

## Analysis of Gender Participation in Fish Farming in Borgu Local Government Area, Niger State, Nigeria

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**Abstract.** The study analysed gender participation in fish farming in Borgu Local Government Area of Niger State, Nigeria. An interview guide was used to gather data from Eighty-seven (87) randomly selected fish farmers in the Area. The data were analysed using descriptive statistics while difference between selected variables of male and female fish farmers was tested using the Kruskal-Wallis test of difference. The mean ages of the male and female fish farmers were 34 and 35 years respectively. Majority (68.6%) of the male and (69%) of the female respondents had tertiary education while (47.4%) and (50.0%) of the male and female respondents respectively had family size of 6 -10 persons. The mean monthly income of the male and female fish farmers were ₦270952.50 and ₦147500.00. Majority of the male farmers (50.7%) and female farmers (87.5%) obtained their fish seeds from commercial fish breeders. Most (91.5%) of male and (68.6%) female farmers sold their fish fresh directly from the pond. The farmers used the earthen ponds male (84.5%); female (87.5%). The major constraints to fish farming among the male and female farmers include poor water supply during dry season ( $\bar{x}=1.67$ ,  $\bar{x}=1.54$ ) and insufficient land ( $\bar{x}=1.64$ ,  $\bar{x}=1.50$ ). Kruskal-Wallis test showed a significant difference between the male and female farmers in the mode of marketing fish and fish mortality as constraints at  $P<0.05$ . The study recommends training on fish processing and fish health management for male and female fish farmers

respectively as well as improved access to credit.

**Keywords:** Aquaculture, Involvement, Fish Farmers, Constraints

### 1. Introduction

Aquaculture involves the deliberate rearing and cultivation of fish to serve as food (Njoku, 2000). Aquaculture includes the propagation, cultivation and marketing of aquatic animals such as catfish, tilapia, ornamental fish and plant for food (Obinna, 2004). In Nigeria, Agriculture provides between 80 to 90 percent of the country's food needs (Odife, 2002). It however has diverse aspects and this includes fish farming which involves the rearing of fish for the purpose of consumption or sale. Fish is acclaimed to be the principal source of animal protein for over one billion people globally and provides many important nutritional and health benefits. Fish has the highest level of easily metabolisable protein, it is reputed for its high quality proteins, fats, vitamins, calcium, iron and essential amino acids.

Fish farm provides important services including supporting nutritional wellbeing, provide feed stocks for the industrial sector, making contribution to rural development increasing export opportunities, more effective administration of natural resources and conservation of biological diversity (Dagtekin *et al.*, 2007). Fish culture is an efficient means of

animal protein production. It provides essential nutrition for over one billion people, including at least 50% of animal protein for 400 million people from the poorest countries Weight Body Gain (World Bank Group, 2011).

The importance of fish in human nutrition in particular and for animal feed (fish meal) as well as for other purposes cannot be overstressed. Its high biological value in terms of high nitrogen and other nutrient content retention in the fish flesh, bones and scales is responsible for the consumption of fish products for health reasons, and also for its high protein, which is easily assimilated when compared with other animal protein. Fish has also been found to be low in cholesterol content, which allows for the enhancement of improved human nutrition, technology, economic benefit. The rapid growth and development of aquaculture experience around the world, is evidence of its high monetary value and increase in quality supply.

Despite their importance and contribution to the fish industry, women have received little attention from both the government and non-governmental organizations. The negligence of women in the fish sector is a matter of priority if the fishery sector is to increase its current level of contribution towards household and national economy. The importance and contribution of women in the aquaculture sector and their role in production point to the need to identify gender participation in the sector. Gender concerns in the fishery sector can only be identified and addressed by identifying the participation of male and female in fish farming as well as the factors hindering their participation. The information provided by this study would help formulate effective interventions to promote the participation of women in fish farming in the study area and the nation at large.

Both male and female fish farmers are engaged in the production of aquaculture activities essential to household welfare (Akereolu, 2003). Women contribution continues to be marginalized while male contribution continues to remain the sole focus of attention (Food Agriculture Organisation F.A.O, 2005). Despite the fact that both male and female fish farmers

adopt aquaculture technologies in the society, their level of participation are not yet known from available empirical evidence (F.A.O, 2005). It is presumed that male fish farmers participated in fish farming system more than female fish farmers. This study focused on the analysis of involvement of male and female fish farmers in the study area. The study aimed to unveil the gender gap in the participation of fish farming in the study area.

