Economic analysis of fish processing and marketing in Ogun Waterside Local Government, Ogun State, Nigeria

[1]Olaoye, O. J., [1]Adegbite, D. A., [1]Oluwalana, E. O., [2]Ashley-Dejo, S. S., [2]Adelaja, O. A. and [2]Fagbohun, A. E.

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

Federal University of Agriculture, P.M.B 2240, Abeokuta, Ogun State, Nigeria

Olaoyejacob62@gmail.com

Abstract

This study examined the economic analysis of fish processing and marketing in Ogun Waterside Local Government Area of Ogun State, Nigeria using structured, validated and pre-tested interview schedules to collect primary data from one hundred and thirteen respondents. Descriptive analysis was used to analyze the socio-economic characteristics, access to productive resources and constraints faced by fish processors while budgetary analysis was used to determine profitability. The result reveals that 99.0% of the respondents were females, 57.4% were within their active economic age group (41 – 50 years), about 50.0% were educated and 82.3% were married. The scale of operation was on small scale level. The result of the budgetary analysis show that average total cost of N53,530.08 was incurred, average total revenue of N58,340.71 was realized and a returning gross margin of N37,088.44. The profitability ratio gave a benefit-cost ratio of 1.089 and expense structure ratio of 0.0603. This is an indication that fish processing business is profitable and viable in the study area. Despite the high profitability of the business, fish processors identified lack of collateral security for bank loan (96.5%), erratic power supply (92.0%) and lack of modern fish processing facilities (43.4%) as their most prevailing problems. With this high level of profitability and viability in fish processing and marketing, it is recommended that Government, cooperative societies, private bodies and non-governmental organizations should provide basic amenities such as storage facilities, electricity, transportation facilities and modern fish processing facilities in other to boost fish production in Nigeria as well as single digit Bank loan with civil servants as guarantors as means of collateral security.

Keywords: Fish processing, fish marketing, socio economics, constraints, profitability

Introduction

Food and Agriculture Organization (2006) stated that 2.0 million metric tonnes of food fish would be required to maintain the present per caput fish consumption level of 13.0 kg per year. It has been noted by some researchers that the only means of meeting up with the annual fish demand for Nigeria would be through a pragmatic option of intensive fish farming (Viveen *et al.*, 1985 and Olaoye *et al.*, 2013). Nigerians are large consumers of fish with national demand of at least 2,350,065MT by 2013 against a domestic fish supply level of 1,150,000 MT, thus occasioning a demand-supply gap of 1,200,000MT (Adekoya, 2014). This shortfall has apparently been the major factor responsible for the importation of at least 1,200,000MT of imported frozen fish annually at a cost of some USD 1.15 billion

(Adekoya, 2014). Domestic fish Production contributions included: Artisanal Fisheries: 1,650,000MT (70.21%); Coastal Trawl Fisheries: 91,650MT (3.9%); and Aquaculture 608,415MT (25.89%) by 2013 (Adekoya, 2014). Ashley – Dejo (2012) noted that with continue increase in Nigeria population there is an urgent need for a sustainable agriculture practice system to meet the increasing demand for food and also maximize the utilization of the available resources with little or no wastage. This could be attained by converting and preserving these over exploited resources into fish processing in the rural communities. The availability of fish to the final consumers at the right time and at good price requires an effective marketing strategy. Marketing of fish passes through various marketing channels and exchange points before they reach the final destination (consumer) in good condition (Ali *et al.,* 2008). Marketing of fish does not only involve the fishermen and consumers only but there are other key players in this marketing distribution especially the middle men, the price of fish changes as it passes through the middlemen such that before the time it reaches the final consumers, thus it became expensive (Lawal and Idega, 2004).

According to Akogun (1994), the type of fish sold varies from place to place in Nigeria and depends largely on the distance between the market and landing site. Fish in the market depends on the financial level of the consumers, preference and their tastes. Fish sold at landing site to middlemen and mammies processors who process fish and sell to distance wholesalers or middle men transporters, the fish pass through some intermediaries before getting to the retailers whole finally sell to consumers. Marketing is essentially an externally focused function and for the fishermen to succeed, it is necessary to identify the opportunities or constraints presented by changes in the environment. Environmental factors affecting marketing of fish globally as stated by (Akanni, 2010) include economic factors, technological environment and so on.

