

FACTORS THAT INFLUENCE ADOPTION OF POND FISH PRODUCTION TECHNOLOGIES BY FARMERS IN IMO STATE, NIGERIA

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ABSTRACT

The study analyzed the influence of some selected factors on the adoption of pond fishery technologies by farmers in Imo State, Nigeria. Multi-stage random sampling technique was used in selecting the samples. The sample size was eighty (80) pond fish farmers. Data were collected through a structured questionnaire. Descriptive statistics such as mean scores, frequency and percentages were used to summarize data. The result showed that the grand mean for overall high influence of the tested factors was 4.2 which included source of water, availability of preferred fingerlings, complexity of the technology, interest rate on loan, availability of fish feed and other inputs, cost of construction and preparation of pond, general cost of fish production, availability of basic amenities, marketing of the fish, profitability, labour availability and general maintenance of pond fishery technologies. Inadequate land space and high cost of feeds and fingerlings were the determining factors of the size of fish farm, the number of ponds a fish farmer could own and the production level of farm. Feeds have been estimated to account for about 60 – 80% of total cost of production of fish depending on species and environment. Other serious factors that influenced the adoption of pond fishery technologies as perceived by the farmers include, complexity of the technology, availability of fish feed, cost of construction and preparation of pond and profitability of fish production. The study therefore recommended that more awareness should be created among the fish farmers about the fisheries technologies. Also, the cost of feeds and fingerlings should be subsidized by the Government to make them affordable by the farmers. Farm credit should be made available to the farmers to raise their capital base such that they can have the financial capacity to adopt and implement fishery technologies.

Keywords: Adoption, Pond Fish Production Technologies, Some Selected Factors, Imo State.

INTRODUCTION

The role of fish farming in achieving household and national food security and poverty alleviation in Nigeria cannot be over emphasized. Fish farming, an artificial method of raising fish for human consumption, is an ancient practice that can still provide profitable means of livelihood for both rural and urban dwellers (Nwaneri., 2015). Otubusin (1987) defined fish farming as a practice of raising fish in an enclosed body of water such as ponds which can be concrete or earthen ponds that houses fish in such away that they cannot escape and at the same time allow for feeding, growth, breeding and harvesting in a well planned way. Fish farming was also defined by Ajieh (2010) as the act of rearing fish in enclosed water body under controlled conditions that aid their growth for human consumption. It is an important source of animal protein for a wider section of Nigeria society, creates employment opportunities and is an important source of income and foreign exchange. It is rich in vitamins and important dietary trace elements such as zinc, fluorine, selenium, phosphorus and amino acids and has high biological value (Campbell, Kenealy and Campbell, 2003). Fish in many ways is even more nutritious than most meat and warm-blooded animals. A well balanced diet from fish and shell fish products prevent an over production of hormones like eicosanoids from essential

fatty acids which can result in diseases as arteriosclerosis, thrombosis, arthritis and asthma. Fish is rich in polyunsaturated fatty acid which keeps blood cholesterol levels low and reduces the risk of coronary heart diseases. Another favourable aspect of fish and other aquatic animal compared with land animals is that they have a higher percentage of edible flesh hence there is little wastage. Access to accurate and adequate information on pond fishery technologies by farmers is essential for increased fish production. Such information must come from credible sources, at the right time, and for the farmers to adopt them correctly.

According to Nwaneri (2015), some of the constraints to increased fish production in Nigeria include inadequate fingerlings production, lack of earth-moving equipment, the high cost of fish feeds, low capital investment, and non-adoption of improved production and processing technologies by most fish farmers. The purpose of this study was to analyze the influence of some selected factors on the adoption of pond fishery technologies. The specific objectives were to: describe the socio-economic characteristics of fish farmers in the area; identify the sources of fisheries technology information to the farmers; analyze the farmers' perceived extent of influence of some selected factors

on their adoption of pond fishery technologies in the study area.

