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Gender Roles and Poverty Determinants of Fish Farmers' Households in Oyo State, Nigeria

[1]Omitoyin, S. A.*, [1]Chineke, E. C. and [2]Adegbesan, T.
[1]Department of Aquaculture and Fisheries Management, University of Ibadan, Nigeria
[2]Oyo State Agricultural Development Project
**Corresponding Author*
E-mail: sbomitoyin@yahoo.com

Abstract

Aquaculture can be a key engine of growth and poverty reduction in Nigeria. The sector is however underperforming partly because women who are often a crucial resource face constraints that reduce their productivity. Their non-defined roles vary considerably and are changing rapidly leading to greater depth of poverty as economic and social forces transform the aquaculture sector. This study examined gender roles and poverty determinants of fish farmers' households in Oyo State. A multistage sampling technique was used to select 250 respondents using well-structured questionnaires based on the four Agricultural Development Programme zoning in Oyo State. Descriptive statistics, t test, Chi square, Harvard gender analysis framework, Foster Greer and Thorbecke poverty measure (FGT) and Probit models were used to analyse the data at α0.05 Result showed that 64.4% of the fish farmers were males, with mean age of 46.27±9.38 years and 55.3% had tertiary education while 35.6% were females with mean age of 41.43±10.42. 55.1% had tertiary education. However, 89.2% had male as household head with mean age 46.56±9.18 while female headed household only 10.8% with mean age of 47.63±14.5. Nineteen fish farming activities were considered and both gender were involved in all. In 15 activities there were significant differences in participation of the roles performed while there was no significant difference in only four roles. FGT for male showed that 70.81% were poor while 29.19% were non-poor. Poverty index was (0.2919), Poverty depth (0.1673) and poverty severity was (0.1159) while for the female, 74.16% were poor and 25.84 were non-poor. Poverty index was (0.2584), Poverty depth (0.1352) and Poverty severity was (0.0889). There was significant difference between the poor and non-poor in both gender. The result of Probit regression for male indicated that farm size and household size, were the major determinants of poverty in the study area while marital status (married), education (No education and tertiary), household size and fish farming experience were the determinant of poverty for females in the study area. Larger farm size for males and higher educational level for females should be encouraged among the fish farmers to help improve their output and make them less susceptible to poverty as well as to be food and nutrition secure.

Keywords: Fish farming household, Gender activities, Poverty status, Women participation.

Introduction

Aquaculture, one of the important sectors of the economy contributes to economic growth, provides employment opportunities, increases revenues earnings and eradicates poverty. Agriculture which is divided into crop production, livestock production, fisheries and forestry sectors is the economic stronghold of the majority of households in Nigeria (Odetola and Etumnu 2013); Ogwumike

and Akinnibosun, 2013). According to Plecher, (2020), agriculture contributed around 21.2% to Nigeria's GDP, 25.75% came from industry, and 52.01% from the services sector in 2018.

However, fisheries sector according to FAO (2017), contributed 0.5% of national GDP in 2015 and is a principal source of livelihood for greater than three million people in the country. Nigeria's huge agricultural resource base offers great potential for growth not only for the rural sector but the entire economy. However, in spite of these enormous natural resources in the country, rising poverty remains a real challenge (Ogwumike and Akinnibosun, 2013). According to Chukwuemeka, (2008, 2009) poverty is said to have many causes, all of which reinforce one another. The sources include lack of assets, such as land, tools, credit and supportive networks of friends and family; lack of basic services, such as clean water, education and health care; and lack of employment income, to provide food, shelter, clothing and empowerment. Some of these factors directly cause poverty while others contribute indirectly by producing inequality. Also, Olowa (2012) stated that poverty can be conceptualized in four ways; these are lack of access to basic needs/goods; a result of lack of or impaired access to productive resources; outcome of inefficient use of common resources; and result of "exclusive mechanisms". According to Awotide (2012), poverty can be caused by lack of multiple streams of income, low involvement of women in fish farming activities and age of the household head. Since the sources of poverty are diverse, it should be seen as a multi-dimensional problem that calls for a solution with a multi-pronged approach, especially as it affects fish farming households who face multiple disadvantages.