There is no doubt that protein of animal origin is in very short supply in Nigeria and about 60 percent of the total 58 gram of the daily protein intake required by an average adult person for healthy living must be of animal origin in form of meat, milk and eggs. In Nigeria about 14 percent of this quantity is consumed, this short fall has strongly compelled the need to supplement to a large extent of animal protein with fish protein. The major challenges facing Nigeria is how to meet the protein demand of the fast growing population.

Over the years, fish marketing had been hampered by bad roads, perishable nature of fish, transportation cost all these either reduce the quality of fish which get to the market or affect the marketing of fish. It was observed that the prices of fish are not uniform in the market, however lack of good storage is also one of the problems associated with fish processors and the major concern of retailers is transportation which is ranked higher with wholesales. The broad objective of the study was to assess the economic analysis of fish processing and marketing in Ogun Waterside Local Government, Ogun State, Nigeria.

Materials and Methods

The study area

The study area was Ogun Waterside Local Government Area in the Ijebu Division of Ogun State. Ogun waterside Local Government 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. The area comprises over 50 towns and villages with headquarter at Abigi is situated on longitude 6°29'N 4°24'E and latitude 6.483°N 4.4°E, while the main town in this area are Iwopin, Oni, Ibiade, Abigi, Efire, Ilushin, Makun-Omi, Ode-Omi and Lomiro (Plate 1), the areas consists largely of Yoruba speaking people of which, the Ijebus comprise about 70 percent, with the Ikales, Ilajes, Itsekiris and Urhobos making up the remaining 30 percent. It has an area of 1,000 km² and a population of 72,935 at the 2006 census. This area is also blessed with a large expanse of fertile land (soil) rich in organic matter, well drained and deep which makes it support various crop cultivation especially plantation crops such as oil palm. The major occupations are farming and fishing (Odulate *et al.*, 2012). The major agric products are garri, fish, rubber, rice and maize. Major natural resources are timber, wild oil palm trees, and vast manila forest. There are two distinct seasons namely, dry season and wet season. Ogun Waterside Local Government was chosen for this study because of the following reasons;

i. Fishing is the major occupation of the people in the area.
ii. Various fish processing and storage methods are carried out there.
iii. It has both near and far market structure.
iv. There is no problem of language barrier.

Sampling size and sampling procedure

Multistage random sampling techniques were used to select respondents from the study area. Nine fishing villages were randomly and purposely sampled for this study (Iwopin, Oni, Ibiade, Abigi, Efire, Ilushin, Makun-Omi, Ode-Omi and Lomiro). Snow-balling sampling technique was used to select respondents from the selected villages. The respondents were those that were into fish processing and marketing. A total sample size of one hundred and thirteen was used for this study and it was conducted between March and June 2012 at Ogun waterside Local Government area of Ogun State. Respondents were both processors and marketers.

Instrument for data collection and analysis

Quantitative data were collected with structured interview guide on sampled fish processors by four trained enumerators under close supervision by the Researchers. The contents of the interview guides were usually translated to the local language (Yoruba) of the respondents because all the tribes understand and speak the language. A reliability coefficient (r) of 0.77 for each section of interview schedule obtained was considered a good and reliable measure as instrument for data collection. Data collected were entered and analyzed using the Statistical Package for Social Science (SPSS) version 19.0.

Data Collection Instruments

The interview guides were divided into four (4) sections: Section A, Socio-economic characteristics; Section B, Access to productive resources; Section C, costs and returns involved in fish processing and Section D, constraints faced by fish processors.

Budgetary analysis (Economic indicator)

The budgetary technique was used to determine the gross margin income of fish processors using t-test for two sample assuming unequal variances.

