so on as shown in Fig. 1.

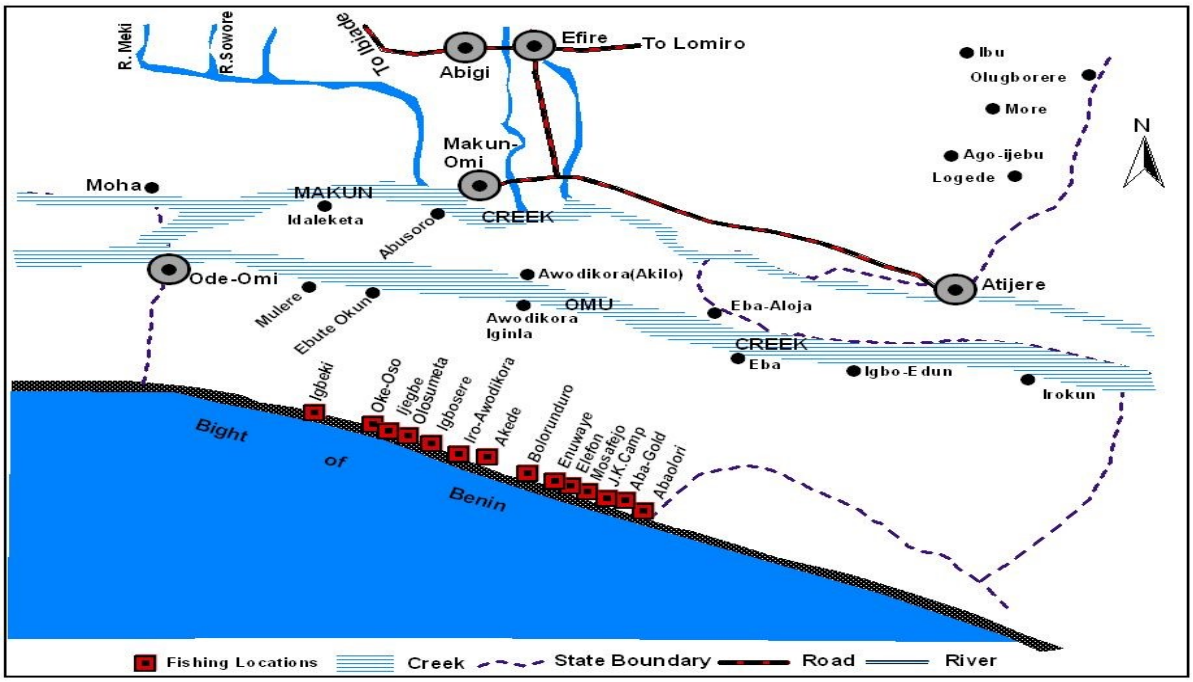

Fig. 1: Map of Ogun Waterside

Sampling techniques and sample size

Purposive sampling techniques were used to select fish processors for this study. Sixty percent of the 23 fishing villages along the coastal communities in Ogun waterside were purposively selected based on the high prevalence of fish processors. This is followed by the random selection of 60.0% of the 213 fish processors in the selected fishing villages from the list of fish processors obtained from Ogun State Agricultural Development Programme (OGADEP). This gave a total number of 128 fish processors which were surveyed for the study. The data used are essentially from primary source i.e. the fish processors in the area. Structured interview schedule was used to collect information from the processors.

Data analysis

The tools that were used in analyzing the data collected include descriptive, gross margin analysis, profitability ratio and inferential statistics. Hypothesis is tested by using the inferential statistical tools such as Chi-square and Pearson Product Moment Correlation. The model/formula used in calculating the profitability indices and marketing efficiency according to Abolagba, 2005; Adegeye and Dittoh, 1985; Olaoye *et al.*, 2014 are as presented below:

Total Revenue (TR) = QyxPy …..... i
Gross margin (GMI) = TR – TVC ……..….ii
Net Farm Income (NFI) = GMI-TFC……...iii
Benefit Cost Ratio (BCR) = TR/TC …… iv
Rate of Return on Investment (RRI) = NFI/TC ….. v
Net Profit Margin (NPM) = NFI/TR……..vi
Marketing efficiency(ME) = TC/TR…….. vii

RESULTS

Socio-economic characteristics of the Respondents

The socio-economic characteristics of the respondents included in this study include age, sex, religion, marital status, educational level, household size, other occupation, mode of fish processing, fish processing experience and reason(s) for going into fish processing.

