Determinants of yield performance in small scale fish farming in Alimosho local government area of Lagos state

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Abstract: The ever decreasing catch of fishes due to over exploitation warranted the adoption of simple random sampling in selecting the respondents to examine the determinant of yield performance in small scale fish farming. Structural interview schedule was used to obtain information from eighty (80) respondents. Descriptive analysis was used to analyse the socio-economic characteristics, while budgetary analysis was used to determine the profitability, and multiple regression analysis was the inferential statistic used.

The result showed that about 70.0 percent of the fish farmers produce above 5000 kilograms per year, while a mean of 5150.75 kilograms per year was obtained. The budgetary analysis revealed that the average total cost of production per annum was N3,694,586.00 while the total revenue was N12,680,490.00; which gives a net farm income of N8, 985,904.00 per annum. The profitability ratio gives a benefit cost ratio of 3.43, and a gross margin ratio of 1.41. This indicates profitability of small scale fish farming in the study area. The significant variables of sex and age are positively related to output resulting in more than a tonne and 13 tonnes increase respectively in output difference in male to female fish farm and an older fish farmer's pond while educational level of the respondents, family and hired labour were negatively related to output, each resulting in not less than 2 tonnes decrease in output with their unit increase. The study therefore recommends, among others, that seminars and trainings should be held at intervals so as to update small scale fish farmers' knowledge on fish farming procedures and practices.

INTRODUCTION

In Nigeria, Agriculture provides between 80 to 90 percent of the country's food needs (Odife, 2002). It however has diverse aspects and this includes fish farming which involves the rearing of fish for the purpose of consumption or sale. Fish is acclaimed to be the principal source of animal protein for over one billion people globally and provides many important nutritional and health benefits. Fish has the highest level of easily metabolisable proteins; it is reputed for its high quality proteins, fats, vitamins, calcium, iron and essential amino acids. The per caput consumption

of animal protein in the country has been put at 5gm per day. This is a far cry from the FAO's recommended level of 35gm per day (Afolami and Oladimeji, 2003). Fish farming is a profitable venture and it is rapidly expanding and it will continue to be profitable if the planning and management are well taken care of. Fish farming started in Nigeria over 40 years ago (Ekwegh, 2005). The Nigerian government has recognized the importance of the fishery sub-sector and it has made several attempts over the years to increase their productivity through institutional reforms and the various economic measures. Some of these

measures provided subsidy for inputs and exemption from tax for fishermen. Despite the efforts of government, there is still a deficit in the supply and demand for fish by the population (Dada, 2004). Most of the fish farming in Nigeria is carried out by small scale operators in small fresh water ponds (UNDP). Nigeria has a population of over one hundred million people and has her national fish demand at over 1.5 million metric tonnes. The current annual aquaculture production hovers around 500,000 metric tonnes. These combined with ever decreasing catch (due to over exploitation) from the capture fisheries have not been able to meet the ever-increasing protein demand of the country. Thus the challenge to increase protein consumption in Nigeria appears to be more urgent now than ever (Mbanasor, 2002).

Poor people are facing new barriers in both their production and returns on fish. Even by the standards of developing countries, artisanal fishers and fish workers are often among the poorest people and they generally operate on a small scale and use traditional fishing practices yet new technologies and environment requirement favour large scale capital intensive operation at the expense of traditional and small scale commercial fishing (Delgado *et al*, 2003). Whereas small scale fish farming supplies the greatest percentage of the Nigerian's annual fish production output (FDF, 1995). Thus, it is worthy of note to study the determinants of yield performance of these small scale farmers.

It is for this reason that the questions of what the socio-economic characteristics of the small scale fish farmers are? what the cost-return relationship of the business is? and what determine the yield performance of small scale fish farming? are addressed in the study.

Objectives of the study: The main objective is to investigate the determinants of yield performance in small scale fish farming.

The specific objectives are to:

- examine the socio-economic characteristics of the small scale fish farmers.
- determine the cost-return relationship in small scale fish farming.
- investigate the determinants of yield performance in small scale fish farming.

METHODOLOGY

The study was conducted in Alimosho local government area of Lagos State. The State, according to the National Population Commission, has the largest population of urban dwellers, virtually all other states have their indigenes living and working in Lagos. There are several small scale fish farmers in Alimosho local government area. This local government area has subdivisions, which include Ipaja Ayobo, Egbeda Akowonjo, Egbe Idimu, Igando Ikotun, Agbado, oke- odo and Mosan Okunola local development areas.

