



International Journal of Applied Research and Technology
ISSN 2277-0585

Publication details, including instructions for authors and subscription information:
<http://www.esxpublishers.com>

Socio-economic Factors Influencing Performance of Fish Farmers in Imo State, Nigeria

Ifenkwe, G. E. and Umeh, O. I.

Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria.

Available online: March 31, 2014

To cite this article:

Ifenkwe, G. E. and Umeh, O. I. (2014). Socio-economic Factors Influencing Performance of Fish Farmers in Imo State, Nigeria. *International Journal of Applied Research and Technology*. 3(3): 11 – 19.

PLEASE SCROLL DOWN FOR ARTICLE

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan, sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instruction, formulae and analysis should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Socio-economic Factors Influencing Performance of Fish Farmers in Imo State, Nigeria

Ifenkwe, G. E. and Umeh, O. I.

Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria.

(Received: 19 March 2014 / Accepted: 24 March 2014 / Published: 31 March 2014)

Abstract

This study examined the effect of socio-economic characteristics on the performance of cooperative and non-cooperative fish farmers in Imo state, Nigeria. Random sampling techniques were adopted to select 210 (Two hundred and ten) respondents used for the study. Structured questionnaire was used to elicit data from the respondents, while Z-test statistics and Ordinary Least Squares (OLS) Linear Regression Models were employed in data analysis. Regression estimates of the socio-economic characteristics of the farmers showed that sex, educational level, household size and experience (years) had significant positive effects of on performance at 5%, 1%, 1% and 10% levels respectively. The correlation coefficient (r) analysis revealed a positive and significant relationship (58.7%) between number of fish ponds owned by cooperative fish farmers and their income. Z-test analysis revealed a significant difference between the performance of cooperative and non-cooperative fish farmers in the study area. The study recommends that efforts should be directed to education of non-cooperative farmers on the benefits of cooperative societies. Furthermore, transformation of the cooperatives should be done structurally with government and NGO's providing accessible credit and improving infrastructural facilities to encourage fish farming in the study area.

Keyword: Aquaculture, Cooperatives, Stocking Density, Artisanal Fishery.

For corresponding author:

E-mail: info@esxpublishers.com

Subject: 0314-0219

© 2014 **Esxon Publishers**. All rights reserved

Introduction

The rapid population growth in Nigeria has resulted to a huge increase in demand for animal protein which research has shown is superior to plant protein. The average protein intake in Nigeria, which is about 19.38gms/output/day is low and far below FAO recommendation of 65gms/output/day (Adewuyi, *et al.*, 2010). Fish is an important source of protein as it provides 40% of the dietary intake of animal protein of an average Nigerian. (Adekoya and Miller, 2004). Nigerians are large consumers of fish with demand estimated at 1.4 million metric tonnes. Unfortunately, Nigeria is not producing enough fish for consumption. Again, the fish industry is not providing the much needed financial empowerment that the fish farmers need. According to the Food and Agriculture Organization of the United Nations, there is a huge supply- demand gap for fish and fishery products in Nigeria (FAO, 2006). A demand-supply gap of at least 0.7 million metric tonnes exist nationally with fish import making up the shortfall at a cost of almost USD 0.5 billion per year. Despite the considerably high potentials of aquaculture in Nigeria, local fish production had failed to meet the country's domestic demand (FAO, 2008). Fish industries remains the most virgin investment sector in Nigeria, compared with the importation of frozen fish in the domestic market (Ndu, 2006). The substantial expansion in aquaculture production is an indication that the sector could be a major player in augmenting the supply of fish protein for consumption and a major source of income for farmers and for foreign earnings (Adeogun, *et al.*, 2007). This also supports an earlier observation that fresh water aquaculture would become a major source of growth for the sector. Given the proper environment for growth, Nigeria can still accelerate the expansion and development of the aquaculture industry. The country has large natural resources to support aquaculture development, inland fresh waters of 14 million hectares and land area of 1.7 million hectares for aquaculture development (Federal Department of Fisheries, 2005; FAO, 2006).

