

Survey on feed and feeding practices of fish farmers in Edo State, Nigeria.

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Abstract - The study was carried out to analyze the feeding regime adopted by fish farmer in Edo State Nigeria. A multi-stage sampling method was used to select 90 fish farmers in Edo state. The study was conducted with the aid of well-structured questionnaires, administered to 90 respondents made up of fish farmers. The results showed that majority of the fish farmers in the area were men (76.7%). Majority of them were married (74.4%) and they were literate (43.3%) mainly tertiary and secondary education. Majority of them were of the age range of between 41 and 50 years (36.7%) and most of them were part time fish farmers (61.1%). Most of the fish farmers cultured catfish (*Clarias gariepinus*) (85.6%). Most of the fish farmers use commercial feed (42.2%) rather than local feed (26.7%), with most of the fish farmers preferring the use of concrete tanks (74.4%) over earthen ponds (15.6%). Most farmers feed their fish twice a day (71.6%) others feed three times daily (26.1%). Majority of the farmers feed their fish on per body weight basis (5% and 3% body weight) (62.1%) others feed to satiation (33.3%) and depending on availability (4.6%). The major unconventional feed ingredient used by farmers was blood meal (from animals) (52.9%). The major constraint faced by fish farmers was inadequate funding (20.0%) which was ranked first. Other constraints were high cost of transportation (18.9%), scarcity of ingredients (12.2%), then high cost of feed (8.9%).

Key Words: farmers in Edo State, Fish feeding, feeding regimes, Fish Nutrition and local feed.

INTRODUCTION

Rapid increase in population of Nigeria has led to a huge increase in the demand for animal protein which is essentially higher in quality than that of plant as it contains all essential amino acids for growth [4]. Our country has insufficient access to the amount and variety of food for a healthy and productive life because she has not fully exploited her agricultural potentials. Thus, the average protein intake in Nigeria which is about 19.38g/caput/day is low and far below FAO requirement of 75g/caput/day [18]. Fish production is economically viable and Nigeria has the resources to produce up to 5 million metric tons

annually [30]. For instance, Edo State is richly endowed with abundant inland water-bodies, flood plains-wetlands which are highly productive and ideal for artisan fisheries and aquaculture development.

Aquaculture therefore remains the only viable alternative for increasing fish production in order to meet the protein need of the people. It was observed that of the over 30,000 metric tons of various freshwater and brackish water fish species caught in the year 2000, catfishes were more abundant next to Tilapias. [10] reported that 27,488 metric tons of catfishes produced in 1990 were consumed locally. This implies that there is still great need for higher production for both local and international markets. In aquaculture, fish require adequate food supply in the right proportions and with proper nutritional contents needed for growth, energy, reproduction, movement, and other activities which they carry out.

MATERIALS AND METHODS

The study was carried out in Edo State, Nigeria. With a population of 3,218,332 people (NPC, 2006); a land area of 19,281.93 square kilometers and lies roughly between Latitudes 05° 44' and Longitudes 05° 4'E and 06° 45'E. The state is bounded by Kogi State in the north and east, Ondo State in the west and Delta State in the south.

Multi-stage sampling was employed in selecting respondents. The first stage involved purposive selection of the three senatorial zones which are Edo North, Edo South and Edo Central. The second stage involved purposive selection of two local government areas from each senatorial zone. The local government selected from Edo North senatorial district are Akoko Edo and Etsako Central local government area, Local government selected from Edo South senatorial district are Oredo and Ovia North East local government area, Local government selected from Edo Central senatorial district are Esan North East and Esan Central local government. The final stage was the selection of thirty

(30) fish farmers from each of the three senatorial districts, using snow ball sampling technique making a total of (90) fish farmers sampled for the study. Primary data were collected from the respondents using questionnaire/interview schedule. Collection of data was done through the use of questionnaire. A structured questionnaire was used to obtain information from ninety (90) fish farmers who were drawn from the three (3) senatorial districts in Edo state. Descriptive statistical technique using SPSS version 20 was used for data analysis.

