

## ASSESSING THE DETERMINANTS OF THE PUSH AND PULL FACTORS INFLUENCING PARTICIPATION IN FISH FARMING IN OSUN STATE, NIGERIA

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### Abstract

*The study determined and assessed the push and pull factors influencing participation of people in fish farming enterprise with a view to reducing fishpond abandonment in the State. Multistage and proportionate sampling procedure was employed to select 240 fish farmers from the three agricultural zones of the State. Data were collected with validated and structured interview schedule. The data were described with percentage, mean and standard deviation while inferences were drawn with factor and regression analyses. Results showed the mean age of the farmers to be  $48 \pm 9$  years. Majority were married with household size of  $6 \pm 3$  people. The farmers had good formal education. Out of the nine factors isolated to influence participation in fish farming, only three were identified to pull people into the enterprise while six pushed people away. It was then concluded that if the scenario should continue, the future of fish farming is bleak in the country and the cost of fish importation would continue to be on the high side.*

**Key words:** determinant, push and pull factors, participation, fish farmers

### INTRODUCTION

Nigeria being an agrarian society has great employment potential for the country's teeming population in fish farming due to friendly and fish farming sustainable environment. But despite these outstanding potentials (which ranges from fish breeding, fish production, processing and marketing of fish and fish products), there are quite a large number of unemployed individuals who do not see fish farming enterprise as a worthwhile means of livelihood. Fish farming is uniquely placed to reverse the declining supplies from captured fisheries and the activity has notable potentials for new livelihood opportunities, providing the mechanism for lower priced fish, enhanced nutritional security and employment for poor communities by servicing urban markets [15]. However, there are factors attracting (pull) and repelling (push) from this enterprise. [3] reported that despite the wide acceptance of fish farming as an income generating activity in Nigeria, its contributions to total domestic fish production has not been very encouraging. Today, aquaculture is the fastest growing livestock production sector in

Nigeria, with a growth of about 29% in 2006 alone, and with prospects of continued growth. This is because demand for fish is on the increase line with population growth, while catches from fisheries are on the decline, even globally [9]. Nigeria as the second largest aquaculture producer in Africa only produced 200,535 tonnes in 2010 [11]. There is huge gap between demand and production of fish in Nigeria, the gap was 0.22 million tonnes in 2012 [11]. In 2010 alone, for instance, Nigeria's fish demand stood at 2.66 million metric tons, and the country had to spend 100 billion naira on fish importation annually [18]. However, [8] reported reasons for slow growth in fish production in African countries as including; technical problems such as poor species, inadequate finance for fish farming, input and political and or economic instability. Some of these reasons may push individuals away from fish farming. Movement in and out of fish farming is very dynamic and the rate at which individuals are pulled and pushed from fish farming are part of an adjustment and restructuring in the farming industry which operates with different intensities at different times depending on a combination of

exogenous and endogenous pressures [7]. This distinctive pattern would rather likely depend on both the push and pull factors.

Nigeria is one of the largest importers of fish with a per capita consumption of 7.52 kg and a total consumption of 1.2million metric tonnes with imports making up about 2/3 of the total consumption. Aquaculture, the rearing of fish and other aquatic organisms, has high prospects in Nigeria. With a projected population of 139.1 million people in 2007, the fish demand is estimated at 1.06 metric tonnes, while supply stands at 0.81 metric tonnes leaving a deficit of 0.25 metric tonnes [10]. However, local fish production has been below consumption with imports accounting for about US\$ 48.8 million (₦7.8 billion) in 2002 [6]. The development of the fish industry will increase local production of fish and save much of the foreign exchange being used for fish importation. Specifically, fish farming has a special role of ensuring food security, alleviating poverty and provision of animal protein. Less than 50% of the total annual fish consumed by Nigerians are produced locally. There is, therefore, the need not only to maximize the exploitation of the nation's fishery resources but to concentrate more on the development of aquaculture which has the greatest potential to increase fish production for local consumption and export. Despite these opportunities, some individuals still abandon their fish farms for other enterprises. The question is, what are the factors pushing people away from this resource filled enterprise? What pulled them into it initially? Some researchers have been able to establish the prospects and challenges of fish farming as well as its profitability as an economic activity, such include; [4], [5] and [13]. Reports from literature contain abundant information on fish farming with little emphasis on push and pull factors influencing peoples' participation in the enterprise, hence the need for this study. In the light of the above, the study provides answer to the following research questions: What are the socio-economic characteristics of fish farmers? Why do people participate in fish farming? Why do people abandon fish farming? What

are the pull and push factors influencing fish farming?