Table 1 shows the distribution of fish processors with respect to their socio economic characteristics. Majority (41.4%) of the fish processors fell within the age bracket of 31 – 40 years while those that fell within 41 – 50 years were 28.9%. This shows that fish processing in the study area was in the hand of people in the economically active age bracket. It was further revealed that all (100.0%) the processors in the study locations were females. Over 70.0% of them were Christians while less than 30.0% practiced Islam. The Table 1also shows that majority (84.4%) of the fish processors were married while 5.5% were divorcee. Over 80.0% of them were Yoruba's. Minority (32.0%) of the fish processors had no formal education while the mean household size was 5.0 people per household. Furthermore, almost half (47.7%) of the fish processors engaged in arable farming as their secondary occupation, 8.6% engaged in hair dressing and 25.0% engaged in selling of coconut. Over 80% of the fish processors engaged in full-time business while 12.5% engaged in part time business. Result shows that 32.0% of the fish processors had fish processing experience between 11 - 15 years, 23.5% had fish processing experience between 6 – 10 years while 1.6% had fish processing experience between 1 – 5 years. Almost 80.0% of the processors in Ogun waterside went into fish processing business because they have no other occupation at their disposal.

Table 1: Percentage distribution of the socio-economic characteristics of fish processors in Ogun waterside (N = 128)

Variables	Frequency	Percentage
Age (years)		
Below 21	10	7.8
21-30	28	21.9
31-40	53	41.4
41-50	37	28.9
Above 50	0	0.0
Mean	**35**	
S.E.	**0.76**	
Sex		
Female	128	100
Religion		
Christianity	94	73.4
Islam	34	26.6
Marital Status		
Married	108	84.4
Divorced	7	5.5
Widowed	13	10.2
Tribe		
Igbo	9	7.0
Yoruba	119	93.0
Educational status		
No formal Education	41	32.0
Adult Education	0	0.0
Uncompleted Primary Education	50	39.0
Completed Primary Education	34	26.6
Uncompleted Secondary Education	3	2.3
Household size (persons)		
1 – 3	21	16.4
4 – 7	101	79.0
8 – 11	6	4.7
Mean	**5**	
S.E.	**0.12**	
Other occupation that generate income apart from fish processing		
Arable Farming	61	47.7
Hair dresser	11	8.6
Selling of coconut	32	25.0
Trading	2	1.6
Mode of fish processing		
Full time	112	87.5
Part time	16	12.5
Fish processing experience (years)		
1 – 5	2	1.6
5 – 10	30	23.5
11 – 15	41	32.0
16 – 20	35	27.3
Above 20	20	15.6
Mean	**16**	
S.E.	**0.53**	
Reason for going into fish processing		
Occupation at disposal	100	78.1
Profitability	7	5.5
Source of income	21	16.4

Source: Field survey, 2013

Economic analysis

The estimated gross margin analysis of fish processors in Ogun waterside were presented in Table 2. It shows that the cost of fresh fish took largest percentage of the total cost (54.35%). The average fixed cost of ₦14,666.28 was recorded, followed by an average total variable cost of₦28,814.51. Equally from the result, an average total cost of ₦43,540.79 was incurred by the respondents, total revenue of ₦75,205.60 was generated while gross margin (GM) of ₦46,331.09. Profitability ratio reveals that Benefit Cost Ratio (BCR) value of 1.73, Rate of Return (ROR) of 0.73, Net Profit Margin (NPM) of 0.42 and marketing efficiency of 0.58 were obtained. It shows therefore that fish processing is a profitable business in the study area. Every one Naira invested will add 73.0 kobo to the business.

