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Profitability Level of Fish Farming In Ife-Ijesa Agricultural Development Programme, Osun State, Nigeria

BAMIGBOYE, OA; AKANNI, FO; ORIPELAYE, OS; OSAZUWA, DK; BAMGBOYE, AM; FADOYIN, AS; AGBOJE, I; BAKPOLOR, VR; LAWAL, MO; HAASTRUP, NO; ADELEYE, OA

Forestry Research Institute of Nigeria, P. O. Box 5054, Jericho Hill, Ibadan, Nigeria

**Corresponding Author Email: bobnath2013@gmail.com*
**ORCID: https://orcid.org/0000-0002-3835-7078*
**Tel: +2348065567335*

Co-Authors Email: bamigboyeadeola27@gmail.com, bunmioripelaye@gmail.com, osazuwadoreen@gmail.com, adetanmiss@gmail.com, olamidefunmilola6@gmail.com, agbojeivie@gmail.com, vanessabakpolor@gmail.com, fadoyinadetoyese@gmail.com, oladokunlawalmbasiru@yahoo.com, adebola786@gmail.com

ABSTRACT: The objective of this paper is to estimate the profitability level of fish farmers in Ife-ijesa zone of Osun State Agricultural Development Programme (OSADEP), Nigeria using standard procedures of structured questionnaires administered to 100 respondents that were randomly selected. The study revealed that fish farming in the Area was male dominated with 89%. For the respondents using earthen 41.3% were range between50-60% and 31.6% of the respondents using concrete were within the range of 50-60years. 70.3% of the respondents using concrete were married and 56.6% of the respondents using earthen were married. 40.5% of the respondents using concrete had tertiary education and 45.2% of the respondents using earthen had tertiary education. 95.7% of the respondents using earthen operate by self-savings and 98.1% of the respondents using concrete also operate by self-saving and the average pond size used was 0.5 hectares. Findings also showed that the estimated average fixed cost and variable cost incurred for all fish farmers were ₦109.296.43 for the respondents using concrete and ₦173,473.38 for the respondents using earthen, while gross margin and average farm profit were ₦108, 718,43 for the respondents using concrete and ₦172,734.88 for the respondents using earthen per annum respectively.

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Various definitions of agriculture include the preparation of soil, feeding, and tending to livestock and crops for human use. (Oladebo, *et al* 2008). The primary activities in agriculture are crop production and livestock rearing. These activities encompass all aspects of soil cultivation, crop production, and livestock production, from soil preparation to plant and animal product distribution and marking. The production of plants and animals useful to humans. Using horticulture in agricultural product marketing, providing farmers with access to research output, and selling agricultural input forestry. (Akanbi *et al*, 2008). According to Singh *et al*. (2006), aquaculture is a significant and promising economic industry in Tripure State. The biological potential for growth in freshwater aquaculture in the state is still far from

**Corresponding Author Email: bobnath2013@gmail.com*
**ORCID: https://orcid.org/0000-0002-3835-7078*
**Tel: +2348065567335*

reaching its limit, and faster development is needed to keep up with the state's growing fish demand. According to Bekibele *et al*. (2007), the financial advantages in boosting food production and self-sufficiency are extensively explored, making farmers self-reliant and employed for the majority of the year, setting it apart from all other farming systems. Nigerians who do fish farming on a small scale do it in freshwater ponds. It's getting more and more common for people to cultivate their own edible fish. Osun state's domestic fish farming is also distinguished by a high degree of application of advanced technologies. It significantly and favorably affects the local homestead fish producers' productivity (Oladeji, 2009). Inoni (2010) reviewed that fish farmers were not only Inefficient in the allocation of productive resources, over utilized feed, fingerling, fixed cost, and labour with an allocative efficiency index of 0.0025 0.00064-0.00017, and 0.00025 respectively the farm had a total a total water surface area of 101.15 hectares, pond size, feed, fingerlings and were labour were significant determination of output in pond fish production. An estimated 1.55 million tonnes of fish are needed to meet the demand; of that amount, 511,000 tonnes are met by domestic production, with the remaining 560.00 tonnes coming from importers, according to government figures. According to the Presidential Form (2005), this was valued at 30 billion dollars (US $400 million) in 2002. A proper agricultural system is required to accommodate this growing demand and to make the most use of the limited resources that are available while minimizing waste. Since farming was brought to the nation a few years ago, integrated fish farming has offered optimism since it can combine the production of fish, cattle, and crops. (Akinrotimi *et al*, 2007). Fish supply has been one of the problems intimidating against adequate fish consumption hence reduced intake of amount protein, fish being highly perishable after harvest require proper preservation and storage to increase the stuff life (Battese *et al*, *1995*). Sanusi *et al* (2004) production can be defined as the technical transformation of input into output. In agriculture we usually deal with physical inputs such as land labour, capital and entrepreneurship. Kareem *et al*. (2009) observed that the fixed cost of fish is 18.338 per year and the variable lost is 459.700 per year, accounting for the largest amount of the total, a profit of 43.289 per month, analysis was performed to assist any risk(s) that associated with unfavorable change in government policy with particular reference to monetary policy