WorldFish (2017) reported that women make essential contributions to the agricultural and rural economies including aquaculture in all developing countries. Their roles vary considerably between and within regions and are changing rapidly in many parts of the world; most importantly in the regions where economic and social forces are transforming the agricultural sector. Despite their important contributions to the fisheries and aquaculture sectors in developing countries, women often earn less than men (WorldFish, 2017). This relates to three patterns around women's work: unpaid work, lower-return work, and lower rates of entrepreneurship. Enabling women to fully engage in and benefit from aquaculture and fisheries can boost production, reduce poverty and enhance nutrition security for millions of fish-dependent households, (WorldFish, 2017).

WorldFish (2018) opioned that despite Nigeria's oil resources, agriculture remains the base of the country's economy, providing the main source of livelihood for most Nigerians. She stated that among rural farming households, 80 percent of the working population engage in crop and animal production as their primary income activity. With most rural households falling below the USD 1.90/day poverty line, over 70 percent are defined as "very poor," based on a measure of daily per capita expenditures. Fisheries is a major economic sector, estimated to employ over 8.6 million people directly and a further 19.6 million indirectly, 70 percent of whom are women. With Nigeria currently producing just over one million metric tons of fish, leaving a deficit of over 800,000 metric tons, which is imported annually, the role of women should be looked into so as to enhance their capability to increase production.

Luomba (2013) stated that the aquaculture sector is often considered a male domain because of the high levels of investments and nature of work. Women's role and participation include pond construction, fingerlings sorting, pond stocking, feeding, sex identification and fish harvest. These are critical roles which have often been ignored partly due to socio-cultural taboo against them. Proper classification of the gender roles of fish farmers and relating it to poverty factors and determinants is very crucial to understanding the causes of poverty and proffering solutions (policy formulation) directed at its reduction.

Most of the aquaculture production in Nigeria takes place in the rural areas where gender roles, the level and incidence of poverty are most pronounced (World fish, 2018). Since poverty is presumed to be a major constraining factor among fish farming households, it is important to investigate the determinants of poverty among fish farming households in Oyo State. The major research questions this study tries to answer are: what are gender roles of fish farmers and what are

the determinants of poverty among fish farming households in Oyo State?

Brief Literature Review

Fish is the cheapest source of protein available to man but its population in the wild has been on a steady decline due to exploitation, habitat loss due to sand filling, and uncontrolled trawling of fishes (Ekpo, *et al*., 2016). Provision of fish to meet the demands of Nigerians can no longer be met through fish caught from capture fisheries hence the need for fish farming. Fish farming has become an important venture in the quest for food and nutrition security in the bid to ascertain the wellness of the household. However, one of the major constraints to the sustainability of this development efforts in fish culture is undefined, undermined and unreported gender productive roles and poverty which is prevalent among the fish farmers (World Fish, 2018).

Gender as defined by the Medical Women's International Association (2002) is the full range of personality traits, attitudes, feelings, values, behaviours and activities that society ascribes to the male and female on a differential basis. It is a social construct, which varies from society to society and over time. These attitudes and traits are constructed socially, time/context specific and can change with time. According to the United Nations Development Programme (2008), gender refers to the social attributes and opportunities associated with being male and female and the relationship between women and men and girls and boys, as well as the relations between women and those between men. Gender dictates what is expected, allowed and valued in a woman or a man in a certain context. Women and men both participate in different roles in the society.

Women are therefore suffering from greater poverty than men in virtually every society due to exclusion in most of the economic activities (World Bank, 2011). The most recent indicators of poverty such as literacy level, access to safe water and the incidence of poverty ranked Nigeria below Cameroon, Mauritania and Senegal (World Bank, 2011).

Available evidence on determinants of poverty focus largely on household characteristics: age, sex, education, health, asset ownership, etc. These are assumed to represent opportunities and capabilities for a given household, or in other words to capture the human and physical capital that determines how vulnerable a typical household could be. The coefficient for level of education of any adult in the household was consistently positive, significant and provided higher levels of welfare for the household (Ogwumike and Akinnibosun 2013).

Aigbokhan (2008) observed that the age, education of household head, household size, and sector of residence has effect on poverty in Nigeria. It was concluded that welfare increases with the level of education thus implying that the less educated the head, the more likely that the household will be poor (Aigbokhan, 2008). Alemayehu, *et al.,* (2001) using a binomial logit model found that the likelihood of being poor is lower in urban than rural areas. People living in households mainly engaged in agricultural activities are more likely to be poor, while male-headed households are less likely to be poor (Alemayehu, *et al*., 2001). Fofack (2002) as reported by Ogwumike and Akinnibosun (2013) observed that poverty in Burkina Faso is a rural phenomenon contributing ninety four percent to total poverty. Using a probit model with binary outcomes over two reference periods, the study showed age dependency ratio, education level of household head, household assets and female literacy as significant determinants of rural poverty.

