

Socio Economic Characteristics and Bio-Security Measures among Fish Farmers in Some Coastal Communities of Rivers State, Nigeria

George A.D.I¹ and Akinrotimi O.A^{2*}

¹*Department of Fisheries and Aquatic Environment, Faculty of Agriculture, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria*

²*African Regional Aquaculture Centre/Nigerian Institute for Oceanography and Marine Research, P.M.B 5122, Port Harcourt, Rivers State, Nigeria*

**Corresponding author*

Abstract: The socio-economic characteristics and biosecurity measures amongst fish farmers in some coastal communities of Rivers State were assessed. Data was collected randomly from 200 fish farmers by interview and administration of structured questionnaires. Descriptive statistics such as frequency and percentages were used to analyze data collected. Results obtained from the study indicated that fish farming were dominated by males (68.50%) and were mostly (48.50%) within the age bracket of 21-40years. Majority of the respondents (70.00%) were educated up to secondary level with 6-10 years experience in fish farming. Most (65.00%) of the farmers in the study area had been trained in fish farming enterprise and they are not full time farmers (42.00%). From the study area, majority (64.50%) of the farmers were fully aware of the biosecurity strategies in aquaculture production. While, a greater proportion (29.00%) of the farmers engaged in cleaning of their environment as a means of biosecurity practices. There was low level of compliance of biosecurity strategies among the fish farmers, with finance (51.00%) as a major constraint. In conclusion, the study observed that the practice of biosecurity measures was not an important issue among the farmers in the study area. It is therefore recommended that financial assistance should be made available to farmers in these communities; so as to enhance their production capacities and bio-security practices compliance.

Key words: Aquaculture, Coastal Communities, Bio-security, Socio-economics, Rivers State.

I. INTRODUCTION

The importance of aquaculture to the socio-economic growth of Nigeria in recent times cannot be overemphasized (Adedeji and Okocha, 2011). It increases the production of animal protein to meet the needs of a fast growing population in the country, it also produces highly priced commodities for export to earn foreign currency, and creates employment opportunities for the young and old (Ayinla, 2007). Aquaculture remains one of the fastest-growing agro-industrial activities in the last four decades and is projected to outpace population growth. In the next decade, total output from both capture and aquaculture is envisaged to exceed that of other livestock production (FAO, 2012). Asia is the highest aquaculture producer with about 90%; the largest quantities are from China, while Africa and Latin America

produce less than 5% (FAO, 2014). Currently, the African continent accounts for less than 1% of the annual total global aquaculture production (FAO, 2015), and the vast majority of Africa's aquaculture is in fresh water, with a little proportion in brackish water (Akinrotimi *et al.*, 2005).

In most part of Nigeria, fish is one of the cheapest and accessible animal proteins consumed by the average Nigerian and it accounted for about 50% of total protein intake (Akinrotimi *et al.*, 2007). Previously, fish supply in Nigeria is mainly from the capture sector, especially the coastal and inland artisanal fisheries. The sector contributes about 85% of total domestic production (Ezenwa, 2006). However, aquaculture has recently been recognized as an alternative means of increasing domestic fish production. It is estimated to have the potential of overtaking capture fisheries in future. Aquaculture in Nigeria is receiving a wide participation as a result of the progressive development in most parts of the country. The total current aquaculture production has leaped from 50,000 metric tonnes in 2005 to 110,000 metric tons in 2010 (Akinrotimi *et al.*, 2011), and demand is expected to continue to grow with anticipated population growth.

Health maintenance in aquaculture production through good hygiene and husbandry practices to manage the impact of pathogens is one of the most important aspects of aquaculture development and management. Biosecurity is therefore the key to reduce the risk of diseases entering a farm. Hence, suitable biosecurity measures can prevent emerging health issues and reduce impacts of disease, with the principle of preventing diseases rather than curative response (Arthur *et al.*, 2009).