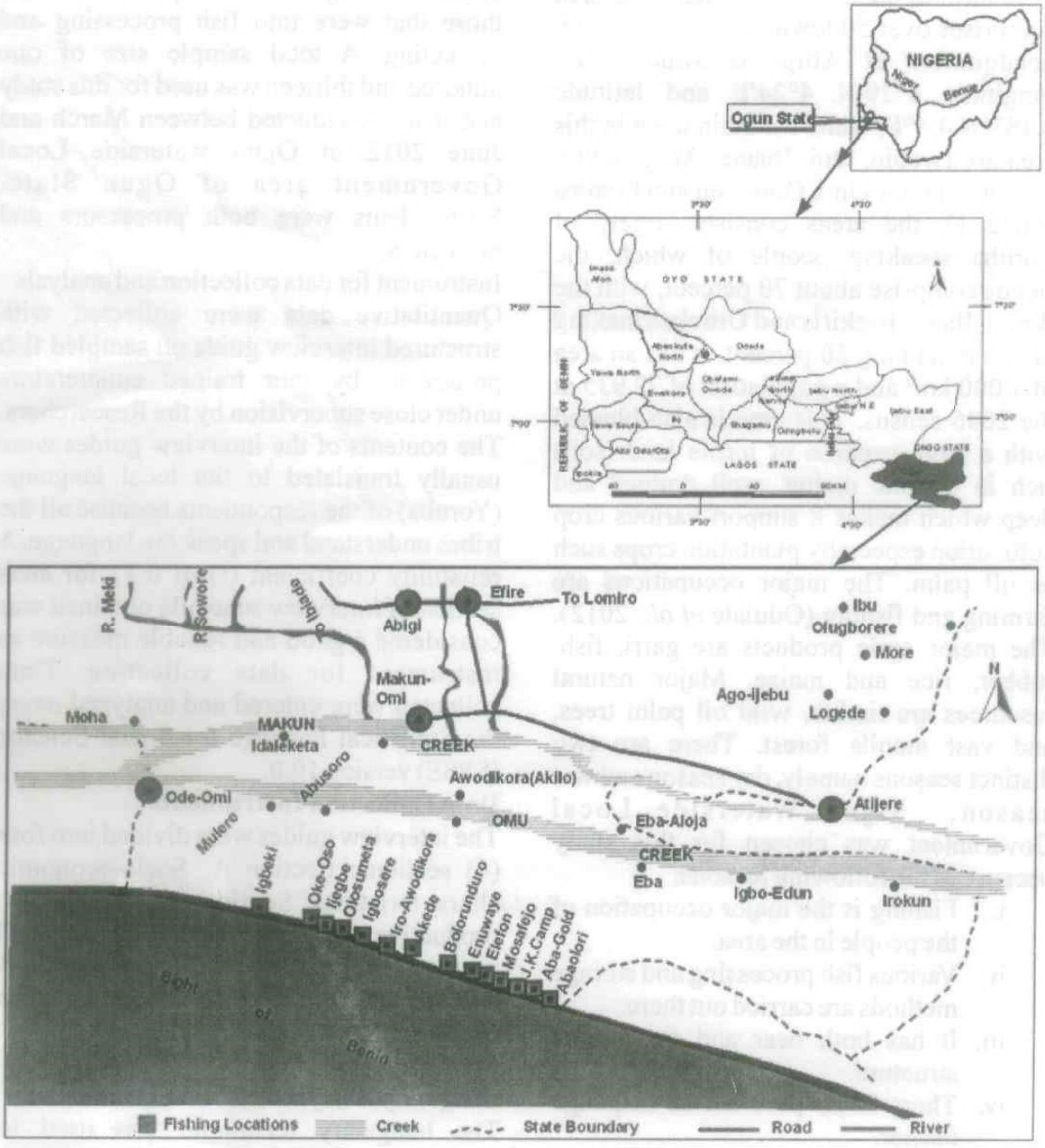

Plate 1: Map of Ogun Waterside Local Government Area
Source: Odebiyi *et al*., 2013

Model used in estimating the cost and return, gross margin and profitability indices were presented according to (Odebiyi *et al.*, 2013; Okwu and Acheneje, 2011; Olukosi and Erhabor, 1989; Olaoye *et al.*, 2013):

$GMI = \Sigma TR - \Sigma TVC$ ..... (i)

$TR = Py. Y_i$ ..... (ii)

..... (iii)

$TC = TVC + TFC$ .....(iv)

$NI = GM - TFC$ ..... (v)

$NPM = GM/TR \times 100$ .....(vi)

$NROI = NFI/TC$.....(vii)

$ESR = TFC/TC$.....(viii)

$BCR = TR/TC$ .....(ix)

Where,
GMI = Gross Margin Income (₦)
NPM = Net Profit Margin
GM = Gross Margin (₦)

NROI = Net Return on Investment (₦)
NFI = Net Farm Income (₦)
NPM = Net Profit Margin (₦)
ESR = Expense Structure Ratio (%)
BCR = Benefit Cost Ratio (%).