Table 2: Cost and Return Analysis of fish processors Ogun Water Side LGA

Items	Amount (₦)	% Total Cost
FIXED COST (FC)		
Smoking kiln	7,706.25	17.69
Processing Shed	1,614.65	3.71
Market union tax	59.14	0.14
Steel Bowls	641.39	1.47
Wire gauze	1,054.28	2.42
Cutlass and File	1,211.06	2.78
Steel knife	856.21	1.97
Baskets (cane)	1,523.28	3.5
Total Fixed Cost (TFC)	**14, 666.28**	**33.68**
VARIABLE COST (VC)		
Fresh Fish	23,664.01	54.35
Fire wood/saw dust	1,624.41	3.73
Kerosene/palm kernel shaft	46.25	0.11
Salts	-	-
Transportation	3,539.84	8.13
Total Variable Cost (TVC)	**28,874.51**	**66.32**
Total Cost (TC)	**43, 540.79**	
Total Revenue (TR)	**75,205.60**	
Gross margin (TR - TVC)	**46,331.09**	
Net Farm Income (GMI-TFC)	**31,664.81**	
Benefit Cost Ratio (TR/TC)	**1.73**	
Rate of Return on Investment (NFI/TC)	**0.73**	
Net Profit Margin (NFI/TR)	**0.42**	
Marketing efficiency (TC/TR)	**0.58**	

Source: Field survey, 2013

Distribution channels of smoked fish

Various distribution channels of smoked fish in Ogun state are presented in Figure 1. It was revealed that there are three channels involved in the distribution of smoked fish. The first channel is from the fishermen to fish processors to wholesalers (large quantities) to retailers (small quantities) and finally to consumers. The second channel is from the fishermen to fish processors to retailers (small quantities) and finally to the consumers while the third channel is from the fishermen to fish processors and directly to the consumers.

