Status of fish farming in Rivers State, Nigeria

Ibemere, I. F. / Ezeano, C. I.

Abstract

The study surveyed the status of fish farming in Rivers State of Nigeria. Structured interview schedule questionnaires were used in sourcing information from 90 fish farmers randomly selected from nine local government areas, with three local government each drawn from each agricultural zone of the state. Data obtained were analyzed using descriptive statistics. The findings revealed that majority (34.4%) of the fish farmers were male and between the age range of 41–50 years. 31.1% of fish farmers cultured their fish in concrete fish tanks. The total mean annual production of fishes was 41,000 metric tons, 38.9% of fish farmers practiced integrated fish farming, 72.2% of the farmers practice only fish production; 58.9% of farmers sourced their information from friends/fellow farmers. In terms of water supply, 40.0% of farmers sourced their water supply from borehole, 36.6% use tilapia species as their fingerlings, 38.9% of farmers sourced their fingerlings from government hatchery. 15.2% of farmers indicated that they suffer loss of tilapia, 54.4% farmers use partial harvest, 92.6% of farmers indicated irregular electricity supply as a major constraint to fish production. In order to facilitate the efficient operation of fish farming in the study area, technical advice on pond construction and preparation, species selection and supply for stocking purposes and collection of relevant data on aquaculture will help in the improvement of fish farming in the study area.

Keywords: Aquaculture, fish, Rivers State.

Introduction

Fish farming, although over 2000 years old started in Nigeria in the early 1950's first in Panyam Plateau state, the Onikan in Lagos and Umuna Okigwe in Imo State (Wokoma, 1986), the fish yields and desired impact of these government fish farms has not been as appreciable as was earlier intended. Until recently the popularization of fish farming remained largely within government circle. Several government policies attempted to improve fish farming. In 1980s the Directorate of Food, Road and Rural Infrastructure (DFRRI) introduced nationwide the homestead fish pond and hatchery construction projects. This gave rise to establishment of over 3,000 homestead fish ponds as well as hatcheries in each of the existing states of Nigeria (Satia, 1990; NEPAD, 2005).

Rivers state belongs to one of the coastal states in Niger Delta region of the country with vast potential for fish farming (Anyanwu et al., 2007). The state is characterized by various types of water bodies such as rivers, fresh and brackish water, creeks and estuaries as well as marine water bodies. These water bodies provide great opportunities for aquaculture. Fish farming in the state is rather means of capture fisheries which is the preoccupation of most riverine communities in the state. The need to increase food supply especially animal protein in Nigeria like in most third world countries gave rise to culture fishery activities in the state (Akinrotimi et al., 2007). In recent times, aquaculture has gained wide popularity. It has been identified as a rational way of augmenting the dwindling fish supply from capture fisheries (Ezenwa, 2004). This increase in acceptance could also be due to the growing demand for some fresh and brackish water fish species for the supply of valuable fish protein (Akinrotimi et al., 2007).

Rivers state being a maritime state with access to the sea, the state is endowed with some major inland water bodies and their valuable resources which could be harnessed to augment capture fisheries production. The fish farmers cannot meet the fish demand of the people and that makes fish to be very expensive which also makes the fish to be food for the rich. The population of the state is increasing daily and fish demand is also increasing, but the production is still low, thus a lacuna exists which this research intends to fill (Pepple and Ebonwu, 2004). The objective of this study is to survey the status of fishing in Rivers State. With the aim of ascertaining the socioeconomic characteristics of the fish farmers; the production level of fish farmers, fish farming management practices; and determine the constraints to fish farming in the study area.

Materials and Methods

Area of Study: This study was carried out in Rivers State of Nigeria. The state is bounded on the south by Atlantic Ocean, on the north by Anambra state, Imo and Abia states, on the east by Akwa Ibom state and the west by Bayelsa and Delta states. Rivers State which is in the Niger Delta has topography of flat plains with a network of Rivers and tributaries. These include new Calabar, Orashi, Bonny, Sombre and Bartholomew Rivers. Rivers State lies between latitude five 5° N' north and mid-way between longitude 5° S' south of the Greenwich Meridian (Howard, 2007). The state is divided into 3 agricultural zones as shown in table 1 according to the Agricultural zoning system of Rivers State Agricultural Development Project (RISADP). The 3 zones are made up of 23 LGAs (local government areas) of Rivers State and they are:

Table 1: Agricultural zones with their LGAs.