### 1.1 Objectives of the Study

The main objective of the study was to analyze the gender participation in fish farming in Borgu Local Government Area, Niger State. The Specific objectives were to:

- Describe the personal characteristic of male and female fish farmers in the study area.
- Determine the farm characteristics of the male and female fish farmers.
- Ascertain the constraints to fish farming among the male and female fish farmers.

## 2. Methodology

### 2.1 The Study Area

The study was carried out in Borgu Local Government Area of Niger State. The area has an Area of land about 16200sq.km and share boundaries with Benin Republic to the West Agwara Local Government to the South, Magama Local Government Area to the North and River Niger Kainji to the East Borgu Local Government Area lies between latitude 90<sup>0</sup>N and 11<sup>0</sup> N and longitude 2<sup>0</sup>E and 4<sup>0</sup>. The major occupations of the people in the area include fishing, trading and farming. The religion practiced in the area are Islamic and Christianity while the languages spoken include Bussa, Hausa, Yoruba, Igbo, Nupe and Kambari. The ethnic group that can be found in the area include Bussa, Hausa, Nupe, Yoruba, Igbo, Kambari and Laru. There are ten (10) wards in the Local Government Area which are Bussa, Karabonde, Wawa, Babanna, Pissa, Konkoso, Shagunu, Dugga, Rafi and Sabuke.

Four communities were purposively selected in the study area and these include New Bussa, Malale, Munai and Fakun. These communities were selected because of the high concentration of fish farmers in the communities. A percentage of the total estimated numbers of fish farmers were randomly selected in each of the selected community to give Eighty-seven (87) fish farmers irrespective of the sex.

Primary data were used in the study. The data were collected from the selected male and female farmers in the study area. Other relevant information for the study was obtained from internet, journals and textbooks.

To determine the constraint to fish farming, respondents were required to indicate the severity of the listed constraints such as serious constraint and mild constraint. The constraints were rated as follows: Serious constraint=2, Mild constraint = 1. The cut off mean was 1.5. Constraints with mean values greater than or equal to 1.5 were regarded as serious constraints, while responses with mean values less than one were regarded as unimportant training needs. Data collected were analyzed using descriptive statistics such as frequency, percentages and means. A non-parametric test Kruskal-wallis test was to test for the difference between the frequency of the selected variables between the male and female fish farmers.

### 3. Results and Discussion

#### 3.1 Personal Characteristics of the Male and Female Fish Farmers

Majority (81.6%) of the respondents were males while (18.4%) were females an indication that more males were engaged in fish farming than the female (Table 1). This finding agrees with that of George (2010) and Ogunlade (2007) who

found that more males were involved in fish farming than women in their study areas. The male dominance implies the laborious nature of fish farming operations which may be very tedious for females to handle as well as the involvement of the female in the domestic affairs of the household. The mean ages of the male and female fish farmers were 34 and 35 years respectively indicating that they were still young and active people. Deji and Koledoye (2013) found that majority of the male and female fish farmers in Ondo State, Nigeria fell within the age category 31-60 years. Majority (57.7%) and (56.3%) of male and female respondents were married. This shows that gender roles in fish farming practice can be effectively distributed among the men and women. Almost all the male and female farmers had one level of education or the other. Agwu and Anyanwu (1996) opined that increase in educational status of farmers positively influenced the adoption of improved technologies and practices of fish farming. Majority (40.9%) and (50.0%) of the male and female respondents respectively had family size of 6-10 persons implying a fairly large family size. Larger proportions (40.9%) and (50.0%) of the male and female respondents respectively received less than ₦250,000.00 as their monthly income from fish farming. The mean monthly incomes were ₦270952.50 and ₦147,500.00 for male and female farmers respectively. This implies that majority of the respondents were low income earners and also, the male fish farmers earned more than the female. A difference in income between male and female fish farmers was also reported by Deji and Koledoye (2013) where they observed that 45.0% of male fish farmers earned annual income of N200,000-N400,000 from fish production, while in the female category, 40.0% earned an annual income of N200,000 and below.

