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Economic Viability of Cat Fish Farming In Nasarawa State

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Abstract

A total of thirty (30) cat-fish farmers were used for the study using structured questionnaire. Data obtained were analyzed using descriptive statistics, sample T-test, and 4-points Likert Scale Ranking of the constraints of cat fish farming. Results showed that, (66.7%) of the respondents engaged in fingerlings production, while (33.3%) produces juveniles. Results also show that 63.3% of the fish farmers produce Heteroclarias species. The rate of feeding fish (kg/day) showed that 33.7% of the respondent fed their fishes 3kg/day while 10% of them fed 4kg/day. Results in respect of feeding frequency required for fish production in the study area indicated that 60% of the fish farmers fed their fishes twice a day 33.3% of the fish farmers fed their fishes thrice a day while 3.3% fed their fish once a day. Highest incurable cost by the fish farmers was storage cost (N929, 192.32) and water supply ranked highest (3.27) among problems confronting the fish farmers. Fish farming has continued to contend with myriad of problems leading to unprofitable venture. The present study closely examined diverse factors and degrees of their importance in aquaculture. Recommendations were made that government should find a lasting solution to problem of land scarcity to reduce cost of production. Base on the result it indicates that the cat fish production is highly profitable which can serve as means of income for the masses.

***Key words**: Fish farmers, Fish farming, Constraints, feeding frequency.*

Introduction

The need to increase fish production in Nigeria and Nasarawa State in particular has become most desirable because of continuous decline in capture fisheries production over decades (Delgado *et al*., 2003). Intensive aquaculture has been identified as the panacea to fish farming. According to Kent (1984) fish is a rich source of amino acid, vitamins, minerals and poly-unsaturated fatty acids not found in other sources of protein. In addition, farming of fish offers some advantages order than farming domesticated land animals. One of these characters is the ability of many species of fish to convert organic wastes such as sewage, piggery wastes, poultry waste, cow dung and other organic industrial by products into usage production efficiency, thus contributing to the management of waste in our environments needs National Economic Empowerment Development Strategy-NEEDS (2004) some of the benefits of fish farming are that swampy area which are unsuitable for agriculture are easily utilized in pond construction, more importantly however, is the fact that protein production per unit area is far higher in fish culture than beef. Fish farming helps in reducing, rural

urban migration and enhances foreign exchange earning of fish apart from producing high quality protein, it provides employment opportunities, people in the aspect of production processing and marketing which provides income and thereby improves the living standard of people (Eyo, 2004).

In Nasarawa state of Nigeria the government on its part has been playing a conservative role in the fisheries sub-sector through the protection of the artisanal fisheries in the state via legislation. The ministry of Agriculture too has been supporting private entrepreneur through provision of technical services with the view to boosting fish production in the state.

In spite of the prevailing supportive conditions to fish farmers towards accelerated fisheries development in Nasarawa state development in the subsector has remained stagnant over years. Very little study has been done on economic viability of fish production in Nasarawa State, consequently the present study was carried out.

Materials and Methods

The study was conducted in Nasarawa State of Nigeria which has a land area of 27,116.8 square kilometers with a population of 3.1 million people National Population Commission (NPC, 2006). The state has 13 Local Government and 16 Development Areas. The State is bounded to the North-west by the Federal Capital Territory (FCT) Abuja, North-east by Plateau State, South-west by Kogi State, South East in Taraba State. In addition, the state is located on the middle belt region of Nigeria. It lies between latitude 70^{o} and 90^{o} North and 10^{o} latitude East. The State has total Arable land of 746,826ha and fresh water surface of 5633ha. The climate lies within the Guinea Savannah region and tropical climate. Rainfall is moderate with a mean annual rainfall of 131,75cm. It has two distinctive seasons, dry and raining seasons. The average rainfall is 1300mm. Over 80% of the entire population are engaged in agriculture especially in the area of crop production, fisheries and livestock production, (MANR, 2008) Nasarawa State is made up of three (3) Geo-political zones; zones A, B and C respectively in Figure 1.

Purposive sampling of 10 fish farmers were selected among catfish farmer from each geo-political zones making a total of 30 fish farmers. This is made up both males and females who were involved in catfish production.

Method of Data Analysis

Data analysis was done using descriptive statistics such as mean, standard deviation, percentage, Likert Scale Ranking and Paired t-test was used where two sets of variable effects were to be compared and tested hypothetically about the differences between their means.