Materials and methods

Description of the Study Area

Oyo State, the study area is located in Southwestern Nigeria. It is one of the thirty-six states of the Federal Republic of Nigeria. The topography of Oyo State is of gentle rolling low land with vegetative pattern of rainforest in the south and guinea savannah in the north with 28,454 km² in land area (OYSG, 2017). It is bounded in the South by Ogun State and North by Kwara State, while in the West by the Republic of Benin and East by Osun State (Figure, 1).

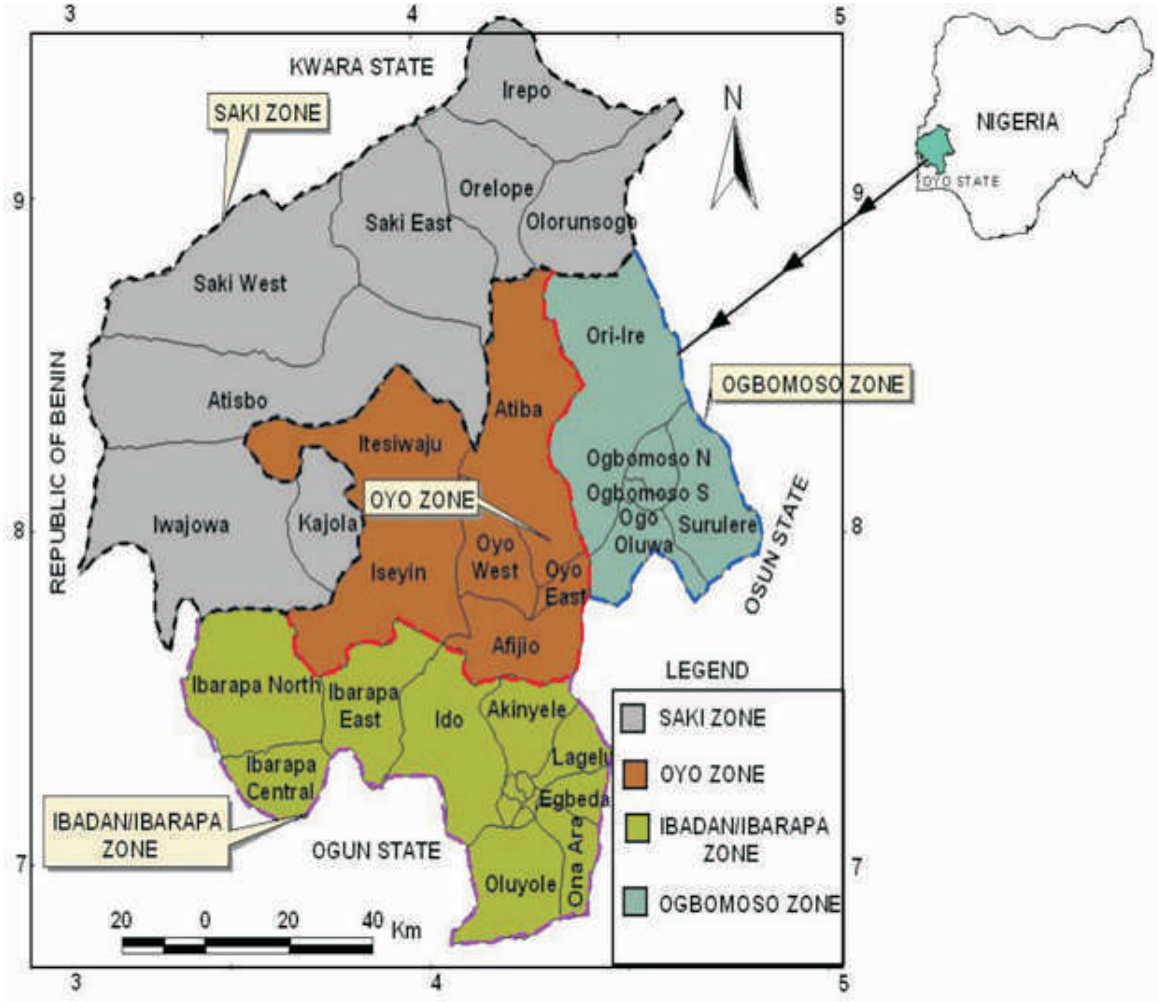

Figure 1: Oyo State ADP Zones and Blocks Showing Study Location
Source: Geography Department, University of Ibadan (2018)