In Nigeria, aquaculture is predominantly an extensive, land-based system, practiced at subsistence levels in fresh water (Anyanwu and Akeredolu, 2005). Commercial fish farming is yet to become widespread (Fagbenro, 2005). At present, most fish farmers operate small-scale farms ranging from homestead concrete ponds to small earthen ponds. This industry produced over 30,000 tonnes of fish in 2000 (FAO, 2005). Today, small-scale fisheries empty about 50 million of the world fisheries and all of them are from the developing counties (FAO, 2001). Industrial fisheries, however, appear to be the most productive on a world-wide scale, but the small-scale coastal fisheries have much greater social significance than the industrial fisheries. (FAO, 1999; Fierier and Allut, 2000). Fishery has been systematically ignored and marginalized over the years in Nigeria. It has also received more than scant attention in the past several decades of national development plans (Berkes, *et al.*, 2001). Fishery occupies a unique position in the agricultural sector of Nigerian economy. Fish is also one of the most important food staples in the world (Amaefula, *et al.*, 2009). It is, therefore, necessary to ensure that improved fish production technologies that have been developed and disseminated are adopted in order to increase fish production (Nwachukwu and Onuegbu, 2008). The fishery industry is crucial to the world economy. The livelihood of millions of people world-wide is dependent on fish farming (Greenfacts, 2004).

In 2010, capture fisheries and aquaculture supplied the world with about 148 million tonnes of fish with a total value of USD 217.5 billion of which 128 million were utilized as food for people Preliminary data for 2011 indicated increased production of 154 million tonnes of which 131 million tonnes was destined as food. (FAO, 2012). Of the 126 million tonnes available for human consumption in 2009, fish consumption was lowest in Africa (9.1 million tonnes with 9.1kg per capita), while Asia accounted for two-thirds of total consumption with 85.4 million tonnes (20.7kg per capita), of which 42.8 million tonnes was consumed outside China (15.4kg per capita) (FAO, 2012). Overall global capture fisheries production continues to remain stable at about 90 million tonnes; although there have been some marked changes in catch trend by country, fishing area and species. (FAO, 2012).

The development of aquaculture can only be enhanced by the introduction of modern technologies (Nwachukwu and Onuegbu, 2008). Although there are been instances of successful introduction of technologies to boost fish production in Bangladesh (Thompson Sultana and Khan, 2005) and Ghana (World Fish Centre, 2005), the major problem has been lack of appropriate technology (Gupta, Bartley and Acosta, 2004; Toure and Noor, 2001; UNDP, 2004). According to Ukaru, *et al.*, (2010), cooperativeness among fish farmers has a role to play in maximizing fish output. A sure means of substantially solving the demand-supply gap is by embarking on widespread homestead/small-scale fish production through cooperative fish farming to enhance performance of fish production not only in Imo state, but in Nigeria at large. Imo state is one of the major subsistence and commercial fresh fish producing states in Nigeria with abundant water resources.

This paper therefore, compared the performance of cooperative and non-cooperative fish farm business in Imo state Nigeria.

Materials and Methods

This study was conducted in Imo State, Nigeria. Imo State is one of the 36 states in Nigeria and it is located in the south-eastern part of the country. The land area is estimated at 5,100.1 square km, and lies within latitude 5° – 6° north of the equator and longitude 6.5° and 7.5° east of the Greenwich Meridian. The dominant fish species from the rivers, lakes and flood ponds are: *Tilapia* spp, *Clarias* spp and *heterobranchus bidosalis*. (Nwachukwu and Onuegbu 2008). Apart from Imo River and Oguta Lake, the state is blessed with many inland waters such as the Igwu, Otamiri, Nworie and Ogachi Rivers (Iloeje, 1999). Extension services are fully funded in the state under the Agricultural Development Project (ADP). Imo State is divided into three agricultural zones. The zones are further broken down into blocks and circles as follows: Owerri zone with 18 blocks and 144 circles, Orlu and Okigwe zones each with 10 blocks and 80 circles, giving a total of 38 blocks and 304 circles (Nwachukwu and Onuegbu, 2008).