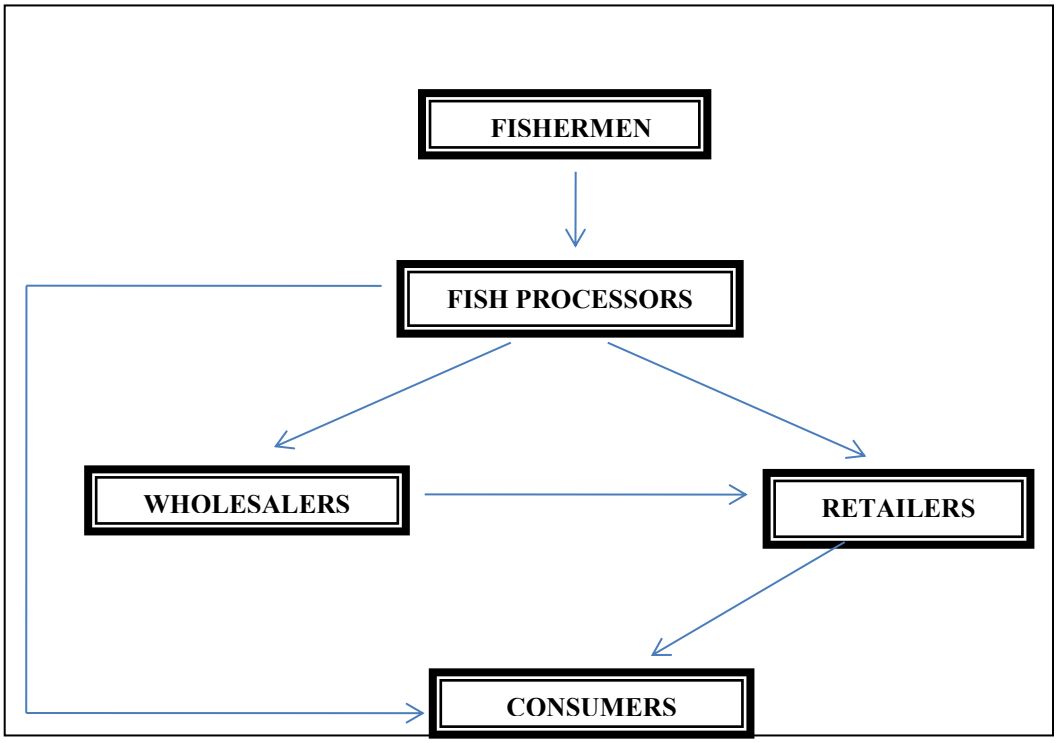

Fig. 3: Distribution Channel of Smoked Fish in Ogun State
Source: Field survey, 2013

Constraints faced during processing, marketing and packaging of processed fish

Table 3 revealed the constraints faced during processing, marketing and packaging of processed fish in Ogun waterside. Majority (83.6%) of the fish processors identified inadequate capital/finance as a very serious problem while 3.9% claimed it is not a problem. From the result, it was revealed that about fifty percent of the fish processors identified seasonal availability of fish as a serious problem, 41.4% claimed it as a very serious problem while 10.2% claimed it is not a problem. The result shows that 61.7% of fish processors were faced with serious high cost of fish to process while 6.3% claimed they do not know. Majority (86.7%) of the fish processors were faced with very serious problem of lack/high cost of modern fish processing facilities while 13.3% were faced with serious problem of lack/high cost of modern fish processing facilities in the area.

From the result, 89.8% of fish processors claimed they do not have problem of insufficient labour, 77.3% of fish processors were faced with serious problem of lack of storage facilities. Over half (51.6%) of the fish processors have serious problem with access to modern technology while 9.4% of fish processors do not have problem with access to modern technology. It was revealed that 58.6% of fish processors in the study area were faced with very serious and serious problem of distance from processing site to the market place while 59.6% of fish processors were not faced with problem of distance from processing site to the market place.

From Table 3, it was revealed that 81.3% of fish processors were faced with very serious problem of high cost of transportation while 18.8% were faced with serious problem. The result shows that 60.2% of fish processors were faced with serious problem of breakage of smoked fish. It was revealed that majority (85.2%) of fish processors were not faced with problem of availability of packaging materials, also, 89.8% of fish processors do not have problem with high cost of packaging materials.

Table 3: Percentage distribution of constraints faced during processing, marketing and packaging of processed fish

Constraints	Mean Level of severity	Rank
Inadequate capital/finance	3.80	2nd
Seasonal availability of fish	3.31	4th
High cost of fish to process	2.92	8th
Lack/high cost of modern fish processing facilities	3.87	1st
Insufficient labour	1.90	11th
Lack of storage facilities	3.15	7th
Access to modern technology	3.30	5th
Distance of processing site to market place	3.59	3rd
High cost of transportation	3.81	2nd
Breakage of smoked fish	3.23	6th
Availability of packaging materials	2.09	9th
High cost of packaging materials	1.98	10th

Source: Field survey, 2013

Testing of hypotheses of the study

This section shows the relationship/difference between some of the independent variables and dependent variables. To test for the relationship between the variables Pearson Product Moment Correlation (PPMC) and Chi-square (χ^2) analysis were used. PPMC was used for the variables that were measured at interval level while Chi –square was used for variables that were measured at nominal level.

There is no significant relationship between socio-economic characteristics of fish processors and marketing efficiency. Table 4 revealed the result obtained from Chi-square analysis from the study area. It shows that there was no significant association between marketing efficiency and marital status ($\chi^2 = 6.543$, $p > 0.05$), educational level ($\chi^2 = 10.994$, $p > 0.05$) and there was a significant association between marketing efficiency and mode of fish processing ($\chi^2 = 47.842$, $p < 0.05$). There was a significant relationship between marketing efficiency and age ($r = 0.48$, $p < 0.05$), house hold size ($r = 0.24$, $p < 0.05$) and no relationship exist between marketing efficiency and years of experience ($r = 0.09$, $p > 0.05$) (Table 5). Constraints faced by fish processors have significant relationship with marketing efficiency at 0.05 levels (Table 6).