**Table 1:** Personal Characteristics of Male and Female Fish Farmers

Variable	Male (n = 71)		Female (n = 16)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Age (years)				
< 30	30	42.2	6	37.5
30 – 50	34	47.9	8	50.0
> 50	7	9.9	2	12.5
Mean	33.0		35.3	

Standard Deviation	11.2		12.4	
<b>Marital status</b>				
Single	30	43.7	7	43.7
Married	41	57.7	9	56.3
<b>Educational level</b>				
No formal education	-	-	1	6.3
Primary education	3	4.2	-	-
Secondary education	20	28.2	4	25.0
Tertiary education	48	67.6	11	68.7
<b>Family size (persons)</b>				
1-5	26	36.6	4	28.6
6-10	29	40.9	7	50.0
11-15	4	5.6	2	14.3
≥ 20	-	-	1	7.1
No response	12	16.9		
<b>Monthly income(naira)</b>				
≤ 250000	48	67.6	14	87.4
250001 – 500000	9	12.7	1	6.3
5000001 – 750000	3	4.2	1	6.3
7500001 – 1000000	1	1.4	-	-
> 1000000	2	2.8	-	-
No response	8	11.3		
Mean		270952.5		147500.0
Standard Deviation		596082.0		166633.0

*Source: Field Survey, 2015*

### 3.2 Sources of capital and information of the fish farmers

Table 2 shows that majority (45.6%) and (37.5%) of male and female fish farmers respectively got information on fish farming through other fish farmers suggesting how important members in the same profession or trade could be as effective sources of useful information. A fewer proportion (18.8%) of the female compared to the male (26.8%) farmers had access to extension agents indicating that the female farmers do not access to extension agents as the male farmers. This finding corroborates that of Osuman (1997) who observed that male farmers have more access to agricultural information through extension agents than the female farmers do. Majority (32.4%) and (43.8%) of the male and female farmers respectively got their capital from personal savings. Although the finding indicates that these farmers relied mainly on their personal savings their investment in fish farming, the female farmers had more access to credit from personal savings. This finding is consistent with Jeiyol *et al.*, (2013) who opined that female rural farmers in Benue State, Nigeria obtained credit from local savings. Cultural factors may be responsible for the non-dominance of friends

and relatives sources of credit for the female farmers as also observed by Alao *et al.*, (2020). However, 21.7% and 18.8% of the male and female farmers respectively obtained capital from Agricultural Banks indicating that the financial institution is playing an important role in the financing of fish farming in the area. Monoculture system was practiced by majority (56.3%) and (68.6%) of the male and female farmers respectively. Majority (50.7%) of male and (87.5%) of female farmers respectively got their fish seeds from commercial fish breeders, while (33.8%) of male and (6.3%) female farmers got their fish seeds from their own hatchery. This implies that the majority of the fish farmers got their fish seeds from commercial feed breeders, though more female farmers were involved in this category. The difference observed between the male and female farmers who got fish feed from own hatchery could be due to high level of skill and time required for fish breeding which the female farmers may not afford. A larger proportion (91.5%) of male and (68.6%) female farmers sold their fish fresh from the pond while (8.60%) of male and (31.3%) of female farmers sold their fish in processed form as smoked fish. This implies that majority of female farmers devoted their time in processing smoked fish rather than

marketing the fish fresh from the pond. The earthen pond was the main type of pond used by the farmers. Earthen ponds have been known to be cheaper and easy to manage compared to the other types of ponds. Majority (77.5%) of male

and (87.5%) of female farmers had below 5 ponds with a mean of 4 and 3 ponds respectively. This is an indication that the male had more ponds than the female farmers.

