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## Research Article

# The Roles of Brackish Water Aquaculture in Fish Supply and Food Security in Some Coastal Communities of Rivers State, Nigeria

### Abstract

**Background and Aim:** Fish plays a crucial role in human nutrition and food supply across the globe, particularly among the poor segment of the society. Food fish currently represents the major source of animal protein needed for growth and development, especially among the children and women who are more vulnerable to malnutrition in developing countries. The importance of food to an individual and society cannot be over emphasized, as food is a basic necessity of life and sufficient intake of quality food is imperative for people to live a strong, vibrant and productive life. Considering the importance of fish food, this study therefore assessed the contribution of brackish water fish farming to stable fish supply and food security in coastal communities of Rivers State.

**Methods:** The roles of brackish water aquaculture in fish supply and food security in 10 coastal communities of Rivers State were investigated using structured questionnaires. The results obtained revealed that majority (56.5%) of the respondents were males, within the age bracket of 36 -50 (36.0%), with house hold size of 6-10 (48.5%). Also, most of the respondents (55.0%) had secondary education. The prominent (20.0%) primary occupations of the respondents include: schooling, fishing aquaculture and fish processing.

**Results:** The result further revealed that Tilapia species is the most consumed fish (26.0%). In analysis of the sources of fish consumed by the respondents, most of the fish comes from fishing (45.0%), 37.0% from aquaculture and 18.0 % from imported frozen fish. Assessing the role of aquaculture as a source of fish food, the respondents believed that aquaculture ensures regular supply (27. 5%), accessibility (25.0 %), low price (20.0%), big size (12.5%) clean (7.5%), good packaging (5. 0 %) and value addition (2.5%) of fish.

**Conclusion:** It is of note that aquaculture plays a crucial role in regular supply and accessibility of fish, which will enhance food security in these coastal areas.

## Introduction

Fish plays a crucial role in human nutrition and food supply across the globe, particularly among the poor segment of the society [1]. Food fish currently represents the major source of animal protein needed for growth and development, especially among the children and women who are more vulnerable to malnutrition in developing countries [2]. According to FAO [3], fish contributed more than 70 percent protein intake for about 400 million people in African and South Asian countries. In Rivers State, Nigeria, fish constitutes a major component of animal protein consumption for the populace in coastal communities [4]. In most part of these areas, majority of the people takes fishing as their primary occupation and depends on it for their livelihoods and sustenance [5].

Over the past decades there is a gradual decline in fish catches and landings, consequent of pollution, over fishing and upsurge in criminal activities that is prevalent in the region in recent times [6]. There is need therefore for a viable alternative of fish production, to augment dwindling fish supply in these coastal areas, and brackish

water aquaculture fits into this. Brackish water fish farming involves culture of fin and shell fishes that are found in the coastal environment [7], it has the capacity of supplying needed food fish on regular basis thereby contributing to food security through supplemented feeding and other food based strategies [8]. Fish consumption is highly beneficial and encouraging people to consume fish on regular basis is not enough to overcome under nutrition, issues of food availability, food access and food utilization most also be addressed. These factor are outlined in the definition of food security adopted by the world food summit in 1996, which states that food security exists when all people of all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [8,9]. The importance of food to an individual and society cannot be over emphasized, as food is a basic necessity of life and sufficient intake of quality food is imperative for people to live a strong, vibrant and productive life. Considering the importance of fish food, this study therefore assessed the contribution of brackish water fish farming to stable fish supply and food security in coastal communities of Rivers State.

## Materials and Methods

This study was conducted in 10 coastal communities namely: Buguma, Ido, Abalama, Tema, Okpo (Asari- Toru Local Government Area); Obuama and Degema (Degema Local Government Area); Abonnema and Obonoma (Akuku-Toru Local government Area) all in Rivers State, Nigeria. These communities were surrounded by many rivers, creeks and estuarine. The vegetation is mainly mangrove and ever green forest. The area is predominantly dominated by water, and can be accessed by road [10]. Data for the study was generated through randomly distributed 200 structured questionnaires administered at 20 respondents per community; the data were collated and analyzed with descriptive statistics which include measures of central tendency such as frequency, percentage and charts.

