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ANALYSIS OF SOCIO-ECONOMIC AND PRACTICES OF FISH FARMERS TOWARDS FISH HEALTH MANAGEMENT IN MAIDUGURI AND ITS ENVIRONMENT

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ABSTRACT
The analysis of socio-economic and practices of fish farmers towards fish health management was carried out in Maiduguri and its environment. The aim was to know the social characteristic of fish farmers, farming practices and to ascertain their biosecurity during fish farming. Atotal of 50 questioners constituting six questions on the socio-economics, twenty on practices towards fish farming and seven on biosecurity were made and distributed to 50 respondents within Maiduguri and its environment. The result shows that 76% of the people involved in fish farming are men with 68% out of them were single. More than 50% of the farmer's qualifications are secondary school and diploma holders with few (20%) of them having children above 12.The types of culture media use mostly by these farmers are the concrete pond (94%) and they mostly involve in monoculture (68%). For those that involve in fish breeding, they always obtain their parent stock from other farms (74%) rather than raising them in their own farm. The farmers experience mortality in their farms because they do not have knowledge of fish management such as diagnosing, feeding, water quality analysis, medication, vaccine, good water source and so on. The use of biosecurity such as sanitation, disinfection, sterilization of materials, use of protective cloths, discard of effluent water and mortalities were not done in the usual manner and these may lead to reduction in fish production in hatcheries.

Keywords: Analysis, Socio-economic, Practices, Farmers, Health, Management

INTRODUCTION

Fish is important in terms of employment income generation, poverty alleviation, foreign exchange earningsand provision of raw materials for the animal feed industry (FDF, 2010). Fish consumption in Nigeriais high, annually reaching 1.2 million metric tons (FDF, 2010). Inland fisheries are clearly important to local food supplies.The overall inland production is consumed in theregion representing nearly one-half of the local supplies (with import excluded).Kenya, Nigeria, the united Republic of Tanzania, Uganda and Zaire are sub-SaharanAfrica's top fresh water-fish producing countries, contributing 70% of total harvest.Fresh water fisheries are almost all artisanal and proper management is urgently needed as most fishing grounds now show sign of intensive exploitation.Culture fisheries play an important role in many sub-Sahara African countries as a major contributor to animal protein, foreign exchange earnings and a generator of rural employment. An estimated 8 million people were directly or indirectly employed in the sector (FAO, 1996). Fish are affected by various pests and diseases which posed threat in the fish farming industries. In recent years, many researchers have been carried out by many authors such as (Shettima *et al*., 2014; Faruk *et al.,* 2004; Ibemere and Ezeano, 2014), Ajana (1995), Ifejika and Ayanda (2005) to ascertain the socio-economic and knowledge of fish diseases in fish farms. Despites all the efforts, lack of knowledge,proper practice towards fish disease and low income coupled with higher house hold size has pose serious problem in fish farming. This study e valuated the socio-economic, knowledge, attitude and practice of fishers towards fish farms management

MATERIALS AND METHOD

Study Area

This study was carried out in Lake Alau North-East Nigeria. It is Located between latitudes 12^0 N and13^0N and longitude 11^0E and 13^0E with the total surface area of 56Km^2 (CBDA, 1986). The climate is sahelian with two distinct seasons. The rainy season start from June to October with mean annual rain fall of about 600mm (Bankole *et al.,* 2003).The dry- hamattan season which start from November to February with very low temperature between (16^0C-19^0C) occur in the night while 26^0C and 29^0C during the day time. (Idowu *et al*. 2004).

Sampling frame technique

A multi- stage random sampling technique was used to select respondents. A total of 50 questioners constituting 6 questions on the socio-economics, 20 on the practices towards fish culture and 7on biosecurity were made and distributed to 50 respondents within Maiduguri (Damboa road, Muna garage, Polo and Bolori). To ensure that the sample was an unbiased representation of the population targeted, the cluster/random sampling techniques was used in choosing the respondents.

Data analysis

Data obtained from the primary questioners were subjected to descriptive statistic; the descriptive statistics used include percentage and frequency. The data was analyzed using Statistical Package for Social Science (SPSS) version 16.