Table 4: Chi-square analysis of the significant association between socio-economic characteristics and marketing efficiency

Variables	χ^2	df	CC	Decision
Marital status	6.543	3	0.16	NS
Educational level	10.994	7	0.08	NS
Mode of fish processing	47.842	1	0.00	S

Source: Field survey, 2013. χ^2= chi square calculated, df = Degree of freedom, CC = Contingency Coefficient, S = Significant, NS = Not significant ($p > 0.05$).

Table 5: Correlation analysis of the significant relationship between socio-economic characteristics and marketing efficiency in Ogun waterside LGA

Variables	Correlation	Probability	Decision
Age	0.48	0.00	S
Household size	0.24	0.01	S
Years of experience	0.09	0.31	NS

Source: Field survey, 2013.
NS = Not significant, S = Significant ($p < 0.05$)

Table 6: Chi square analysis of the significant association between constraints faced by the fish processors and marketing efficiency in Ogun waterside LGA

Variables	χ^2	df	CC	Decision
Constraints – Marketing efficiency	74.453	20	0.00	S

Source: Field survey, 2013. χ^2= chi square calculated, df = Degree of freedom, CC = Contingency Coefficient, S = Significant, NS = Not significant ($p > 0.05$).

DISCUSSION

From the field survey carried out, it was discovered that majority of the fish processors in Ogun waterside fell within age range of 31 - 50 years which were economically active age. This assertion is in line with the findings of Olowosegun *et al.* (2004). The respondents within this age rage were considered to be physically and physiologically mature and able to withstand stress in fish processing operations. It is then obvious that fish processing business was dominated by middle age women who were still active and could increase their output. Udoh and Nyienakuma, (2008) observed that this age bracket composed of the innovative, motivated and adoptable individuals, which is an indication that middle-aged people had higher aspiration to easily adopt modern technology and could take risk. The study revealed that one hundred percent (100.0%) of the processors of smoked fish were women. This confirms the findings of other authors who categorized processing of fish as female business (Abolagba *et al*., 2005; Gomna, 2006).

Ekong, 2003 pointed out that marriage in our society is highly cherished. This claim was further confirmed by the report of Fakoya, (2000) and Oladoja *et al.* (2008) who asserted that marriage confer some level of responsibility and commitment on individual who are married. In this study, it was discovered that majority of the processors were married (84.4%) while very few were divorced and widowed. The high percentage of married respondents were probably due to the fact that the respondents took fish processing as a career The tribe of the respondents described the socio-cultural group of the respondents to show the degree of social heterogeneity in the study area. In the study, it revealed that majority of the respondents were Yorubas and Igbo.

Education was a variable that widened mental horizon, influenced the totality of the individual and predisposed respondents to new innovations. An educational status is the literacy level of a person. It was observed that fish processing business in Ogun waterside was dominated by the uneducated class which is an important factor and similar to the general opinion that most processors are illiterates or semi-illiterates most of whom dropped out of formal school system. The level of educational attainment of the processors influenced their adaptation to modern processing facilities (Zen *et al*., 2000) and hence more readily to enhance their income than the illiterate respondents. Asiabaka (2008) reported that education had a positive influence on processors income. Household size was an essential variable of fisheries enterprise (Olaoye, 2010). From the result, the mean household size was five implying that majority of the processors do not keep large members in their homes.

Based on processors response during field survey, it was discovered that some of the respondents engaged in other occupation apart from fish processing. This can be supported by assertion of Ellis, (2000) that farming on its own is rarely sufficient for household needs in rural African settings. The study indicated that there were two categories of fish processors in the study area which are full-time 87.5% and part time 12.5%. Experience is the act of gaining knowledge through constant practices of skill, which brings about specialization. The sum of these then results in increase in output. Experience played prominent role in any fish processing business (Olaoye, 2010). From the findings of this study, the mean processing

experiences was about 16 years in the study area and as such have good skills and better approaches to fish processing business. Majority (78.1%) of the fish processors from the study area went into fish farming based on occupation at disposal.