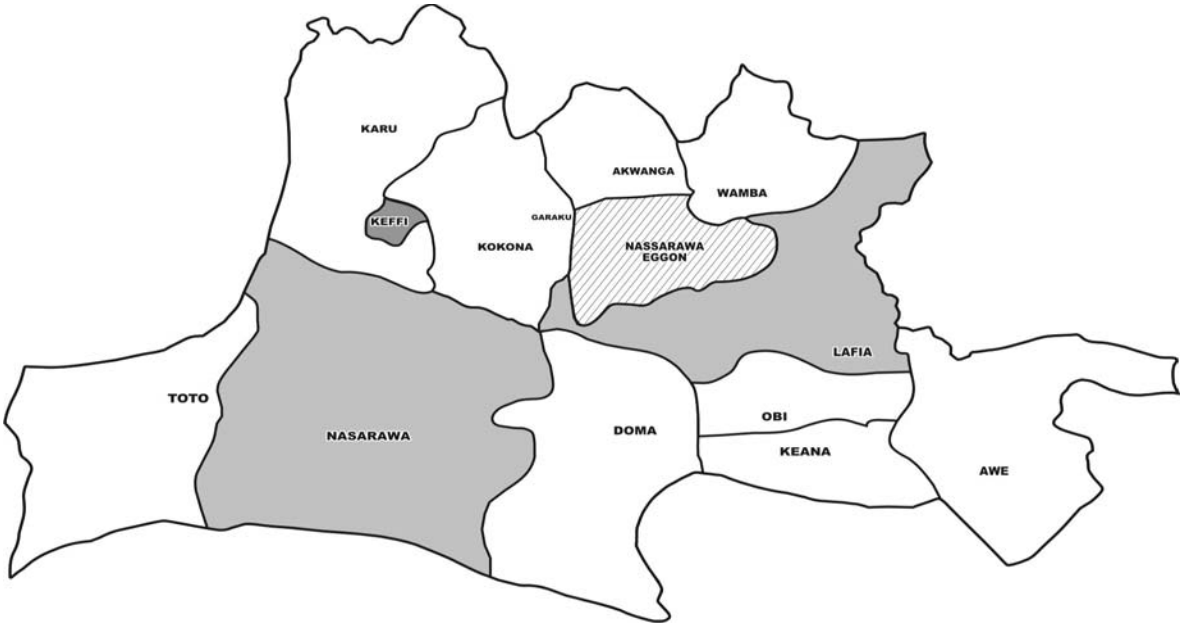

Figure 1: Map of Nasarawa State showing three (3) Geo-political zones

The t-test statistics for unpaired samples was done using the formula below:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S^2(n_1+n_2)}{(n_1)(n_2)}}}$$

Where t=t-test
X_1 = mean output of cat fish farmers
X_2 = mean input of cat fish farmers
S_2 = variance of cat fish farmers
n_1 and n_2 = Number of the respondents participants
The budgeting techniques employed were net farm income. The difference between the gross revenue (GR) and the total cost (TC) gives the net revenue (NR) Net farm income (NFI) is expressed as NFI = GR – TC (Adesoye, 2004).
Where; NFI – Net Farm Income; TC – (TVC + TFC) = Px – X ; GR – PY – Y
GR – Gross return ; PY – Unit price of output ; Y – Quality of output
Px – Unit price of Input ; TC – Total Cost (N) ; TVC – Total Variable Cost (N)
TFC – Total fixed cost

Results and Discussion

Results show that majority of the respondents are male (86.7%) while 13.3% of the respondents are female (Table 1). The low participation of women in fish farming may be due to religion and cultural belief of the people in the study area. The age distribution of the majority of the fish farmers were between 41 – 50 years accounting for (56.7%) followed by age between 31 – 40 (13.3%) and the least being ages between 1 – 20 (3.3%). This could be attributed to the fact that fish farming requires patient which is easily provided by the old people above forty years old. Ayodele (1999) in another study reported that respondents between the ages of 21 – 50 years comprising men and women indicated active age that will support increase production.