### **Objectives of the study**

- (i) describe the socio-economic characteristics of the fish farmers in Osun State; and
- (ii) examine the push and pull factors influencing participation in fish farming.

## **MATERIALS AND METHODS**

### **Study area**

This study was carried out in Osun State of Nigeria. It is located in the South western region of the country and lies within coordinates 7°30'N, 4°30'E. The mean annual temperature ranges between 27.2<sup>0</sup>C in the month of June and 39.0<sup>0</sup>C in December. The rainfall ranges between 1,420 mm in the rainforest belt to 1,133 mm in the savanna. The vegetation allows for agricultural production which provides an enabling environment for the inhabitants' major occupation, which includes various agricultural activities. They are also involved in some non-farm activities.

### **Target population, sampling procedure and sample size.**

Fish farmers in Osun State were the target population for this study. A multistage and proportionate sampling procedure was adopted for the sample selection. At the first stage, 20per cent of the LGAs in each zone were selected. This was followed by proportionate selection of six LGAs from the zones. Four communities prominent with fish farming were purposively selected from each LGA. Finally, systematic sampling technique was used to select ten fish farmers from the list of fish farmers from each selected community. A total of 240 fish farmers were selected and interviewed for the study.

Reliable and thoroughly validated interview schedule was adopted for the study. Data collected were described with mean and standard deviation while factor analyses and regression were used to make inference.

### **Measurement of variables**

There are two major variables, dependent and the independent variables. Dependent variable was participation. This was measured on a five point Likert type of scale. This was scored

from 0 – 4 and a participation index was generated which was used to run against other independent variables.

Independent variables were measured either on a binary scale of yes or no or direct figures given by the respondents were used as in case of age, number of years spent in formal education, number of extension contact among others. All the variables were subjected to varimax rotation to generate factor which were later regressed to show the direction and magnitude of the factors.

## RESULTS AND DISCUSSIONS

### Socio-economics characteristics

Results in Table 1 show that majority (83.4%) of the respondents were middle aged (41-60 years) and still in their productive years in fish farming. The mean age of the respondents was 48±9 years. This result shows that a higher proportion (83.3%) of the respondents were male. Also that a little more than half (52.1%) were Muslim and the remaining 47.9 per cent were Christian. Majority (94.2%) of the respondents were married with only 4.6 per cent being single and the remaining 1.2 per cent was widowed. The mean household size was 6±3. Findings showed that fish farmers in the study area were highly educated. This might be due to the technical know-how involved and high technicality required of fish farming. This finding corroborates that of [16], [13] and [14].

### Factors influencing people’s participation in fish farming.

The factors influencing participation is further divided into push and pull factors to show those factors that are attracting farmers and those that are repelling them from fish farming enterprise.

In an attempt to categorize the various variables influencing peoples’ participation in fish farming, factor and component analysis were used to isolate the crucial factors influencing participation in fish farming.

The relevant variables were inter-correlated and ran with varimax factor rotation pattern to produce uncorrelated factors.

Results showed the varimax rotation with the variables and the correlation values. Variables

with high correlation were considered where only nine of the thirteen listed variables had their Eigen values above one.

Table 1 Distribution of respondents by some selected personal and socio-economic characteristics

Variables	Frequency	Percentage	Mean	Standard Deviation
<b>Age</b>				
≤ 30	15	6.3		
31 – 40	35	14.5		
41 – 50	100	41.7		
51 – 60	76	31.7		
61 – 70	12	5.0		
> 70	2	0.8	48.0	9.
<b>Religion</b>				
Islam	125	52.1		
Christian	115	47.9		
<b>Marital status</b>				
Married	226	94.2		
Widowed	3	1.3		
Single	11	4.5		
<b>Household size</b>				
1 – 4	59	24.6		
5 – 8	134	55.8		
9 – 12	35	14.6		
13 – 16	6	2.5		
> 16	6	2.5	6.4	3.3
<b>Education status</b>				
No formal educ.	10	4.2		
Primary educ.	60	25		
Secondary educ.	82	34.2		
Tertiary educ.	88	36.7		

Source: Field survey, 2015.

The factor name ascribe to each group of variance was given based on the following criteria as used by [12], [17]:

- (i)The researcher’s subjective interpretation of experience from literature.
- (ii)Picking synonyms of the highest loading variable on each factor
- (iii)Retaining the name based on the similarity of the features of the variables contributing to each other.