Sampling procedure and sample size

The multi-stage sampling technique was used; the four agricultural development zones from the Oyo State Agricultural Development Programme namely: Ibadan Ibarapa, Ogbomoso, Oyo and Saki were chosen. Sixty percent extension blocks from each of the four zones to give a total of 13 blocks were purposively selected for the study. From each of the blocks, snowball approach was used to select 250 fish farmers households throughout the four extensional zones.

Data collection instruments

Well-structured questionnaire was administered to the respondents, which was used for primary data collection. The questionnaire was divided into five (4) sections: the socio-economic characteristics of fish farmers in the study area, roles/activities performed by each gender, livelihood strategies employed by fish farmers households, the measure of poverty status of fish farmers and the household expenditure of fish farmers' households in the study area.

Data Analysis Techniques

Descriptive statistics (mean, standard deviation, percentages) was used to investigate the socio-economic characteristics of male-headed and female-headed fish farming household, Chi-square, Harvard gender analysis framework was used to profile different activities carried out on the fish farm, Foster, Greer and Thorbecke (FGT)

method (Mean Per Capita Household Expenditure (MPPCHE), was used to determine the poverty status and Probit Regression was used to identify the determinants of poverty among male and female headed fish farming households.

Model Specification

Foster, Greer and Thorbecke (FGT) poverty measure (MPPCHE approach). The FGT measure, which measures the absolute poverty as used by Baiyegunhi and Fraser (2010) is expressed as:

$$P_{\alpha i}^{\,i} = \frac{1}{n}\sum_{i=1}^{q}\left[\left(z - y\right)\Big/ Z\right]^{\alpha}$$

when $\alpha = 0, \quad P_0 = \frac{1}{n}\sum_{i=1}^{q}\left[\left(z - y\right)\Big/ Z\right]^{0} = \frac{q}{n}$ → *Poverty incidence or head count*

$\alpha = 1, \quad P_1 = \frac{1}{n}\sum_{i=1}^{q}\left[\left(z - y\right)\Big/ Z\right]^{1}$ → *Poverty gap or depth*

$\alpha = 2, \quad P_2 = \frac{1}{n}\sum_{i=1}^{q}\left[\left(z - y\right)\Big/ Z\right]^{2}$ → *Poverty severity*

Where $P\alpha_i$ is the weighted poverty index, n is the total number of households, Y is the per capita expenditures of households in food poverty, Z is the poverty line and α is the degree of concern for the depth of poverty.

α = 0 gives the incidence of poverty, α = 1 gives the depth and α =2 gives the severity of poverty

Probit model is a type of regression where the dependent variable can be of two values, in this case poor and non-poor, it is used to model dichotomous or binary outcome variables, thus, probit model estimates the probability that an observation will lie exactly within one of the category of the binary outcome. In Probit model, Y can be said to be the dependent variable and is binary which is having just two outcomes, poor or non-poor. X's are then said to be regressors which influence the outcome of Y.

The Probit model (adapted from Ogwumike and Akinnibosun, (2013) is given as:

$$p\left(Y = \frac{1}{x}\right) = \frac{\exp(x_i\beta)}{1+\exp(x_i\beta)} = \frac{1}{1+\exp(x_i\beta)}$$

This can be expressed as

$$q_{it} = bx_{it} + e_{it}$$

Where:

q_{it} = an unobservable latent variable for poor households
bx_{it} = vector of explanatory variables
b = vector of parameter to be estimated
e_{it} = error term