S/N	Zones	Local Government Areas
1.	I	Port Harcourt, Obio/Akpor, Ikwerre, Emohua, Oyiabo, Eleme, Gokana, Khana, Tai, Okirika, Ogu/Gbolo.
2.	II	Abua/Odual, Degema, Akuku-Toru, Asari-Toru, Bonny, Andoni and Opobo/Nkoro
3.	III	Etche, Ahoada East, Ahoada West, Ogba/Egbema/Ndoni, Omuma.

Source: Howard (2007)

Sampling technique, sample size and data analysis: Random sampling techniques were employed in the selection of

Table 1: Demographic characteristics of fish farmers (n=90).

Age of Respondents (years)	Frequency	Percent	Mean
21-30	15	16.7	
31-40	21	23.3	
41-50	31	34.4	42.3
50 and above	23	25.6	
Total	90	100.0	
Gender of respondents			
Male	58	64.4	
Female	32	35.6	
Total	90	100.0	
Marital status of respondents			
Single	26	28.9	
Married	55	61.1	
Widowed	9	10.0	
Total	90	100.0	
Household size			
1-5 persons	27	30.0	
6-10 persons	38	42.2	08.0
11-15 person	15	16.7	
16-20 persons	10	11.1	
Total	90	100.0	
Educational level			
First School Leaving Certificate	2	2.2	
SSCE	31	34.4	
OND/NCE	9	10.0	
HND/B.Sc.	25	27.8	
M.Sc.	13	14.4	
Ph.D.	10	11.1	
Total	90	100.0	
Primary occupation of respondents			
Full-time farming	39	43.3	
Farming/Business	28	31.1	
Farmer/Civil servant	16	17.8	
Retired civil servant/farmer	7	7.8	
Total	90	100.0	
Farming experience (in years)			
1-5	23	25.6	
6-10	42	46.7	
11-15	11	12.2	
16-20	14	15.6	
Total	90	100.0	
Land ownership			
Inherited	71	78.9	
Leased/rent	5	5.6	
Share cropping	7	7.8	
Purchased	7	7.8	
Total	90	100.0	
Annual income from fish sales			
<N100,000	18	20.0	
N100,000-N200,000	28	31.1	
N201,000-N300,000	20	22.2	
N301,000-N400,000	19	21.1	
Above N501,000	5	5.6	
Total	90	100.0	

Source: Field Survey, 2010

the samples from Agricultural Zones of Agricultural Development Programme of Rivers State. In zone I, 3 local government areas were selected; they are Ikwerre, Obio/Akpor and Tai. In zone II 3 local government areas were selected; they are Akuku-Toru, Asari-Toru, Abua/Odual. In zone III, Etche, Ogba/Egbema/ Ndoni and Omuma were also selected. In this 9 local government areas selected, 10 fish farmers were randomly selected from each local government making a total of 90 fish farmers. Data were collected by use of primary and secondary sources. Primary data were collected by use of interview schedule while secondary sources were by use of textbook, journal publication on aquaculture, and the internet. Structured interview schedule were used to collect data from the fish farmers. Data from the study were analyzed by use of descriptive statistics (FAO, 2005).

Results and Discussion

Socioeconomic characteristics of fish farmers are shown in Table 1, majority (34.4%) of the fish farmers were between the age range of 41-50 years, 25.6% were above 50 years, while 23.3% were between 31-40 years. The mean age is 42.3 which showed that the farmers are relatively young. 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 Bolorundiro (2003) 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. Also on the issue of gender majority (64.4%) of the respondents were males, while 35.6% were females. The implication is that male dominated fish farming in the study area. This is in agreement with Olawoye (2001) who noted that majority of fish farmers were males in his evaluation of the aquaculture status in Oyo state. Moreover, the marital status of the respondent showed that majority (61.1%) of the fish farmers were married while 28.9% were single. The implication is that fish farming is the business of the married in the study area. This is in agrees with the findings of Ifejika and Ayanda (2005) who reported same in fish farmers in Kainji lake basin of Nigeria.

