Analysis of profitability of small-scale catfish farmers in Oyo State, Nigeria

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Abstract

The study examined some parameters affecting profitability of small-scale catfish farmers in Oyo State, Nigeria. Multi-stage sampling technique was used to select 222 catfish farmers from all the four agricultural extension zones of Oyo State using structured questionnaire. Data were analysed using descriptive statistics, profitability indices and multiple regression models. Benefit cost ratio, rate of return, gross revenue ratio, net profit margin and expense structure ratio were 1.69, 0.69, 0.59, 0.41 and 0.15 respectively, indicating that catfish farming is profitable in the study area. Multiple regression estimates revealed that the model was a good fit and age, farming experience, educational qualification, household size and source of income were the important and significant (P>0.01) socio-economic parameters affecting the gross margin of catfish farms in the study area. Results emanating from the findings revealed that preservation/storage/processing facilities, non-availability/high cost of quality fish seed, poaching/predators and high cost of fish feed were some of the constraints facing catfish farmers in Oyo State. Policies that intended at encouraging youth, input supply at subsidized rate (feed), and also provision of credit facilities with flexible means of repayment and affordable interest rates should be advocated for so as to increase catfish production in the State.

Keywords: small-scale, catfish, profitability, gross margin, farmers

Introduction

For several decades in Nigeria, agriculture had been the bedrock of the country economy by providing the nation with food, employment, foreign reserve and reduces poverty (Central Bank of Nigeria (CBN), 2003). The agricultural pattern of the country is dualistic and this is reflecting on the existence of small-scale, resource poor farms existing alongside with very few large-scale commercial farms. Agriculture still plays an active role in the economy of Nigeria through its contribution to the nation's Gross Domestic Product (GDP) despite the neglect of the sector in favour of the oil sector at the discovery of oil in the 1970s (Tiamiyu *et al.*, 2015). With recent global decline in the price of oil and its products coupled with the problem of low agricultural production especially of animal protein, Nigeria has no choice but to move from its reliance on the oil and gas sector in diversifying its economic activities into other viable sectors. One such sector that Nigeria can intensify on is agriculture, particularly aquaculture sub-sector which is reliable and sustainable and has the potential

of increasing the nation's GDP through exportation. This is because it is the fastest growing sub-sectors of agriculture in the developing countries especially China and other Asian countries (Green facts 2004).

Fish is generally acceptable animal protein source because of its high nutritive values. It is rich in vitamins and some quantities of calcium, phosphorous, fat and other nutrients needed for human growth and health. Fish protein has been found to be rich in essential amino acids which are suitable for complementing high carbohydrate diets. They are also rich in minerals such as thiamine, riboflavin and preformed vitamin A and D (Akanni, 2010).

Nigeria has over 14 million hectares of inland water surface, out of which about 1.75 million are available and suitable for aquaculture (FAO, 2006). In Nigeria, aquaculture is predominantly an extensive land based system, practiced at subsistence levels in fresh waters (Anyawu-Akeredolu, 2005). The full potential of commercial aquaculture has yet to be exploited (Fagbenro, 2005), most catfish farmers operate small-scale farms ranging from homestead concrete ponds (25 – 40 meters) to small earthen ponds (0.02 - 0.2 hectares). The industry produced over 85,000 tonnes of fish in 2007 (FDF, 2008).