The data used are essentially from primary source i.e. the small scale fish farmers in the area. Structured interview schedule was used to collect information on the socio-economic characteristics of the respondents as well as input-output data. The sampling frame was obtained from the fish farmers association, out of which 100 fish farmers were randomly selected. However, only 80 farmers responded adequately and the data supplied were analysed. Descriptive analysis was used to highlight the socio-economic characteristics of the

respondents. Budgetary analysis was used to determine the profitability of the enterprise. It was done by estimating the total variable and fixed cost as well as total revenue to determine the net profit of an average small scale fish farmer. Also multiple regression analysis was used to analyse and explain the relationship between the dependent (the fish yield) and the independent variables from where the major yield determinants were obtained. The various functional forms fitted include linear, semi-log, Cobb-Douglas and exponential functions. Implicitly, the function is:

$Y = (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8)$

Where

Y= yield (kg)

X_1= sex (dummy)

X_2= marital status (dummy)

X_3= age (years)

X_4= education (years)

X_5= fixed cost (N)

X_6= hired labour (manday)

X_7= family labour (manday)

X_8= variable cost (N)

RESULTS AND DISCUSSION

Table 1 revealed that 73.8 percent of the fish farmers were male while 26.3 percent were female. This implies that more males were involved in small scale fish farming which is in line with the culture of the people in the area that men engage in fish farming more than women and that women are mostly involved in processing and other post harvest activities. About 81.3 percent of the respondents were married. This shows that most of the small scale fish farmers are settled family men and women with responsibilities. These responsibilities would likely make them willing to seek innovations so as to increase their income earning capacity and improve their standard of living.

The largest percentage (41.3%) of the farmers fall between the ages of 40-50 years. This implies that most of the small scale fish farmers were in their middle age group. About 63.8 percent of the respondents were HND/B. Sc holders while 1.3 percent of them have OND/NCE qualifications. More than half (51.3%) of the respondent produce between 260kg and 2,000kg per cultured period, while only 16.3 percent produce above 12,000kg per cultured period. The mean production of the respondent was 5,150.75kg.

Furthermore, 55 percent of the respondents practice semi-intensive culture system, 40 percent practice intensive system while only 5 percent practice extensive culture system. Thus, it could be said that the fishing systems in the study area are gradually moving away from the extensive (low production rate) culture system into more productive systems (intensive and semi-intensive). About 51.3 percent of the farmers culture their fish for an average period of six months. The choice of culture period is usually influenced by factors such as timing towards festive period or due to the lack of feeds as explained by Okoye and Omorinkoba (1994). Also, 33.8 and 61.3 percent of the respondents sourced water from taps and underground water respectively. Only 1.3 percent of the respondents in the study area sourced water from streams/rivers. This may be due to the fact that Lagos State is a city that is highly congested and most of the inhabitants dug well and drilled boreholes while some get water from government sources (Water Corporation). The largest percent (62.9 %) of the fish farmers obtained their

fingerlings from fish farms while 25.9 percent do self breeding and only 11.2 percent obtained fingerlings from streams/rivers. The fact is that the fingerlings sourced from fish farms are more likely to be healthier and well bread.

Table 1: Socio Economic Characteristics of Respondents

Characteristics	Frequency	Percentage
Gender		
Male	59	73.8
Female	21	26.3
Total	80	100.0
Marital Status		
Single	8	10.0
Married	65	81.3
Divorced	3	3.8
Widowed	4	5.0
Age		
20-30	9	11.0
30-40	17	21.4
40-50	33	41.3
Above 50	21	26.3
Educational Level		
No formal education	1	1.3
Primary school	3	3.8
Secondary school	3	3.8
OND/ NCE	12	15
HND/ BSC	51	63.8
Post graduate	10	12.5
Cultural System		
Extensive	4	5.0
Semi-intensive	44	55.0
Intensive	32	40.0
Water Sources		
Streams/Rivers	1	1.3
Taps	27	33.8
Rainfall	3	3.8
Underground water	49	61.3
Fingerlings Sources		
Fish Farms	56	62.9
Streams/Rivers	10	11.2
Self Breeding	23	25.9
Total	**80**	**100.0**

Source: Field survey, 2007

Table 2 showed the cost and return analysis where the total variable cost and total fixed cost represents 32.5 percent and 67.5 percent of the total cost of production respectively. The higher value for fixed cost may be due to the high cost of land acquisition in the area as well as high cost of construction materials like cements used in constructing a high standard fish pond. The gross margin of N11, 479, 304 and a net farm income of N8, 985, 904 indicates that small scale fish farming is profitable in the study area.