RESULTS AND DISCUSSION

Social Characteristics of the fish farmers in Maiduguri and its environs

The Social Characteristics of the fish farmers in Maiduguri and its environment were presented in table 1 below. The social characteristics of fish farmers within Maiduguri and its environs have shown that majority (76.0%) of the fish farmers were males, while 24.0% were females. The implication is that male dominated fish farming in the study area. This is in close range with the evaluation of Ibemere and Ezeano (2014) who reported (64.4%) for males while (35.6%) were females in River State. The marital statuses of the respondent showed that majority (68.0%) of the fish farmer were married while 32.0% were singles. The implication is that the fish farming business is dominated by the married, in the study area. This was in agreement with the findings of Ifejika and Ayande (2005) who reported same for fish farmers in Kainji Lake Basin of Nigeria. In terms of educational attainment of fish farmer in the study area, majority (48.0%) were NCE/Diploma holders while 6.0% were primary school certificate holders, 10.0% were SSCE holders, 2.0% were HND/Degree holders while (14.0%) had no formal education. The implication of this findings is that most of the fish farmers in the study area can read and write and can easily adapt to new innovation. This was in agreement with the reports of Ajana (1995), in the survey of status of the fish farming in Ogun State. The household size indicated that majority (34.0%) had a household size of 4 – 8 while (28%) had less than 4 family members, 20% had 12 and above while 18.0% had 9-12 household number. This indicated that there was enough man power in the study area while huge family expenditure is inevitable. This finding was in line with that of Ibemere and Ezeano (2014) on status of fish farming in Rivers State, Nigeria. The primary occupation of the respondent revealed that majority (36.0%) of the fish farmers in the study area were civil servants, 28% were student, while only 10.0% were full time farmers. This was indicated that fish farmers may not devote their time in farming business, because of their office duties. This was in agreement with that of Ifejika and Ayanda (2005) in Niger State who reported that involvement of most fish farmers in the State are on part-time basis.

Table 1: Fish Farmers Socio-economic status in Maiduguri and its environments

Socio-economic	Frequency	% Responses
Gender		
Male	38	76.0
Female	12	24.0
Marital Status		
Single	16	32.0
Married	34	68.0
Level of Education		
No Formal Education	7	14.0
Primary	3	6.0
Secondary	5	10.0
NCE/Diploma	24	48.0
HND/Degree	10	20.0
Household Size		
Less than 4	14	28.0
4 – 8	9	18.0
9 -12	17	34.0
12 and above	10	20.0
Occupation		
Fish farming	5	10.0
Students	14	28.0
Civil servants	18	36.0
Location of Farm		
Bolori	7	14.0
Damboa Road	14	28.0
Muna Garage	9	18.0
Polo	20	40.0

Fish Farming Practices of fish farmers in Maiduguri and its environ

The fish farming practice of the farmers in Maiduguri and its environments are presented in table 2. The type of ponds used for fish farming indicated that 94.0% of the fish farmers in the study area were using concrete ponds while 6.0% were using earthen ponds. The fish farmers in the study were relatively rich since they can afford land and concrete pond. This was in agreement with the report of Ajana (1995) who reported similar trend in Ogun State, Nigeria. Majority (60.0%) of the respondents were practicing monoculture that is the farming of single species of fish in a pond. Also, 26.0% of the farmer's reared more than one species, while 10.0% practice monosex culture and only 2.0% were practicing integrated farming. This was not in conformity with the report of Ibemere and Ezeano (2014) who reported that 38.9% of the fish farmers practice integrated fish farming conversely, 26.7%, 22.2%, and 72.2% were practising monoculture, polyculture and fisheries production only. The study shows that most of the farmers (92.7%) combined Tilapia and Clarias which further demonstrated that the farmers were earning multiple benefits of both space utilization and reduction in cost of feeding. About 28.8% of the fish farmers have hatchery in their farm, while 36.0% have no hatchery and buy fingerlings from other farms.