Artisanal fishery, aquaculture and industrial fishery are the main subsectors contributing to the local fish production (FDF, 2008) at 68.8%, 25.7% and 5.5% respectively (FDF, 2013). However, the production from these subsectors are insufficient to meet the fish demand of Nigerians because of the ever increasing population of the country as well as the use of low-tech equipment which characterized the artisanal fishery. In Nigeria, aquaculture development has been driven by social and economic objectives, such as nutrition improvement in rural areas, generation of supplementary income, diversification of income activities, and the creation of employment (Chilaka *et al.,* 2014). Profitability is the financial reward that farmers get from its produce. It is the primary goal of all business outfits. The basis of farmer's decision for venturing into farming operation and allocating their scarce resources in the production depends on the relative profits gained (Carlso, 2001; Don 2009). Profit is a function of farm type, size, location and commodity produced as well as yield, output price and operational cost which include both fixed and variable cost (Blank, 2002; Jolejole *et al.*, 2009). Farm profitability is the key to fish production enterprise as fish farmers would only embrace new technologies if they are profitable (Ashley-Dejo *et al*, 2016). Government policies and decisions affect farmers profit (Acquaah, 2005). Studies have been carried out on profitability of fish production using gross margin analysis in many part of Nigeria and it was confirmed that fish production is profitable; these include Ashaolu *et al.* (2005), Olagunju *et al*. (2007), Raufu *et al*, (2007), Emokaro and Ekunwe (2009), Okwu and Acheneje (2011) Olaoye and Odebiyi (2011) and Tunde *et al.* (2015). The objectives of this study were to examine the socio-economic characteristics of the small-scale catfish farmers; determine the profitability of small-scale catfish enterprises; examine the socio-economic factors influencing profitability of small-scale catfish farmers in the study area and examine the constraints facing small-scale catfish farmers in the study area**.**

Materials and Methods

Study area description

The study was conducted in Oyo State, Nigeria. The State is located in the rainforest vegetation belt of Nigeria within longitude of $2^{0}38.66^{1}$N and $4^{0}38.25^{1}$N and latitude

$9^0 8.74^1$E and $7^0 1.68^1$E. It is bounded in the south by Ogun State and in the north by Kwara State, in the west by the Republic of Benin while in the east it is bounded by Osun State (Figure 1), with a population of over 5,591,589 million people (Olagunju *et al.*, 2007).

The tropical climate of the State is broadly of two seasons which are rainy season (between March and October) and dry season (between November and February). The mean temperatures are highest at the end of the Harmattan (averaging 28^0C), that is from the middle of January to the onset of the rainy season in the middle of March. The annual rainfall varies from 1,200 mm at the onset of rainy season to 1,800 mm at its peak in the Southern part of the State with an average rainfall of between 800 mm and 1,500 mm at the northern parts of the State (Olagunju *et al.*, 2007). The State was divided into four Agricultural Development Project (ADP) operational zones (Ibadan/Ibarapa, Ogbomoso, Oyo and Saki (Figure 1)) covering all the Local Governments.