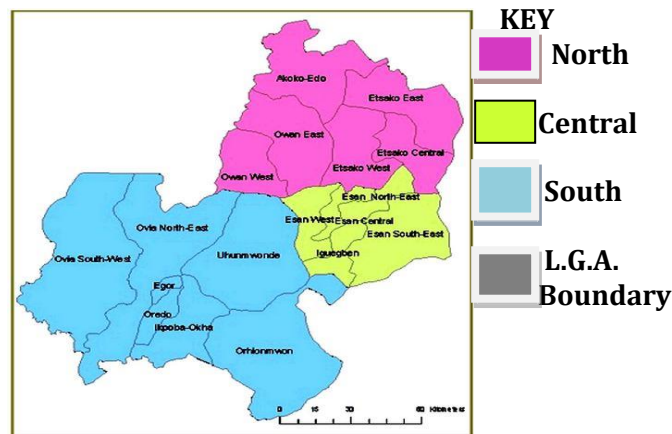


Fig 1. Map of Edo State showing Various Senatorial Districts

RESULTS AND DISCUSSIONS

DEMOGRAPHIC PROFILE OF RESPONDENTS

From the result obtained, 76.7% of the respondents were male while the remaining 23.3% was female. Age range of less than 30years was 30.0% 30-40years was 23.3%; 41-50years was 36.7% while those above 50years completed the remaining 10%. This indicates that most of the respondents were within the economically active population and therefore constitute a good labor force for fish farming industry [23]; an age in which they are considered highly productive and active to undertake strenuous task associated with farm work. This indicates that very few young and old people are involved in fish farming. Also, past studies revealed that older farmers often tend to be more conservative or traditional and were afraid of taking risk, which the adoption of new farm technology entails [24] Among the respondents the Full-time fish farmers represented 38.9% while those on part time basis were 61.1%.

Table -1: Distribution according to Gender

	Frequency	Percentage
Male	69	76.7%
Female	21	23.3%
Total	90	100%

Males accounted for 76.7% of the total respondents while females accounted for 23.3% of the total respondents which is quite low when compared to the males. The implication is that fish farming is dominated by males who have strength for the job in the study area. This is in agreement with [22] who noted that majority of fish farmers were males in his evaluation of the aquaculture status in Oyo state.

Table 2: Age of Respondent

	Frequency	Percentage
Less than 30years	27	30.0%
30-40	21	23.3%
41-50	33	36.7%
Above 50	9	10.0%
Total	90	100%

This result implies that fish farming activities are dominated by people between 41and 50 years of age which is the more active age bracket who have both strength and a reasonable level of maturity. The implication is that since the farmers are young, they are productive and innovative and can take risk in investments. This is in agreement with the results of [6] who observed same in fish farmers in Niger State; he reported that the age group 41-50 is the most active productive years of farmers.

Table 3: Farming Status of Farmers

	Frequency	Percentage
Full time	35	38.9%
Part time	55	61.1%
Total	90	100.0%

The primary occupation of the respondent revealed that majority (61.1) of the fish farmers in the study area were part- time farmers, 38.9% were full-time farmers. This implies that most of the fish farmers engaged in other occupation apart from fish farming. Occupation remains valid in our society as people have one or two things they engaged in which gives them sense of satisfaction and belonging in the society. This agrees with that of [13] in Niger State who reported that involvement of most fish farmers in the state are on part-time basis.

Table 4 Culture Facilities Used

Culture facilities	Frequency	Percentage
Earthen	14	15.6%
concrete tank	67	74.4%
plastic tank	3	3.3%
concrete/fibre	1	1.1%
Earthen/concrete	2	2.2%
Concrete/plastic	3	3.3%

The result of the culture facilities is shown in table 4. A higher percentage of respondent 74.4% uses concrete tank, this was followed with farmers that uses earthen pond (15.6%) while the least culture facilities used in Edo state is a combination of concrete and fibre tank. while 1.1% either went for earthen/fibre tank or tarpaulin tank. This is similar to findings of [21] and [20] that convenience or adoption rate of culture in concrete tanks was mainly to more prominent features of urban and peri-urban fish farming, more cost-effective feed conversion, greater survival records, unit size reductions, higher fish stocking densities, more intensive grow-out management and art of backyard farming. This was also similar to findings of [19] in Oyo State.