**Table 2:** Sources of Capital and Information of the fish farmers

Variable	Male		Female	
	Frequency	Percentage (%)	Frequency	Percentage (%)
<b>Sources of information</b>				
Other fish farmers	34	45.6	6	37.5
Television and Radio	7	9.9	2	12.5
Newspaper and Magazine	11	15.5	3	18.8
Extension agent	19	26.8	3	18.8
<b>Sources of capital</b>				
Commercial Bank loan	13	18.3	3	18.8
Agricultural Bank loan	15	21.1	3	18.8
Friend and Relatives	12	16.9	1	6.3
Personal saving	23	32.4	7	43.8
Cooperative organization	7	9.9	2	12.5
Money lender	1	1.4	-	-
<b>Culture System used</b>				
Monoculture system	40	56.3	11	68.6
Polyculture system	31	43.7	5	31.3
<b>Sources of fish seed</b>				
Research Institute	11	15.5	1	6.3
Commercial fish breeders	36	50.7	14	87.5
My own hatchery	24	33.8	1	6.3
<b>Mode of marketing fish</b>				
Fresh from pond	65	91.5	11	68.6
Processed into smoked fish	6	8.5	5	31.3
<b>Types of ponds</b>				
Earthen pond	60	84.5	14	87.5
Concrete pond	7	10.0	1	6.3
Plastic tanks	3	4.2	1	6.3
Metallic tank	1	1.4	-	-
<b>Number of ponds</b>				
≤5	55	77.5	14	87.5
6-10	14	19.7	1	6.3
11-15	2	2.8	1	6.3
Mean	4.31		3.06	
Standard deviation	3.89		2.89	

*Source: Field Survey (2015)*

### 3.3 Constraints to Fish Farming

In the male category, poor water supply during dry season ( $\bar{x} = 1.67$ ) was ranked the 1<sup>st</sup> constraint while insufficient land ( $\bar{x} = 1.64$ ) was ranked 2<sup>nd</sup> (Table 4). Poor marketing and distribution of fish product ( $\bar{x} = 1.50$ ) was ranked 3<sup>rd</sup>, followed by insufficient information on fish farming ranked ( $\bar{x} = 1.44$ ) 4<sup>th</sup>. Other constraints in the male category include scarcity of fish seed fingerlings ( $\bar{x} = 1.40$ ) (5<sup>th</sup>) and poor fish health service ( $\bar{x} = 1.33$ ) (7<sup>th</sup>). In the female category, poor water supply during dry season ( $\bar{x} = 1.54$ ) was the ranked the first constraint followed by insufficient land ( $\bar{x} = 1.50$ ) and fish mortality ( $\bar{x} = 1.50$ ). Scarcity of fish seed fingerlings ( $\bar{x} = 1.40$ ) was 4<sup>th</sup> and insufficient information of fish farming ( $\bar{x} = 1.38$ ) was ranked 5<sup>th</sup>. Inadequate supply of water during dry season and insufficient land can be considered the two major constraints of the fish farmers. The short duration of rainy season in the area could be responsible for the inadequate water supply during dry season. The rainy season starts in April and ends in September, with highest rainfall record between July and

and (87.5%) of female farmers had below 5 ponds with a mean of 4 and 3 ponds respectively. This is an indication that the male had more ponds than the female farmers.

August. The dry season begins in October through early April and the hottest period is between March and April. Although, there were some similarities in the ranking of the constraints faced by the male and female fish farmers, high rate of fish mortality was ranked 2<sup>nd</sup> for the female while it was 11<sup>th</sup> for the male farmers. This finding is consistent with Oyinbo and Mohammed (2015) who found reported high fish mortality as a major factor militating female fish farmers in Lagos, Nigeria. The difference in the ranking could be due to the fish handling of management capability of the male farmers which is assumed to better compared to that of the female farmers. This knowledge gap in the female can be bridged through training on the skills of managing fish. Nwabeze (2010) identified lack of access to information on fish farming as one the major constraints to women’s participation fish farming in Nigeria. Therefore,

it is necessary that extension agents should have direct contact with women as well. Similarly, while poor marketing of fish product was ranked 3<sup>rd</sup> for the male farmers, it was 9<sup>th</sup> for the female farmers. The female farmers were more involved in processing of fish for marketing compared to the male thereby giving them an edge in terms of fish marketing. This suggests the need for the male fish farmers to acquire needed skills in fish processing. While inadequate capital ranked 13<sup>th</sup> for the male farmers, in was ranked 9<sup>th</sup> for the female farmers suggesting that capital was more of a constraint to the female than the male farmers. Studies (Kusakabe, 2003) have found out that women have less access than men to formal sources of credit, such as banks or credit unions. They rarely have the collateral required, usually land title. Therefore women rely mostly on family, their savings, or money lenders