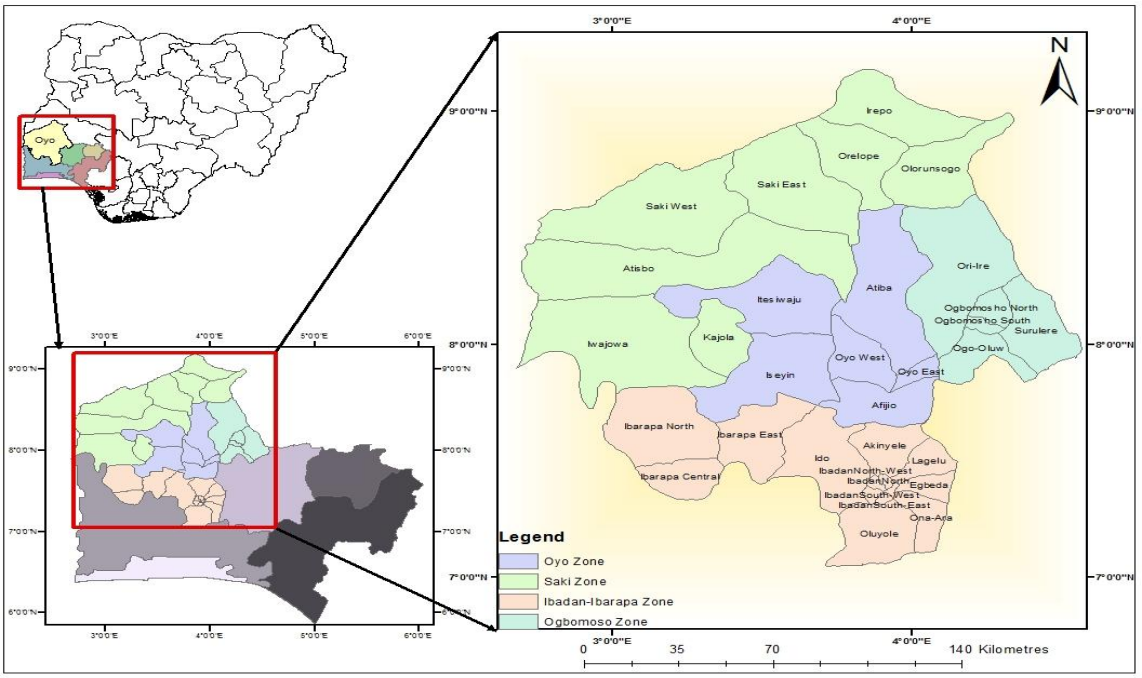

Figure 1: Map of Oyo State ADP showing zones and blocks

Sampling size and data analysis

The four agricultural zones in Oyo State namely Oyo, Ibadan/Ibarapa, Saki and Ogbomoso were used for this study. A multi-stage random sampling technique was adopted in the selection of blocks, circles/cells and catfish farmers. First, there are twenty five (25) agricultural extension blocks in the State, out of which 60.0% were randomly selected to give a total of sixteen (16) extension blocks i.e 5, 4, 4, and 3 (Oyo, Ibadan/Ibarapa, Saki and Ogbomoso) agricultural extension blocks respectively from each zone. From the selected blocks, 60.0% of the cells were selected randomly from the selected extension blocks summing up to a total of seventy nine (79) cells, out of one hundred and thirty (130) cells. Finally, 60.0% of registered catfish farmers were also

selected using simple random sampling technique from the selected cells to give a total number of two hundred and twenty two (222) catfish farmers from Oyo State out of three hundred and seventy (370). A structured questionnaire was used in soliciting information from the farmers. This method was an adaptation of the method used by Olaoye (2010) and Ashley-Dejo (2012).

The data were analysed using various profitability indices as presented in equation (1) – (6) and Cobb-Douglas function equation was used for the analysis of the influence of some socio-economic characteristics of the farmers on the gross margin of their farms equation (7).

Profitability Indices

Gross Margin (GM) = TVP – TV…..... (1)

Net Farm Income (NFI) = GMI – TFC..... (2)

Benefit Cost Ratio (BCR) = TR/TC…..... (3)

Rate of Returns on Investment (RORI)

= (NFI/TC) x 100…….. (4)

Net Profit Margin (NPM)= NFI/TC..... (5)

Profit percentage

= ((TR - TC)/TC) x 100……..…. (6)

where:

TVP = Total value of Product

TVC = Total variable Cost

TFC = Total Fixed Cost

NFI = Net Farm Income

GMI = Gross Margin Income

TC = Total Cost (sum total of both variable and fixed cost)

TR = Total revenue (product of output and unit price of output)

Depreciation values of fixed items were used for calculation. Depreciation was calculated using a Straight Line Method (SLM), which assumed salvage value of zero.

DS = (OC - SV)/L

where:

DS = Annual depreciation

OC = Original Cost

SV = Salvage Value

L = Expected or Useful Life Span (Years)

Cobb-Douglas function form is specified as:

$InY = In\beta_0 + \beta_1 InX_1 + \beta_2 InX_2 + \beta_3 InX_3 + \beta_4 InX_4 + \beta_5 InX_5 + \beta_6 InX_6 + \beta_7 InX_7 + \beta_8 InX_8 + e$....(7)

where:

Y = Gross margin (₦/production circle)

X_1 = age of the farmers (years)

X_2 = gender (male = 1, female = 0)

X_3 = marital status (married = 1 and otherwise = 0)

X_4 = farming experience (years)

X_5 = Educational qualification (year spent in school)

X_6 = House hold size (number)

X_7 = membership of fish farmers association (yes = 1, No = 0)

X_8 = source of finance (borrowed = 1 and otherwise = 0)

B_0 = intercept, B_1- B_8 = regression parameters to be estimated and e = error terms. Statistics such as the explanatory power of the model (R^2), the significance of the estimated coefficient, the magnitude of the estimated coefficient were used to describe result of the regression model.

Finally, a 4-point Likert type scale was used to elicit data on constraints facing fish farmers in the study area. The scores were weighed and the weighted average found. The critical mean of 2.5 was used to accept or reject an item as a constraint on catfish farm production in the study area. The constraints that score equal to or more than critical means of 2.5 was accepted as constraint to catfish farming in the study area or otherwise rejected.

