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CATFISH FINGERINGS PRODUCTION AND POVERTY REDUCTION IN OWERRI AGRICULTURAL ZONE OF IMO STATE, NIGERIA

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ABSTRACT
The study examined catfish fingerlings production and poverty reduction in Owerri Agricultural zone of Imo State. Fish farming is the production and husbandry of aquatic plants and animals in a controlled environment. As Nigerian population grows, there is a need for intensification of fish production to argument the shortage of protein requirement. A multi-stage sampling procedure was used and forty- five respondents were purposely selected. Questionnaire was the instrument of data collection. Data was analyzed using descriptive and inferential statistics. The result showed that number of time fingerlings are produced yearly and number of male and female brood-stock used were positive and significant at 1% level of probability. The producers made a net profit of ₦496, 163.29. The major constraints encountered were high cost of pond and low quality of brood-stock. The study recommended that credit should be available to reduce cost of production.
Keywords: Catfish, Fingerlings, Brood-stock and Poverty

INTRODUCTION

Fish farming is the practice of raising fish for human consumption. Gupta *et al.* (2013), defined fish farming as the production and husbandry of aquatic plants and animals in a controlled environment. According to Canon, (2015), catfish (*clarias species*) are a diverse group of ray finned fish, named for their prominent barbels, which resemble a cat's whiskers. Fingerlings are the proper size for stocking in table fish production. Cat fish fingerlings are sexually immature fishes with adult features, they are post larva that have grown up to 10-25cm in size (Njoku, 2008).

The Federal Department of Fisheries, (FDF, 2008), observed that fisheries occupy a unique position in the agricultural sector of the Nigerian economy, in terms of Gross Domestic Product (GDP), the fisheries sub-sector has recorded the fastest growth rate in agriculture. (CBN, 2008), Stated that the contributions of the fisheries sub-sector to agriculture GDP was estimated as 4.0% in the year 2007, out of the total estimate of 40% being contributed by the agricultural sector. Production is a process of transformation of input into output. It can be change in the form (raw material) or place (supply chain). To produce the fingering necessary for catfish production, access to classical production inputs such as land, labour and capital are required.

Catfish fingerlings production is very crucial for any successful catfish farming production enterprise (Robonski, 2013). This can be done through natural, induced or artificial spawning. To maximize profit of each method adopted is the ultimate goal of the farmer. As poverty reduction is a set of measures, both economic and humanitarian, that are intended to permanently lift people out of poverty, catfish fingerling production and rearing to maturity will help to improve the well-being of Nigerians. In captivity the African catfish does not spawn or reproduce spontaneously since the environmental factors such as rise in water level and inundation of shallow areas does not occur at the fish farms. Male and female brood-stock is required for breeding. There is a need for artificial fertilization of eggs, incubation of fertilized eggs and subsequent production of catfish fingerlings.

According to FAO (2006), Nigeria is a protein deficient country. The protein in the diet can be primarily remedied through the consumption of protein – rich plant or animal but protein from animal source is in short supply in Nigeria. FAO, (2012), stated that the protein intake in developing countries is below the required 75g per person per day.

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Nigerian population is growing at about 4% per annum as against livestock production which is growing at about 2% per annum (Owolabi, 2009). The total fish demand for Nigeria based on the 2014 population estimate of 180 million is 3.32mt while production is 1.123mt. Hence Fisheries contributed 0.48% to Agriculture GDP and contribution of Agriculture to GDP in 2014 was 20.24%. (FDF, 2016). The level of fish consumption in the country has been reported to be far below the international standard due to low productivity (Owolabi, 2009).

High cost of animal protein to a level that is almost beyond the reach of the ordinary citizen, has given rise to considerable increase to the demand for fish to supplement the needed animal protein intake. Inadequate knowledge of production practices, high cost of feed militates against catfish fingerlings production. This study sought to fill the gap in knowledge. The following objectives guided the study: determine the cost and returns of catfish fingerlings production; estimate the determinants of quantity of catfish fingerlings produced and ascertain the constraints encountered.

METHODOLOGY

The study was carried out in Owerri agricultural zone of Imo state, Nigeria. The zone is located between Latitude 4°45^{1} and 7°25^{1} north of the equator and Longitude 6°5^{1} and 7°25^{1} east of the Meridian (Microsoft Corporation, 2007). The population is about 1,480,853 persons which is about 38% of the total population of 3,934,879 of the state (NBS, 2007). The zone is richly endowed with fertile land suitable for the rearing of livestock like sheep, pig, goat, poultry, fish, and crops. According to Canon, (2015), in Imo state, the major farms producing catfish fingerlings are located in Owerri agricultural zone, thus, the study area has numerous catfish fingerlings producers and fish farmers. All these necessitated the choice of the zone as the study area.