The study covered the cooperative and non-cooperative fish farmers in Imo State. A multi-stage, stratified, random sampling technique was adopted in selecting the respondents. The list of the cooperative fish farmers (Table 1) was provided by the Association of Fish Farmers and Aquaculturists of Nigeria (AFFAN). A sample of 35 registered fish farmers

cooperatives was selected and 3 fish farmers cooperative members was randomly selected from each of the cooperatives giving a total of, 105 (One hundred and five) cooperative members. Furthermore 105 (One hundred and five) fish farmers' non-cooperative members were randomly selected from the three agricultural zones of the state. This gave a total of 210 (Two hundred and ten) respondents used for the study. Z-test statistics was used to compare the performance of cooperative with non-cooperative fish farmers, while ordinary least square multiple regression (linear model) was used to ascertain the relationship between socio-economic characteristics of fish farmers and their performance, and between the number of fish ponds owned by cooperative members and their income.

Results and Discussion

Socio-economic characteristics of respondents studied were age, sex, marital status, occupation and household size, and the results are presented in Table 2. The Table 2 reveals the fish farmers' age in years. The mean age for cooperative and non-cooperative fish farmers was 40.38 and 46.74 respectively. Majority (69%) of the respondents involved in fishing cooperatives activities were young, within 30 – 50 years of age This is consistent with the findings of Ukaru, *et al.*, (2010), that majority of fish farms were owned by young people. Fish farming was dominated by males (67.62% and 81.90%) for cooperative and non-cooperative fish farmers respectively. This supports FAO (2010), and Nwachukwu and Onuegbu, (2008) that only few a women were involved in fish farming business in Africa. Majority of the respondents, and specifically, 83.81% and 72.38% of the cooperative and non-cooperative fish farmers respectively were married. This finding implies that more married men/women were involved in fishery business. It was also established that more married fish farmers participated in cooperative fish farming (83.81%) than among non-cooperative fish farming (72.38%).

Most of the cooperative fish farmers were civil servants (42.86%), who are into fishing as part-time business, while more of the non-cooperative fish farmers were fish farmers by occupation. According to FAO (2010), employment in fisheries and aquaculture had grown substantially in the last three decades, with an average rate of increase of 3.6% per year since 1980. Civil servants are usually more educated and do participate more in cooperative activities probably because of their level of enlightenment. This is in support of the findings of Ukaru, *et al.*, (2010). Again most of the cooperative fish farmers (46.67% and 40.00%) had secondary and tertiary education respectively, while most of the non-cooperative farmers (44.76%) had primary education. This is followed by those non-cooperative farmers (28.57%) who had secondary education. The findings also showed that 10.48% of the non-cooperative farmers had no formal education, while all the cooperative farmers had at least a primary education level (13.33%). Meanwhile, only about 16.19% of the non-cooperative farmers were educated at the tertiary level. The implication of this is that the high educational attainment level of the cooperative farmers may have influenced their subscription to membership of fish farmer's cooperative societies. These resolutions are also in line with the findings of Ukaru, *et al.*, 2010. The principle of education, training and information helps in boosting the education levels of cooperative members as is consistent with the report of the International Cooperative Alliance, (ICA, 2005).

The various household sizes for cooperative fish farmers were 4-6 (44.76%), 7-9 (31.45%), and 10-12 (2.86%) lower household sizes were recorded for non-cooperative fish farmers. The 1991 Population Census in Nigeria adopted the United Nation's definition of a household as all the people living together under one roof, eating from the same pot and recognizing one person as the head (Ekong, 2010). It was hypothesized that there is no significant relationship between the Socio-economic Characteristics of Cooperative and non-cooperative fish Farmers and their Performance. This performance was determined using ordinary least square multiple regression model. Linear functional form was chosen as the lead equation based of econometric and statistical reasons. As shown in Table 3, four variables, sex, educational level, household size and farm experience (years) of the cooperative and non-cooperative fish farmers were positive and have a significant relationship with the performance of fish farmers.