This finding was in agreement with the work of Ibemere and Ezeano (2014) who reported that 32.2% sources their fingerlings from other farms. Majority of the fish farmers sources brood stock from other farms which indicathat fish farmers in the study area may not know the genetic history of the broodstock they are using and so cannot predict the performance of their fingerlings after breeding. The farmers within the study area still source for fingerlings from the wild, an estimated value of 6.0% of the fish farmers source fingerlings from the wild while 74.0% source fingerlings from others which also include importation from other States like Lagos. The implication was that fish of unknown genetic and health information may pause threat in the future in the sense that some pathogen peculiar to the fish species may be dormant in the fish original domain and become active in the new environment due to environmental factors such as temperature which will cause mortality and lost is inevitable.Twenty percent (20%) of these fish farmers from the study area breed their own fingerlings by themselves. The implication was that, these farmers know their fish in terms of growth performance, and fish from these farms are more reliable than their counterpart. Mortality in the hatchery is too high (64.0%) which may not be unconnected to the fact that fingerlings in the hatcheries need "tender loving care" and much interaction occur between the success of the breeding and survival, and that of the physico-chemical parameters of the hatchery water and the farmers could be naïve because not all actually studied fisheries and aquaculture. Some saw others hatching and followed suit while some only went for seminars and then embarked on fish breeding which are not the best causes of mortality in hatchery but was mostly blamed on poor water quality. This may be due to the fact that the water profile is drastically reducing and the concentration of gypsum is on the increase, unless the waters are treated the mortality of fish in the hatcheries are unstoppable, the fish farmers that reported infectious and non-infectious diseases were 33.3 and 22.2% respectively. However, these percentages are unreliable because fish death is not diagnosed and without diagnosis, no reasonable conclusion can be drawn. Without knowing the cause of a disease condition, one cannot start treatment. Majority (80.0%) of the fish farmers do not diagnose their sick fishes. The proper storage method among fish farmers in the study area was high (76.0%) which indicated that most of the nutrient in the feeds is available for the fish in a situation where the feed is not expired. Additionally, farmers' response regarding source of water indicated that 86.0% of the farmers were using borehole water which requires storage because the dissolved oxygen is low and the temperature is a little higher, this means that the water supplies in the study area was quantitative because with power supply, one can pump as much water as possible. This work was in agreement with the findings of Ogunlade (2007) in survey of fish farming activities in Osun State. On the other hand, 10.0 and 4.0% of the fish farmers used stream and well water respectively as sources of water. This study revealed that fish farmers do not give priority to water quality testing where, 68.0% of the farmer don't care about the quality of pond water. This means that fish may die due to stress of different calibre such as low dissolved oxygen, high temperature and ammonia. Frequency of pond water change and washing of pond during medication recorded poor performance from the respondents. This was in divergent with the work of Faruk *et al.* (2004) who documented that the knowledge of the farmers on basic fish management was poor.The treatment with antibiotics in this study recorded 48.0% which means reasonable amount of farmers are using antibiotics but without diagnosis and prescription and this does more harm than good, because of antibiotic pressure which has high tendency of causing antibiotic resistance. This study differed with the work of Faruk *et al.,* (2004) who documented that the status of fish disease and health management practices were 46.4% treatment with lime and potash while 0.8% was using lime and antibiotic. Information on vaccines and vaccination was lacking in the study area. The implication is that the farmers are left behind in terms of new innovations in aquaculture.

Table 2: Fish Farming Practice in maiduguri and its environments

Fish farming practice	Frequency	% Responses
Types of culture system used		
Concrete pond	47	94.0
Earthen pond	3	6.0
Types of culture practice		
Mono culture	30	60.0
Poly culture	13	68.0
Mon sex culture	6	12.0
Integrated farming	1	2.0
Combination of species cultured		
Tilapia x Clarias	12	92.3
Clarias x Heterotis	0	0.00
Tilapia x Heterotis	0	0.00
Heterobranchus x Tilapia	1	7.69
Do you have hatchery		
Yes	14	28.0
No	36	72.0
Source of brood stock		
Other farm	10	71.42
Owned farm	4	28.57
Source of fingerlings		
Wild	3	6.0
Other farms	37	74.0