A multi-stage sampling procedure was used in the study. Out of the eleven Local Government Areas (LGAs) that made up Owerri Agricultural zone, five were purposely selected due to the numerous producers of catfish fingerlings found in the area. The LGA's are Ngor-Okpala, Oguta, Owerri Municipal, Owerri North, and Owerri West. Three communities were purposely selected and three catfish fingerlings producers were randomly selected from each of communities. The list of catfish fingerling producers in the communities, which forms the sample frame, was obtained from zonal extension agent of Agricultural Development Programme (ADP) in the study area. A total fifteen (15) communities and forty-five respondents were selected.

Data was collected from primary sources through questionnaire. The tools for analysis were multiple regression, cost and returns analysis and descriptive statistics. The model is as follows: NR = TR – TC; Where, NR = Net Revenue; TR = Total Revenue TC = Total Cost (TVC + TFC); TVC = Total Variable Cost; TFC = Total Fixed Cost
The model for the regression analysis was specified as: $Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e)$ Where Y= Quantity of fingerlings produced yearly (numbers); X_1= Age (years) X_2 = Household size (number of persons in house); X_3 = Production experience (Years); X_4 = Educational level (years); X_5 = Religion (dummy variable, Christians =1, Muslim =0); X_6 = Gender (dummy variable, male =1, female = 0); X_7 = Number of times catfish is produced yearly; X_8 = Number of male and female brood- stock used yearly (nos); X_9 = Number of ponds used; E = Error term

RESULTS AND DISCUSSION

Cost and Returns of Catfish Fingerlings Production

The result in Table 1 shows the cost and return analysis of production in a breeding session. From the result, a total variable cost (TVC) of ₦176,807.61 and a total fixed cost (TFC) of ₦73,923.1 was incurred

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while total revenue (TR) of ₦746,894 was realized. Subtraction of total cost (TC) from total revenue gave a profit of ₦496,163.29 which was considered enough to keep the farmers in catfish fingerlings production. The subtraction of total variable cost (TVC) from the total revenue (TR) has a gross margin of ₦570,086.39. This implies that catfish fingerling production is profitable in the study area.

Table 1 Distribution according to cost and returns for catfish fingerlings production

Variable cost 1

S/N	Items	Unit	Unit price ₦	Total ₦
1.	Male brood-stock	3	6102	18,306
2.	Female brood-stock	4	5315	21,260
3.	Hormone injection	1.5ml	6580	9,870
4.	Artemia (antibiotics)	1.3 tin	9166.7	11,916.71
	Total Variable Cost 1(TVC1)			61,352.71

Variable cost 2

S/N	Items	Unit	Number of weeks	Unit price ₦	Total ₦
5.	Brood-stock feed	3Kg	1	888.9	888.9
6.	Hatchling feed	3Kg	3	4000	12,000
7.	Fingerling feed	3.2Kg	6	4576	27,456
8.	Water	------	------	------	2250
9.	Labor	3 mandays	9	4180	112,860
		Total Variable cost 2			115,454.9
	Total Variable cost (TVC)= TVC_1 + TVC_2				176,807.61

Fixed cost 1

S/N	Items	Unit	Number of months	Unit price ₦	Total ₦
10.	Land	< 0.2 hectare	12	3530	42,360

Fixed cost 2

S/N	Items	Unit	Useful life(years)	Unit price ₦	Value after depreciation ₦	Total ₦
11.	Hatchery pond	2	8.5	50,200	5,905.9	11,811.8
12.	Brood-stock pond	2	6.7	34,922	5,212.2	10,424.4
13.	Net	7	1.3	881	677.7	4,743.9
14.	Blade	3	1	30	30	90
15.	Bowl	6	1	508	508	3,048
16.	Towel	5	1	281	281	1405
			Total Fixed Cost 2			31,523.1
			Total Fixed Cost (TFC) = TFC_1 + TFC_2			73,923.1
			Total Cost (TVC +TFC)			250,730.71

Revenue

S/N	Items	Unit	Unit selling price ₦	Total ₦
17.	Male Broodstock	3	3,838	11,514
18.	Female Broodstock	4	4,504	18,016
19.	Fingerlings	37,756	19	717,364
	Total Revenue (TR)			746,894
	Gross Margin (TR-TVC)			570,086.39
Net Profit (TR – TC)				496,163.29