The coefficient of determination for sex of the cooperative and non-cooperative fish farmers was positively related to the performance of the farmers with a z-value of (2.127) which was significant at 5%. This suggests that the sex of the fish farmers influenced their performance positively and that males perform better as fish farmers. Ekong, (2010) observed that the males are highly cherished and valued among the ruralites in Nigeria. The position of men as bread-winners in various households as invariably encourages them to work harder and in this case through increasing the number of fish ponds, and ultimately their performance level. The coefficient of determination for educational level of cooperative and non-cooperative fish farmers was also positively signed and significantly related to their performance with a z- value of 3.309, and significant at 1% level of probability. This implies that education is vital to increase and maximized output level of fish production. Education gives farmers access to important agricultural information. As the fish farmer gains education, either formal or informal, the performance level increases. Okoye, *et al.*, (2004) asserted that educated farmers are expected to be more receptive to new and improve technologies in agriculture than farmers without formal or informal education. Education is a tool to enhance effectiveness and performance because an educated farmer will invariably strive to increase the number of fish ponds and technologies adopted.

Household size was also positively and significantly related to performance of fish farm business in the study area at z-value of 2.705, significant at 1%. This implies that an increase in the household size will increase farm hands and spur the farmer to establish more fish ponds, and this will increase output and invariably maximize performance. This is in line with a *priori* expectation that more fish ponds will likely be constructed by families with larger household size. Farming experience, measured by the actual number of years spent on fish farming business, was also positively inclined and significantly related to the performance of fish farmers with a z-value of 1.663, significant at 10%. This implies that years of fish farming experience is positively related to performance. The more years a fish farmer has spent in fish farm business, the better the performance of the farmer will be. For instance, an experienced fish farmer will always increase his number of

fish ponds know when and how to stock and maximize income through enhanced performance. Generally, Satisfaction increase with increasing years of work experience Ukuru, *et al.*, (2010) noted that wealth of experience in fish farming is an added advantage that leads to success in the business.

As shown in Table 4, F-ratio computed (2.244) was greater than z-critical (2.10) and significant (0.037) was less than the level of significance value (0.05). The variables (fish farming experience, level of education, marital status, occupation, household size, sex and age of the farmers) predicted 50.258% of the performance of the cooperative fish farmers in the study area. Consequently, the null hypothesis that socio-economic characteristics of the cooperative farmers has no significant positive effects on the performance of fish farmers was rejected, while the alternate hypothesis that have significant and positive effect socio-economic characteristics of the cooperative fish farmers on performance was accepted. The findings revealed that there was a positive and significant relationship (at 5%) between number of fish ponds and income of cooperative fish farmers. The correlation shows that there was 58.7% relationship between number of fish ponds and income at 5% significant level. This implies that as the number of fish ponds increase, the income of the cooperative fish farmers would also increase, Increase in the number of fish ponds with adequate and suitable fish stocking densities/fish populations will lead to increased income level of the fish farmer and when income is increased, the cooperative fish farmer may also think of increasing the number of his/her fish ponds. The number of fish ponds is therefore positively correlated with level income of fish farmers

The mean income level for cooperative fish farmers was #94,540.95, while the mean income for non-cooperative was #31,142.85. The result shows that there was a significant difference between income of cooperative members and non-cooperative members. Further investigation showed that Cooperative members were more exposed to credit facilities through their cooperative groups, enjoyed subsidized cost of fishing inputs, had enhanced fish transportation facilities through the cooperatives, and better fish preservation facilities from the cooperative groups. In addition, the cooperative members enjoyed good marketing structures for fish and fish products enjoyed by the cooperative members. Quite often, fish and fish products were marketed cooperatively. This maximized the income level of the members and forestalled farm gate selling and exploitative action of the middlemen. Moreso, the enlightenment and education gathered through workshops, seminars and symposiums organized by the members of cooperatives helped in maximizing fish production leading to maximized income level of the cooperative fish farmers.

Table 6 also showed that Z-cal (7.205) is greater than z-tab (1.658). There is therefore a significant difference between the number of fish ponds of cooperative fish farmers and non-cooperative fish farmers. The average mean level of the member of fish ponds for cooperative and non-cooperative fish farmers were 8.6857 and 4.8762 respectively. In summary, the cooperative fish farmers performed better in terms of number of fish ponds because, membership subscription to cooperative societies gave room for expansion through the acquisition of credits, subsidies, education/training, good marketing of fish products, better cooperative preservation of fish and transportation facilities etc. These factors led to increased number of fish ponds and good stocking densities/increased fish populations by the cooperative fish farmers.