The explanatory variables (X's) included in the model are

X_1 = Farm Size (m^3)
X_2 = Married (Yes=1, No =0)
X_3 = Divorced (Yes=1, No =0)
X_4 = Secondary Education (Yes =1, No=0)
X_5 = No Education (Yes =1, No=0)
X_6 = Tertiary Education (Yes = 1, No = 0)
X_7 = Household size (Number)
X_8 = Age (in years)
X_9 = Years of Experience (in years)
X_{10} = Farm type (Monoculture=1, Integrated =2)
X_{11} = Source of capital: Bank loan (Yes=1, No =0)
X_{12} = Source of capital: Friends and Family (Yes=1, No =0)
X_{13} = Income from primary occupation (□)
X_{14} = Income from secondary occupation (□)

Results

Socio-economic characteristics of the respondents

The socio-economic characteristics as presented in Table 1 revealed that fish farming in the study area was male-dominated (64.4%) with only 35.6% female in the study area. The male-headed households accounted for 89.2% with mean age of 46.56±9.18 while the female-headed households were only 10.8% with mean age of 47.63 ±14.5. This showed that the involvement of the female gender is low despite their potential in contributing to fish farming in the study area. Younger women (<50 years (96.3%) were involved in fish farming compared to 64.1% male in the same age range. Majority (86.5%) of the males were married while 63% of the females were also married. The religious inclination showed that 57.8% males were Christians while 77.8% of the females were Christians.

Educational qualification showed 51.9% females had tertiary education as compared to 42.6% males had 42.6%. This showed more females had higher educational qualification. The household size of 5-6 persons was highest for both males and females. Lower farm size (< 1.0 hec) was recorded for males (36.3%) while that of females (14.8%). More females (48.1%) had larger farm size between 4.0 and 4.99 hec than males (24.2%). More males (66.8%) were into only fish farming while 59.3% of the females were into fish integrated with other crops. Both groups depended on their personal savings, males (66.4%), females (66.7%) for their farm operations; 55.2% (males) and 63% (females) has belong to social groups; 41.3% (males) and 37% (females) had access to infrastructure, and 66.8% (males) and 59.3% (females) had the highest.

Table 1: Socio-economic characteristics of respondents

Variables	**Freq.**	**%**
Sex		
Female	89	35.6
Male	161	64.4
Total	**250**	**100**
Variables	Freq.	%
Household Head		
Female	27	10.8
Male	223	89.2
Total	**250**	**100**

Male				**Female**	
	Freq.	**%**		**Freq.**	**%**
Age			**Age**		
20-30	15	6.7	20-30	15	55.6
31-40	66	29.6	31-40	3	11.1
41-50	62	27.8	41-50	8	29.6
51-60	76	34.1	51-60	-	-
61-70	4	1.8	61-70	1	3.7
Mean = 46.56±9.18			Mean = 47.63 ±14.5		
Marital Status					
Single	21	9.4	Single	10	37
Married	193	86.5	Married	17	63
Widowed	1	0.4	Widowed	-	-
Divorced	8	3.6	Divorced	-	-
Religion			**Religion**		
Christianity	129	57.8	Christianity	21	77.8
Islam	94	42.2	Islam	6	22.2
Education Qualification			**Education Qualification**		
Primary	31	13.9	Primary	-	-
Secondary	61	27.4	Secondary	12	44.4
Technical	29	13	Technical	-	-
Tertiary	95	42.6	Tertiary	14	51.9
Others	7	3.1	Others	1	3.7
Mean Years	3.94±1.17		Mean Years	4.15±1.06	
Household Size			**Household Size**		
1-2	43	19.3	1-2	7	25.9
3-4	56	25.1	3-4	1	3.7
5-6	102	45.7	5-6	14	51.9
>7	22	9.9	>7	5	18.5
Mean4.7±2.03			Mean 6.41±3.88		
Farm Size			**Farm Size**		
0-.99	81	36.3	0-.99	4	14.8
1.0-1.99	44	19.7	1.0-1.99	2	7.4
2.0-2.99	14	6.3	2.0-2.99		
3.0-3.99	4	1.8	3.0-3.99		
4.0-4.99	54	24.2	4.0-4.99	13	48.1
5.0-5.99	6	2.7	5.0-5.99		
6.0-6.99	4	1.8	6.0-6.99		
7.0-8.99	16	7.2	7.0-8.99	8	29.6
Mean	3.16±2.34		Mean	5.37±2.82	