The determinant of quantity of catfish fingerlings produced

In order to estimate the determinants of the quantity of catfish fingerlings produced, a model was subjected to multiple regression analysis using four functional forms (linear, semi-log, double log and exponential. The exponential form was chosen as the lead equation ($Y= 9.625 + 0.003X_1 - 0.0172X_2 + 0.021X_3 + 0.038X_4 + 0.1225X_5 + 0.038X_6 + 0.166X_7 + 0.043X_8 - 0.003X_9$) for further discussion because it has the highest R^2 value (0.951) and also highest F- Value (75.988). The result showed that the independent variables (X_1- X_9), jointly explained 95.1% of the variation in the quantity of catfish fingerlings produced. The interpretation of the result indicated the following:

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Age (X_1) has a positive relationship with catfish fingerling produced (CFP) implying that as age increases CFP increases and vice versa. Household size (X_2) has a negative relationship with CFP and statistically significant as t-calculated -1.719 is less than t tabulated 2. 71, at 10% level of probability.

Number of times CFs are produced yearly (X_7) and number of male and female brood-stock used (X_8) are positively related to quantity of CFP and statistically significant at 1% level of probability with 0.166 and 0.043 values respectively.

Table 2: Multiple regression estimates of the factors affecting the quantity of catfish fingerlings production.

Variable	Exponential Form	Double-log Form	Linear Form	Semi-log Form
Intercept	9.625	7.313	-51831.127	-493686.550
	(37.891)***	(21.257)***	(-2.055)**	(-7.592)***
Age(X_1)	0.003	0.240	1588.856	91252.052
	(0.764)	(2.178)**	(4.281)***	(4.379)***
Household	-0.017	-0.096	-1438.512	-9389.717
Size(X_2)	(-1.719)*	(-2.075)**	(-1.424)	(-1.076)
Production	0.021	0.055	159.153	-6627.023
Experience(X_3)	(1.926)*	(1.291)	(0.147)	(-0.821)
Education (X_4)	0.038	0.099	1677.965	4597.093
	(1.653)	(1.361)	(0.727)	(0.335)
Religion(X_5)	0.122	0.030	2419.910	-2555.693
	(1.103)	(0.439)	(0.219)	(-0.196)
Gender(X_6)	0.038	0.021	2136.844	2875.322
	(0.682)	(0.512)	(0.389)	(0.369)
Number of times fingerlings are produced yearly(X_7)	0.166	-0.033	-4149.654	-65251.814
	(4.025)***	(-0.292)	(-1.012)	(-3.074)***
Number of male & female brood-stock used(X_8)	0.043	1.132	5553.727	127848.998
	(8.597)***	(13.009)***	(11.163)***	(7.774)***
Number of pond(X_9)	-0.003	-0.056	395.732	1449.596
	(-0.097)	(-0.564)	(0.113)	(0.078)
R^2	0.951	0.973	0.967	0.934
F-value	75.988***	139.705***	115.036***	55.124***

xxx Significant at the 1% level
xx Significant at the 5% level
x Significant at the 10% level
Values in parenthesis are t-values

Constraints encountered in catfish fingerling production

The result in Figure 1 showed that 91.1% of the respondents indicated that high cost of pond as a major constraint. Other problems include; low quality brood-stock (88.9%), price fluctuation, difficulty in land acquisition and difficulty in acquiring loans.