TR = Total Revenue (₦)
TVC= Total Variable Cost (₦)
TC =Total Cost (₦)
NI = Net Income (₦)
Py = Unit Price of Output Produced (₦)
Y = Quantity of Output (kg)
Pxi = Unit Price of Variable input used (₦)
Xi = Quantity of Variable Input (Kg)

Data Analysis Techniques

Various analytical tools were used to achieve the objectives of the study and they include: simple descriptive statistics such as frequency distribution tables, percentages, averages (mean), gross margin (GM) and profitability ratios.

Results and Discussion

One hundred and thirteen respondents of diverse socio-economic features were interviewed. Therefore, an analysis of the socio economic characteristics of these fish processor/marketers in terms of their age structure, sex, marital status, level of education, household size, cooperative societies, scale of operation and income were presented in this study.

Table 1 shows the distribution of the respondents interviewed for this research work about 60.0 percent of the respondents were within the age range of 41 – 50 years, this shows that the respondents within this age bracket were highly productive, more receptive to innovation, more technically efficient, effective and active to undertake strenuous tasks associated with fish processing and marketing which was in line with Bello (2000) and Olaoye *et al.* (2013). About 20.0 percent fall within 31 – 40 years; those who were above 50 years of age were over 18.7 % while 3.5 percent were less than 30 years of age.

In most parts of Nigeria, especially south western, fish marketing whether in the live or processed form is mostly done by women (Kingdom and Alfred-Ockiya, 2009). Over the years, fish marketing and processing has become such an important occupation among the women folk that some women inherit the enterprise from their mothers (Akpaniteaku *et al.*, 2005)). In rural communities where women are predominantly engaged in fish handling, processing and marketing, most families depend mainly on free fish supplied by the women of the household for food and the income derived from the enterprise for household upkeep (Babalola *et al.*, 2015).

Ninety nine (99.0) percent were female, this indicate that women participate more than men in most fish processing and marketing activities because distance fishing is more labour intensive and more risky. This was supported by a similar study in Benue State that found out that about 90 percent of women participated in fish marketing in fishery business (Lawal and Idega, 2004). This also confirms the findings of other authors who categorized fish processing and marketing as female business (Abolagba and Chukwu, 2008; *Babalola et al.*, 2015).

It was also observed that most (82.3%) of the respondents were married leading to greater job commitment and responsibility. Generally, the findings indicated that fish processing/marketing in the study area have stable marriages. Most (96.7%) of the respondents had formal education and this implies that literacy level will contribute significantly to decision making, added merits in terms of achieving huge income, efficient marketing and running sustainable fish processing and marketing enterprise. The house hold size of the respondents between the ranges of 1 – 10 persons (62.9%) had mean of 10.12 ± 0.289 while 37.2% were between 11 and 20 persons. This means that large household size compliment labour cost and minimizes scarcity for fish processing/marketing and reduces the cost of hired labour.

Membership of cooperative society affords the opportunity of sharing technical information on modern fish production techniques, purchasing inputs in bulk, exchanging labour, have access to credit facilities to enhance their production, boost productivity, resource use efficiency effectively, share information and project a collective demand. It is therefore a factor which influences the adoption to improve fishery technologies, it was noted that 75.2 percent of the respondents do not belong to any cooperative society while only 24.8 percent were members, which may be the reason for not benefitting from any source of credit facility which was in line with the position of (Akinbile, 1998).

Majority of the respondents operated on small scale level with average monthly income of ₦40,061:95 per month indicating a good business venture. This shows that the venture will provide income of equivalent to junior civil servant in Nigeria.

Table 2 shows that over 95 percent and 53.1 percent of the respondents does not have access to capital and extension services, 92.9 percent had access to fish catches, 69 percent do not have access to rural institutions such as banks etc. while 48.7 percent rarely have access to modern technologies such as improved smoking kiln, preservatives either for fish processing.