**Table 4:** Constraints to fish farming among respondents

Constraints to fish farming	Male (n=71)		Female (n=16)	
	Mean	Rank	Mean	Rank
High cost of fish seed fingerlings	1.22	10 <sup>th</sup>	1.14	13 <sup>th</sup>
Scarcity of fish seed fingerlings	1.40	5 <sup>th</sup>	1.40	4 <sup>th</sup>
Predator	1.20	11 <sup>th</sup>	1.30	7 <sup>th</sup>
Theft	1.24	8 <sup>th</sup>	1.22	11 <sup>th</sup>
Poor marketing of fish product	1.50*	3 <sup>rd</sup>	1.29	9 <sup>th</sup>
Inaccessibility of market	1.37	6 <sup>th</sup>	1.33	6 <sup>th</sup>
Inadequate capital	1.18	13 <sup>th</sup>	1.29	9 <sup>th</sup>
Disease and pest	1.15	14 <sup>th</sup>	1.17	12 <sup>th</sup>
High fish mortality	1.20	11 <sup>th</sup>	1.50*	2 <sup>nd</sup>
Flood	1.24	8 <sup>th</sup>	1.00	14 <sup>th</sup>
Poor fish health service	1.33	7 <sup>th</sup>	1.30	7 <sup>th</sup>
Insufficient information on fish farming	1.44	4 <sup>th</sup>	1.38	5 <sup>th</sup>
Insufficient land	1.64*	2 <sup>nd</sup>	1.50*	2 <sup>nd</sup>
Poor water supply during dry season	1.67*	1 <sup>st</sup>	1.54*	1 <sup>st</sup>

*Source:* Field survey, 2015

### 3.4 Difference between male and female farmers in selected variables

Table 5 shows there that there was significant difference in the mode of marketing fish between male and female farmers. There was also significant difference in fish mortality as a constraint between male and female fish farmers at P<0.05. There was no significant difference in the other selected variables between the male and female fish farmers. The implication of the finding is that women fish farmers need to be trained on how to handle issues that relate to fish health in order to solve the problem of mortality since the male farmers are better in this regards. Similarly, the male fish farmers need skill on fish processing.

**Table 5:** Kruskal-Wallis Test for difference between male and female fish farmers

Variables	$\chi^2$	Df	Decision
Culture system used	1.276	1	NS
Type of pond	0.080	1	NS
Source of capital	0.242	1	NS
Source of information on fish farming	0.122	1	NS
Source fish seed	1.486	1	NS
Mode of marketing fish	5.935	1	***
High cost of fish seed fingerlings	0.408	1	NS
Scarcity of fish seed fingerlings	0.001	1	NS
Predator	0.149	1	NS
Theft	0.101	1	NS
Poor marketing and distribution of fish	0.935	1	NS
Inaccessibility of market	0.044	1	NS
Inadequate capital	0.470	1	NS
Disease and pest	0.021	1	NS
High fish mortality	4.193	1	***
Flood	1.996	1	NS
Poor fish health services	0.205	1	NS
Insufficient information on fish farming	0.126	1	NS
Insufficient land	0.677	1	NS
Poor water supply during season	0.738	1	NS

\*\*\* p < 0.05, NS Not significant

#### 4. Conclusion and Recommendations

Fish farming in Borgu Local Government Area is male dominated. The female fish farmers were not as knowledgeable and skilled as their male counterpart as revealed in the culture system adopted by the farmers and their sources of fish seeds. Although both the male and female fish farmers shared some of the constraints however, they differ significantly in the problem of fish mortality. They also differ significantly in the mode of marketing fish. While the male farmers sold their fish fresh from the ponds the female fish farmers processed theirs through smoking for market.

Based on the findings of this study, the following recommendations are made:

- Fish farmers especially the females, should be trained on fish management to reduce fish mortality.
- Farmers especially the males should be trained on fish processing to improve marketing.
- There is need to improve access to credit facilities among the farmers in order to boost production in the study area.

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