Constraints to Integrated and Non – Integrated Fish Farming Activities in Ogun State, Nigeria

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Abstract

The study examined constraints to integrated and non- integrated fish farming activities in Ogun State, Nigeria. Random sampling techniques was used to select 133 non - integrated fish farmers (NIFF) and 216 integrated fish farmers (IFF) (n = 349) from the study area. Data were analysed using chi-square and Pearson Product moment correlation. Results showed that 92.5% of NIFF was male compared to IFF (90.7%). Also, 96.8% of IFF and 79.7% of NIFF were married. The mean ages of sampled farmers were 44 years (NIFF) and 46 years (IFF) while the mean fish farming experiences were 4 years (NIFF) and 5 years (IFF). However, respondents' major constraints to fish farming were exploitation by middlemen (88.9%), price fluctuation (92.8%), inadequate capital (87.9%) and epileptic power supply (77.4%). The chi-square analyses showed that knowledge of fish farming had significant association with respondents sex ($\chi^2 = 9.44$, df = 2, p = 0.00), occupation ($\chi^2 = 25.5$, df = 8, p = 0.01), Pearson correlation analyses showed significant relationship between farmers knowledge and age (r = 0.20, p = 0.00), fish farming experience (r = 0.17, p = 0.00), level of cosmopoliteness (r = 0.16, p = 0.00) and production constraints (r = -0.00, p = 0.00).

Keywords: Constraints, Production, Integrated and non - integrated fish farming

1. Introduction

Integrated fish farming is a multiple land use approach in food production which combines fish culture with other agricultural production systems such as livestock and crops. It is the association of two or more separate farming systems, which become part of the whole farming system. The major feature of this system includes the recycling of waste product such that the waste of one system becomes the input of the other system. Thus integrated fish farming promotes efficient utilization of farm space for multiple productions (Eyo *et al*., 2006). This practice is not new to Nigerian agricultural farming system. Oribhabor and Ansa (2006) created awareness on the significance of integrated fish farming in organic waste reclamation, recycling and re-use in Niger Delta of Nigeria.

As greatly efficient as this system of Agriculture is, there are many economic and social constraints which may affect small and large integrated fish farmers. Some good example of these constraints are: capital constraints and access to credit, market price risk, production risks, inadequate incentives for maintenance of water infrastructure, capital assets, social attitude and gender factors, marketing problems including transportation and logistics, problems with extension and diffusion of knowledge, labour constraints and land constraints (Farrington *et al* ., 2002).

However, recent developments in the macro and micro economic environment (current global economic recession) has brought about increasing pressure on farm income and has stimulated a search for alternative sources of generating additional income among resource poor farmers in developing countries. Generally, farming on its own rarely provides a sufficient means of survival in rural area of low-income countries these days. For this reason, most farmers are found to depend on a diverse portfolio of activities and income sources to balance their economic need. If only farmers are well focused and dedicated, integrated fish farming is capable of bringing a sense of hope in the sustenance of family wellbeing (Van der Mheen, 1999). Although, several constraints that are beyond the control of farmers may force them to participate in other activities which may bring some form of support for their family living. In view of the above, the study examined the constraints to integrated and Non – integrated fish farming in Ogun State, Nigeria. The study therefore,

1.2 Objective of the study

1.2.1 Broad Objective

The general objective of the study is to identify various constraints affecting integrated and non – integrated fish farming in Ogun State, Nigeria

1.2.2 Specific Objectives

To identify the constraints to integrated and Non – integrated fish farming in the study area

To describe the socio economic characteristic of integrated and non integrated fish farmers in the study area

To ascertain farmer's sources of information on non - integrated fish farming and integrated fish farming in the study area.

1.2.3 Hypotheses

HO_1: There is no significant relationship between socio economic characteristics of the respondents and their knowledge of fish farming.

HO_2: There is no significant relationship between farmer's constraint and their knowledge of fish farming

2. Materials and methods

The study was conducted among integrated and non- integrated fish farmer in Ogun Satte, Nigeria The state is situated within the tropics covering 16,409.29 square kilometers with a population of about 4,054,272(National Population Commission 2006). The state is divided into twenty (20) local government areas (LGAs) and four (4) major agricultural Zones (Abeokuta, Ijebu-ode, Ilaro and Ikenne). For ease of extension administration by Ogun State Agricultural Development Programme (OGADEP) which is the agency responsible for agricultural extension activities in the state (Figure 5). The Zones are further sub-divided into twenty (20) blocks (Abeokuta-6, Ijebu-Ode-6, Ilaro-4 and Ikenne-4).

