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Status of Fish Farming in Rivers State, Nigeria

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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 area, with three local government each drawn from each agricultural zone of the state. Data obtained was 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. About 31.1% of fish farmers cultured their fish in concrete fish tanks. The total mean annual production of fishes were 41,000 mt, 38.9% of fish farmers practiced integrated fish farming, 72.2% of the framers practice only fish production. About 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 constraints 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.

Key words: Aquaculture, fish, Rivers State, Nigeria

INTRODUCTION

Fish farming, although over 2000 ago started in Nigeria in the early 1950's first in Panyam Plateau state, the Onikan in Lagos and Umuna Okigwe in Imo State (Wokoma, 1987). The fish yields and desired impact of these government fish farms has not been as appreciable as was intended earlier. Recently the popularization of fish farming remained largely within government circle. Several government policy attempted to improve fish farming. In 1980's 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 pre-occupation of most Riverine Communities in the state. The need to increase food supply especially animals 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 make 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 exist which this study intends to fill.

The objective of this study is to survey the status of fishing in Rivers State of Nigeria. With the aim of ascertaining the socio-economic 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.

METHODOLOGY

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 plans 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 five (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 Local Government Areas (LGAs) of Rivers State.

Sampling technique, sample size and data analysis: Random sampling techniques were employed in the selection of the samples. In 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 was collected by use of primary and secondary sources. Primary data was collected by use of interview schedule while secondary sources were by use of textbook and Journal publication on Aquaculture and internet. Structured interview schedule was used to collect data from the fish farmers. Data from the study was analyzed by use of descriptive statistics (FAO, 2005).

Table 1: Agricultural zones with their LGAs

| Zones | Local Govt. Areas (LGAs) |
|-------|--|
| I | Port Harcourt, Obio/Akpor, Ikwerre, Emohua, Oyigbo, Eleme, Gokana, Khana, Tai, Okirika and Ogu/Gbolo |
| II | Abua/Odual, Degema, Akuku-Toru, Asari-Toru, Bonny, Andoni and Opobo/Nkoro |
| III | Etehe, Ahoada East, Ahoada West, Ogba/Egbema/Ndoni and Omuma |

Source: Howard (2007)

RESULTS AND DISCUSSION

Socio-economic characteristics of fish farmers are shown in Table 2, 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 Bolorunduro (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 agreement with the findings of Ifejika and Ayanda (2005) who reported same in fish farmers in Kainji lake basin of Nigeria.

The household size (Table 2) indicated that majority (42.2%) of the respondents had a household size of 6-10 persons while 30% had 1-5 persons. The mean household was 8.0 which indicated large family size. The implication of this findings 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. Landownership 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

Table 2: Demographic characteristics of fish farmers (n = 90)

| Parameters | Frequency | Percentage | Mean |
|--|-----------|------------|------|
| Age of respondents (years) | | | |
| 21-30 | 15 | 16.7 | 42.3 |
| 31 -40 | 21 | 23.3 | |
| 41 -50 | 31 | 34.4 | |
| 50 and above | 23 | 25.6 | |
| Total | 90 | 100.0 | |
| Sex 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 | |
| Widow | 9 | 10.0 | |
| Total | 90 | 100.0 | |
| Household size (person) | | | |
| 1-5 | 27 | 30.0 | 8.0 |
| 6 -10 | 38 | 42.2 | |
| 11-15 | 15 | 16.7 | |
| 16 -20 | 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 | | | |
| Fulltime 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 (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 sales of fish | | | |
| ₦100,000 | 18 | 20.0 | |
| ₦100,000-₦200,000 | 28 | 31.1 | |
| ₦201,000-₦300,000 | 20 | 22.2 | |
| ₦301,000-₦400,000 | 19 | 21.1 | |
| Above ₦501,000 | 5 | 5.6 | |
| Total | 90 | 100.0 | |

Source: Field survey (2010)