MATERIALS AND METHODS

Study area: The study area is Ife-Ijesha ADP zone. There are three ADP zone in Osun State and they are differently located. They are Ife-Ijesha; Iwo and Osogbo ADP Zones. Ife-ljesha zone is made up often Local Government Areas; at Ilesha we have Ilesha West: Ilesha east, Atakunmonsa West; Atakunmonsa East; Obokun and Oriade. Also, at lie-central we have Ife East area office at modakeke; Ife North, lie south and Ife East. Ife-ljesha zone falls on latitude *T30*°to the North and *8*°to the south. It is marked by latitude *4° 30(>* to the west and longitude *5*° to the east. The Rain fall distribution is about 29mn to 30mn while the relative humidity is recorded as 85.5% meanwhile, the main annual temperature is 31.92° and 49.1 r C (Wheather Data File, 2010).The two vegetation regions that are predominant in the state are the rainforest, which is mostly found in Ife/Ijesha zone (Southern sector and the forest, savanna/masaic (derived savannah) among in Iwo and Osogbo zone, the major occupation of people in the zone is farming.

Data Collection: Primary data were collected through the administration of well structural questionnaire will be used as instruments for data collection during the research. The information that were collected includes socio-economic characteristics e.g age, educational, level, experience, family, profitability level e.g labour type, fixed cost e.g cost of land, building cost etc. Variable cost e.g fingerlings fertilizers etc.

Population, sampling procedure and Sample size: In the-study, the total number of registered fish farmers is 143. Multi stage random sampling was employed in data collection because the study is A DP /one in Ife-ljesha down to the local government and back to the fish farmers where the farmers were selected randomly, Also the total population of the registered farmers will be divided into four stages

Stage 1: We have Ife East areas office, Ife North, Ife central Office which the total number of registered fish farmers in stage one is (26). *Stage 2:* We have Ilesha West, Ilesha West, Ilesha East and Obokun were the total number of registered fish farmers in stage two is (45)

Stage 3: Here, we have Atakumosa West, Atakunmosa East and Ife East which the total number of the registered fish farmers in stage three is (17). *Stage 4:* In this stage we have Oriade which the total number of the registered fish farmers in stage four (12). Multi stage sampling with was used because the study was from ADP zone in Ife Ijesha down to the local government and useful for the study is (100).

Method of Data Analysis: The data for this study was analyzed using descriptive statistics, Gross magin principle and regression analysis. The descriptive statistics was used to analyze the socio-economic characteristics of the respondents and problem

confronting fish farmers. The gross-margin analysis was used to analyze the cost and return

Gross margin: Gross margin was used to analyze the cost and return from fish production to generate profitability level of the farmer and are presented in equations 1, 2 and 3.

$$GM = TR - TVC \quad (1)$$
$$\pi = GM - TFC \quad (2)$$
$$TR = pxq \quad (3)$$

Where GM = Gross margin; TR = Total revenue; TVC = Total Variable Cost; TFC = Total fixed Cost; π = Profit; P = Price and Q = Quantity

Measurement of variables: In the study two variables were used dependent and independent variables. The dependent variable is the total fish output in kilogram (kg) and independent variables are input of labour (mandayss). Number of fingerlings (kilograms) and fish pond size (hectares) feed in kilogram. Table 1 showed that 89 of the respondents were male constituting 80% of the entire population, while the numbers of female respondents were 19 constituting 20%. This showed that male was more involved in fish farming than female in the study area and due to the strength of male fish farming production would be boosted. This is in line with the findings carried out by Samuel (2002) Aquaculture development in Africa, training and Reference manual humberside international fisheries institution.