Biosecurity can be described as organized steps taken to keep disease from a farm and to prevent the transmission of disease within an infected farm to neighboring farms." (Troell *et al.*, 2011). Biosecurity is a team effort, a shared responsibility, and an on-going process to be followed at all times. From the breeder to the hatchery, to grow-out operators, bio-security measures have to be observed to contribute to the success of aquaculture industry. The major components of bio-security,

as practiced by the fish aquaculture industry, include: isolation, traffic control, sanitation, and rodent and insect control. The purpose of these practices is to prevent the introduction of pathogens and to provide the best living conditions for the health of the culture fish (Emmanuel *et al.*, 2014). Moreover, FAO (2004) defined biosecurity as “an essential group of tools for the prevention, control, and eradication of infectious disease and the preservation of human, animal, and environmental health.” (Lee 2000).

The occurrence of disease is a combination of the health of the animal, the condition of the environment, and the presence of a pathogen. FAO (2005) used the disease continuum model to illustrate how outbreaks of disease were the result of a weakened immune system of the culture animals, caused by neuroimmune changes resulting from stresses and infection. (Batom Rouge *et al.*, 2005). There are lot of information on the water quality, breeding, nutrition, economic efficiency and production strategies of fish in culture medium (Adeogun *et al.*, 2007; Baruwa *et al.*, 2012; Akinrotimi *et al.*, 2015), while information on the biosecurity measures of fish farms in the coastal area of Rivers State, Nigeria is scanty and limited. In this context, reference information about the characteristics of fish farmers and farming practices that may affect occurrence and transmission of fish diseases, fish survival and suitability of fishpond water for fish farming is important for sustainability and expansion of fishery industry. The objective of this study therefore, was to evaluate the socio-economic characteristics, and biosecurity measures in cultured fish farms in some coastal communities of Rivers State Nigeria.

II. MATERIALS AND METHODS

Data collection and Analysis

Primary data were collected through structured questionnaires answered by 200 randomly selected individual that have different socio-economic backgrounds from 10 communities (20 per each community) namely: Ido, Abuloma, Tema, Okpo and Ilelema in Asari Toru Local Government Area; Obuama and Degema in Degema Local Government Area and Abonnema and Obonoma in Akuku Toru Local Government Area all in Rivers State, Nigeria. The data was collated and analyzed using descriptive statistics involving the use of measures of central tendency such as frequency and percentages.

III. RESULTS

The socio-economic characteristics and level of practice of biosecurity measures amongst fish farmers in some coastal communities of Rivers State are presented in Table 1. Results from the study indicated that fish farming in the study area were dominated by males (68.50%) and were mostly (48.50%) within the age bracket of 21-40years. Majority of the respondents (70.00%) were educated up to secondary level with 6-10 years experience in fish farming. Most (65.00%) of the farmers in the study area had been trained in fish farming enterprise and they are not full time farmers (42.00%). The

level of awareness of bio-security strategies of fish farmers in some coastal communities of Rivers State is shown in Table 2. From the study area, the majorities (64.50%) of the farmers are fully aware of the biosecurity strategies in aquaculture production, 27.0% were partially aware, while, 8.50% of the respondents were not aware. The biosecurity practices among fish farmers in some coastal communities of rivers state are presented in Table 3. The results indicated that most (29.00%) of the farmers engaged in cleaning of their environment as a means of biosecurity practices, this was closely followed by fencing of farm premises (21.0%), and proper discharge of pond waste water (20.5%) Lower values of 3.50% were recorded in quarantine of fish and analysis of water quality (Table 3). Level of compliance of bio-security strategies among fish farmers in some coastal communities of rivers state are presented in Table 4. From the results most of the respondents (55.0%) indicated that there was low level of compliance in biosecurity strategies in the study area (Table 4). The constraints to the compliance of bio-security strategies among fish farmers in the study area are presented in Table 5. The results revealed that with finance (51.00%) as a major constraint (Table 5).

Table1: Socio-Economic Characteristics of Fish Farmers in Some Coastal Communities of Rivers State

Socio-economic characteristics	Frequency	Percentage (%)
Sex		
Male	137.00	68.50
Female	63.00	31.50
Total	200.00	100.00
Age		
< 20 years	20.00	10.00
21-40 years	99.00	48.50
41-60years	70.00	35.00
> 60 years	11	5.50
Total	200.00	100.00
Educational Level		
Primary	20.00	10.00
Secondary	140.00	70.00
Tertiary	40.00	20.00
None	0.00	0.00
Total	200.00	100.00
Years of Experience		
1 – 5	90.00	45.00
6 -10	40.00	20.00
11 – 15	30.00	15.00
16 – 20	20.00	10.00
>20	20.00	10.00
Total	200.00	100.00