Table 3: System of fish farming practice (n = 90)

| System of fish farming practice | Frequency | Percentage |
|---------------------------------|-----------|------------|
| 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)

Table 4: Estimated annual production capacity of table size fish and current price for various species (n = 90)

| Types/species | Mean annual production (mt) | Unit cost (kg ⁻¹) (₦) |
|--|-----------------------------|-----------------------------------|
| <i>Clarias</i> | 12,000 | 500 |
| <i>Heterobranchus</i> | 6,000 | 600 |
| Hybrid of <i>Clarias</i> and <i>Heterobranchus</i> | 8,500 | 500 |
| Common carp | 5,000 | 800 |
| <i>Tilapia</i> species | 9,600 | 300 |
| Total | 41,100 | |

Source: Field survey (2010)

Table 5: Fish farming techniques/practice used by farmers (n = 90)

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

Source: Field survey (2010)

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 3 indicated 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 4, *Clarias* 12,000 mt, at unit cost of ₦500 kg⁻¹, *Tilapia* spp. 9,600 mt with unit cost of ₦500 kg⁻¹, hybrid of *Clarias* and *Heterobranchus* 8,500 mt with unit cost of ₦600 kg⁻¹ and common carp 5,000 mt with unit cost of ₦800 kg⁻¹. The total mean annual productions of fishes were 41,000 mt. Data in Table 5 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 6), this is in tandem which is in agreement with that of Ajana (1995). Regarding

Table 6: Integrated fish farming activities (n = 90)

| Integrated fish farming activities | Frequency | Percentage |
|------------------------------------|-----------|------------|
| Fisheries/crops and 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 |

Source: Field survey (2010)

Table 7: Sources of information for fish farmers (n = 90)

| Sources of information for fish farmers | Frequency | Percentage |
|---|-----------|------------|
| 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 |

Source: Field survey (2010)

Table 8: Sources of water supply (n = 90)

| Sources of water supply | Frequency | Percentage |
|-------------------------|-----------|------------|
| Rain water | 6 | 6.7 |
| Stream | 22 | 24.4 |
| Borehole | 36 | 40.0 |
| Well | 17 | 18.9 |
| Rivers (Tide) | 9 | 10.0 |
| Total | 90 | 100.0 |

Source: Field survey (2010)

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 7), this supports the view of Olagunju *et al.* (2007) among fish farmers in Oyo, this shows the literacy level of the fish farmers.

Table 8 revealed that majority (40.0%) of the respondents sourced their water supply from Borehole, 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 borehole as their sources of water supply followed by farmers using stream as their sources of water supply. Table 9 indicated that majority (35.6%) of fish farmers use *Tilapia* species as their fingerlings, 21.1% use hybrid of *Clarias* and *Heterobranchus* and 20.0% use *Clarias* and *Heterobranchus* species, respectively. Table 10 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 11 revealed 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

Table 9: Types/species of fingerlings used by farmers (n = 90)

| Types/species of fingerlings used | Frequency | Percentage |
|--|-----------|------------|
| <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)

Table 10: Source of fingerlings (n = 90)

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

Source: Field survey (2010)

Table 11: Constraints to fish farming in the study area (n = 90)

| Constraints | Percentage |
|------------------------------|------------|
| Inadequate infrastructure | 52.6 |
| Inadequate supply fish feeds | 70.8 |
| Irregular electricity supply | 92.6 |
| Poor finance | 85.8 |
| Poor hatchery facilities | 51.2 |
| High cost of feeds | 70.8 |
| Suitable land acquisition | 60.2 |
| High price of input | 80.5 |
| Diseases and poaching | 86.7 |
| Irregular water supply | 85.6 |
| Poor water quality | 40.2 |
| High cost of management | 60.8 |
| Poor extension services | 55.8 |
| Poor marketing | 60.5 |
| Inadequate skill workers | 48.4 |
| Canibalism | 90.5 |

Source: Field survey (2010)

farming in the study area, Cannibalish (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 (1986).

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 that areas.

Provision of 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.

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