Conclusion and Recommendations

Socioeconomic and demographic characteristics affects human perception and performance irrespective of whether one is operating individually or collectively. This study corroborates this age long view. Regression estimates showed that the socio-economic characteristics of the farmers (sex, educational level, household size and fish farming experience in years) have significant and positive effect on fish farmer's performance. The correlation coefficient analysis also revealed a 58.7% positive and significant relationship between number of fish ponds owned by cooperative fish farmers and their income, while, the z-test analysis revealed a significant difference in the performance of cooperative and non-cooperative fish farmers in the study area; cooperative fish farmers performed better than their counterpart who were not members of any organization It is therefore, recommended that stronger efforts be directed towards enlightenment of non-cooperative fish farmers to subscribe to membership to cooperative fish farming to enable them have easy access to credit and inputs, improved fish marketing structure and to become exposed to new fish production innovations that would maximize their fish output and income levels.

References

- Adekoya, B.B and Miller, J.W (2004). Fish Cage Culture Potential in Nigeria: An Overview. *National cultures Agriculture Focus Vol. (5):10*.
- Adeogun, O.A, Ogunbadego, H.K, Ayinla, O.A and Oresgun, A. (2007). Urban Aquaculture Producer Perceptions and Practices in Lagos state Nigeria. *Middle East Journal of scientific Research* 2(1): 21-27, IDOSI pub. 2007.
- Adewuyi, S.A, Phillip, B.B, Ayinde, I.A and Akerele, D. (2010). Analysis of Profitability of Fish Farming in Ogun State, Nigeria. *Journal of Human Ecology* 31(3): 179-184. Kamla Rag. (2010)
- AFFAN (2011). Association of Fish Farmers and Aquaculturists of Nigeria. September, 2011.
- Amaefula, A. Onyenweaku, C.E, Asumugha G.N. (2009). Technical Efficiency of Fish Farmers in Delta State, Nigeria. A Translog Stochastic Frontier Production Approach. *Proc. of the 43rd Annual Conf. of the Agricultural Society of Nigeria*. Abuja 2009. Pp 356-359.
- Anyanwu, D, Akeredolu, B. (2005). Urban Aquaculture in Nigeria. *World Aquaculture Society, Annual Report* .www.was.org/meetings/abstractdata.
- Berkes, F.R, Mahon, P, Mcconney, R, Pollnac, C and pomeryoy, R.S. (2001). Managing Small-scaled Fisheries. *Alternative Directions and Methods International Development Research Centre, Ottawa* pp.208.
- Ekong, E.E. (2010). Rural Sociology. 3rd Edition, Uyo. Dove Educational Publishers 2010.
- Fagbenro, O.A. (2005). Aquaculture in Nigeria, History Status and Prospects. *A report of FAO World fish centre workshop; Cameroon*.
- FAO (1999). Indicators for Sustainable Development of Marine Capture Fisheries. *FAO Rome Fisheries Technical Guidelines for Responsible Fisheries* NO 6.
- FAO (2001). The State of World Fisheries and Aquaculture, FAO Fisheries Department, Rome 2001.
- FAO (2005). Small Scale Aquaculture in Sub Sahara Africa. *Revising the aquaculture target group Paradigm*. Rome: FAO fisheries.
- FAO (2006). Fisheries Management in the Federal Republic of Nigeria. www.FAO.org/fi/Fep/en/NGA/body. retrieved. 2011.
- FAO, (2008). Fisheries Department and its SOFIA Report on Fisheries and Agriculture Rome, 2008.
- FAO (2012). The State of World Fisheries and Aquaculture. FAO Fisheries and Aquaculture. Department, Rome, 2011. Pp 1-30
- FDF (Federal Department of Fisheries), (2005). Presidential Forum on Fisheries and Aquaculture. Status and Opportunities. Pp. 51-54.
- Freier, J. and Allut, G.A. (2000). Socio-economic and Biological Causes of Management Failure in European Artisanal Fisheries. *The case of Galicia (New Spain) Marine policy*.
- Greenfacts, (2004). World Fisheries Production. www.greenfacts.org/fisheries/04Utilization.htm. Retv. Jen. 2012
- Gupta M.V, Bartley D.M and Acosta B.O (2004). Use of Genetically Improved and Alien Species for Aquaculture Biodiversity in Africa. *World Fish Centre*, P.107.
- Iloeje, N.P, (1999). A New Geography for Nigeria. London: Longman
- MNAR, (2003). *An Overview of the Capture Fishers Development in Imo State*. *Journal of fishery society of Nigeria*, 2003. 007-011.
- Ndu, N.R. (2006). Fish Farm Layout, Pond Construction Management and Maintenance Hatchery Technique. *A paper presented at the National Workshop on the principles and techniques of fish farming, organized by Nigeria agricultural co-operatives and Rural Development Bank*. Kaduna, 2006.
- Nwachukwu, I. and Onuegbu, R. (2008). Adoption of Aquaculture Technology for farmers in Imo State of Nigeria. *Journal of Technology studies*. Pp 57-63.
- Okoye, B.C, Okorji, E.C. and Asumugha, G.N. (2004). Outlook on Production Economics of Paddy Rice under Resource Constrains in Ebonyi State. *Proc. Of the 38th Annual Conf. of the Agricultural SOCIETY of Nigeria (ASN)* 17-21 Oct ,Lafia .
- Thompson, P.M., Suultan P, and Khan, A.K.M (2003). Aquaculture Extension Impact in Bangladesh. *World Fish Centre*.
- Toure, M.K. and Noor, M. (2001). The role of Aquacultural Technology in food and nutritional Security on Africa. *Journal of Food and Nutritional Security* I. (1).
- Ukaru, A, Uzokwe, U.N, and Ideh, .V (2010). Comparative Analysis of Cooperative and Non-Cooperative Fish Farmers in the Central Agro-ecological Zone of Delta State Nigeria. *Extension Farming System Journal* vol. (2) No. 1 .pp 92-93.

