



Assessment of Fish Farmers Use of Recommended Management Practices in Oyo State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author BAO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors OAF and ARR managed the analyses of the study. Author SIA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The enhancement of fish production through aquaculture can be brought about by enhancing farmers' utilization of information on new innovations and recommended practices. This study was carried out to assess fish farmers' use of recommended management practices in Oyo state. One hundred and fifty fish farmers were selected from the four agricultural zones in the state using multistage sampling technique. Primary Data were analyzed using descriptive and multiple regression analysis. Most of the fish farmers were male (88%), 78% had tertiary education and 68% had <11years of experience in fish farming. The study revealed that the rate of adoption of recommended aquaculture management practices was 46.7%. The regression analysis also revealed a linear relationship between the socio-economic characteristic and adoption of RAMP ($R^2 = 0.879$). Educational background ($p < 0.05$), years of experience ($p < 0.1$) and method of farming

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($p < 0.05$) were positively significant. The use of these management practices were also limited by different factors as revealed in the study. In conclusion, the adoption of recommended management by fish farmers is not encouraging enough. Strong cooperation between the fish farmers and extension agents was highly recommended.

Keywords: Aquaculture; management practices; fish farming; socio-economic characteristics.

1. INTRODUCTION

Fish seems to be the only animal protein source which has no serious socio-cultural constraints to its production and in-take. Aihonsu et al. [1] reported that traditionally, fish on the average generally appear cheaper than meat. Nigeria is the largest fish consumer in Africa and among the largest fish consumers in the world with over 2.0 million metric tons of fish consumed annually [2]. Nigeria imports over 900,000 metric tons of fish to meet the demand which outstrips the local production of about 1.1million metric tons [3]. Statistics by FDF [3] also indicated that the recent growth in fish production is as a result of increased activities of aquaculture. Aquaculture arose from the decrease in supply from ocean fisheries and it has the potential to contribute significantly to national food security; alleviate malnutrition and poverty.

Aquaculture, as a sub-sector of agriculture and has certain complexities. For example, the provision of fingerlings to stock ponds, pond fertilization, feeding and water quality management requires considerable sophistication [4]. The farmer therefore needs competency in knowledge, skills and techniques involved in the efficient management of fish to maximize production. Farmers' competences in aquaculture is said to be enhanced through adoption of agricultural innovations, by transferring technology and knowledge from scientists to farmers to trigger development [5]. Omitoyin [6] reported that without adequate management, a well constructed fish farm may not be profitable and productive. Aquaculture management practices are concerned with farming practices adopted by fish farmers. According to Pillay and Kufy [7]; Galanopoulos and Aggelopoulos [8], the concept of management practices are associated with the entire technical operation of a farm and monitoring of the daily activities of the farm where it covers activities such as nutrition programs, food and diet, animal health, and more. These recommended practices also consist of *monitoring your fish ponds regularly*, how fast the fish are grows, how well

supplementary feeds are being utilized, *keeping good records and planning ahead* for the operation of the *farm*.

Akinbile and Alabi [9] stated that the enhancement of local fish production can be brought about by improving capacity in terms of enhancing farmers' access to and utilization of information on new innovations and recommended practices. There is limited information on the use of recommended management practices by fish farmers in Oyo state. Therefore, this study was designed to assess the use of recommended aquaculture management practices by fish farmers in the state.

Specifically, the study was designed to;

1. Describe the socio-economic characteristics of the respondents
2. Assess farmers' adoption of the identified recommended management practices
3. Effect of socio-economic characteristics of the respondents on their adoption of recommended management practices.
4. to identify constraints to the use of recommended management practices Hypothesis.

H₀: The selected socio-economic characteristics of the fish farmers have no influence on the adoption of recommended management practices.

2. METHODOLOGY

The study was conducted in Oyo State, South - West Nigeria. The state is located in the rainforest vegetation belt of Nigeria within longitude 70 23'47" N and 3055'0". It is bounded in the south by Ogun State and in the north by Kwara State, in the west by the Republic of Benin while in the east it is bounded by Osun State. Oyo state exhibits the typical tropical climate of averagely high temperatures, high relative humidity and generally two rainfall maxima regimes during the rainfall period of March to October. Oyo state consists of

thirty three local governments. According to Oyo State Agricultural Development Programme (OYSADEP), Oyo State is divided into four agricultural extension zones namely: Ibadan/Ibarapa, Ogbomoso, Oyo and Saki.