Results and Discussion

The socio-economic characteristics of catfish farmers in the study area were shown in Table 1. Result on age shows that 5.0% were between 21- 30 years, 37.8% were between 31 – 40 years while 8.1% were

above 50 years. Most (49.1%) of the respondents were between 41 – 50 years, with mean age of 46 years. The result indicated that larger percentage were above 40 years of age indicating that they are mature and able to withstand stress in fish farming enterprises. This age bracket is majorly considered as productive and economically active (Baruwa *et al.* 2012, Ashley-Dejo *et al*., 2017) which portends better future for catfish production. Udoh and Nyienakuma, (2008) too observed that this age bracket composed of the innovative, motivated and adoptable individuals which is an indication that middle-aged people had higher aspiration and will easily adopt improved innovations and could take risk resulting into increase in farmers' income.

Most (84.2%) of the respondents who engaged in catfish farming were male. This implies that men were more actively involved in catfish farming than their female counterparts in the study area. This result is corroborated by the findings of Brummett *et al*. (2010) that fisheries activities are mostly dominated by men. Also, low involvement of females in catfish farming may be due to the inability of most women to own their personal land for farming (Olaoye, 2010). The result is also similar to the findings of Oladimeji *et al.* (2013) who noted that 95.0% of the fish farmers were male and implies that fish farming in the study area was male dominated and this is attributed to the fact that fish farming is strenuous and energy consuming which many females could not withstand. It is also worthy of note that some women were into fish farming and means that women participation in aquaculture is increasingly becoming popular. This is contradictory to the general notion that women cannot venture into fish farming.

Result in Table 1 shows that 11.3% and 76.1% were single and married respectively. The high percentage in marriage corroborates the observation of Oladoja and Adeokun (2013) that 84.0% of catfish farmers in Ogun State were married. This implies that higher percentage of catfish farmers were people of responsibility who engage in one activities or the other to be able to cater for the family needs. Respondents' educational qualification is an important factor that may shape farmers' skills and influenced them to adopt technologies that may generate high income. The educational attainment of farmer does not only raise his productivity but also increases his ability to understand and evaluate new innovations disseminated to them. The result shows that 96.8% had one form of education or the other. Majority (49.1%) had tertiary education, 27.9% had secondary education while 19.8% had primary education. High level of respondents with tertiary education recorded in this study might be due to the nature of the study area because of civilization and its implication is that the respondents in that area may be very receptive to new innovations. The findings is also in agreement with the earlier finds of Olagunju *et al.* (2007) who noted that high level of education among fish farmers usually have positive effect on their acceptance to new technology. Tunde *et al.* (2015) also observed that more than half of fish farmers in Oyo State had tertiary education. The fact that about half of catfish farmers had tertiary education proves that fish farmers can be said to have high level of education which is an added advantage in boosting their output in the long run.

The result shows that majority (53.2%) were Christians, 43.2% were Muslims while 3.6% were Traditional worshipers. This shows that Christians were more into catfish farming in the study area. Although majority of the fish farmers were either Christians or Muslims; this is could be attributed to civilization, the practice of traditional gods was also observed within the study area.

The mean household size in the study area was 6 persons. It was further noted that

the household size of the catfish farmers in the study area ranged from 1 to 18 persons. The implication is that the relatively large household size may likely enhance labour supply on the farm. The study revealed that 40.5% of the farmers had between 11 – 15 years of fish farming experience, 35.6% had between 5 – 10 years of experience. The mean years of fish farming experience was 9.3 years which suggested that respondents in the study area had considerable good years of fish farming experience. Farming experience is an important factor determining the profit level and farm output. The more farmers able to understand the business, conditions, trends, prices etc, the better their output will be which in turn will invariably had positive influence on the gross margin.

It was shown that majority (67.6%) got their land through purchase while 23.0% got their land through rent. The reason may be because wetland is becoming competitive nowadays for other agricultural use, instead of selling it off, some owners preferred given it out on lease vis - a - vis some taken. Furthermore, transfer of land is very common in local society as one of the ways inheritors claim what belong to their father. Based on this fact, it was recorded that 7.7% of the fish farmers inherited their land from their ancestors.