Tables

Table 1: Registered Fisheries Cooperatives in Imo State

S/N	Names of Cooperatives	L.G.A	Activity
Okigwe Zone			
1	Diakuma youth farmers cooperatives	Onuimo, Okigwe	Multi-purpose
2	Akogu fish farmer cooperatives	Umunna	Multi-purpose
3	Onyenwu fishing cooperatives	Ihitte Uboma	Multi-purpose
4	Umueseaka fishermen cooperatives	Ihitte Uboma	Multi-purpose
5	Udoamaka farmer cooperatives	Ideato south	Multi-purpose
6	Afo-Dimkpa cooperatives	Ideato south	Multi-purpose
7	Abukwa farmers cooperatives	Ideato south	Multi-purpose
8	Igwebuikie fish farmers cooperative society	Umunna	Fish farm
9	Okwelle autonomous cooperative society	Okwelle	Multi-purpose
10	Ndikpa aboh umuduru women farmers cooperative union	Onuimo	Multi-purpose
11	Chidinma fish farmers cooperative society	Ihube	Fish farm
Orlu Zone			
12	Udoka fish farmers group	Oru east	Fish farm
13	Oru east cooperatives	Oru east	Multi-purpose
14	Kalabari beach fishermen cooperatives	Oguta	Fish farming
15	Amaruru Development Cooperatives	Araruru Orsu	Multi-purpose
16	Bright Ihioma farmers cooperatives	Orlu	Multi-purpose
17	Uzondu fish farmers cooperative society	Mgbidi, Oru west	Fish farm
18	Dike women cooperative society.	Mgbidi, Oru west	Multi-purpose
19	Ubanna oru west cooperative society	Oru west	Multi-purpose
20	Jah bu ikeanyi oru west farmers cooperative society	Oru west	Multi-purpose
21	Ezimba united farmers cooperative society	Orlu	Multi-purpose
22	Dike Amaka farmers cooperative society	Mgbidi	Multi-purpose
23	Agabson Agro allied farmers cooperative group	Oru west	Multi-purpose
24	Aji progressive cooperative society	Oru west	Multi-purpose
25	Udoka oru west cooperative union	Oru west	Multi-purpose
26	Aqua-green fish farmer's cooperative group.	Orlu	Fish farm
Owerri Zone			
27	Otuifunanya fishing cooperatives	Ohaji/ Egbema	Fish farm
28	Udokamma fisheries cooperatives	Ohaji/Egbema	Fish farm
29	Obioma fishermen cooperatives	Ohaji/Egbema	Multi-purpose
30	Abacheke fisheries progressive cooperatives	Abacheke Ohaji	Multi-purpose
31	Ifeoma farmers cooperatives	Iha/ Egbema	Multi-purpose
32	Obiawuolu fish cooperatives	Egbema	Multi-purpose
33	Oborottu cooperatives	Ohaji/ Egbema	Fish farm
34	Egbema farmers cooperatives	Ohaji/ Egbema	Multi-purpose
35	Fishermen cooperatives.o/c Edward Keke	Abueke Ihite Uboma	Fish farming