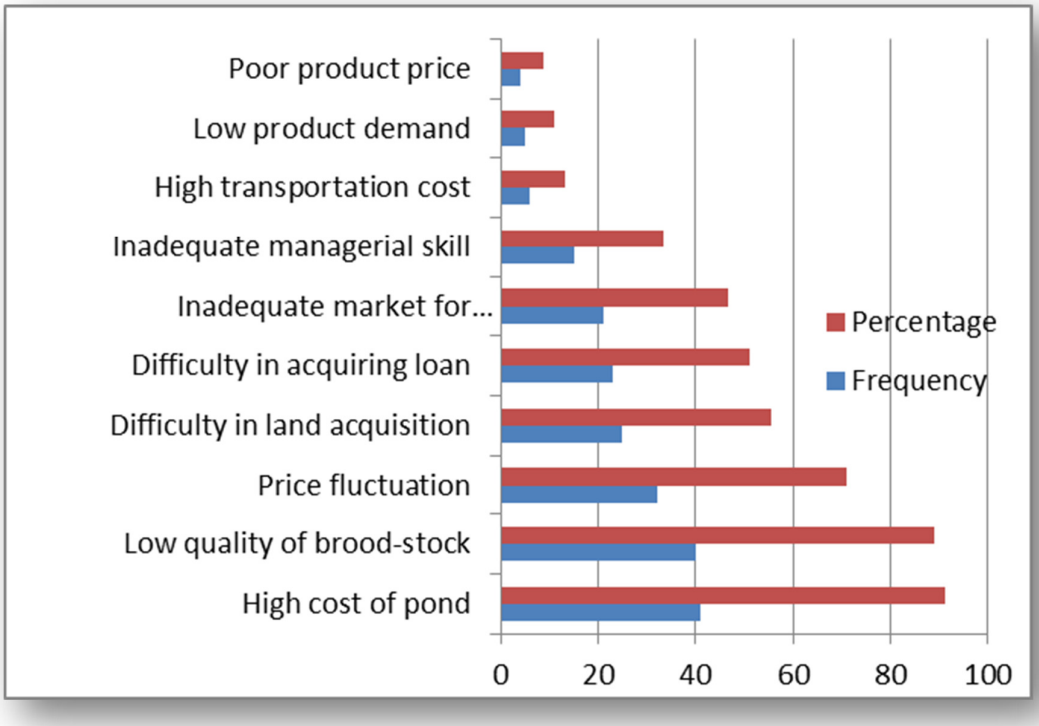

Figure 1: Constraints encountered in Catfish fingerlings Production

CONCLUSION/RECOMMENDATIONS

Both male and female brood-stock was required for catfish fingering production. The amounts required for male and female brook-stock are ₦2034 and ₦1326 respectively. The brood stock was sold in addition to the fingerlings produced. Among the determinants of the

quantity of fingerlings produced, age (X_1) and experience (X3) were significant at 1% level of probability. Catfish fingerling production was profitable in the study area. The main constraints encountered were high cost of pond and low quality brood-stock.

Farmers should be encouraged to invest in the production of catfish fingerlings because it has potentials of increasing income. Catfish fingerlings producers require easy access to credit in order to solve the problem of inadequate finance. Catfish fingerlings producers should be encouraged to form cooperative groups in other to acquire modern equipment, credit facilities and to take advantage of economies of scale which will reduce labor cost and enhance their revenue base.

REFERENCES

Canon, C. U. (2015): Fish farming for the young entrepreneur, Crown Publishers Owerri Imo state.

Central Bank of Nigeria (2008): "Annual report and statement of account; CBN Publications, Abuja."

FAO, (2006) Food and Agricultural Organization of the United Nations Mass Production of Fry and fingerlings of the African catfish. www.Fao.org/docrep/field/003/ac381e/Ac38Eoo.htm

FAO (2012) Food and Agricultural Organization of the United Nations Supplement part presented at the workshop and exchange views in fiscal reforms for fisheries. To promote growth, poverty eradication and Sustainable management, Rome, Fisheries report No5: pp841-854.

Federal Department of Fisheries (2008): "Annual report of the aquaculture and Fisheries sector", A paper work presented at the Monthly Technology Review Meeting (MTRM) Of Anambra state agriculture Development Programme @ Awka.

Federal Department of Fisheries (2016).Nigeria Fishery Statistics. Summary Report. Https://www.fcwc-fish.org\901-Nigeria. (Accessed October 28, 2017)

Gupta, S.K and P.C Gupta (2013): General and applied Ichthyology, (fish and Fisheries) S-Chand and company ltd Ram Nagar, New Delhi, India.

Microsoft Corporation (2007). Logical break down of geometrical and population density distribution in Nigeria; *Microsoft Encarta premium suite 2014*(Latest Software); accesses 28 February, 2016).

National Bureau of Statistics (NBS) (2007). National Bureau of statistics Official Gazette (FGP 71/52007/2,500(OL24): Legal Notice on Publication of the Details of the breakdown of the National and State Provisional Totals, 2006 Census. www.nigerianstat.gov.ng (acessed28 February, 2016).

Njoku, D. C. (2008): The Ecology of Nigerian Fishes. Contacom communications Ltd, Owerri, Imo State.

Owolabi, O.O (2009):" Wildlife Conservation to meat protein consumption in the Rural communities in South western Nigerian", Proceedings of the 29th Annual Conference Nigerian Society for Annual Production (NSAP) May 21- 27, Akure.

Robonski, L.P. (2013): Hidden truths about catfish business. www.nairaland.com/1240657/hidden truth catfish business.