The household size (Table 1) indicated that majority (42.2%) of the respondents had a household size of 6-10 per-

Table 2: System of fish farming practice (n = 90)

System of fish farming practice	Frequency	Percent
Pond culture (earthen)	21	23.3
Cage culture	13	14.4
Concrete	28	31.1
Homestead	20	22.2
Pen culture	8	8.9
Total	90	100.0

Source: Field Survey, 2010

sons while 30% had 1-5 persons. The mean household was 8.0 which indicated large family size. The implication of this finding is that there are too many people to feed even though they provide enough labour. In terms of educational level, majority (34.4%) of the respondents were school certificate holders while 27.8% were HND/B.Sc holders, 14.4% were M.Sc holders. The implication of this finding is that most of the fish farmers in the study area are educated people that can easily adopt innovations. This is in agreement with the report of Ajana (1995) in survey of status of the fish farming in Ogun state. The primary occupation of the respondent revealed that majority (43.3%) of the fish farmers in the study area were full-time farmers, 31.1% were farmers/business, while 17.8% were farmers/civil servants. This implies that most of the fish farmers devote their time in farming business. This disagrees 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. The farming experience revealed that majority (46.7%) of the fish farmers had 6-10 years of experience in fish farming business, while 25.6% of fish farmers had 1-5 years of experience, then 15.6% of the fish farmers had 16-20 years of experience. The implication of this finding is that most of the fish farmers in the study area are experienced which encourages increased production and innovation adoption. This is in agreement with that of Akinrotimi et al. (2010) in survey of brackish water aquaculture status in Rivers state. Land ownership revealed that majority (78.9%) of fish farmers in the study area were the rightful owners of their land, while 7.8% of the fish farmers in the study areas were share croppers and purchased their land respectively. This implies that land acquisition for establishment of fish farm is not really their major problem which also encourages them in the fish farming. The annual income revealed that majority (31.1%) of the fish farmers earned ₦100.00 – ₦200.00 annually, 22.2% of fish farmers earned ₦201,000 – ₦300,000, while 21.1% of the farmers earned ₦301,000 – ₦400,000. The implication of this finding is that fish farming in the study area is a lucrative business. This is in disagreement with the report of Ifejika and Ayanda (2005).

Table 2 indicates that majority (31.1%) of the fish farmers practice concrete fish pond, 23.3% practice pond culture (earthen fish pond), while 22.2% practice homestead in fish production. The implication is that fish farmers in the study area are relatively rich since they can afford concrete fish pond. This is in agreement with the report of Ajana (1995) who reported similar trend in Ogun state, Nigeria.

The mean annual production is indicated in Table 3, *Clarias* 12,000mt, at unit cost of ₦500/kg, *Tilapia* spp. 9,600mt with unit cost of ₦500/kg, hybrid of *Clarias* and *Heterobranchus* 8,500mt with unit cost of ₦600/kg and common carp 5,000mt with unit cost of ₦800/kg. The total mean annual productions of fishes were 41,000 metric tons.

Data in table 4 showed that 38.9% of the fish farmers practice integrated fish farming that is combination of fish production with crops and animals. Also 26.7% of the farmers practice only monoculture, while 22.2% practice polyculture. The results obtained in this study revealed that majority (72.2%) of the farmers practice only fisheries production, while 27.8% practice fisheries/crops and vegetable production, 6.7% practice fisheries/poultry, 2.2% practice fisheries/piggery and fisheries/snailery respectively (Table 5), this is in tandem with is in agreement with that of Ajana (1995).

Table 3: Estimated Annual production capacity of table size fish and current price for various species (n=90)

Types/species	Mean annual (mt) production	Unit cost (N)
<i>Clarias</i>	12,000	500/Kg
<i>Heterobranchus</i>	6,000	600/Kg
Hybrid of <i>Clarias</i> and <i>Heterobranchus</i>	8,500	500/Kg
Common carp	5,000	800/Kg
<i>Tilapia</i> species	9,600	300/Kg
Total	41,100	

Table 5: Integrated fish farming activities (n=90)

Integrated fish farming activities	Frequency	%
Fisheries/crops & vegetables	15	16.7
Fisheries/poultry	6	6.7
Fisheries/piggery	2	2.2
Fisheries/snailery	2	2.2
Fisheries only	65	72.2
Total	90	100.0

Table 7: Sources of water supply (n=90)

Sources of water supply	Frequency	%
Rain water	6	6.7
Stream	22	24.4
Borehole	36	40.0
Well	17	18.9
Rivers (tide)	9	10.0

Table 4: Fish farming techniques/practice used by farmers (n=90)

Fish farming technique/practice	Frequency	%
Monoculture	24	26.7
Polyculture	20	22.2
Integrated	35	38.9
Water recycle system	11	12.2
Total	90	100.0

Table 6: Sources of information for fish farmers (n=90)