Results also showed, that (43.3%) of the fish farmers had pond size of about 1-400m^2 followed by (40%) of the farmers which had 401-800m^3 pond size, while about (16.7%) of them had the largest pond size of about 801-200m^2 respectively. This agrees with the reports of (Okaeme, 1996) who revealed that the size of most Nigerian ponds range from 25m^2 to 400m^2 Pillay and Kutty (2001) also reported that in intensive culture system, there is an obvious preference for smaller ponds ranging in size from 1 – 5ha. Results further showed that (40%) of the respondents had number of fish pond ranging between 1-2 ponds, while the remaining (3.3%) of the fish farmers had between 11 – 15 ponds. This may largely be as a result of the level of the financial capability of most of the fish farmers. As fish farming is known to be of moderate high financial need (Okaeme, 1996). Results also showed that (53.3%) of the fish farmers used earthen ponds which is the major type of pond, while only about (3.3%) of the fish farmers used recirculatory ponds for culturing fish.

Sixty percent (60%) of the catfish farmers engage in monoculture, while 40% practice polyculture method of production Table 2 also indicated that 63.3% of fish farmers produce Heteroclarias species while 16.7% produce Carias as the least of species under culture by the respondents. The result showed that the method of land ownership by fish farmers is mostly through purchased having a percentage value of (60%), leasing accounts for 23.6%, while others account for 3.3% method of land ownership for fish production. The result showed that (53.3%) of the fish farmers have streams and rivers as their water source, well water accounted for 13.3% as their water source for cat fish production while borehole accounted for 33.3%. Pillay and Kutty (2001) reported that availability of water of appropriate quality is particularly important for land based aqua-culture. These results therefore indicated that fish culturing is best using natural sources of water like river and streams as enumerated by (Pillay and Kutty, 2001). This could be due to the fact that some of the rivers and streams exist all year round within the study areas.

Majority of the fish farmers (80%) source their funds through personal savings 3.3% sourced their funds through cooperatives, while 13.5% of the farmers sourced theirs through fund raising. Table 3 showed that 10 respondents (33.3%) stocked less than 500 fishes per pond, while 6.7% of the fish farmers stocked between 3,000 – 4500 fishes per pond being the least in number. Type of feed use by respondents for fish production showed that 50% of the farmers imported feed while 46.7% of the farmers use local feeds. This showed that fishes within the study area can do well, using local formulated feeds and protein content of the feed. Sixty percent (60%) of the fish farmers feed their fish twice a day. (33.3%) feed their fishes thrice a day while (3.3%) of the respondents feed their fish once a day.

The result of sample t-statistics for the cost variable for fish production in the study area showed that the highest incurable cost by the fish farmers is the storage cost which had a total mean of N929,192.32 having a t-statistics value of (0.000**). This could be attributed to the perishable nature of fish products that required storage facilities that are capital intensive. This was closely followed by the cost of land acquisition for pond construction N350,316 (0.000**) which could be attributed to the nearness of Nasarawa State to the FCT Abuja and the influx of people from neighbouring states like Benue, Plateau and Taraba, which makes land acquisition for fish farming highly capital intensive. Pond construction cost had a mean value of N224, 133 (0.003**).

Result of 4-points Likert Scale Ranking of the constraints of catfish farming in the study area revealed that problem of water supply with mean of 3.27 was rated highest. The scale further indicated problem of fingerlings supply (2.79) comes next while the problem of feed unavailability with mean of a 2.45 was rated as the least problem confronting the fish farmers in the study area.

Conclusion and Recommendation

From the study, it was found that there are socio-economic constraints to catfish production in the study area. These include use of feed availability, water supply, farming method, pest and diseases, credit and loan facilities absent of extension agent, absent of market and transport, shortage of storage facilities and environmental problems. Constraints put together contributed to low production of catfish production in Nasarawa State. In spite of the constraints majority (75%) of the farmers in the study area are still willing to raise catfish due to its numerous benefits.

Recommendations

The following recommendations are possible solutions to improve catfish production in the study area.