## Results and Discussion

The socio-economic characteristics of the respondents in these areas are presented in Table 1. most of the respondents (36.0 %) are within the age bracket of 36-49, which was closely followed by 26-35 (33.0 %) and the lowest (10.5 %), was recorded in the age bracket of 50 years and above, from the results of this study, most of the respondents are young people. This result agrees with the findings of Akinrotimi and Edun [11] in the same area, implying that residents in the coastal area, are within the economically active age, which represent prospective labour force for fisheries and aquaculture venture [12]. Most of the respondents (56.5%) were males, while (43.5 %) represents the female folks, for house hold size, the highest (46.5%) was observed in house hold size between 6-10 persons, followed by 1-5 (40.0%) while the lowest (11.5 %) was recorded in family size of above 10, it is worthy of note that “house hold size” as used in this study does not refer to the size of immediate nuclear family, but includes every one living in the same house with the respondent. This result is in line with the report of Edun and Akinrotimi [13] in some coastal communities of Rivers State, they reported that male dominance and large house hold size were prevalent in these areas.

The prominent (20.0%) primary occupation of the respondents include schooling, fishing, aquaculture and fish processing, an indication that most of the respondent are at their youthful and productive stage, and are expected to be strong and vibrant, as Akinrotimi et al. [14], noted that fishery and aquaculture activities are for strong energetic people. Most of the respondents (55.0%) had secondary education, followed by primary (30.0%) and tertiary (12.0 %), while only 3.0% had none, this implies that coastal dwellers have some degree of educational background which enables them to communicate and interact effectively. The species of fish being consumed by the respondents is presented in Table 2. *Tilapia* species is the most consumed fish (26.0%), this result revealed that *Tilapia* fish is a common product of fishery and aquaculture activities in coastal environment. In survey of rural aquaculture in some coastal communities, Akinrotimi et al. [15], observed that *Tilapia* species, such as *Tilapia guineensis* and *Sarotherodon melanotheron* are the most commonly consumed fish in brackish water zones of Niger Delta, this may be due to their abundance and cheaper price, when compared to other species.

In analyzing the sources of food fish consumed by the respondent,

**Table 1:** Socio –economic variables of the respondents (n=200).

Parameters	Age (years)	Frequency	Percentage
	15-25	41	20.5
	26-35	66	33.0
	36-50	72	36.0
	50 an above	21	10.5
	Total	200	100
<b>Sex</b>			
	Male	113	56.5
	Female	87	43.5
	Total	200	100
<b>Household size (person)</b>			
	1-5	80	40.0
	6-10	97	48.5
	Above 10	23	11.5
	Total	200	100
<b>Primary Occupation of respondent</b>			
	Schooling	40	20.0
	Fishing	40	20.0
	Farmer	35	17.5
	Fish processing	40	20.0
	Civil Servant/Company workers	20	10.0
	Trading	15	7.5
	Retirees	10	5.0
	Total	200	100
<b>Educational Qualification</b>			
	Primary	60	30.0
	Secondary	110	55.0
	Tertiary	24	12.0
	None	6	3.0
	Total	200	100

**Table 2:** Species of Fish Consumed by the Respondents.

Fish Species	Frequency	Percentage
<i>Tilapia (Tilapia guineensis)</i>	52	26.0
<i>Mullet (Liza falcipinnis)</i>	4	2.0
<i>Catfish (Chrysichthys nigrodigitatus)</i>	3	1.5
<i>Barramundi (Lates calcarifer)</i>	2	1.0
<i>Mudskipper (Periopthalmus papilio)</i>	14	7.0
<i>Red snapper (Lutjanus agennes)</i>	4	2.0
<i>Grunters (Pomadysis jubelini)</i>	2	1.0
<i>Tarpon (Megalops atlanticus)</i>	4	2.0
<b>Shell fishes</b>		
<i>Oyster (Crassotrea gasar)</i>	10	5.0
<i>Periwinkle (Tympantonus fuscatus)</i>	40	20.0
<i>Whelk (Thais coronata)</i>	2	1.0
<i>Bloody cockle (Senilia senilis)</i>	1	0.5
<i>Shrimps (Penaeus notialis)</i>	35	17.5
<i>Crabs (Callinectes amnicola)</i>	28	14.0
Total	200	100