METHODOLOGY

Study Area Description

Imo State is one of the 36 states in Nigeria located in the South Eastern part of the country. The land area of the state is estimated at 5,100.1 square km. The state lies within Latitude $4^{\circ} 45^1$ and $7^{\circ} 15^1$ North of the equator and Longitude $6^{\circ} 5^1$ and $7^{\circ} 25^1$ East of the Greenwich meridian. Apart from Imo River and Oguta Lake, the state is blessed with many inland waters such as the Igwu, Otamiri, Nworie, OramiriUkwa, Ogachi and OnukwuNjaba Rivers. The population of the state stood at 3,934,899 (NPC,2006). Generally, about 80 percent of the people engage in Agriculture. Extension services are fully funded by the state under the Agricultural Development Project (ADP).The state is divided into three agricultural zones, namely Owerri, Orlu and Okigwe zones. The zones are further broken down into blocks. A block is an agricultural area covering a specified number of villages and supervised by extension agents. Again, each block is further divided into circles or cells. Each block contains eight circles. A circle is an agricultural area containing a number of farm families. Thus, the Owerri zone has 18 blocks and 139 circles, Orlu zone has 10 blocks and 107 circles and Okigwe zone has 10 blocks and 80 circles.

In all, Imo state is made up of 38 blocks and 326 circles.

Sample Size and Data Analysis.

A multi-stage sampling procedure was adopted in the selection of blocks, circles and fish farmers. Total of eight blocks were randomly selected, four blocks from Owerri and two each from Orlu and Okigwe zones. Two circles were randomly selected from each block while five contact fish farmers were selected randomly from each circle giving a total of 80 respondents. A structured questionnaire was used in soliciting information from the farmers. Objectives (i), (ii) and (iii) were realized with descriptive statistics such as means, percentages and frequency distribution. Mean scores from a five (5) point Likert type scale was used to determine the magnitude of response on the perceived extent of influence of some selected factors on adoption of pond fishery technologies (objective iv). The mean cut-off point was arrived at by finding the mean of the nominal likert scores. The mean adoption level was determined thus:
$$\bar{X}_s = \frac{\sum X}{n}$$
 \bar{X}_s of each was computed by multiplying the frequency of each response pattern with its appropriate nominal value and dividing the sum with the number of respondents to the items.

This is summarized with the equation below:

$$\overline{X}_s = \sum f/n/nr$$

Where: \overline{X}_s = mean score

\sum = summation

F = frequency

n = Likert nominal value

nr = Number of respondents

$$\overline{X}_s = \frac{1+2+3+4+5}{5} = 15/5 = 3.0$$

The cut-off mean was 3.0. Therefore farmers responses with mean scores of 3.0 and above were accepted and rejected if otherwise.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Pond Fish Farmers.

Table1 shows the percentage and mean distribution of respondents' socio-economic characteristics. The mean age of the farmers was 40 years. This shows that most of the pond fish farmers in the area were middle-aged. Age is usually considered to be a primary latent characteristic in adoption decisions (Agbamu and Ohorhoro, 2007). The majority (73%) of the pond fish farmers were males while 28% were females. Most (91%) of the pond fish farmers were married. Thus, according to Nwaneri, Ibezim and Nwaneri; (2013), getting married is a highly cherished value among rural dwellers in Nigeria, not only because of the need for children and the

continuation of the family but also, because the women and children form a ready source of unpaid labour. The table also shows that 42.5% of them had post primary education. It is widely believed that education creates a favourable mental attitude for acceptance of new ideas and practices. It enables a farmer to seek for and utilize useful information from both print and electronic media, thereby accelerating the rate of adoption of technologies (Ozor and Madukwe, 2005; Agbamu and Ohorhoro, 2007). The mean household size of the farmers was seven. According to Iwueke (1987) and Nwaneri (2015), household size of seven is large. Large size of household might compel decisions to adopting good technologies to be able to provide adequate food for all members. The mean score for farming experience of the pond fish farmers was 14 years. Experience is important for effective day-to-day running of farm enterprise and could influence positively the adoption of innovations (Nwaneri, *et al.*, 2013). The longer the years of farming experience, the more efficient a farmer is presumed to be. In other words, the experience gained all through the years in active farming will enable the farmer to make profitable decision and put him/her in a much better position to accept or reject innovation.

Table 1: Distribution of Pond Fish Farmers According to Socio-economic Characteristics in Imo State, Nigeria (N=80).