The study area has a bimodal rainfall pattern which reaches its peak in July and September (Aderibigbe, 1994)

2.1 Sampling procedure and sampling size

Multistage and simple random sampling (SRS) technique was used in this study. The first stage involved selection of all Ogun State Agricultural Development Programme (ADP) operational zones (Abeokuta, Ilaro, Ijebu-ode and Ikenne). Fifty percent (50%) of the blocks was selected which is equivalent to two and three blocks respectively from each of the zone. Furthermore, sixty percent (60%) of the cells in each of the selected blocks were also selected which amounted to 13, 9, 9 and 8 making a total of 39 extension cells. Thereafter, 56% of registered fish farmers were selected from the chosen cells. Thus 349 respondents were interviewed for the study. Primary data was collected from the respondents using a well structured interview guide. Descriptive and inferential statistical tools was used to measure the objectives and hypothesis

2.2 Measurement of variables

Age: The actual age of the respondents was obtained in years.

Sex: Respondents indicated whether they are male = 1 female = 2. Frequency counts and percentages were then used to interpret the data generated.

Educational attainment: Respondents indicated their level of educational attainment from the list of eight options provided as:

a) No formal education, b) Primary, c) JSS/Modern III, d) Secondary

e) Technical/Grade II, f) OND/NCE, g) HND/B.Sc, h) Postgraduates

Number of years of involvement in fish farming: Respondents were asked to state the number of years they have been involved in fish farming and this was measured at interval level.

Constraints to integrated fish farming

This was expressed in terms of the constraints faced by farmers in their production process. Respondents were asked to indicate their constraints using 3 points rating scale, ranging from very serious (1) serious (2) and not serious (1). The maximum points were 33 while the minimum points were 11. The resultant scores was used for further categorization.

Data analysis

The generated data for this study were analysed using frequency, count, percentages and regression.

3. Results and discussion

Table 1 shows the mean age of the respondents between the two categories of fish farming (Non - integrated fish farming and integrated fish farming) to be 44, and 46 years, indicating that majority of the respondents were within economically active age category (FAO, 1997; Yunusa, 1999). In support of this result, Fakoya and Daramola (2005) observed that respondents within this age bracket are more innovative, motivated and adaptable individuals who can with wisdom cope with farming challenges. Respondents in the age bracket 40 – 50 years are more involved in integrated fish farming (38.0 percent) while non - integrated fish farming recorded (NIFF) 36.1 percent. The percentage range between the two categories under study is a pointer to the fact that much commitment either in terms of finances or experience is needed to cope with farm operations especially with integrated fish farming (IFF) with multiple enterprises which recorded the highest value (38.0 percent). The age bracket 30-40 years is another important age category with strength for mobility to tackle some of the task on the farm. In this age bracket, integrated fish farmers (IFF) dominated with 27.8 percent compared to non - integrated fish farmers (NIFF) (19.5 percent). It could be recalled that, the above age category are youth who have the capacity to explore and withstand farm stress. However, this may be one of the reasons why those who are into integrated fish farming dominated this age category. Financial requirements of the farm operations in all categories may also be the reason for lower values recorded for other age groups (< 30, 30-40, 50-60 and >60 years) as compared to age 40-50 group.

Sex is an important factor to consider in farming activities or any other energy demanding exercise. Out of all the respondents sampled, 91.4 percent were male considering the two farming categories (IFF and NIFF) while 8.6 percent were female. This result can be justified by the assertion of Brummett *et al*. (2010) that fisheries activities are mostly dominated by men. However, the observation can also be said to be contrary to the report of Worby, (2001) who reported that women are often motivated than men to adopt new technologies that provides nutritional benefits such as fish culture. Based on the technologies involved which may be energy demanding, farming occupation is largely controlled by men and this may be due to the general belief that men are more energetic than women. The finding can be further supported by the assertion of Ekong, (2003) that women play minimal roles in farming among Yorubas.