Results in Table 3 show the names of the nine factor groups extracted as follows: Factor 1- Economic factor which accounted for 14.49 per cent, factor 2 – Information factor which accounted for 12.71 per cent, factor 3– Farming type factor which accounted for 10.76

per cent, factor 4 –Personal characteristics factor which accounted for 7.61per cent, factor 5 – Family related factor which accounted for 6.78 per cent, factor 6- Output factor which accounted for 5.65 per cent, factor 7 –

Maintenance cost factor which accounted for 4.24 per cent, factor 8 – Accessibility factor which accounted for 3.57 per cent and Factor 9 –Management practices factor which accounted for 3.53 per cent.

Table 2. Results of varimax rotated component matrix showing correlation coefficient of highly loaded variables

Variables	Factors								
	1	2	3	4	5	6	7	8	9
Age		-.442			.507				
Sex							.382		-.467
Marital status				.456	.453				
Religion				-.316			.432		
Household size	.407				.622				
Educational status		.615			-.309	.502			
Years of formal education		.687				.450			
Number of catfish rearing practiced			-.663		.348				
Type of fish rearing practiced			-.663		.348				
Cosmopolitaness		.576	-.518		1				
Organization membership	.399	.549		.347					
Source of information	.412	.547	.363		.455				
Total income from fish farming	.835								
Distance from residence to fish farming	.367	.317				-.381			
Distance from farm to market		.360	.324			-.322		.363	
Location of fish pond		.355	.318					.359	-.320
Type of stocking practice			-.469						-.315
Number of cropping		.423	-.365			-.331	-.302		
Times of feeding per day							-.592		.310
Year of experiece	-.672								
Size of fish farm	.340	-.501							
Age of pond	.323	-.501							
Total production in kg	.855								
Number of fish seeds stocked	.783								
Source of loan	.316		.648						
Source of input				.315					
Benefits of fish farming				-.804		.303			
Problem of fish farming				-.804		.303			

Source: Computed from results of factor analysis, 2015

All the factors accounted for 69.4 percent of the variance of the dependent variable. This is encouraging and shows that the variables pulled together accounted for a good percentage of the factors influencing participation of fish farmers in fish farming enterprise.

### Push and pull factors influencing participation in fish farming.

Results in Table 4 show the regression coefficient of push and pull factors influencing participation in fish farming. The regression model summary showed that all the crucial factors isolated were highly correlated (R= 0.886) with participation in fish farming. The

$R^2 = (0.784)$  shows that 78.4 per cent of the factors isolated were associated with participation of farmers in fish farming. The remaining 21.6 per cent were responsible for the uninvestigated factors not isolated in the study.

Table 3. Table showing the factor names, Eigen values and percentage contribution

Factor s	Names	Eigen value	Percentage Contributi on	Cumulativ e percentag e
1.	Economic factor	4.494	14.496	14.496
2.	Educational factor	3.940	12.710	27.205
3.	Farming type	3.336	10.762	37.967
4.	Personal characteristics	2.361	7.617	45.585
5.	Family related	2.103	6.785	52.369
6.	Output factor	1.751	5.650	58.091
7.	Maintenance cost	1.315	4.243	62.262
8.	Accessibility factor	1.109	3.578	65.840
9.	Management practices	1.095	3.532	69.372

Source: Derived from the results of factor analysis, 2015.

Factor 1 (Economic factor) was positively and significantly correlated with participation ( $b = 0.076$ ;  $p < 0.02$ ). This shows that this factor might likely pull farmers to participate in fish farming. Economic factor included income from total production in fish farming as well as low cost on labour, input and other expenses. The more the income, low cost on labour and low input cost, the more the farmers are attracted or pulled into fish farming.

Factor 2 (Information factor): This factor was negatively significant to participation in fish farming. Information factor in this case may push farmers away from participating in fish farming. This might be true because the extension agents who were supposed to disseminate the right technological information to the fish farmers were very few in number in the State. Information is very essential for success in fish farming as stated by [3]. Fish farmers might receive information from friends and neighbours, different organisations etc. These pieces of information might not be very correct and might lead to reduced productivity when put into practice. This might discourage some farmers, thereby reducing their level of participation.

Factor 3 (Fish farm related characteristics factor): This factor was also negatively significant ( $b = -2.731$ ;  $p < 0.05$ ). This factor included location of fish farm, as well as size of pond. This shows that this factor might push away farmers from participating in fish farming when not appropriate. When the location of fish farm was not favourable in terms of availability of water, when the size of the pond is not big enough this might not yield expected returns thus push farmers away from participating in fish farming. Also the type of stocking practiced when not properly done will negatively influence their participation.