The economic analysis represented in Table 2 show that the, an average total cost of ₦43,540.79 was incurred by the respondents; total revenue of ₦75,205.60 was generated while gross margin (GM) of ₦46,331.09 was recorded in Ogun waterside per month. This result is in line with the findings of Yomi Alfred *et al*. (2012) who observed that fish farming as a business in Ogun State is viable since BCR is greater than one. The Rate of Returns (ROR), was 0.73, implies that for every one naira invested, 73 kobo was gained. The Marketing efficiency of 0.58 indicates that fish marketing system was 58% efficient profitable and viable in the study area.

It was revealed that there are three channels involved in the distribution of smoked fish. The first channel is from the fishermen to fish processors to wholesalers (large quantities) to retailers (small quantities) and finally to the consumers. The second channel is from the fishermen to fish processors to retailers (small quantities) and finally to the consumers while the third channel is from the fishermen to fish processors and directly to the consumers.

The constraints faced by fish processors during processing, marketing and packaging of processed fish were rated according to the degree of severity. It was revealed that the fish processors do not have problem of insufficient labour, availability of packaging materials and high cost of packaging materials in the study area.

CONCLUSIONS

In this study, all the fish processors were females. There is urgent need to educate more women towards going into fish business because it is profitable and viable. It also creates employment opportunities and increases revenue for the state and nation as a whole. Some of the constraints faced by the fish processors in the study area include inadequate capital seasonal availability of fish and high cost of fish to process.

Fish processors should be encouraged to form themselves into viable cooperative societies by first identifying their pre-existing traditional associations or group, which could be fine-tuned to formal cooperative societies. This will enable them enjoy economies of scale, freedom from exploitation by the middlemen, bulk purchasing of processing equipment at low cost and availing themselves with varieties of skills and specialization at their disposal in terms of fish processing, distribution and marketing.

Environmental sanitation education and orientation should be organized for fish processors; this will enable them to reduce the unattractive environment that makes their operations smelly and repulsive.

REFERENCES

Abolagba, O. J., Igene, J. O. and Oronsanye, J. A. O. (2005). Investigations on the fishing practices in Ekenwan Area of Ovia North East Local Government Area of Edo State. *Nigeria Journal of Agriculture, Forestry and Fisheries*, 6(1): 35-40.

Adegeye, A. J. and Dittoh, J. S. (1985). Essential of Agricultural Economics. Impact Publishers Nigeria Limited, Ibadan, Nigeria. Pp. 113 – 115.

Akinola, O. A., Akinyemi, A.A and Bolaji, B. O. (2006). Evaluation of traditional and solar drying systems towards enhancing fish storage and preservation in Nigeria (Abeokuta Local Government as a case study).*Journal Fisheries International*, 1(2-4): 44-49.

Ako, P. A. and Salihu, S. O. (2004). Studies on some major and trace metals in smoked and oven dried fish, *Journal of Applied Science, Environment and Management,* 8(2): 5-9.

Ali, E. A., Gaya, H. I. M. and Jampada, T. N. (2008). Economic Analysis of Fresh Fish Marketing in Maiduguri Gamboru Market and Kachallari Alau Dam landing site of Northeastern Nigeria. *Journal of Agricultural Society*, 4: 23-26.

Arthur, C. T. and Osei-Somuah, A. (2004). Microbial contamination of smoked Anchovy, *Ghana Journal of Agricultural Science*, 37: 69– 74.

Ashamo, M. O. and Ajayi, O. E. (2001). Effect of processing and storage methods on the shelf life and incidence of insect pests on smoked fish, *Global Journal of Pure and Applied Science,* 9(3): 320 - 326.