Characteristics	Frequency	Percentage
Age		
20 – 29	5	6.3
30 – 39	35	43.7
40 – 49	28	35.0
50 – 59	9	11.3
60 – 69	3	3.7
Mean age	40	
Gender		
Male	58	72.5
Female	22	27.5
Educational level		
No Formal Education	4	5.0
Primary education	15	18.7
Secondary level	34	42.5
Tertiary education	27	33.8
Household Size		
1 – 4	13	16.2
5 – 8	51	63.8
9 – 12	12	15.0
13 – 16	4	5.0
Mean	7	
Marital status		
Widow	4	5.0
Single	3	3.8
Married	73	91.2
Farming experience (yrs)		
1 – 10	36	45.0
11 – 20	27	33.7
21 – 30	12	15.0
31 – 40	4	5.0

41 – 50	1	1.3
Mean	14	

Source: *Field survey, 2015*

Sources of Information Used by the Pond Fish Farmers

Table 2 shows the mean distribution of respondents according to their sources of information. Majority (72.5%) of the farmers received information from Agricultural Extension agents. However

37.5% of them got information from Radio, 22.5% others received information through interaction with fellow farmers. This findings revealed that Television Journals and Agricultural shows were not common channels in the dissemination of information to the pond fish farmers.

Table 2. Distribution of Pond Fish Farmers According to Sources of Information.

Source of information	Frequency *	Percentage (%)
Extension Agent	58	72.5
Fellow farmers	18	22.5
Radio	30	37.5
Television	10	1.2
Journals	2	2.5
Agricultural shows	2	2.5

Source: *Field survey, 2015*

* Multiple responses recorded

Pond Fishery Technologies Extended to Fish Farmers

Table 3 shows distribution of the pond fish production technologies extended to aquaculturists in Imo State. The table revealed that Pond site selection, pond maintenance and fish harvesting methods were rated 70%, and pond

preparation/construction were rated 80%. Other pond fishery technologies extended to them include fish stocking and method of transportation of fingerlings (56%), fish feeding (53%) and fish preservation (60%) are the pond fishery technologies accepted by the farmers as being available in the area.

Table 3 Distribution of Fish Farmers Perception Based on Pond Fish Production Technologies Extended in the area.

Pond Fishery Technologies	Yes (%)	No (%)
Pond site selection	56 (70.0)	24 (30.0)
Fish fertilization	3 (3.8)	77 (96.3)
Egg hatching	3 (3.8)	77 (96.3)
Pond preparation/ construction	64 (80.0)	16 (20.0)
Fish stocking	45 (56.3)	35 (43.8)
Transportation of fingerlings	45 (56.3)	35 (43.8)
Fish feeding	42 (52.5)	38 (47.5)
Pond maintenance	56 (70.0)	24 (30.0)
Fish harvest method	56 (70.0)	24 (30.0)
Fish preservation	48 (60.0)	32 (40.0)

Source: *Field survey data, 2015*

Values in Parentheses are percentages

Farmers Perceived Extent of Influence of Some Selected Factors on Their Adoption of Pond Fish Production Technologies.

Table 4 shows the factors perceived by farmers to influence their adoption of pond fishery technologies in the study area. The tested factors are source of water, availability of preferred fingerlings, complexity of the technology, interest rate on loan, availability of fish feed and other inputs, cost of construction and preparation of pond, general cost of fish production, availability of basic amenities, marketing of the fish, profitability, labour availability and general maintenance of pond.

These 15 selected factors were responsible for adoption of pond fish production

technologies by fish farmers in the study area as they all scored high (X score ≥ 3.0). For instance, inadequate land space and high cost of feeds and fingerlings could determine the size of fish farm, the number of ponds a fish farmer could own and the production level of farm. Feeds have been estimated to account for about 60 – 80% total cost of production of fish depending on species and environment (Adeparusi, 2005). According to Ofor and Okpara (2005) and Nwaneri (2015), the realization of full potentials of aquaculture in Nigeria has been limited by expensive fish feed. Similarly, Agbamu and Orhorhoro (2007) reported that inadequate fish production information and general cost of fish

production could decrease the rate of technology adoption among fish farmers. Other serious factors that influence the adoption of pond fish production technology as perceived by the farmers include,

complexity of the technology, availability of fish feed, cost of construction and preparation of pond and profitability of fish production.

Level of Influence of Factors That Might Influence Adoption of Pond Fish Production Technologies in Imo State (Threshold mean = 3.0).