Table 3 shows the major constraints faced by the fish processors-marketers in the study area. It was observed that lack of collateral for bank loan was a major constraint (96.5%) while pricing of fish was the least constraints (0.9%) faced by the respondents in the study area. The situations were made more difficult by the unwillingness of financial institutions to grant loan to the fish processors and marketers. Even when loans are given, it was usually at very high interest rate (Omitoyin, 2007).

The Table 4 shows that the total fixed cost items was ₦32,277.86 while the total variable cost was ₦21, 2521.22 to give total cost of ₦53,530.08 and yield total revenue of ₦58,340.71. The gross margin (₦37,088.44), net income or marketing margin (₦4,810.63), and the benefit cost ratio (BCR) or marketing efficiency was found to be 1.089 which implies that fish

Table 1: Socio-economic characteristics of respondents (n = 113)

Variable	Frequency	Percentages
Age (years)		
21 – 30	4	3.5
31 – 40	23	20.5
41 – 50	65	57.4
51 – 60	17	15.1
Above 60 years	4	3.6
Mean age ± Std Error		**45.85 ± 0.696**
Sex		
Male	1	0.9
Female	112	99.1
Marital Status		
Single	3	2.7
Married	93	82.3
Divorced	6	5.3
Widow/widower	11	9.7
Educational Qualification		
No formal education	4	3.5
Adult education	1	0.9
Completed primary education	49	43.4
Uncompleted secondary education	3	2.7
Completed secondary education	55	48.7
Tertiary education	1	0.9
Household size (Persons)		
1 – 10	71	62.9
11 –20	42	37.2
Mean ± Std Error		**10.12 ± 0.289**
Cooperative societies		
Membership	29	24.8
Non-membership	84	75.2
Scale of operation		
Small scale	83	73.0
Medium scale	27	23.9
Large scale	3	2.7
Monthly income (₦)		
15000 – 30000	25	22.1
35000 – 40000	45	39.9
45000 – 60000	43	38.1
Mean ± Std Error		**40,061:95 ± 858.905**

Source: Field survey, 2012

Table 2: Access to productive resources

Access to productive resources	Frequently	Occasionally	Rarely	Not at all
Access to capital	1 (0.9)	0 (0.0)	3 (2.7)	109 (96.5)
Access to extension services and training	52 (46.0)	0 (0.0)	1 (0.9)	60 (53.1)
Access to fish catches	105 (92.9)	2 (1.8)	2 (1.8)	4 (3.5)
Access to rural institutions	1 (0.9)	5 (4.4)	29 (25.7)	78 (69.0)
Access to modern technologies	1 (0.9)	12 (10.6)	55 (48.7)	45 (39.8)

Source: Field survey, 2012

Table 3: Constraints faced by fish processors-Marketers (n = 113)

Constraints	Very serious	Serious	Not a problem	Don't know
Lack of collateral for bank loan	96.5	2.7	0.9	0.0
Lack of modern fish processing facilities	43.4	54.9	1.8	0.0
Inadequate extension services	30.1	21.2	48.7	0.0
Inadequate storage facilities	67.3	30.1	0.0	2.7
Delay in supply of fresh fish	8.8	16.8	74.3	0.0
Power supply	92.0	6.2	0.0	1.8
High transportation cost	15.9	84.1	0.0	0.0
Diseases and predators	2.7	4.4	92.9	0.0
Pricing of fish	0.9	23.0	76.1	0.0
Technical skills	0.0	48.7	51.3	0.0
Insufficient labour	0.0	1.8	98.2	0.0

Source: Field survey, 2012

processors/marketers in the study area operated on a ratio that was greater than 1.0 (break even position) which means that the proposed fishery investment will be high yielding (Offem *et al.*, 2008). If BCR value is greater than 1.0, it means that the respondents were efficient in utilization of resources and have very high rate of returns because the cash flow becomes positive quite early in life of the fishery project. Also, the favourable output-input price relation shows that capital investment was not tied up for long in fixed assets; hence substantial benefits begin to flow early in the life of the project. Also, marketing efficiency /BCR indicated that the system of marketing *ceteris paribus* would accrue more margins as the total revenue increased, thus showing that the market was efficient irrespective of the associated costs.

The net return on capital investment in fish processing/marketing in the study area was 0.0900 implies that return on every naira invested was 9.00 kobo indicates a profit in the enterprise. This finding reveals that the business was profitable and viable upon all constrains encountered.