Table 5 Species of Fish Cultured

Species	Frequency	Percentage
Catfish	77	85.6%
Tilapia	2	2.2%
catfish/tilapia	2	2.2%
Catfish/bony tongue	1	1.1%
catfish/tilapia/bony tongue	2	2.2%
catfish/carp	3	3.3%

The African catfish (*Clarias gariepinus*) has been identified as one of the fish species with the greatest potential to contribute to fish production in Nigeria. In 2004, it contributed about 32% of the total production [5].

From the result obtained, 85.6% of fish farmers prefer monoculture of catfish this may be as a result of poor market price for Tilapia due to too much bone. The reasons for this species might also be due to the fact that the species has a high market value and it can attain the market size under a few months of rearing. This is similar to findings of [21] and [20] that adoption rate of monoculture of *Clarias* sp. had replaced poly culture due to better market prices, greater demand preference, cultural preferences of most customers, hardiness of fish stock convenient for culture, presentation of fish live at sales point and relatively superior/timely growth performance.

Table 6: Types of Feeds Used For Feeding Fish

	Frequency	Percentage
commercial source	38	42.2%
local feed source	24	26.7%
Both	28	31.1%

The result of the study indicates that most farmers (42.2%) in Edo state go for commercial source of feed. This is a common practice of many fish farmers who believe that the imported feeds are high quality fish meal feeds with a complete nutritional profile for meeting the nutritional requirement of fish [12], and

that it will give the specially young and vulnerable fingerlings a healthy start. This is in agreement with [25] who pointed out that the effectiveness of a feed is a preferred determinant rather than the cost of the feed.

Table 7 Reason for Choice of Feed

Reason for local feed use	Frequency	Percentage
readily available	29	35.4%
they are both good feeds	6	7.3%
local feed is an alternative	7	8.5%
cant formulate local feed	3	3.7%
lower cost of local feed	36	43.9%
commercial feed for small fish, local feed for big fish	1	1.2%

From the study, 43.9% which constituted the majority on this category choose local feed because of its lower cost when compared to commercial or imported fish feed. Since the success of fish farming depend on the provision of suitable and economical fish feeds, we need to use locally available feedstuff especially aquaculture by-products to reduce the price of complete feeds [9]. This report is also in agreement with the work of [26] who reported that when farmers used locally made feeds, feed cost always tend to drop by 10-20% irrespective of intensity of stocking or species stocked.

Table 8: Frequency of Feeding

Frequency of feeding	Frequency	Percentage
Once a day	2	2.3%
Twice a day	63	71.6%
Three times a day	23	26.1%

From the result above, it indicated that 71.6% of fish farmers in Edo state prefer to feed their fish twice a day. This might be to reduce feed wastage and save cost. This result is similar to what was reported by [15] that feeding of *Clarias gariepinus* fingerlings twice a day is the best feeding frequency. [2] also reported that

feeding *Clarias gariepinus* fingerlings twice or thrice a day was effective for optimum result in growth. 26.1% of the farmers chose feeding three times a day and this is similar to report of [1] that feeding *Clarias gariepinus* fingerlings thrice a day gave best results in terms of growth and economic profit. [7] found that feeding *Heterobranchus bidorsails* once a day had the best result. This is however, represented by 2.3% of fish farmers in the state.