As further shown in Table 1, majority (62.6%) of the fish farmers were members of cooperative societies. The findings is not too far from the submission of Shetimma *et al.* (2014) who observed that about 85.4% of fish farmers in Borno State belonged to fish farmers' associations/cooperative society. This implies that financial resources needed in fish farming enterprises could easily be obtained from cooperative societies with no or less difficult collateral, flexible means of repayment and affordable interest rates. Also, needed inputs can be purchased together and collective marketing will be enhanced. Majority (57.7%) of the respondents' accessed financing from limited informal sector (personal savings and friends/relatives), and this could translate into ineffectiveness, small scope and in variably low income.

Table 1: Percentage distribution of the socio-economic characteristics of small scale fish farmers in Oyo states (N = 222)

Variables	Frequency	Percentage (%)	Mean	Std
Age (years)				
21-30	11	5.0		
31-40	84	37.8		
41-50	109	49.1		
Above 50	18	8.1	46	13.09
Gender				
Male	187	84.2		
Female	35	15.8		
Marital Status				
Single	25	11.3		
Married	169	76.1		
Widowed	20	9.0		
Separated	8	3.6		

continue…

Variables	Frequency	Percentage (%)	Mean	Std
Educational qualification				
No formal Education	7	3.2		
Primary Education	44	19.8		
Secondary Education	62	27.9		
Tertiary Education	109	49.1		
Religion				
Christianity	118	53.2		
Islam	96	43.2		
Traditional	8	3.6		
House hold size (persons)				
1 – 3	35	15.8		
4 – 7	152	68.5		
8 – 11	35	15.8	6	3.563
Fish farming experience (years)				
Less than 5	35	15.8		
5 – 10	79	35.6		
11 – 15	90	40.5		
Above 15	18	8.1	9.3	4.850
Mode of land acquisition				
Purchase	150	67.6		
Lease/Rent	51	23.0		
Inheritance	17	7.7		
Gift	4	1.8		
Membership of Cooperative Society				
Yes	139	62.6		
No	83	37.4		
Source of finance				
Personal savings	106	47.8		
Friends/Relatives	22	9.9		
Cooperatives society	55	24.8		
Bank loan	39	17.6		

Source: Field Survey, 2011

Economic analysis and profitability ratio of fish farmers in Oyo State

Table 2 presents the results of cost and return analysis which shows that cost of feed took largest percentage of total cost of production (86.45%). This implies that huge amount of money was expended on purchase of fish feed showing that feeding cost is the most expensive in catfish enterprise. The fixed cost of production consists of cost of land, pond construction, pond equipment such as net, weighing scale etc which accounted for 13.41% of the total fixed cost. Also, an average total cost of ₦2,883,515.08 was incurred by the respondents in a cropping season, with gross margin (GM) of ₦2,376,616.36. This indicates that fish

farming in the study area is profitable. This result is consistent with the finding of Ashaolu *et al.* (2005) and Olaoye and Odebiyi (2011) who observed that fish farming is profitable.

The analysis of ratios in Table 2 reveals that the Benefit cost ratio (BCR) was greater than one. BCR is one of the concepts of discount method of project evaluation. As a rule of thumb any business with BCR greater than one indicated profit (Olagunju *et al*., 2007). The finding in this study compares favourably with earlier work of Emokaro and Ekunwe (2009) who examined the efficiency of resource-use among catfish farmers to be viable. Since the ratio (BCR = 1.69) it implies that fish farming in Oyo state is profitable. It is therefore much possible to have higher value of BCR with increase in capitals and skilled labour. The rate of returns was 0.69 implies that for every one naira invested, ₦ 0.69 was gained and a gross revenue ratio of 0.59 indicates that for every one naira return to fish farm enterprise, 59kobo is being spent. The result is also in line with work of Raufu *et al,* (2007) and Okwu and Acheneje (2011) who also affirm that fish farming business is cost-effective. Expense Structure Ratio (ESR) is 0.15 which implies that 15% of the total cost of production is made up of fixed cost component. This make the fish farming business worthwhile since increase in the production (output) with variable cost will increase the total revenue leaving the fixed cost unchanged.