Received Training in fish farming		
Yes	130	65.00
No	70	35.00
Total	200.00	100.00
Principal Occupation		
Fish Farmer	23	11.50
Civil Servants	86	42.00
Business (Trader)	41	20.50
Farming (Crop and Livestock)	17	8.50
Self Employed	23	11.50
Work in companies/industries	10	5.00
Total	200.00	100.00

Source: Author’s Field work (201 9)

Table 2: Level of Awareness of Bio-security Strategies of Fish Farmers in Some Coastal Communities of Rivers State

Level of Awareness	Frequency	Percentage (%)
Fully Aware	129	64.50
Partially Aware	54	27.00
Not Aware	17	8.50
Total	200	100

Source: Author’s Field work (201 9)

Table 3: Biosecurity Practices among Fish Farmers in Some Coastal Communities of Rivers State

Biosecurity Practices	Frequency	Percentage (%)
Fenced Farm	42	21.00
Quarantine of new fish	7	3.50
Clean Environment	58	29.00
Restriction of Visitors Access to Ponds	16	8.00
Provision of Footbath	14	7.00
Disinfection of farm tools before use	8	4.00
Diagnosis and Treatment of Disease	10	5.00
Proper discharge of pond water	41	20.50
Analysis of water quality	7	3.50
Workers use of clean personal protective wears	8	4.00
Total	200	100

Source: Author’s Field work (201 9)

Table 4: Level of Compliance of Bio-security Strategies among Fish Farmers in Some Coastal Communities of Rivers State

Level of Compliance	Frequency	Percentage (%)
High	18	9.00
Moderate	52	26.00
Low	110	55.00

Zero	20	10.00
Total	200	100

Source: Author’s Field work (201 9)

Table 5: Constraints to the Compliance of Bio-security Strategies among Fish Farmers in Some Coastal Communities of Rivers State

Constraints	Frequency	Percentage (%)
Lack of information	27	13.50
Finance	102	51.00
Farmers indifference attitude	28	14.00
Community interference	21	10.50
Government Policy	22	11.00
Total	150	100

Source: Author’s Field work (201 9)

IV. DISCUSSION

The socio-economic characteristics of fish farmers in some coastal communities of Rivers State of the present study was in line with those reported in other areas of Nigeria (Ajieh, 2010). They reported that most of the respondents were within the age group (21-40 years) and suggested that fish farming required youth that were strong and active because fish farming required adequate attention and a lot of responsibility. In this study area, most of the farmers were males, the finding agrees with the result of Oladejo (2010) who observed the same trend in some local government area of Oyo State, Nigeria. The male dominance of fish farming enterprise plays an important role in fish farming and agriculture, in terms of property acquisition (Kudi *et al.*, 2008). It also determined the ability to perform some physical work as it was generally believed that men are more efficient in physical and strenuous activities than women. Majority of the farmers in the study area were educated up to secondary level with 6-10 years experience in fish farming and had been trained in fish farming enterprise and they are not full time farmers. This meant that fish farming is dominated by the educated class, with a lot farming experience, practicing on part time basis and are well trained. This is in line with the results of Ajieh (2010) who observed the same trend in fish farmers from in some Local Government Area of Edo State, Nigeria. This is so because fish farming required a lot of technical and scientific knowledge to be successful. From the results most of the respondents (55.0%) indicated that there was low level of compliance in biosecurity strategies in the study area. This observation agrees with the findings of Nwabueze and Ofuoku (2020) who observed the same trend among the catfish farmers in Delta State, Nigeria. They reported that issue of biosecurity measures were taken as less importance in the study area. The fish farmers in the study area revealed finance as a major constraint limiting their compliance with biosecurity measures. This is in line with observation of Maduka *et al.* (2016) who observed the same trend among farmers in Jos, Plateau State, Nigeria.

V. CONCLUSION

In conclusion, the study observed that the practice of biosecurity measures was not an important issue among the fish farmers the study area. Based on the findings of this study, it therefore recommended that financial assistance should be made available to farmers so as to enhance their production capacities. Also, Guidelines supported by appropriate legislation is needed to enforce practice and compliance of biosecurity practices in the study area.

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