Table 9 Feeding Frequency and Weight percent

Frequency of feeding	Frequency	Percentage
based on body weight	54	62.1%
Satiation	29	33.3%
depending on availability	4	4.6%
Weight percent		
3% body weight	14	23.3%
5% body weight	45	75%
Others	1	1.7%

The result on the study indicated that 62.1% of farmers in Edo state prefer to feed their fish based on weight. 33.3% of farmers feed their fish depending on the availability of feed while the remaining 4.6% feed their fish base on discretion. On feeding of fish based on body weight 75% of farmers feed their fish at 5% body weight; 23.3% feed at 3% body weight while the remaining 1.7% feed on other percentage. [3] reported that newly hatched fry are fed several times daily at 6–10 percent of fish weight. Fingerlings are fed between 2 and 5 percent of their body weight per day, while brood fish are fed 1 to 2 percent of their weight per day.

Table 10: Unconventional Feed Ingredients

Unconventional ingredient	Frequency	Percentage
Blood meal	45	52.9%
Feather meal	4	4.7%
Earthworm meal	3	3.5%
Others	33	38.8%

Unconventional fish feeds are potential feed ingredients, which have not been used in fish feed production. They contain high quality feed ingredients that can compare favorably with conventional feed types and are expected to be cheaper by virtue of the fact that there is no competition for human consumption. Unconventional fish feed can be of animal or plant source [28]. From the result above, most of the farmers (52.9%) in Edo state utilizes blood meal as unconventional ingredient in the diet of fish. This might be due to it being available and relatively cheap. Blood meal is a good quality ingredient for fish and has been tested successfully in many fish species. Spray-dried blood meal can be used as a binder in fish feeds. In gibel carp (*Carassius auratus gibelio*), African catfish (*Clarias gariepinus*) [11] and tilapia, spray-dried blood meal can replace 50 to 75 % of the fish meal, and in rainbow trout (*Onchorhynchus mykiss*) up to 100 % [29; 16]. However, it was found to lower performance in tilapia when replacing fish meal [8].

Table 11: Constraints in Feeding and Sourcing for Feed

	Frequency	Percentage
1,2,3,4	18	20.0%
1,3,4	17	18.9%
3,4	14	15.6%
4	1	1.1%
2	11	12.2%
2,3,4	6	6.7%
3	8	8.9%
1,2,3	4	4.4%
1	3	3.3%
1,4	3	3.3%
1,2,4	1	1.1%
1,3,4,5	1	1.1%
2,3,4,5	1	1.1%
TOTAL	90	100%

1. Inadequate funding
2. Scarcity of feed ingredients
3. High cost of feed
4. High cost of transportation
5. Others

The result of the study revealed 20% of farmers suffer from inadequate funding, scarcity of feeding ingredient, high cost of feed and high transportation cost. 18.9% chose a combination of inadequate feeding, high cost of ingredient and transportation cost; 15.6% chose just combination of cost of feed and cost of transportation; 8.9% chose just high cost of feed as source of feed. It was observed that of all the categories respondent picked high cost of feed as major constraint to fish farming in Edo state. [17] also reported cost of feed as major constraint facing fish farmers in Ekiti state. [14] have reported that feed constitute about 60% of production cost. [25] acknowledged fish feed to be the most expensive input in fish culture operations and accounts for about 70% of production cost. [27] also stated that Diet costs constitute the largest annual variable outlay, up to 80% of operating expenses incurred during intensive production of an aquaculture enterprise.

Table 12: Can You Compare Local Feed with Commercial Feed Nutritionally?

	Frequency	Percentage
Yes	49	52.8%
No	36	40.4%
I don't know	6	6.7%

This result implies that there is improvement in the feed production technology in the state. This result is in disagreement with [14] who said that the low quality of fish feed and its attendant high cost are the major factors limiting the development of aquaculture in Africa.

CONCLUSIONS

It is therefore evident from the result obtained in this study that catfish should be fed twice or three times daily; morning, noon and evening time of the day. Feed is the single most important cost in total production cost for fish. This study has shown that the cost of feed for fish farmers in Edo State is high, but is similar to prices in other parts of Nigeria. The study has also shown that many fish farmers over feed their fish,

causing extra cost, as well as leading to decreased water quality in the ponds, slowing the growth rate of the fish. Farmers need to improve their production practices to understand proper feeding regimes so they can reduce the amount they spending on fish feeds and put their income to more productive use.

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