Considering the educational level of sampled farmers in the study area, it was revealed that majority (83.1 percent) of the respondents had secondary and tertiary education. For the purpose of comparison, majority of integrated fish farmers had secondary school certificate (47.7 percent) compared to non - integrated fish farmers (38.3 percent). For the category of farmers that had tertiary certificate, non - integrated fish farmers had higher percentage (47.4 percent) compared to integrated fish farmers (33.5 percent). It is also worthy of note that the respondents had different levels of education based on their indicated acquired degrees. Although, a relatively small proportion of non - integrated fish farmers (3.0 percent) had no formal education while 11.6 percent had primary education. The high level of education recorded in this study might be due to the metropolitan nature of the study area and its implication is that the respondents according to Olagunju *et al*. (2007) may be very receptive to new innovations. This result shows that at least more than half of the respondents had the capacity to learn new innovation within a short period of time based on their level of education.

Occupation remains valid in our society as people have one or two things they engaged in which give them sense of belonging in our society. Comparing the occupational status of the respondents, majority (58.3percent) of integrated fish farmers (IFF) engaged more in farming activities compared to non - integrated fish farmers (NIFF) (46.6 percent). It is obvious that 26.4 percent of non - integrated fish farmers dominated paid employment (the class who choose farming as second class occupation) compared to integrated fish farmers (21.8 percent). Based on farmer's response during field survey, it was discovered that some of the respondents engaged in other occupation apart from farming. Furthermore, it was recorded that 5.4 percent of the respondents considering the two farming categories belong to other occupational class. This observation showed that non-farm activities are becoming important in our society, especially in the communities with closer proximity to the cities. This can be supported by the assertion of Ellis (1999) that farming on its own is rarely sufficient for household needs in rural African settings. Trading and other little businesses were other things they engaged in. Adducible reason for this occurrence is as a result of multiple enterprises combination in integrated fish farming which may take more of their attention compared to activities in non integrated fish farming. In all, it can be established that the two categories of farmers (IFF and NIFF) in this study seek for different livelihood strategies and economic portfolios which could assist their food security and income generation which is very common practice among farmers (Ashley and Carney 1999; Ellis, 1999 ; Toulmin *et al.*, 2000).

Notable percentage (59.3 percent) of integrated fish farmers were full time farmers compared to non integrated fish farmers (46.6 percent). While 53.4 percent recorded for non integrated fish farmers dominated the group of part time farmers compared to their counterpart with 40.7 percent been accounted for integrated fish farmers. Higher value (60.7 percent) recorded for integrated fish farmer (IFF) as full time farmers compared to NIFF (46.6 percent) is a further confirmation that they have much engagement with several farm enterprises which take most of their time unless they delegate their responsibility to do other farm activities/enterprises.

Experience played prominent role in any farming enterprise, from the findings of this study 77.4 percent of non integrated fish farmers had 1-5 years experience compared to their counterpart with 60.2 percent (integrated fish farmers) while 28.7 percent of integrated fish farmers dominated the category of farmers that had 6-10 years experience in fish farming, only 11.1 percent of integrated fish farmers had over 10 years experience compared to other category of farmers with 7.5 percent (non - integrated fish farmers). This implies that this aspect of farming is still very new compared to other farming practices like mixed farming or rotational farming which had being in existence for over 100 years ago. As a result of this, there is need for more subject matter specialist in this area of farming to assist rapid dissemination of information to practicing and intending farmers in the nearest future.

Table 2 shows various constraints faced by respondents in integrated and non - fish farming.

The extent to which integrated fish farming could increase farmers economic return in the study area is inhibited by problems observed during farming operations. Table 2 present "constraints" as an area of concern that requires administrative, leadership and scientific action. The result shows that, most of the respondents identified

inadequate finance as a major problem with 91.2 percent recorded for integrated fish farmers and 82.7 for non integrated fish farmers. This finding is corroborated with the findings of Daramola, (2005) that credit is an important input for expansion of aquaculture/agriculture. So also, 88.8 percent of the respondents identified exploitation by middle men as a very serious constraint. The reason for is observation is that middle men are always needed as a key player in the marketing channel. They cannot be easily by-pass because the amounts of product sold at farm gate rely solely on them, for this reason, they may dictate prevailing market prices after buying the product at give-away prices.

Majority (94.0 percent) of integrated fish farmers identified price fluctuation as one of the most serious constraints compared to 91.0 percent of non integrated fish farmers. This could be seen as a peculiar problem throughout the zone which needs urgent attention. This may be as a result of higher concentrations of farms in the same location with similar cropping season. For power supply, both integrated fish farmers (79.6 percent) and non integrated fish farmers (73.0 percent) identified epileptic power supply as a limiting factor. Power failure generally in the country affects most agricultural firms thus reducing the rate of production and finally leading to high operational cost in production. This has also made retail prices of farm produce to be very expensive. Furthermore, both integrated fish farmers (88.0 percent) and non integrated fish farmers (87.2) identified insufficient land as not a serious constraint. This is an indication that most of the farmers set up their farms in an area that is agrarian in nature. Poaching, taxation from government and high cost of transportation were also identified not to have any serious effect.