Table 5 revealed that there was no significant association between extent of access to productive resources utilized by fish processors-marketers and their sex (χ^2 = 2.922, $p < 0.05$), but there was a significant association between extent of

Table 4: Profitability indices of the respondents

Items	Amount (?)	Total cost (%)
TFC	32,277.86	60.30
TVC	21,252.22	39.70
Total cost (TC)	53,530.08	100.0
Total Revenue (TR)	58,340.71	
Gross margin (GM)	37,088.44	
Net income (NI)	4,810.63	
Expenses structure ratio (ESR)	0.6030	
Benefit cost ratio (BCR)	1.0890	
Net Profit Margin (NPM)	0.6360	
Net Return on Investment (NROI)	0.0900	

Source: Field survey, 2012

access to productive resources utilized by fish processors-marketers with marital status ($\chi^2 = 62.040$, $p < 0.05$), religion ($\chi^2 = 26.988$, $p < 0.05$) and educational level ($\chi^2 = 48.488$, $p < 0.05$).

Moreover, the result of correlation analysis shows that, there was no significant relationship between extent of access to productive resources utilized by fish processors-marketers and their age ($r = 0.008$, $p < 0.05$), house hold size ($r = -0.074$, $p < 0.05$) and Average Monthly Income ($r = -0.163$, $p < 0.05$) while significant relationship between extent of access to productive resources utilized by fish processors-marketers and their Number of Dependents ($r = 26.988$, $p < 0.05$).

Table 6 showed that there was a significant difference between the profit level of the fish processors-marketers and constraints faced. This shows that constraint faced by the fish processors –marketers had a direct effect on the profit margin. The minimal constraints faced by the respondents the better their profit margin. Both (i.e constraints and profit) depends directly on each other the higher the constraints faced the lower the profit of the processors-marketers and vice versa. T-test result with a value of P = 10.653 and a significant of 0.000 showed that there is a significant difference between the profit level of the respondents and their constraints.

Table 5: Analysis of respondent's socio-economic characteristics and extent of access to productive resources by fish processors -marketers

Variables	χ^2	Df	CC	Decision
Sex	2.922	112	0.819	NS
Marital status	62.040	112	0.000	S
Religion	26.988	112	0.008	S
Educational level	48.488	112	0.018	S
Variables	R		P	Decision
Age	0.008	0.936		NS
Household size	- 0.074	0.435		NS
Number of Dependents	26.988	0.008		S
Average Monthly Income	- 0.163	0.084		NS

Source: Field survey, 2012

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

Conclusion and Recommendations

It is concluded from this study that processing and marketing of fish in the study area is highly profitable despite the constraints encountered. It was also found that most of the respondents were female and married. It was also observed that lack of collateral for bank loan, modern fish

Table 6: T-test result of profit level of respondent to the constraints faced by the fish processors-marketers

	T	df	sig1	Decision
Profit-constraints	10.653	112	0.000	Significant

***= Decision criterion is reject null hypothesis when P <0.05: Df= Degree of freedom**

processing facilities, inadequate storage facilities and erratic power were the major challenges faced by fish processors in the study area. In order to improve the level of processing and marketing of fish in the study area, the following recommendations should be followed.

i. Government and non-governmental organizations should organize an enlightenment programme that will educate and improve the knowledge and skills of fish processors and marketers which will shed more light on better method of fish processing and preservation
ii. Government and private bodies should ensure good/motorable road network or even rehabilitate and where necessary construct new roads.
iii. Fish processors and marketers should be encouraged to join fish associations so as to benefit from credit facilities, extension services (communication services) fishery inputs.

References

Abolagba, O. J. and Chukwu, I. 2008. Socio economic status of fresh fish processors in Benin metropolis, Nigeria. *Aquafield* 4: 32-39.

Adekoya, B. B. 2014. Researchers, Extensionists and Farmers' Interactions on Sustainable Fish Farming In Nigeria. Text of an invited paper to the Agriculture Media Resources and Extension Centre (AMREC) Workshop held at the Post Graduate School Auditorium, Federal University of Agriculture, Abeokuta (FUNAAB) on Tuesday 22nd July, 2014. 4p.

Adekoya, B. B. and Miller, J. W. 2004. Fish Cage Culture Potential in Nigeria-An Overview. National Cultures. *Agriculture Focus.* 1(5): 10.