Multi-stage sampling method was used to select respondents for this study. Two local governments were selected from each ADP zone for the first stage. The second stage was the selection of three blocks from the each selected local governments to give twenty four blocks in total. In the third stage, five fish farmers were randomly selected from each block which gave a total of one hundred and twenty fish farmers. Primary data was collected with the use of a structured questionnaire.

Tables, percentages and mean were used to describe the socio-economic characteristics of the respondents. To assess the adoption of the management practices, a list of improved management practices was obtained after which adoption scores were computed for each practices. Scores of 2,1 and 0 were given for “adopted”, “discontinue” and “not adopted” respectively. Management practices with a mean score > 1.0 were perceived as “adopted” by farmers. Multiple regression analysis was used to estimate the influence of socio-economic characteristics of the respondents on adoption/use of these management practices.

The multiple regression model is specified as:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_8x_8 + U$$

Y= Level of adoption of recommended aquaculture management practices
(Number of recommended management practices adopted by farmers)

x= independent variable

x₁=gender (Male=1, Female=2)

x₂=age (in years)

x₃=educational background (Primary=1, Secondary=2, Tertiary=3)

x₄=marital status (Single=1, Married=2)

x₅=household size (number of people in household)

x₆= years of experience (number of years in fish farming)

x₇= Farm size (in acres)

x₈= Method of farming (Part time=1, Full time=2)

a= constant

b₁-b₈= regression coefficient

U= error term

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of the Fish Farmers

Table 1 shows the distribution of fish farmers with respect to their socio economic characteristic. 88% of the fish farmers were male while 12% were female. This result can be justified by the assertion of Brummett et al. [10] that fisheries activities are mostly dominated by men. The mean age of 47years indicates that most of the fish farmers are still in their productive age which portends better future for fish production [11]. This is also in line with Alfred and Fagbenro [12] who stated that majority of the fish farmers in the southwest region are within the age bracket of 36-55years which is identified as the prime age years when they are full of vitality and would likely use available sources of information on new innovations for their benefit.

The study revealed that majority were married (98%) while 78% had tertiary education. This means that fish farming in Oyo state is dominated by the educated class and mostly by those armed with high level of education. The high level of literacy could be regarded as an advantage for the adoption of recommended management practices in fish production. This is supported by Agbamu [5] that there is a correlation between literacy levels of farmers and the use of recommended practices. It is widely believed that education creates a favourable mental attitude for the acceptance of new ideas and practices. The mean farm size of 1.1 acres indicates that most fish farmers in the state operate on a small scale. Assessing the years of farming experience, it revealed that majority of the fish farmers had less than 11years of farming experience which is an indication that involvement in fish farming has increased recently. 82% of the fish farmers were said to take fish farming as their only source of income. Full time fish farmers tend to adopt management practices better than the part time farmers as they have enough time to carry out necessary activities on their farm

3.2 Adoption of Recommended Aquaculture Management Practices

Table 2 shows that the adoption rate of the fifteen management practices identified was 46.7%. Liming of pond was the most adopted management practice (\bar{x} =1.47). Management practices such as weeding of pond banks

(\bar{x} =1.33), water quality/treatment (\bar{x} =1.31), feeding management (\bar{x} =1.29) and cleaning and hygiene (\bar{x} =1.29) were also highly adopted by the fish farmers in the state. Waste water management and post harvest technology were the least adopted management practices by fish farmers in the state. This could be as a result of the technicality and the cost involved in adopting these practices. Other less adopted practices were fingerlings acclimatization (\bar{x} =0.79), stocking density/ratio (\bar{x} =0.78), routine check/test cropping (\bar{x} =0.95), fertilization (\bar{x} =0.97) and netting to control pest (0.91)

3.3 Effect of Socio-economic Characteristics on Adoption of RAMP

The regression analysis result in Table 3 revealed that the educational background of the respondents had a positive coefficient (0.144) and significant at 5% level of probability. This is an indication that the higher the level of education of the farmers, the higher the probability of adopting the recommended management practices. This means that educated farmers tends to adopt recommended management practices better. This is supported