Table 2: Economic analysis and profitability ratio of fish farmers in Oyo State

Items	Adopters	
	Amount (₦)	% Total Cost
Variable cost		
Fish Feed	2,158,456.01	86.45
Fish seed	211,801.59	8.48
Lime/Fertilizer	3,473.18	0.14
Labour	69,296.88	2.78
Fuel	21,314.19	0.86
Transportation	17,351.08	0.85
others	15,212.00	0.61
Total variable cost	2,496,904.93	86.60
Fixed cost		
Land purchase/rent	18,616.43	4.82
Water pump	9,293.85	2.40
Concrete tanks	78,154.59	20.22
Deep well	21,570.00	5.58
Earthen pond	26,514.11	6.86
Plumbing materials	3,010.45	0.78
Building/Shed	167,856.00	43.41
Generator	45,761.00	11.84
Drag net, Weighing Scale/Cutlass/	10,694.62	2.77
Wheel barrow/ Shovel/ Head pan/ Bowls	5,139.10	1.33
Total fixed cost	386,610.15	13.41
Total cost	2,883,515.08	

continue…

Items	Adopters	
	Amount (₦)	% Total Cost
Total revenue	4,873,521.29	
Gross margin	2,376,616.36	
Net farm income	1,990,006.21	
Benefit cost ratio (bcr)	1.69	
Rate of return (ror)	0.69	
Gross revenue ratio (grr)	0.59	
Net profit margin (npm)	0.41	
Expense structure ratio (esr)	0.15	

Source: Field survey, 2011

Regression parameters on the determinant of profitability of catfish farmers in Oyo State

Table 3 presents the results of ordinary least square (OLS) regression model. It indicates that R^2 square was 0.710 which suggests that the explanatory variables in the model specification were important and they explained 71.0% of the variation in the dependent variable (gross margin). This shows that the model is of good fit and has a good predictive ability. The higher the value of R^2, the better the goodness of fit of the specific model, F-ratio was 26.71 and significant at 1.0% level, which implies that the independent variables included in the mode; adequately explained the variation in the dependent variable (gross margin).

The result revealed that age, farming experience, educational qualification, household size and source of income are important and all significant at 1.0% level of probability. It was also revealed that farming experience, educational qualification, household size and source of income had positive relationship with gross margin while age had negative relationship according to *a priori* expectation. This means that increase in farming experience, educational qualification and household size and source of income would result into an increase in gross margin equal to value of coefficient of these significant variables individually. Negative relationship between age and gross margin implies that as age increases the farmer become less productive as per *a priori* expectation. Therefore, as fish farmers are aging, young people (school leavers) should be encouraged to take up fish farming enterprises (either as core source of income or entrepreneur enterprise) by making available all necessary farm input at subsidised rate and provision of necessary public facilities within the farm settlement. All these focus mainly on the government policy which should be formulated to encourage the experienced fish farmers to remain in the enterprise and also draw the attention of youth to engage in fish farming. Farming experience had positive influence on the gross margin which could be due to improvement in resources-use efficiency as years of experience impresses. This conforms to the finding of Nwaobiala (2014) who stated that any increase in farming experience will lead to increase and intensity adoption of fishery technologies which will make farmers to be less averse to risk and resulting into increase in output.

The coefficient for educational qualification (18.643) was positively signed and significant at 1.0% level of probability. This implies that an increase in education will result to corresponding increase in gross

margin which is in agreement with *a priori* expectation. This finding is in agreement with the finding of Tunde *et al.* (2015) who noted that educational qualification increases productivity and enhances the farms ability to understand, evaluate and effectively utilize farming techniques which will equally boost their gross margin.

Increase in household size could result in an increase in gross margin provided if the members of the house hold are available to serve as farm workers, the farmer would have no cause to obtain credit to pay hired labour, otherwise, increase in house hold size that are willing and ready to assist will affect output positively and income negatively. Increase in source of finance would result into easy access for expansion and provision of adequate and quality feed for the stocked fish invariably increase gross margin.