Table 1: Distribution of respondents by sex

Sex	Frequency	Percentage
Male	89	89
Female	12	12
Total	100	100

Source: Field Survey, 2011

Distribution of Respondents by Age: Table 2, presented the results based on age of the fish farmers, The respondents within the age 30-40 years using concrete were 13.1% while the respondents using earthen were 7.6% , those within the range of 41-50 were 28.2% for the respondents using concrete and 22.6% for the respondent using earthen, those within 51-60years were 41.3% for the respondents using concrete and 39.6% for the respondents using earthen, those within 61-70 year were 13.1% for the respondents using concrete and 15.1% for the respondents using earthen and those within 71-80 years using concrete were 4.3% and those using earthen were 15.1% those one with highest proportion were between 71-80 years who were involved in aquaculture the means age of entire respondents using concrete was 9.4 and also for the mean age of the respondent using earthen was 10.6 which revealed that majority of the respondent were in the middle age. This implies that majority of the fish farmers in the study area were in their active age which increases the productivity level; this is not consistent with finding reported by Afolami (2001) with his mean age to be 42 years.

Distribution of Respondents by Marital Status: The table shows that 10.6% of the respondents using concrete earthen were single while 18.8% of the respondents using concrete were also single 70.3% of the respondents using concrete were married while 56.6% of the respondent using concrete were widower) while 15.1%of the respondent using earthen were widow (or) just 2.1% of the respondent were spirited while 9.5% using earthen were separated. This showed that married people were majorly involved in fish farming this implies that expenses on incurred or rented labour would be reduced because the production is usually supported by family labour; therefore, they have family labour to help no farm, it supports the findings by Yomi, (2002).

Distribution of Respondents by Religion: The table 4 showed that 63.8% of the respondents using concrete were Christian to,25.9% of the respondent using concrete were Muslim, while 26.4%of the respondents using earthen were also Muslim and just 10.6% of the respondent using concrete were traditionalist. And just 5.7% of the respondent using earthen to were traditionalist this Implies that Christians are more engaged in fish farming production and others.

Distribution of respondents by household size: Table 5 showed that the respondents with the range of household size from 1-5 were 82.2%using concrete and those using earthen were 87.2%, those that range from 6-10 were 13.3% using concrete and those that were using earthen were 5.5% and while those that range from 11-15 were 4.5% using concrete and just 7.3% were using earthen. This revealed that most of the respondents had a household size that is from 1-5 which as a result is to help them in fish farming production and reduce lost of labour. The mean of the household size of people using concrete is 15 while the mean of the household size of those using earthen is 18.4 which inculcate that the size is more than the arrearage family size. This result is consistent with findings reported by (*Idiong* 2007).

Distribution of the Respondents by Level of Education: Table 6 showed that 27.6% of the respondents had no formal education were using concrete and also 22.6% of the respondents were using earthen,12.7% had primary education for those that were using concrete

and 3.8% for those that were using earthen, 40.5%had ternary education for those that were using concrete and just 45.2% for those that were using earthen,4.3% had adult literacy education for people that were using concrete and 9.4%for fish farmer that were using earthen, and just 8.5%had technical education for those that were using concrete and 11.4% for those were using earthen. The highest class had ternary education. This implied that government need to spend much time exposing the farmers to more advanced method of fish farming.

Table 2: Distribution of respondent's by age

Age	Frequency Concrete	Parentage	Cumulative parentage	Frequency Earthen	Percentage	Cumulative percentage
30-40	6	13-1	21.3	4	7.6	10.5
41-50	13	28.2	10.5	12	22.6	21.3
51-60	19	41.3	35.5	21	39.6	35.5
61-70	6	13.1	18.0	8	15.1	16.0
71-80	2	4.3	14.7	8	15.1	16.0
Mean	52			50		
Total	47	100	100	53	100	100

Source: Field survey, 2011.

Table 3: Distribution of respondent's by marital status

Marital status	Frequency Concrete	Parentage	Cumulative parentage	Frequency Earthen	Percentage	Cumulative percentage
Single	5	10.6	17.4	10	18.8	15.1
Married	33	70.3	41.3	30	56.6	39.6
Widow(er)	8	17.0	28.2	8	15.1	30.2
Separated	1	2.1	13.1	5	9.5	7.6
Total	47	100	100	53	100	100

Source: Field survey, 2011.