Table 1. Socio-economic characteristics of the fish farmers

Variables	Frequency	Percentage	Mean
Gender			
Male	132	88	
Female	18	12	
Age			
≤ 30	12	8	
31 – 40	30	20	
41 – 50	57	38	
51 – 60	36	24	
61 – 70	15	10	47.0
Educational Background			
Primary	6	4	
Secondary	27	18	
Tertiary	117	78	
Marital Status			
Single	3	2	
Married	147	98	
Household size			
1 – 5	51	34	
6 – 10	87	58	
11 – 15	9	6	
16 – 20	3	2	6.6
Fish Farm Size			
≤ 1.0	117	78	
1.1 – 2.0	12	8	
2.1 – 3.0	3	2	
≥ 3.1	18	12	1.1
Years of Experience			
1 – 5	57	38	
6 – 10	45	30	
11 – 15	27	18	
16 – 20	9	6	
Above 20	12	8	9.9
Method of Farming			
Part – time	27	18	
Full – time	123	82	
Total	150	100	

Table 2. Level of adoption of recommended aquaculture management practices by fish farmers in Oyo State

RAMP	Adopted	Discontinued	Not Adopted	Mean
Cleaning and Hygiene	92	10	48	1.29
Water quality/ treatment	81	34	35	1.31
Fertilization	49	47	54	0.97
Liming	98	25	27	1.47
Fingerlings Acclimatization	40	38	72	0.79
Test cropping/Routine check	51	41	58	0.95
Disease control	80	15	55	1.17
Weeding of pond banks	93	14	43	1.33
Feeding management	79	35	36	1.29
Record keeping	68	37	45	1.15
Artificial propagation of fish seeds	45	41	64	0.87
Waste water management	27	24	99	0.52
Netting to control pest	47	43	60	0.91
Stocking density/ratio	41	35	74	0.78
Post harvest Technology	28	31	91	0.58

*RAMP highly adopted = Liming $X=1.47$ (Scores of 2,1 and 0 were given for “adopted”, “discontinue” and “not adopted” respectively)

Table 3. Multiple regression result showing the socio-economic factors influencing farmers’ adoption of RAMP

Variables	Standardized Coefficients	T	sig
Size	0.005	0.156	0.891
Age	0.063	1.327	0.316
Educational background	0.144	4.715	0.042**
Years of Experience	0.278	3.187	0.086*
Methods of farming	0.405	7.616	0.017**

by Imo and Essien [13] who reported that education enhances farmers’ ability to understand, evaluate and adopt production techniques.

Years of experience was also found to have a positive coefficient (0.278) and significant at 10% level of probability. This indicates that farmers with higher years of experience are likely to have good farming skills adopt recommended management practices. Experience is important for effective daily running of farm and can positively influence adoption of innovations. Method of farming had (0.405) coefficient and significant at 5% level. This indicates a positive influence on adoption of recommended management practices. Full-time farmers are more likely to adopt management practices or innovations better than the part time farmers, especially when the practices are more time-intensive (D’Souza et al., 1993).

The R square (0.879) indicates that the socio economic characteristic of the fish farmers accounted for 87.9% variations in the adoption of recommended management practices by fish farmers in the state.

3.4 Constraints to the Use of Recommended Management Practices

Table 4 shows the factors affecting the use of recommended management practices. Major factors highlighted by the fish farmers were cost, labour and technical knowledge. 71% was attributed to inadequate capital/high cost of adoption, and 71% to inadequate technical knowledge. According to Bolorunduro and Adesehenwa [14], the adoption of recommended aquaculture management practices and technologies by small-scale farmers depends on cost, availability of recommended inputs and ease of handling.

Table 4. Factors affecting the use of recommended management practices

Factor	Percentage (%)
Inadequate capital/ high cost of adoption	71
Labour Intensive	44
Inadequate technical knowledge	71
Inadequate access to extension services	65
No obvious advantage	46

**Multiple responses*

4. CONCLUSION AND RECOMMENDATION

In conclusion, adoption of recommended management practices by fish farmers in Oyo state is still low. Farmers’ use of these management practices is influenced by some socio-economic characteristics and the farmers also face limiting factors which are responsible for the low adoption of these recommended practices. Based on the findings of this study, effective cooperation between fish farmers and agricultural extension agents is recommended in order to make the fish farmers aware, adopt and know the benefits of adopting these recommended management practices. Training workshops and farmers’ club can be organized by the extension agents to educate the farmers on how they can improve their productivity and maximize profits through adherence to recommended management practices. Commercial financial institutions should also be encouraged to invest in fish farming, by allocating loans to farmers at reduced interest rate and affordable collateral.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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