Variables	Freq.	%			
Type of farm			**Type of farm**		
Fish only	149	66.8	Fish only	5	18.5
Fish integrated with other animals	23	10.3	Fish integrate with other animals	1	3.7
Fish integrate with other crops	7	3.1	**Fish integrate with other crops**	16	59.3
Fish integrate with both animals and crops	44	19.7	Fish integrate with both animals and crops	5	18.5
Source of Capital			**Source of Capital**		
Personal Savings	148	66.4	Personal Savings	18	66.7
Bank loan	49	22	Bank loan	6	22.2
Friend and Family	24	10.8	Friend and Family	3	11.1
Cooperative society	2	0.9	Cooperative society	-	-
Membership of social Organisation			**Membership of social Organisation**		
Yes	123	55.2	Yes	17	63
No	100	44.8	No	10	37
Fish farming Experience			**Fish farming Experience**		
<5 years	59	26.4	<5 years	11	40.7
5-10	149	66.8	5-10	16	59.3
11-20	15	6.7	11-20	-	-
Total	223	100	**Total**		
Mean	8.42±4.18		**Mean**	4.74±	
Access to Infrastructure			**Access to Infrastructure**		
Always	92	41.3	Always	10	37.0
Often	70	31.4	Often	6	22.2
Not Often	41	18.4	Not Often	9	33.3
Never	20	9.0	Never	2	7.4

Table 2 showed the 19 different activities carried out in fish farming operations. It was observed that 143 (57.2%) male respondents were involved in weed control while 55 (22.0%) female respondents were involved, 117 (46.8%) male respondents processed fish, 28 (11.2%) female respondents also engaged in fish processing, and 99 (39.6%) male respondents fed livestock, while 33 (13.2%) of the female respondents also took part in feeding of livestock. Male respondents, 80 (32.0%) applied fertilizer, 22 (8.8%) females participated in fertilizer application. Table 2 also showed that there was no significant difference based on gender role, weed control, processing of fish, feeding of livestock and fertilizer application, while there was significant difference between pond construction, pond stocking, transportation of fish, pond preparation, pond management, cropping of fish, fish marketing, feeding of fish, hatchery management, sale of fish (processed), sale of fish (fresh), integrated farming, feeding of livestock, sale of livestock, planting vegetables, based on gender roles.

Table 2: Roles performed in fish farming disaggregated by gender

	Male		Female				
Activities/ Roles	**Frequency**	**Percent (%)**	**Frequency**	**Percent (%)**	**Chi-square**	**Df**	**Sig**
Pond construction	185	74.0	57	22.8	332.176	3	.000
Pond stocking	175	70.0	57	22.8	179.816	2	.000
Weed control	143	57.2	55	22.0	5.184	1	.023
Transportation of fish	164	65.6	54	21.6	24.336	1	.000
Processing of fish	117	46.8	28	11.2	1.024	1	.312
Pond preparation	171	68.4	61	24.4	33.856	1	.000
Pond management	170	68.0	62	24.8	166.304	2	.000
Cropping of fish	167	66.8	65	26.0	28.224	1	.000
Fish marketing	87	34.8	37	14.8	23.104	1	.000
Feeding of fish	96	38.4	46	18.4	127.304	2	.000
Hatchery management	125	50.0	52	20.8	105.176	2	.000
Sale of fish (processed)	58	23.2	33	13.2	228.152	2	.000
Sale of fish (fresh)	66	26.4	36	14.4	55.696	1	.000
Integrated farming	91	36.4	49	19.6	18.496	1	.000
Feeding of livestock	99	39.6	33	13.2	10.816	1	.001
Sale of livestock	79	31.6	31	12.4	33.856	1	.000
Planting vegetables	96	38.4	40	16.0	13.456	1	.000
Sale of vegetables	44	17.6	118	47.2	104.976	1	.000
Fertilizer application	80	32.0	22	8.8	1.064	2	.587

The poverty status of the household is as shown in Table 3. FGT for male-headed households showed that 70.81% were poor while 29.19% were non-poor while in the female-headed households, 74.16% were poor and 25.84% were non-poor.

Table 3a: Poverty status of fish farming households

	Female			Male			All		
Poverty Status	Freq.	Percentage	Cum %	Freq	Percentage	Cum %	Freq.	Percentage	Cum
Poor	66	74.16	74.16	114	70.81	70.81	180	72.00	72.00
Non Poor	23	25.84	100.00	47	29.19	100.00	70	28.00	100.00
Total	89	100.00		161	100.00		250	100.00	

Table 3b: Test of significance

Table 3b showed there was significant difference between poor and non-poor in both male and female headed household.