Source: Association of Fish Farmers and Aquaculturists of Nigeria (AFFAN), 2011

Table 2: Socio-Economic Characteristics of Respondents.

Variables	Cooperative fish farmers		Non-cooperative fish farmers	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age (Years)				
20-29	19	18.10	09	8.57
30-39	31	29.52	19	18.10
40-49	28	36.19	29	27.62
50>	17	16.19	48	45.71
Mean Age	40.38		46.74	
Sex				
Male	71	67.62	86	81.90
Female	34	32.38	19	18.10
Total	105	100	105	100
Marital Status				
Married	88	83.81	76	72.38
Others	17	16.19	29	27.62
Total	105	100	105	100
Occupation				
Fish farmers	40	38.10	35	33.33
Traders	15	14.29	33	31.43
Artisans	5	4.76	13	12.38
Civil servants	45	42.86	24	22.86
Total	105	100	105	100
Level of Education				
Tertiary Edu. Level	42	40.00	17	16.19
Secondary Edu. Level	49	46.67	30	28.57
Primary Edu. Level	14	13.33	47	44.76
No-formal education	0	00	11	10
Total	105	100	105	100
Household size				
None	4	3.81	17	16.19
1-3	18	17.14	32	30.48
4-6	47	44.76	38	36.19
7-9	33	31.43	16	15.25
10-12	3	2.86	2	1.19
Mean Household Size	5.06		3.65	

Source: Field Survey, 2011.

Table 3: Regression Estimate of Socio-economic Characteristics Affecting the Performance of fish farmers

Variable	B	Stand Error	Z	sig
(Constant)	3.459	3.254	1.063	.290
Age	-0.020	0.039	-0.504	.616
Sex	2.224	1.046	2.127**	.036
Marital status	1.249	1.261	0.990	.325
Occupation	0.984	0.960	1.025	.308
Education level	0.546	0.165	3.309***	.000
Household size	0.544	0.201	2.705***	.000
Experience (years)	0.133	0.080	1.663*	.100

Table 4: ANOVA Result

Model	Sum of squares	df	Means square	F	Sig.
Regression	351.809	7	50.258	2.244	0.0379
Residual	2172.819	97	22.400		
Total	2524.629	104	-	-	-

a. Predictors (constant) Experience, Education, Marital status, Occupation Household Size, Sex and Age.

b. Dependent variable: fish farm income (fish output)

Table 5: Correlation Coefficient between Number of Fish Ponds of Cooperative fish farmers and their income level

Variables	No of fish ponds	Income
	1	0.587**
No of fish ponds		
Income	0.587**	1

**Significant at 5%

Table 6: Comparison between the performance of Cooperative and Non-Cooperative Fish Farmers

Variable	Individual mean	Pooled mean	df	z-cal	z tab
Income of cooperative fish farmers	94,540.952	63398.10	104	4.380	1.658
Income of non- cooperative fish farmer	31,142.857	-	-	-	-
No. of ponds of cooperative fish farmer	8.6857	3.8095		7.208	1.688
No. of ponds of non-cooperative Fish farmers	4.8762				