Sources of information for fish farmers	Frequency	%
Extension agents	16	17.8
Friends/fellow farmers	53	58.9
Mass media	13	14.4
Literature	5	5.6
Internet	3	3.3
Total	90	100.0

Table 8: Types/species of fingerlings used by farmers (n=90)

Types / species of fingerlings used	Frequency	%
<i>Clarias</i>	18	20.0
<i>Heterobranchus</i>	18	20.0
Hybrid of <i>Clarias</i> and <i>Heterobranchus</i>	19	21.1
Common carp	3	3.3
<i>Tilapia</i>	32	35.6
Total	90	100.0

Source: Field Survey, 2010

Regarding information on aquaculture practice, majority (58.9%) of the respondents sourced their information from friends/fellow farmers, 17.8% sourced their information from extension agents while 14.4% sourced their information on fisheries production from mass media. Also, 3.3% of the farmers got their information from internet (Table 6). This supports the view of Olagunju et al. (2007) among fish farmers in Oyo and shows the literacy level of the fish farmers.

Table 9: Source of fingerlings (n=90)

Sources of fingerlings	Frequency	%
Personal hatchery	29	32.2
Government hatchery	35	38.9
Private hatchery	17	18.9
Wild	9	10.0
Total	90	100.0

erobranchus and 20.0% use *Clarias* and *Heterobranchus* species respectively. Table 9 indicated that majority (38.9%) of the fish farmers sourced their fingerlings from government hatchery 32.2% of the fish farmers got their fingerlings from personal hatchery, and 18.9% of fish farmers got their fingerlings from private hatchery. This implies that most of the fish farmers do not have hatchery in their farms. They normally get it from outside their farms.

Table 10: Constraints to Fish Farming in the Study Area (n=90)

No.	Constraints	Percentage
1.	Inadequate infrastructure	52.6
2.	Inadequate supply fish feeds	70.8
3.	Irregular electricity supply	92.6
4.	Poor finance	85.8
5.	Poor hatchery facilities	51.2
6.	High cost of feeds	70.8
7.	Suitable land acquisition	60.2
8.	High price of input	80.5
9.	Diseases and poaching	86.7
10.	Irregular water supply	85.6
11.	Poor water quality	40.2
12.	High cost of management	60.8
13.	Poor extension services	55.8
14.	Poor marketing	60.5
15.	Inadequate skill workers	48.4
16.	Cannibalism	90.5

Source: Field Survey, 2010

assistance in aquaculture feasibility survey and identification/selection of suitable sites for fish farm development. Also technical advice on pond construction and preparation, species selection and supply for stocking purposes, fish pond management practices in terms of feeding, fertilization, harvesting, preservation and marketing of fish harvest should be made available to farmers. Conclusively, formation of fish farming association and cooperative societies for opportunities to credit facilities is crucial for the growth and sustainability of aquaculture in the state.

Table 7 revealed that majority (40.0%) of the respondents sourced their water supply from Borcholc, while 24.4% sourced their water supply from streams, 18.9% sourced their water from well, this results is in line with that of Ogunlade (2007) in survey of fish farming activities in Osun state. This implies that most of the farmers are using borcholc as their sources of water supply followed by farmers using stream as their sources of water supply.

Table 8 indicated that majority (35.6%) of fish farmers use *Tilapia* species as their fingerlings, 21.1% use hybrid of *Clarias* and *He-*

Table 10 reveals that majority (92.6%) of the farmers indicated that irregular electricity supply is a major constraint to fish production in the study area. However, the following factors affect fish farming in the study area, cannibalism (90.5%) diseases and poaching (86.7%), poor finance (85.5%), irregular water supply (85.6%), high cost of inputs (80.5%), high cost of feeds (70.8%), inadequate supply of feeds (70.8%) and inadequate supply of fish feeds (70.5%).

The implication of this finding is that almost all the factors indicated are impediment to fish production in the study area. This is in agreement with Chua-Thia (2009).

Conclusion

The status of aquaculture in Rivers State indicated that its potential in increasing fish production is yet to be fully utilized, as a result of factor limiting its expansion. Therefore contributions of stakeholder in the industry such as farmers, cooperative societies, research agencies are appropriate government interventions are urgently needed to assist production of fish in the state and create an enabling environment for aquaculture, which will ultimately results in the sustainable growth of fish farming in Rivers State. In order to facilitate the efficient operation of the fish farming in the state, immediate action would be required in the following areas: Provision of

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