Akanni. K. A. 2010. Economics of small-scale Agricultural Enterprise in selected Rural Communities in South Western Nigeria, international *Journal of Multidisciplinary Research* 3 (1&2): 165 – 173.

Akinbile, L. A. 1998. Group formation and group dynamics. Paper presented at NAERLS Workshop on Extension Communication Techniques. Moor plantation, Ibadan, 11pp.

Akogun, M. O. 1994. *Women in Fisheries,* Seminar Paper, Department of Fisheries and Wild life. University of Ibadan. 24pp.

Akpaniteaku, R. C., Weimin, M. and Xinhua, Y. 2005. Evaluation of the contribution of fisheries and aquaculture to food security in developing countries. NAGA, *World Fish Center Newsletter*. **28**: 1 - 2.

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 North eastern, *Journal of Agriculture and Social Science* (4): 23 – 26.

Ashley – Dejo, S. S. 2012. Adoption of aquaculture production innovations by small scale fish farmers in Oyo State, Nigeria. Msc. Dissertation Federal University of Agriculture Nigeria. 183pp.

Babalola, D. A., Bajimi, O. and Isitor, S. U. 2015 Economic potentials of fish marketing and women empowerment in Nigeria: evidence from Ogun State. *African Journal of Food, Agriculture,*

Nutrition and Development, 15 (2): 9922–9934.

Bello, M.O. 2000. *"Cauterization of potential Adopters for organic-based fertilizer among vegetable farmers in Ojo LGA, Oyo State*. B. Agric. Project University of Agriculture Abeokuta. 53pp.

Food and Agriculture Organization 2006. Year book of Fishery Statistics Summary Tables. www.fao.org/fi/statist.asp

Kingdom, T. and Alfred-Ockiya, J. F. 2009. Achieving the Millennium Development Goals through Fisheries in Bayelsa State, Niger Delta, Nigeria. *Asian Journal of Agricultural Science*. 1(2): 43 - 47.

Lawal, W. L and Idega, E. O. 2004. Analysis of fish marketing in Benue State. Proceedings of the 2004 Annual Conference of the National Association of Agricultural Economists (NAAE). NAERLS workshop on extension commission techniques. Moor Plantation, Ibadan, 11pp.

Odebiyi, O. C., George, F. O., Olaoye, O. J., Idowu, A. A., Agbonlahor, M. U. and Oke, A. O. 2013. Economic analysis of coastal fisheries value chain development in Ogun Waterside Local Government Area, Ogun State, Nigeria. *Journal of Agricultural Economics and Development*, 2 (9): 345 - 355.

Odulate, D. O., George, F.O. A., and Idowu, A. A 2012. Role of women in fisheries in Coastal Wetland Areas of Ogun State, SouthWest Nigeria. *Journal of Agricultural Science and Environment* 12 (1): 74 - 82.

Offem, B. O., Ikpi, G. U. and Adinya, I. B. 2008. Economic appraisal of the inland artisanal fishing industry of Cross River State, Nigeria. *Aquafield* 4: 22 - 31.

Okwu, O. J. and Acheneje, S. 2011. Socio-economic analysis of fish farming in Makurdi Local Governmnet Area, Benue State, Nigeria. *European Journal of Social Sciences*, 23 (4): 508 – 514.

Olaoye, O. J, Ashley-Dejo S. S, Fakoye, E. O, Ikeweinwe, N. B, Alegbeleye, W. O, Ashaolu F. O and Adelaja O. A 2013. Assessment of socio-economic analysis of fish farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Biology*, 8 (9) I: 45 – 55.

Olukosi, J. O and Erhabor, P. O. 1989. *Introduction to Farm Management Economics: Principles and Applications*. Ag-tab Publishers Limited Zaria, Nigeria. 176pp.

Viveen, W. J. A. R., Richter, C. J. J. Van Oordt, P. G. W. J. Janseen J. A. L. and Huisman E. A. 1985. *Practical Manual for the Culture of the African Catfish (Clarias gariepinus). Research and Technology*. Published by Directorate General International Cooperation of the Ministry of Foreign Affairs, The Hague, the Netherlands and FAO. 100 pp.

Received: 21st August, 2014
Accepted: 13th August, 2015