Table 4: Distribution of respondent's by Religion

Religion	Frequency Concrete	Parentage	Cumulative parentage	Frequency Earthen	Percentage	Cumulative percentage
Christianity	30	63.8	50.3	36	67.9	41.8
Islam	12	25.6	39.0	14	26.4	30.2
Traditional	5	10.6	10.7	3	5.7	28.0
Total	47	100	100	53	100	100

Source: Field Survey, 2011

Table 5: Distribution of respondent's by household size

Household size	Frequency Concrete	Parentage	Cumulative parentage	Frequency Earthen	Percentage	Cumulative percentage
1-5	37	82.2	37.7	48	87.2	48.7
6-10	6	13.3	32.3	3	5.5	21.3
11-15	2	4,5	30.0	40	7.3	20.0
Mean	15			18.4		
Total	45	100	100	55	100	100

Source: Field Survey, 2011.

Table 6: Distribution of the respondent's by level of Education

Level of Education	Frequency Concrete	Percentage	Cumulative parentage	Frequency Earthen	Percentage	Cumulative percentage
No formal education	13	27.6	28.2	12	22.6	22.6
Primary education	6	12.7	13.1	2	3.8	15.1
Secondary education	3	6.4	6.55	4	7.6	7.6
Tertiary education	19	40.5	41.3	24	45.2	39.6
Adult literacy education	2	4.3	4.3	5	9.4	5.0
Technical education	4	8.5	6.55	6	11.4	10.0
Total	47	100	100	53	100	100

Source: Field Survey, 2011.

Distribution of respondents by fish enclosure in use: Table 7 showed that 47% of the respondents used concrete fish pond while 53% used earthen fish pond. This indicated that cost of pond construction would be affordable.

Table 7: Distribution of respondents by fish enclosure in use

Fish enclosure in use	Frequency	Percentage
Concrete pond	47	47
Earthen pond	53	53
Total	100	100

Source: Field survey, 2011.

Distribution of Respondents by Source of Credit: Table 8 revealed that the respondents that operate in obtaining credit were 95.7% of the self- savings for concrete and for fish farmers using earthen were 98.1% and 4.3% of friends and relatives for concrete and for earthen for 1.9% of friends and relatives, while co-operations society commercial banks, money lenders; non-government organization and others were not involved. This implies that there will be low productivity since self-saving incomes serves has a source of credit used in financial of production.

Costs and Return of the Fish Farmers in the Study Area: Fixed cost: Table 9 showed the amount of capital invested on land as 72453.3, for fish farmers using concreted, also for those using earthen the amount of capital investment on land were 120925, for pond construction. It was 36843.13, for people using concrete pond for also for people using earthen pond it was 52548.38, while hooks and sinks and other were not involved in production. This showed that capital was invested on pond construction by the respondents in the study area and the total fixed cost for concrete fish pond was 109,296.43 while the total fixed cost for earthen fish pond was 173,473.38.

Variable Cost: Table 10 revealed the amount spent on each items needed in production by the respondent and they are follows: fingerings 387750, feed 144500, fertilizer 7300, time 5300, transportation 69700 and maintenance was 83700.this is for the fish farmer using concrete fish pond and for those using earthen fingerlings 870800, feed 260050, fertilizer 6900, lime 3600, Transport 58600, maintenance 129300. This revealed much fund (capital) is invested in purchasing fingerlings, in order to meet fish demand by the consumer and maximize production. However, feed was the one who affricated the greatest amount of capital in order to carry on production.

Table 8: Distribution of Respondents by source of credit

Source of credit	Frequency create	Percentage	Cumulative percentage	Frequency earthen	Percentage	Cumulative percentage
Personal saving	45	95.7	78.9	52	98.1	88.1
Friends & relative	2	4.3	21.1	1	1.9	11.9
Co-operative	0	0	0	0	0	0
Commercial bank	0	0	0	0	0	0
Money lender	0	0	0	0	0	0
Non-Governmental organization	0	0	0	0	0	0
Others						
Total	47	100	100	53	100	100

Source: Field Survey, 2011

Table 9: Distribution of Respondents by their fixed cost

Fixed items	Cost (s) for concrete	Useful life (yrs)	Deprecatio n	Cost (s) N for earthen	Useful life (yrs)	Depreciation
Land	5434000	71	72453.3	7255500	60	120925
The pond	1879000	51	36843.13	1629000	31	52548.38
Hooks and sinks	0	0	0	0	0	0
Others	0	0	0	0	0	0
			TFC = 109,296.43			TFC = 173,473.38

Source: Field Survey, 2011

Table 10: Variable Cost

Variable items	Cost concrete	Percentage	Cost earthen	Percentage
Fingerlings	387750	55.6	870800	65.5
Feed	144500	20.7	260050	19.5
Fertilizer	7300	1.05	6900	0.52
Lime	5300	0.76	3600	0.27
Transportation	69700	9.99	58600	4.41
Maintenance	83700	11.9	12 9300	9.8
Total	TVC=698250	100	TVC=1329250	100

Source: Field Survey, 2011.