3.1 Test of hypotheses

To test for the relationship between the variables in hypothesis one, Pearson Product Moment Correlation (PPMC) and Chi-square (χ^2) analyses were used. PPMC was used where the variables were measured at the interval level, while for chi-square variables were measured at nominal level. The correlation coefficient obtained from the statistical analysis in Table 3 shows that, there was a significant relationship between knowledge of the farmers (integrated fish and non integrated fish farming) and age ($r = 0.20$, $p = 0.00$) and fish farming experience ($r = 0.17$, $p < 0.00$). This result is in agreement with the report of Adeniji (2005) who reported a similar significant relationship between age and knowledge among farmers. The implication of this result is that, the prominent age category of the respondents between the two different types of farming categories may be responsible for the trend of this result. In other words, as the age of the respondents increases, their knowledge in fish farming also increase which further shows their interest in fish farming. Furthermore, there were significant relationship between knowledge and cosmopoliteness, ($r = -0.16$, $p<0.01$).

The result of chi-square analysis shows that, there were significant association between knowledge of fish farming and, occupation ($\chi^2 = 25.5$, $p < 0.05$), mode of involvement ($\chi^2 = 17.1$, $p < 0.05$) land acquisition ($\chi^2 = 26.4$, $p < 0.05$)) and extent of group participation ($\chi^2 = 12.5$, $p < 0.05$), while no significant relationship was recorded between educational level ($\chi^2 = 10.79$, $p > 0.05$), religion ($\chi^2 = 1.20$, $p > 0.05$), nativity($\chi^2 = 2.51$, $p > 0.05$) and knowledge of fish farming.

From the data collected, there were more male farmers in integrated fish farming (91.4 percent) than their fellow female counterpart; this observation may be due to the energy and physical exertions required for farming activities. However, the significance value recorded is an indication that sex is a barrier to this type of farming. The significant relationship observed between farmer's educational status and their knowledge of integrated fish farming is a clear attestation to the fact that education is important to the success of any innovation. This finding is supported by assertion of Islam and Dewan (1987), that education is an important factors in changing attitude, adoption of new technologies and ability of the respondents to handle different technologies.

Similarly, the significance of mode of involvement may be due to time demanded for fish farming, especially more for those in integrated category. So also, for cosmopoliteness, the significance implies that, farmers tend to pursue one or two things outside their native communities that can be of help in their farming enterprise.

3.2 Constraints to fish farming

Ho2: There is no relationship between farmer's constraints and their knowledge of fish farming.

Table 5 shows that respondent's constraints had significance relationship with farmer's knowledge of fish farming at 0.05 levels ($r = -0.002^{**}$, $p < 0.05$). Thus showing that the more the extent of challenges confronting an average farmers in their production activity, the lesser their likelihood of involving in technologies that involved further integration. This observation is in accordance with the report of Spangler, (1984) that drought, poor road, lack of credits (for expansion of aquaculture/agriculture), transportation problems and other related constraints in fish farming required urgent interventions from the government to strengthen research or new technology. This result

thus shows that more efforts need to be made to help farmers overcome various challenges like inadequate finances, exploitation by middlemen and ensuring that market channels where farmers can sell their product are put in place in other word, private investors should come to farmers aid in such a way that soft loan can be given out which will be of help in planning their farming operation, by this their problem will be minimal.

4. Conclusion and recommendations

Based on the results of this study, four pressing constraints were identified among the respondents in the study area. Such as exploitation by middle men, price fluctuation, inadequate finance and epileptic power supply. Based on these the study recommends

The high initial capital outlay could serve as a problem for would be fish farmers who may be recourse poor, which may result to small number of people engaging in fish and integrated fish production and this will automatically lead to low fish, poultry and livestock supply.

Provision of credit and housing facilities that will enhance farmers production in fish farming

Provision of institutional support from private investors to the farmers (including establishment of farm mill centers and processing and packaging unit in a close by farms.