Asiabaka, C. (2008): The need for agricultural extension policy in national development. A key note address presented at 13th AESON conference held at Michael Okpara University of Agriculture, Umudike, Abia State*,* 8th-11th April, pp 1 - 48.

Ekong, E. E. (2003). An introduction to rural sociology(2nd edition).Uyo. Nigeria dove educational publishers. Pp 259-285.

Ellis, F. (2000). Rural livelihood, diversify in developing countries: evidence and policy. *Environment,* 2 (1): 298-302.

Fakoya, E. O. (2000). Farmers' use of sustainable land management practices in Ondo State, Nigeria. A PhD. Thesis, Department of Agricultural Extension and Rural Development, University of Ibadan. 160pp.

Federal Department of Fisheries – FDF. (2005). Fisheries Statistics of Nigeria, Statistics Division, Unpublished figure. 42pp.

Food and Agricultural Organization – FAO. (2012). The State of World Fisheries and Aquaculture 2012, Rome. 209pp.

Gomna, A. (2006). The role of traditional aquaculture systems and fish in food security and livelihoods of fishing communities in two States in Nigeria: A thesis submitted for the degree of Doctor of Philosophy. Institute of Aquaculture, University of Stirling, Stirling, Scotland. 309pp.

Idowu, A. A., Olaoye, O. J., Ifegbesan, A., Abdul, W. O. and Olawale, O. B. (2012). Evaluation of fishermen transactional sex for fish marketing in coastal areas of Ogun waterside Local Government Area, Ogun State, Nigeria. *Global Journal of Science Frontier Research: Agriculture and Biology*, 12(1): 42 – 53.

Madugu, A.J. and Edward, A. (2011). Marketing and Distribution Channel of Processed Fish in Adamawa State, Nigeria. *Global Journal of Management and Business Research*, 11(4): 21-26

Oladoja, M. A., Adedoyin, S. E and Adeokun, O. A. (2008). Training needs of fisher folks on fishing technologies. *Journal of Food Agriculture and Environment Science and Technology.* 6(1): 281 - 290.

Olaoye, O. J. (2010). Dynamics of the adoption process of improved fisheries technologies in Lagos and Ogun States Nigeria. A Ph. D thesis in the Department of Aquaculture and Fisheries Management, University of Agriculture, Abeokuta, Ogun State, Nigeria. 337pp.

Olaoye, O. J., Adegbite, D. A., Oluwalana, E. O., Vaughan, I. O., Odebiyi, C. O., and Adediji, A. P. (2014). Comparative Evaluation of Economic Benefits of Earthen Fish Ponds and Concrete Tanks in Aquaculture Enterprises in Oyo State, Nigeria. *Croatian Journal of Fisheries*, 72 (3): 107 – 117.

Olowosegun, T., Sanni, A. O., Sule, A. M. and Bwala, R. L. (2004). Contribution of women to fisheries development in Kainji Lake Basin. Proceedings of the 19th Annual Conference of Fisheries Society of Nigeria (FISON) Held 29th Nov – 3rd Dec, 2004 at Kainji, Niger State, Nigeria Araoye, P. A. (ed). pp 91 – 97.

Tomek, W.G and Robinson, L. (1981). Agricultural product prices, 2nd edition. Ihaca, New York, U.S.A Cornel University press. 267pp.

Udoh, A. J. and Nyienakuma, M. G. (2008). Examining socioeconomic characteristics and adoption trend of artisanal fishers of Akwa Ibom State in West Africa. *Journal of Agriculture and Social Science,* 4: 141–46.

Yomi Alfred, S. D., Odefadehan, O. O. and Ukut, M. E. (2012). Attitudinal analysis of women involvement in fish processing and marketing in Ondo State. *International Journal of Fisheries and Aquaculture,* 4(7): 124-132.

Zen, L. W., Tai, S. Y. and Raja Abdullah, N. M. (2000). Socio-economic characteristics of Payang seine (Lampara) and Driftnet fisheries in west Sumatra, Indonesia. *NAGA World Fish Centre Quarterly*, 23: 33-37.