Yearly Output of Fish Farmers: Table 11 showed the different range of output of fishing of different respondents in which they are as follows: the respondents which has an output that range from 1000-1500 was 8.5%for concrete and for earthen 3.8% those ranging from 1501-2000 were2.1%for concrete and for earthen 1.9%,those ranging from 2001-250 were 4.2% for concrete and1.9% for earthen, those ranging

from3501-3500 were 8.6%and 5.7% for earthen those ranging from 3501-4000 were 10.7% for concrete and also 3.8%for earthen those ranging from 4001-4500 were 14.9%for concrete and for earthen 18.9% those ranging from 4501-500 were2.1% and 3.8%for earthen, those ranging from 5001-5500 were 6.4%and 9.5% for earthen, those ranging from 5501-6000 were 2.1% for concrete and 7.5%for earthen those ranging, those ranging from 6001-6500 were 12.8%and 13.2% for earthen, those ranging from 6501-7000 were 14.8% and 16,9%for earthen and those ranging from 7001-7500 were 2.1 for concrete and 11.3% for earthen. the majority of the respondent fells within the range of 501-4000kg for concrete and for earthen majority fells within the range of 4501-5000kg, while the mean output for concrete was 3627 and for earthen 4077kg which implies that the supply is too low because of the alarming demand rate. This is in support of the work carried out by Kudi and Atala (2002) cost and return analysis of unregulated of maize production in Zaria local government area of Kaduna State.

Table 11: Yearly output of Fish Farmers

Output (kg)	Frequency for concrete	Percentage	Frequency for earthen	Percentage
1000-150014	4	8.5	2	3.8
1501-200	1	2.1	1	1.9
2001-2500	2	4.2	1	1.9
2501-3000	5	10.7	1	1.9
3001.3500	4	8.6	3	5.7
3501-4000	5	10.7	2	3.8
4001-4500	7	14.9	10	18.9
4501-5000	1	2.1	2	3.8
5001-5500	3	6.4	5	9.5
5501-6000	1	2.1	4	7.6
6001-6500	6	12.8	7	13.2
6001-7000	7	14.8	9	16.9
7001-7000	1	2.1	6	11.3
Mean	3627kg		4077kg	
Total	47	100	53	100

Source: Field Survey, 2011.

Gross Margin Analysis: Table 12 showed that the total variable cost TVC for concrete was ₦698.250 and TVC for earthen was ₦1329250, the total fixed cost for concrete was ₦109, 269.43 and TVC ₦173, 473.35 for earthen, total revenue TR for concrete was ₦55100 and TR for earthen was ₦73850, gross margin for concrete was ₦54169.43 and the gross margin for earthen was ₦99623.38, while the profit for concrete was ₦55100 and profit was uncreative and it be invested and embarked on

Given: total fixed cost=TFC
Total variable cost =TVC
Total Revenue TR =(Pxq)
Price =p. quantity =q
Gross margin gm =TR- TFC

Table 12: Gross Margin Principle

TFC for concrete	109,269.43
TFC for earthen	173,473.38
TVC for concrete	698250
TVC for earthen	1329250
TR for Concrete	55100
TR for earthen	73850

Source: Field Survey, 2011

Constraint: Table 13 showed that 60% of the respondents were faced with the problem of theft, 5% with pollution, 10%with fiancé and 25% of with flooding. This clearly indicate that stealing was the major problem faced by the fish farmers and for increased production, adequate security needs to be put in place**.**

Table 13: Problems

Problems	Frequency	Percentage
Theft	60	60
Pollution	5	5
Finance	10	10
Flooding	25	25
Total	100	100

Source; Computer Print-out of Field Survey, 2011

Conclusion: Fish farming is profitable in the research area, according to the analysis conducted for the project. The outcome showed that resources were not being used effectively. The fish farmers had to deal with a number of issues, including flooding, theft, and a shortage of government loans.

Declaration of Conflict of Interest: The authors declare no conflict of interest

Data Availability Statement: Data are available upon request from the first author or corresponding author.

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