Table 2: Budgetary Analysis

Variable	Amount (N)
Total variable cost	1,201,186
Total fixed cost	2,493,400
Total cost	3,694,586
Total revenue	12,680,490
Gross margin	11,497,304
Net farm income	8,985,904

Source: Field survey, 2007

The analysis of ratios in Table 3.0 revealed that the benefit cost ratio (BCR) is above one emphasising the profitability of the business. The rate of returns, 2.43, implies that for every one naira invested, N2.43 was gained and a gross revenue ratio of 0.29 indicates that for every N1.00 returns to fish farming enterprise, 29 kobo is being spent. Also, the expense structure ratio 0.67 shows that 67 percent of the total cost of small fish farming was made up of fixed cost items and a gross margin ratio of 1.41 further confirm that the business is profitable.

Considering the function with variables with highest level of significance, adjusted R^2 value as well as parameter estimates that conform to a priori expectation, the linear function was chosen as the lead equation. By the adjusted R square of 0.813, it indicates that 81.3 percent variability in Y (fish output) is due to the joint effects of the various explanatory variables in the model.

Some of the parameter estimates are significant at different levels. The gender of the respondents (X_1) has a significant effect on fish output at 10 percent and it is positively related to

the output. This may be due to the fact that most farmers are male who gave all it demands in terms of management practices to the fish output. The age of respondent (X_3) is also positively related to fish output. This means that as their age increases so is the output. This may be due to the fact that years of experience increase with age and the effect is significant at 5 percent level.

Also, the level of education (X_4) is negatively related to fish output and it has a significant effect at 1 percent significant level. This may be due to the fact that people with higher levels of education may not have time to take care of their fish farms. Moreover, Table 1.0 revealed that majority (63.8 percent) of the fish farmers had a degree in academics. As a result, they may have other occupations that earn them income. Construction cost (X_6) has a positive association with fish output at 10 percent significant level. This implies that a naira increase in construction cost brings about 0.025 kg increase in output. This may be due to the fact that the more money spent on constructing a suitable fish pond, the better their chances of survival and their conditions of living leading to an increase in output. Both hired and family labour are negatively related to fish output suggesting pilfering and home consumption leading to significant reduction in output.

The linear function, which was chosen as the lead equation, is stated as follows:

$Y= 1760723 + 13284.44X_1 - 158.36X_2 +$

$(1.565) \quad (2.075)^* \quad (-0.029)$

$1104.83X_3 - 18641.25X_4 + 0.025X_5 -$

$(0.451)^{**} \quad (-4.027)^{***} \quad (1.027)$

$3745.81X_6 - 4218.95X_7 - 2253.03X_8 + E$

$(-1.998)^* \quad (-5.982)^{***} \quad (-1.445)$

Adjusted R^2 = 81.3 percent

***: statistically significant at 10 percent level of significance
**: statistically significant at 5 percent level of significance
*: statistically significant at 1 percent level of significance

Table 3: Profitability Ratio

Ratio	Value
Benefit Cost Ratio	3.43
Rate of Return	2.43
Expense Structure Ratio	0.67
Gross Revenue Ratio	0.29
Gross Martin Ratio	1.41

Source: field survey, 2007

Respondents affirmed that the major problems encountered in fish farming include electricity failure, lack of funds, high cost of feed, bacterial infections, predators, waste management and cannibalism, among others.

SUMMARY

The study revealed that small scale fish farming is considered a viable option of increasing income of the family as likewise observed by Olukunle, 2004.

Among the independent characteristics, education, hired labour, and family labour had significant relationship with yield performance

RECOMMENDATION

Based on the findings of the study, the following recommendations are suggested to improve the productivity/ yield performance of the respondents:

❖ The extension agent-farmer coverage needs to be improved upon, so that regular and prompt visits could be made to fish farmers in order to intensify their awareness and adoption of improved technology, formal fund sourcing etc.

❖ Extension agents should train fish farmers on effective utilization of funds so as to reduce unnecessary costs or expenses.

❖ Literate farmers need to pay adequate attention and commitment to fishing activities in order to improve output.

❖ Seminars and trainings should be held at intervals so as to update small scale fish farmers' knowledge on fish farming procedures and practices.

❖ Small scale fish farmers should come together to form co-operative unions to complement individual efforts.

❖ Fingerlings should be sourced from healthy fish farms.

❖ Inputs such as feeds should be subsidized and made available to small scale fish farmers through the fish farming associations.

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