(Figure 1), most of the fish comes from fishing (46.0%), while 35.0% comes from aquaculture, and 19.0% from frozen fish (Imported). This result revealed that aquaculture has improved contrary to earlier reports by Akinrotimi et al. [16], that food fish from the wild is about five times that of aquaculture in coastal areas. The respondents consumed fish very often, (97.0%), while 3.0% of the respondents sometimes consumed fish and 0.0% does not consume it at all (Figure 2). This implies that majority of coastal dwellers derived their needed

protein source from fish. The reasons gave by the respondents for consuming fish are highlighted in Figure 3. Most of the respondents (50.0%) consumed fish because of its availability, low price (40.0%), while nutritive value and taste had (4.0%) and (6.0%) respectively. This result corroborates with the report of Akinrotimi and Edun [17] in consumer disposition towards fish consumption, the authors observed that availability and price is a major determinant factor in consumption of fishery products in coastal communities. In assessing the role played by aquaculture as a source of fish food (Table 3). The highest percentage (27.5%) of the respondents, believed that aquaculture ensures regular supply of fish, this was closely followed by accessibility (25.0%), lower price (20.0%) and big size of fish (12.5%), clean fish (7.5%), good packaging (5.0%) and value addition

**Table 3:** Roles of Aquaculture as a Source of Fish Food.

Roles	Frequency	Percentage
Regular fish supply	55	27.5
Fish accessibility	50	25.0
Bigger fish	25	12.5
Lower price	40	20.0
Value. Addition	5	2.5
Fresh/clear fish	15	7.5
Good packaging	10	5.0
<b>Total</b>	<b>200</b>	<b>100</b>

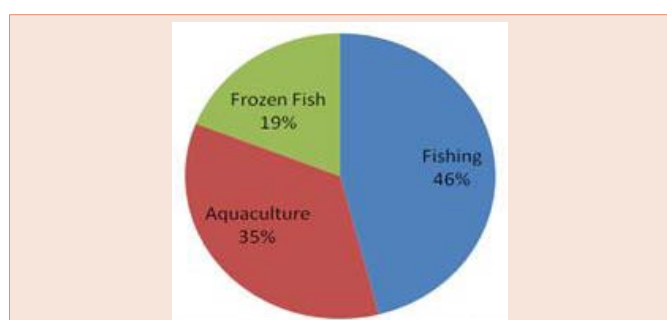
(2.5%). This result is in agreement with that of Akinrotimi et al. [18] who reported that the most important role of aquaculture in any community is fish supply and accessibility, which form the basis for food security.

## Conclusion

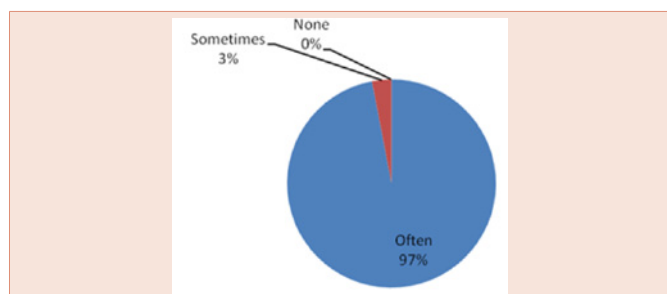
It is of note that aquaculture plays a crucial role in regular supply of fish, its output can be predicted, as it ensure accessibility to fish products at all times irrespective of the season. Consistent fish supply and accessibility by the people will guarantees food security among the coastal dwellers which will enhance their livelihood for sustainable development in these areas.

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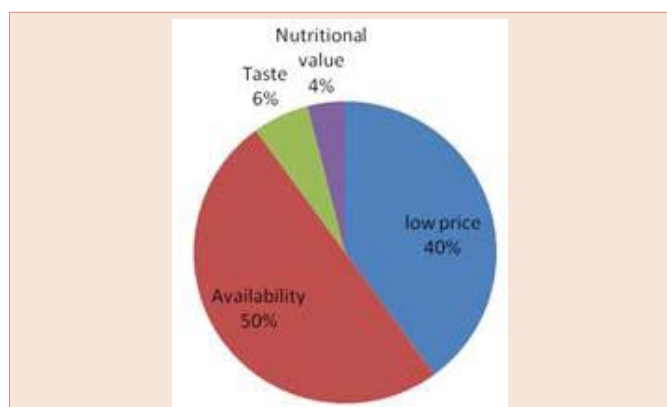
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**Figure 1:** Sources of fish food consumed by respondents.



**Figure 2:** Rate of fish consumption by the respondents.



**Figure 3:** Respondents reason for fish consumption.



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