Owned farms	10	20.0
Any mortality in hatchery		
Yes	9	64.0
No	5	35.71
Causes of mortality in hatchery		
Poor water quality	4	44.4
Infectious disease	3	33.3
Non-infectious disease	2	22.2
Do you carry out diagnosis on fish		
Yes	10	20.0
No	40	80.0
Source of Fish Feed		
Foreign feed	15	30.0
Locally formulated	28	56.0
Depend on natural feed	7	14.0
Feed storage facilities		
Air tide container	12	24.0
Poly bags	38	76.0
Source of water		
Borehole	43	86.0
Well	2	4.0
Stream	5	10.0
Do you carry out water quality analysis?		
Yes	16	32.0
No	34	68.0
How frequent do you change water?		
Fortnightly	26	52.0
Monthly	11	22.0
Only when the need arise	13	26.0
Do you wash pond while changing?		
Yes	20	40.0
No	30	60.0
Do you feed during medication?		
Yes	8	16.0
No	42	84.0

Fish Bio-security practiced by fish farmers in Maiduguri and its environments

Table 3 below presented fish bio-security practiced by fish farmers in Maiduguri and its environments. Bio-security has to do with all the necessary steps and procedures followed in order to ensure the health and life of the fishes.The bio-security practice with respect to sanitation revealed that 20 (40%) were carrying out sanitation while 30(60.0%) were not.Out of the 50 respondent, 21(42%) were using disinfectant while 29(58.0%) were not using any kind of disinfectant.Visitors contact with stock has shown that out of the 50 respondents, 25(50.0%) were Yes and 25(50.0%) were No.with respect to use of protective clothing, only18 (36.05) of the respondents used protective clothing while 32(64.0%) were not using any kind of protective clothing.Out of the 50 respondents, 26(52.0%) were borrowing equipment while 24(48.0%) were not borrowing equipment. 41(82.0%) were majority of the respondents that don't disinfect/sterilize borrowed equipment while those that disinfect borrowed equipments recorded 9(18.0%).With respect to effluent water discard, majority 38(76.0%) were just flushing out the pond water, 12(24.0%) were recycling/reusing the water through irrigation. Mode of disposal of mortality, 40(80.0%) of the respondent cook and eat while 7(14.0%), 2 (4.0%) and 1(2.0%) used to buried in the ground, incorporated into fish feed and fed to fish directly respectively. The health and bio security aspect of this study was very poor. The result of his research was in line with Faruk *et al.*, (2004), this was due to high stocking density of fish, inexperience of most fish farmers, poor input and poor understanding of fish health management.

Table 3: Fish Bio-security of fish farmers

Biosecurity	Frequency	% Responses
Do you carry out sanitation on your farm?		
Yes	20	40.0
No	30	60.0
Do you use disinfectant?		
Yes	21	42.0
No	29	58.0
Do visitors have contact with stock?		

Yes	25	50.0
No	25	50.0
Does your personnel use protective cloth?		
Yes	18	36.0
No	32	64.0
Do you borrow equipment?		
Yes	26	52.0
No	24	48.0
Do you sterilize/disinfect the borrowed equipment?		
Yes	9	18.0
No	41	82.0
How do you discard affluent water?		
Watering vegetables	12	24.0
Just flushed out	38	76.0
How do you dispose mortalities?		
Buried in the ground	7	14.0
Incorporated into fish feed	2	4.0
Cook and eat	40	80.0
Fed to fish directly	1	2.0

CONCLUSION

The analysis of socio-economic and practices of fish farmers towards fish health management in Maiduguri and its environment was very crucial in order to know the level of education and knowledge of fish farmers for sustainable farming. The majority of fish farmers in Maiduguri and its environment were men and most of them were single with poor educational background. Majority of the married farmers had children ranging from 2-4. The types of culture media used mostly by these farmers are the concrete pond and they mostly involved in monoculture. For those that involve in fish breeding, they always obtain their parent stock from other farms rather than raising them in their own farm. The farmers experience mortality in their farms because they do not have knowledge of fish management such as diagnosing, feeding, water quality analysis, medication, vaccine, good water source and so on. The use of bio-security such as sanitation, disinfection, sterilization of materials, use of protective cloths, discard of effluent water and mortalities were not done in the usual manner and these may led to reduction in fish production in hatcheries.

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