(i) There should be increase in research and extension services by government in other to find ways of improving fish production, processing, storage and marketing as a whole in the state.
(ii) Provision of credit facilities for fish farmers at affordable rate
(iii) The farmers should be given more formal and informal education so that they can improve on their productivity
(iv) Farmers should be able to test the soil and water samples to detect the presence of physiochemical parameters before venturing into fish production

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Table 1: Socio-Demographic Characteristics of respondent (n=30)

Variables	**Frequency**	**Percentage**
Gender		
Male	26	86.7
Female	4	13.3
Total	**30**	**100**
Age (years)		
<20	1	3.3
31-40	4	13.3
41-50	17	56.7
>50	7	23.3
Total	**29**	**100**
Education		
Primary	0	0
Secondary	10	33.3
Tertiary	16	53.3
No formal education	4	13.3
Total	**30**	**100**
Household (people)		
0 – 5	12	41.38
6 – 10	14	48.28
11 above	3	10.34
Total	**29**	**100**
Marital status		
Single	2	7.41
Married	25	92.59
Total	**27**	**92.59**
Religion effect		
To large extent	14	46.67
Little extent	12	40.0
No effect	3	10.0
Total	**29**	**96.67**
Cultural effect		
To large extent	15	50.00
Little extent	11	36.67
Non – effect	3	10.0
Total	**29**	**96.67**

Table 2: Method of production, species and resources required for fish production in the study area.

Variables	Frequency	Percentage
Method of production		
Mono culture	18	60
Poly culture	12	40
Total	**30**	**100**
Species produced		
Clarias	5	16.7
Tilapia	6	20
Heteroclarias	19	63.3
Total	**30**	**100**
Resources for production		
Land	11	36.7
Water	17	56.7
Capital	1	3.3
Total	**29**	**96.7**
Number of workers		
2 workers	12	40
4 workers	13	43.3
5 workers	5	16
Total	**30**	**100**
Production type		
Fingerlings	20	66.7
Juvenile	10	33.3
Total	**30**	**100**

Table 3: Stocking density and feeding methods used by respondents

Variables	Frequency	Percentage
Stock density		
<500	10	33.3
501 – 1500	5	16.6
1,501 – 3000	7	23.3
3,001 – 4500	2	6.7
>4501 and above	4	13.4
Total	**28**	**93.3**
Types of feed used		
Local feed	14	46.7
Imported feed	15	50
Total	**29**	**96.9**
Rate of feeding (kg/day)		
1 kg/day	5	16.7
2 kg/day	10	33.3
3 kg/day	11	36.7
4 kg/day	3	10
Total	**29**	**96.7**
Feeding frequency		
1 time/day	1	3.3
2 times/day	18	60
3 times/day	10	33.3
4 times/day	1	3.3
Total	**30**	**100**

Table 4: Sample t-statistics for the cost parameters required for cat fish production in the study area.

	N	Mean	Std Deviation	Std. Error mean	t.	df.	Sig.
Fingerlings cost (N)	30	66.33	22.05	4.03	16.479	29	.000**
Feed cost (N)	30	19118.33	81402.35	14861.97	1.286	29	.208^{ns}
Fertilizer cost	6	1383.33	672.81	274.67	5.036	5	.004**
Lime cost	6	300.00	122.47	50.00	6.000	5	.002**
Pesticide cost	2	85000.00	106066.02	75000.00	1.133	1	.460^{ns}
Transport cost	19	193447.7	257271.38	59022.85	3.278	18	.004**
Storage cost	26	929192.31	1002857.48	196676.53	4.724	25	.000**
Land cost	19	350315.79	333218.82	76445.64	4.583	18	.000**
Pond cost	19	224132.63	290029.14	66537.25	3.369	18	.003**
Water cost	1a	450000.00					
Hired labour cost	28	6411.07	13842.25	2615.94	2.451	27	0.21**
Miscellaneous cost	30	897.33	2666.76	486.88	1.843	29	.076^{ns}

Table 5: Likert Scale ranking of the constraint of catfish farming in the study area

Constraint	Sample size (n)	Not very serious 20 – 40% (1)	Slightly serious 20 – 40% (1)	Serious 61 – 80% (3)	Very serious 81–100% (4)	Decision total (T)	Mean decision (T/n)	Inference	Rank
Fingerlings supply									
Feed availability	29	2	5	19	3	71	2.45	Serious	6th
Water supply	30	0	0	22	8	98	30	2	0
Diseases and pests	30	2	1	24	3	88	2.93	Serious	3rd
Organized market	30	2	0	28	0	86	2.8	Serious	4th
Transportation	30	1	1	28	0	78	2.60	Serious	5th
Problem storage problem	30	1	1	28	0	78	2.60	Serious	5th