Table 3: Estimates of regression parameters on the determinant of profitability of fish farmers in Oyo State

Variables	Parameters	Coefficient	Standard error	t-ratio
Constant	β_0	136.271	141.485	0.921
Age (X_1)	β_1	-7.413	1.542	-4.739***
Gender (X_2)	β_2	-86.485	38.52	-1.747
Marital status (X_3)	β_3	-7.267	31.742	-0.274
Farming experience (X_4)	β_4	10.378	1.249	6.437***
Educational qualification (X_5)	β_5	18.643	4.438	5.838***
Household size (X_6)	β_6	20.172	4.741	4.765***
Membership of fish farmers association (X_7)	β_7	3.758	6.742	0.488
Sources of finance (X_8)	β_8	9.597	1.715	5.129***
R - square (R^2)		0.710		
Adjusted R^2		0.663		
F – value		26.711***		

Source: Field survey, 2011
***P<0.01

Production constraints among catfish farmers in Oyo State, Nigeria

Various constraints faced by fish farmers and their weight scores were presented in Table 4. The most critical constraints were insufficient labour, preservation/ storage/ processing facilities, non-availability/ high cost of quality fish seed, poaching/ predators, high cost/ lack of construction equipment, market price fluctuation, high cost of fish feed and water shortage during dry season. All these constraints reduce output and at the same time increase the cost of production. Therefore, there is an urgent need to provide catfish farmers with easy access to appropriate land and affordable processing and preservation facilities. Storage facilities should be provided to fish farmers which will help in price stabilization and would enhance farmers' income and probably encourage expansion of farm size. Adequate research work should be intensified on fish nutrition to reduce the high cost of fish feed which as the highest weight mean score of 4.54 resulting as the major constraints perceived

by catfish farmers in the study area. This is in agreement with the result obtained in Table 2 of this study which put the cost of fish feed at 86.45% of the total cost of production. Market price fluctuation is ranked second as the major constraints perceived by fish farmers in the study area. Fish farmers in should endeavor to agree on particular price range during their monthly or quarterly meetings depending on the average weight of fish at point of sale so as to combat this challenge. Non availability/high cost of fish seed also weighed a mean score of 4.00. Government through the Ministry of Natural Resources, Fisheries Department should mandate that all fish hatchery operators within the State should obtain license from the Fisheries Department in order to combat the aforementioned constraints.

Table 4: Percentage distribution of the catfish farmers by aquaculture production constraints

Constraints	Very serious	Moderately serious	Serous	Not a problem	Weight score	Weight means
Land acquisition	18	72	2	130	422	1.90*
Insufficient labour	48	79	0	95	560	2.52**
Distance of the extension staff's office to the village/ farm.	39	53	20	110	487	2.19*
Preservation/ Storage/ Processing Facilities	71	96	15	40	735	3.31**
Inadequate Motivation from extension officer	31	49	73	69	551	2.48*
Absence of strong co-operative society	0	47	10	165	296	1.33*
Lack of finance (capital and credit)	12	34	35	141	356	1.60*
Non-availability/ High cost of quality fish seed/fry	152	48	0	22	889	4.00**
Poaching/ predators	40	170	0	12	808	3.64**
High cost/ lack of construction equipment	91	122	0	9	869	3.91**
Market price fluctuation	167	55	0	0	973	4.38**
High cost of fish feed	200	22	0	0	1007	4.54**
Water shortage during dry season	31	174	17	0	822	3.70**
Disease and pest infestation	8	64	0	150	467	1.65*
Lack of technical know-how	41	53	0	128	467	2.10*
Mean total						43.25
Critical mean						2.5

Source: *Field* Survey, 2011

Decision rule: Critical mean = 2.5, **mean accepted as a constraints, * mean not accepted as a constraints

Conclusion

Catfish farmers in the study area are young, active and well experienced. The enterprise is dominated by male fish farmers. High level of education in the study area could have affected their technology usage and these had translated into better and high income. Catfish enterprise is still profitable with BCR, ROR, NPM and ESR of 1.69, 0.69, 0.41 and 0.15 respectively. Age, farming experience, educational qualification, household size and source of income may influence catfish farmer's gross margin. The gross margin of catfish farmers should be enhanced by providing the farmers with credit facilities with flexible means of repayment and affordable interest rates. All these would lead to expansion of farm size and adoption of recent innovations. Experience farmers should be encouraged to stay on the farm while educated youths should be motivated to take up catfish production to solve the challenges of food insecurity especially animal protein in the country.

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