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Table 1. Distribution of respondents by their socio economic characteristics

Variables	Non integrated fish farming n=133		Integrated fish farming n = 216		Total response n = 349	
Age(years)	Freq	%	Freq	%	Freq	%
Below 30 years	15	11.3	4	1.9	19	5.4
30 - <40	26	19.5	60	27.8	86	24.6
40 - <50	48	36.1	82	38.0	130	37.2
50 - <60	32	24.1	52	24.1	84	24.1
60 and above	12	9.0	18	8.3	30	8.6
Mean age	**44**		**46**			
Sex						
Male	123	92.5	196	90.7	319	91.4
Female	10	7.5	20	9.2	30	8.6
Educational status						
No formal education	4	3.0	12	5.6	16	4.6
Primary education	15	11.3	28	13.0	43	12.3
Secondary education	51	38.3	103	47.7	154	44.1
Tertiary education	63	47.4	73	33.8	136	39.0
Occupation						
Artsianship and craft	15	11.3	9	4.2	24	6.9
Farming	62	46.6	126	58.3	188	53.9
Paid employment	29	26.4	57	21.8	86	24.6
Trading	12	9.0	20	9.3	32	9.2
Others	15	11.3	4	1.9	19	5.4
Fish farming experience(years)						
1 -5	103	77.4	130	60.2	233	66.8
6 – 10	20	15.0	62	28.7	82	23.5
Above 10	10	7.5	24	11.1	34	9.7

Source: Field survey, 2009

Table 2. Distribution of the respondents by constraints faced in integrated and non- integrated fish farming n=349

Variables	Non integrated			Integrated			Total response		
Constraints	VS	S	NS	VS	S	NS	VS	S	NS
Inadequate finance	110(82.7)	17(12.8)	6(4.5)	197(91.2)	19(8.8)	0(0.00)	307(87.9)	36(11.1	6(1.7)
Insufficient land	3(2.3)	14(10.5)	116(87.2)	7(3.2)	19(8.8)	190(88)	10(2.9)	33(9.4)	306(87.7)
Irregular supply of inputs	19(14.3)	43(32.3)	71(53.4)	11(5.1)	77(35.7)	128(59.3)	30(8.6)	120((35.7)	199(52.0)
High cost of operation	30(22.5)	40(30.1)	63(47.4)	41(19.9)	56(25.9)	117(54.2)	73(20.9)	96(27.5)	180(51.6)
Poaching	14(10.6)	8(6.1)	111(83.5)	30(13.9)	17(7.8)	169(78.2)	44(12.6)	25(7.2)	280(80.2)
Absence of government support	64(48.2)	16(12)	53(39.8)	61(30.1)	22(10.2)	129(59.7)	129(37.0)	38(10.9)	182(52.1)
High cost of transportation	35(26.3)	41(30.8)	57(42.9)	57(26.4)	83(38.4)	76(35.2)	92(26.3)	124(35.6)	133(38.1)
Exploitation by middlemen	114(85.7)	13(9.8)	6(4.5)	196(90.7)	7(3.2)	13(6.0)	310(88.9)	20(5.7)	19(5.4)
Price fluctuation	121(91.0)	5(3.8)	7(5.3)	203(94.0)	6(2.8)	7(3.2)	324(92.8)	11(3.2)	14(4.0)
Epileptic power supply	98(73.0)	13(9.8)	22(16.5)	172(79.6)	9(4.1)	35(16.2)	270(77.4)	22(6.3)	57(16.3)
Taxation from government	3(2.3)	4(3.0)	126(94.7)	0(0.0)	8(3.8)	208(96.3)	3(0.9)	12(3.4)	334(95.7)

Source: Field survey, 2009

Note:

VS = Very serious,

S = serious

NS = Not serious

Table 3. Chi –square analysis of respondents socio economic characteristics and their knowledge of integrated fish farming

Variables	χ^2	Df	CC	Decision
Sex	9.44	2	0.00	S
Educational status	10.79	6	0.09	NS
Occupation	25.5	8	0.01	S

Source: Field survey, 2009

Note: S = Significant at 0.05 level

NS = Not Significant at 0.05 level

Table 4. Correlation analysis of the respondents socio economic characterises and their knowledge of integrated fish farming

Variable	R	P	D
Age	0.20	0.00	S
Fish farming experience	0.17	0.00	S
Level of cosmopoliteness	0.16	0.01	S

Source: Field survey, 2009

Note: S = Significant at 0.05 level

NS = Not Significant at 0.05 level

Table 5. Relationship between respondent's constraints and type of integration

Variable	Rho	P	Decision
Constraints	-0.002**	0.02	S

Source: Field survey, 2009

S = Significant at 0.05 level