Factor 4 (Personal characteristics factor): This factor was positive and significantly related ( $b = 0.054$ ;  $p < 0.05$ ). This showed that the more favourable the personal characteristics of a farmer, the more his or her participation in fish farming. Personal characteristics in this case included age, household size and attitude of farmers. This factor might likely pull farmers to participate in fish farming.

Factor 5 (Family related factor): This factor showed a negative significant relationship ( $b = -1.214$ ;  $p < 0.02$ ). This showed that the factor might likely push farmers away from participating in fish farming. Family related factor included size of household. If the household size continues to increase, smallholder fish farmers might not be able to meet the family needs. Thus, reduces participation in fish farming.

Factor 6 (Educational factor): This factor was negative and significantly related to participation in fish farming ( $b = -1.997$ ;  $p < 0.05$ ). This factor might likely push farmers away from fish farming. This might be true because the more educated a farmer is, the more the tendency for him or her to have another occupation, thus practicing fish farming on part time bases. This might be due to his engagement in other occupational activities which would yield better income. High education of the respondents might account for the percentage practicing part time fish farming.

Factor 7 (Maintenance cost factor): This factor was positively significant to participation in fish farming ( $b = 0.058$ ;  $p < 0.05$ ). This factor may attract or pull farmers into fish farming.

This was evidenced when the fish farming maintenance cost was very low, thus increasing income for farmers. On the other hand, if the cost of maintenance of the fish farm was high, it might cause farmers to be pushed away from fish farming. However, scholars had reported that fish farmers were using their family members as labour on the farm, thereby reducing cost of maintaining fish farms [1]; [3]; [14] and [2].

Table 4. Showing the regression analysis of the isolated factors to identify push and pull factors influencing participation in fish farming

Factors	Unstandardized coefficient (B)	Standardized coefficient (b)	Significant coefficient
Constant	73.336		0.009
Factor 1	2.427	0.076	0.020
Factor 2	-20.287	-1.169	0.005
Factor 3	-40.365	-2.731	0.040
Factor 4	1.137	0.054	0.032
Factor 5	-34.491	-1.214	0.023
Factor 6	-54.254	-1.997	0.012
Factor 7	2.097	0.058	0.035
Factor 8	-17.151	-0.285	0.051
Factor 9	-81.299	-1.970	0.060

R = 0.886; R<sup>2</sup> = 0.784; Adjusted R<sup>2</sup> = 0.138

Source: Computed from results of factor analysis, 2015.

Factor 8 (Accessibility factor): This factor was negatively significant to participation in fish farming (b = -0.285; p < 0.05). When fish farmers do not have easy access to his/her farms, the fishes may not be fed well and routine management practices may also suffer. This may lead to low production, thus serve as a push factor that might discourage fish farming, thereby become a push factor.

Factor 9 (Management practices related factor): This factor was negatively significant (b = -1.970, p < 0.1). This is at 10% level of significance. Since this factor was negatively correlated, it might serve as a push factor from participating in fish farming. [3] reported that since fish farmer extension agents were few on the field, many farmers resulted to trial and error management practices which might not be favourable to production. When productivity continues to be on the decline, farmers might be discouraged from participating in such enterprise. In addition, aged fish farmers who were tradition bound might not be familiar with modern

management practices since extension agents were few thus continued to have reduced productivity which might discourage fish farmers from the enterprise, as a result be pushed away from production.

The findings revealed that only three factors (Economic, personal characteristics and maintenance cost) were pull factors while six factors (Information, fish farm characteristics, family related, educational, accessibility and management practices related) were push factors. This implies that there were more push factors than the pull factors; If this scenario should continue, the future of fish farming is bleak in Osun State in particular and Nigeria as a whole.

## CONCLUSIONS

In conclusion, fish farming which is believed to be a highly productive venture has both push and pulls factors which are agitating against its success. However, the push factors are more than the pull factors in Osun State which is an indication that fish farmers are gradually been pushed out of the enterprise. If the trend should continue unchecked, few fish farmers would be left in the enterprise in the nearest future and more foreign exchange would be spent to import fish for the populace.

From this study resulted the following recommendations:

- Cost of input in fisheries should be subsidised by the government.
- More fishery extension agents should be recruited to train farmers on a regular basis.
- Fish farming should be made attractive to the youth in order to improve the number of participants in the enterprise.
- The push and pull factors should be considered when planning programmes for the fish farmers.

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