Factors	Mean Score	Decision
Extent of inadequate fishery information influence on the adoption of technology	4.8 Influence	High
Extent of availability of source of water as hindrance to the adoption of technology	4.1 Influence	High
Extent of availability of preferred fingerlings as a problem to the adoption of technology	4.4 Influence	High
Extent that complexity of the technology influence the adoption of technology	4.4 Influence	High
Extent that your interest in fishery affect adoption of technology	3.9 Influence	High
Extent that availability of fish feed and other inputs affects acceptance of technology	4.8 Influence	High
Extent that cost of construction and preparation of pond for fish production affect the acceptance and adoption of technology.	4.8 Influence	High
Extent to which cost of fish feed affect the adoption of pond fishery technology.	4.9 Influence	High
Rating of the general cost of fish production.	3.9 Influence	High
Extent to which the cost of fish production affect the adoption of pond fishery technology.	4.4 Influence	High
Extent to which availability of basic amenities influence the adoption of the technology.	3.9 Influence	High
Extent to which marketing of the fish influence the	3.9	High

adoption of the technology.	Influence	
Extent to which the profitability affect the adoption of the technology.	4.0	High
	Influence	
Extent to which land space availability influence the adoption of the technology.	4.2	High
	Influence	
Extent to which pond maintenance influence the adoption of the technology.	3.1	High
	Influence	
	4.2	Overall High
Grand Mean	Influence	

Source: *Field survey data, 2015.*

CONCLUSION

The study analyzed the influence of some selected factors on the adoption of pond fish production technologies by farmers in Imo State, Nigeria. The result showed that the grand mean for overall high influence of the tested factors was 4.2. The factors include source of water, availability of preferred fingerlings, complexity of the technology, interest rate on loan, availability of fish feed and other inputs, cost of construction and preparation of pond, general cost of fish production, availability of basic amenities, marketing of the fish, profitability, labour availability and general maintenance of pond fish production technologies. The study therefore recommended that more awareness should be created among the fish farmers about the fisheries technologies, also, the cost of feeds and fingerlings should be subsidized by the Government to make them affordable by the farmers. Farm credit should be made available to the farmers to

raise their capital base such that they can have the financial capacity to adopt and implement production technologies.

REFERENCES

- Adeparusi, E.A, (2005), Growth Performance of Oreochromis Niloticus fed Diet in which Cooked Soybean Replaced fish Meal. Nigeria Journal of Animal Production 32(1 and 2):158 – 166.
- Agbamu, J.U and Ohorhoro, W.C (2007), Adoption of Aquaculture Management Techniques in Delta State. Journal of Research in Agriculture,3 (11): 35 – 40.
- Ajieh, P.C (2010), Adoption of Fishery Technologies by Fish Farmers in Akoko – Edo L.G.A, Edo State, Nigeria. Research Journal of

- Fisheries and Hydrobiology,5(2):137 – 143.
- Campbell, J.R, Kenealy, M.D. and Campbell, K.L (2003), Animal Sciences. The Biology, Care And Production of Domestic Animals; New York, McGraw-Hill Publishers, Pp8-9and 121.
- Iwueke C.C. (1987), “Farmer Related Factors Influencing the Adoption of Agricultural Innovation in Imo State, Unpublished Ph.D. Thesis, Dept of Agricultural Extension, university of Nigeria, Nsukka.
- National Population Commission (NPC) (2006), Population Census of Federal Republic of Nigeria. Analytical Report at National Level.
- Nwaneri, T.C, Ibezim, G.M.C and Nwaneri, J.A. (2013), Farmers Use of Information and Communication Technologies in Ivo L.G.A of Ebonyi State, Nigeria. Journal of Agriculture, Socio-economics and Sustainable Environment (JASSE)1(2):34 – 41.
- Nwaneri, T.C. (2015). Adoption of Pond Fishery Technologies by Farmers in Imo State, Nigeria. M.Sc. Dissertation; Dept of Agricultural Economics and Extension, Abia State University, Uturu.
- Ofor, C.O. and Okpara, D.A. (2005), Biomass and Seed Production of Twelve Soybean Varieties in Fish Pond in South Eastern Nigeria. The Nigeria Agricultural Journal 36:97 - 107
- Otunbunsin, S. (1987), “Aquaculture roles and potentials”. National Tribune, March 6, 1987.
- Ozor, N and Mduekwe, M.C.(2005): obstacles to the Adoption of Improved Rabbit Technologies by Small Scale Farmers in Nsukka L.G.A. J. Agric. Food ,Environment,Extension and Agric. Science 4(1):70-73 January 2005
- Salua, E.S, Lawee, A.Y, Levea, G.E. and Bello, D. (2014), Adoption of Improved Fisheries Technologies by Farmers in Southern Agricultural Zone of Nasarawa State, Nigeria. Journal of Agricultural Extension and Rural Development 6(11):339 – 346.