Poverty status	T	Df	Sig.(2-tailed)
Male	5.14	160	.000
Female	3.880	88	.000

Poverty indicators among sampled respondents in the sample area were analysed using the three indicators of poverty as highlighted in the Foster, Greer and Thorbecke (FGT) model. The indicators are incidence of poverty, poverty depth and poverty severity. Result presented in Table 4, showed that for male-headed households, Poverty index was (0.2919), poverty depth (0.1673) and severity was (0.1159), while for females, poverty index was (0.2584), poverty depth (0.1352) and severity was (0.0889).

Table 4: Poverty indices of the sampled household (Incidence, Depth and Severity)

Poverty indices	Index number Male poverty	Female Poverty	Total poverty
Head count index (incidence) (α=0)	0.2919	0.2584	0.2800
Poverty gap (Depth) (α=1)	0.1673	0.1352	0.1559
Squared poverty gap (Severity) (α=2)	0.1159	0.0889	0.1064

Source: Author's Computation, 2020

In Table 5,the result of Probit regression for males indicated that farm size and household size, were the major determinants of poverty in the study area while marital status (married), education (No education and tertiary), household size and fish farming experience were the determinant of poverty for females in the study area. For males, the result showed that the smaller the farm size, the more the tendency for the fish farmer to be poor. The fish farm size was significant but has negative coefficient. The result indicated that an increase in fish farm size decreases the likelihood of being poor while a decrease in farm size increased the likelihood of being poor. The smaller the fish farm size, the poorer the household, while the larger the farm size, the lower the likelihood of being poor. The result of marginal effect showed that there was -0.000041 chance of fish farm size causing poverty to fall when there is a change in farm size. Also, the higher the household size, the higher the poverty level. The households size is significant with positive coefficient for both male and female households. Households with larger size are more likely to be poor, while households with small sizes are less likely to be poor. The marginal effect showed that the size of the household was seen to have a direct relationship with poverty status indicating that the larger household size have higher probability of being poor compared to smaller ones. For the male, a unit increase in household size would increase the level of poverty by 5.7%, while for the female, a unit increase would lead to 18.2% increase in poverty. This could mean that increase in household size directly or indirectly reduces income per-head (per-capita income) as well as impair standard of living of the household. Also, increase in household size is directly related to increase in household's expenditure i.e increase in household size portrays increase in non-farm budgetary allocation and perhaps reduction in farm investment and income generating capacity. This means that, increase in household size is also associated with increase in family responsibility and reduction in per capita household income. This invariably means that fish farmers with high household size will likely have low per capita income.

However for females, the result showed that there is higher likelihood for unmarried women to be poor than married women and if the female had tertiary education, level of poverty is likely to fall by 38% but if she does not have any education, there is 26.9% chance of been poor. The higher the level of experience the lower the poverty.

Increased years of experience, is likely going to lead to better performance, thus respondents with more experience are less likely to be poor. Even though the age is not significant, but the result showed that the higher the age, the higher the poverty level. For farm type, the respondents practicing only fish farming would likely have their poverty level increase in the process. Diversification and multiple streams of income should therefore be encouraged. When funds are received from family and friends, there is the probability that poverty level will fall. The result showed that access to credit facilities or loan was not significant but had a negative coefficient meaning that the respondents that have access to credit facilities or loan are less likely to be poor while those that do not have access to credit facilities or loan are more likely to be poor. This is similar to the findings of Omitoyin (2013) on micro-credit in poverty alleviation among fish farmers in Osun State.

Table 5: Probit Regression Analysis by Gender

	Marginal Effects (Standard Error of dy/dx)		
	MALE	**FEMALE**	**ALL**
Farm Size	-0.0000416***	-0.000026	-0.0000376***
	(0.000015)	(0.000024)	(0.000012)
Martial Status			
Married	-0.1341	-0.5494***	-0.1495
	(0.11452)	(0.1136)	(0.0987)
Divorced	0.2008		0.16004
	(0.2084)		(0.1969)
Education			
No Education		0.2696**	0.2965
		(0.1169)	(0.1983)
Secondary Education	0.14384		0.1249
	(0.1402)		(0.1207)
Tertiary Education	-0.155758	-0.3823***	-0.1638
	(0.1200)	(0.0817)	(0.1093)
Age	0.00612	0.00170	0.0022
	(0.0047)	(0.0079)	(0.0033)
Household size	0.0572***	0.1817***	0.0646***
	(0.0176)	(0.0681)	(0.0125)
Farm Type	0.0291	0.0241	0.01474
	(0.0329)	(0.04002)	(0.0240)
Source of capital			
Bank Loans	-0.1340	-0.1415	-0.2008***
	(0.0956)	(0.1259)	(0.06247)
Friends and family	-0.0611	-0.1191	-0.0786
	(0.1385)	(0.1544)	(0.1044)
Log of Primary Income	0.01177	-0.1277	0.03782
	(0.1090)	(0.1781)	(0.0833)
Log of Secondary Income	-0.06870	-0.1793	-0.1285*
	(0.1049)	(0.1126)	(0.0705)
Fish farming Experience	-0.04334	-0.4229**	-0.1047**
	(0.0686)	(0.1649)	(0.0534)
No of observation	159	88	247
R-squared	0.1669	0.4122	0.2129
LR Chi2 (Prob.)	32.22 (0.0037)	41.68 (0.0000)	62.70 (0.000)
Log Likelihood	-80.4192	-29.7165	-115.8968

Source: Author's Computation, 2020
"***", "**" and "*" represent significance at 1%, 5% and 10% respectively

Discussion

A change in farm size was relevant to determining if a household will be poor or not. Amao *et al* (2009) found poverty to be negatively associated with pond size. This means that the larger the pond size, the less the likelihood of the owner being poor. The household size distribution showed that there were enough hands (family labour) engaged to carry out fish farming operations. This result agrees with Agbamu (2000), who said that the number of persons in a family paves the way for the use of family labour. The result also agrees with the work of Okoye (2009). For the females, tertiary education is significant but with negative coefficient. Those with tertiary education are less likely to be poor because they may possess the skills and ideas needed to improve on their fish farming business. This is similar to the observation of Akpan *et al* (2016) that, respondents with higher number of years of formal education are less poor compared

with those with fewer years. The reason could be the exposure and degree of technology adoption which is positively correlated with increase in years of formal education. The findings also agree with Ohen, Agom and Okon (2009) and Abda and Eglal (2010) in Khartoum North, Sudan as cited by Iruo, *et al.,* (2018). For years of experience, similar results were obtained by several other research studies that showed socioeconomic characteristics, such as age, labour in farm operations, household size, and farming experience to have reduced poverty in fish farming households in Nigeria (Etim, 2007; Etim, Edet, & Okon, 2008; Etim, Edet, & Esu, 2009; Oladimeji, Abdulsalam, Damisa, & Omokore, 2013; Etim & Patrick, 2010). Empirical evidence has shown that poverty is negatively associated with income, gender, marital status and education (Osinubi, 2003; Etim, 2007; Etim, and Patrick, 2010; Faisal *et al.,* 2005; Oladimeji *et a*l., 2013). Even though the primary and secondary income were not significant, increase in income would make the fish farmers less prone to poverty. This is in line with the finding of Olowa (2012) which stated that distribution of income has an important influence on poverty. The observation that fish farmers with income from fish only are likely going to be poorer is supported by the findings of Blackmore *et al* (2018), who observed that raising small livestock and fish can improve income and nutrition.

Conclusion and recommendation

This study examined the gender roles and determinants of poverty among fish farming households in Oyo State, Nigeria. Harvard gender analysis framework, Foster, Greer and Thorbecke as well as Probit regression model were used to determine role participation, poverty indices and poverty status of the respondents. Results indicated that there were significant differences in some roles carried out by both males and females. The poverty status: index, depth and severity were obtained. Factors identified to determine poverty status in male are: farm size and house hold size while for females: no education, tertiary education, married marital status, household size and years of experience determined the poverty status. Larger farm size, for males and higher educational status for females would enhance overall improvement of farm productivity in the study area. An increase in the value of any of these variables would increase the likelihood of not being poor. There is the need to expand fish production through increased capacity of the fish farmers for optimum resource utilisation. Policies that will empower female gender through capacity building, and participation to enhance their livelihood and foster its contributions to poverty reduction should be encouraged. Promotion of fish farming from small scale to large scale fish production with the view to enhance higher productivity should be vigorously pursued.

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