

GENDER GAP ADOPTION OF FISH FARMING TECHNOLOGIES IN AFIJIO LOCAL GOVERNMENT AREAS OF OYO STATE, NIGERIA

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ABSTRACT

The study was conducted with the purpose to unveil the gender gap in the adoption of fish farming technologies in Afijio Local Government Areas of Oyo State. Two hundred respondents were interviewed for the study via structured and pre-tested interview schedule, and multi satge sampling technique. The level of adoption of the technologies was low due to the characteristics of the technologies. The findings revealed that at $p < 0.01$, there was a significant difference in fish feeding techniques between men and women fish farmers. More so, at $p < 0.05$, significant differences exist between men and women level of adoption of race- way method, water management techniques. Gender equality principles should be mainstreamed into clear and effective technology development for enhanced production and sustainable socio-economic livelihood among fish farmers in Nigeria.

Keywords: Gender Gap, Adoption, Technologies, Fish Farming and Nigeria

BACKGROUND INFORMATION

“Nigeria has the capacity to produce fish to meet the demands of her citizens, as well as for exportation. I strongly believe that if all States give more attention to aquaculture, importation of frozen fish into the country will be a thing of the past.”(Daily times, 11 April, 2012)

FAO report (2006) states that Nigeria has become one of the largest importers of fish in the developing world, importing some (304,413) metric tonnes annually. The inventory of fish farm in Nigeria indicated that Oyo State has the least number of fish ponds in the south-western Nigeria and that some of the ponds are lying fallow while the rest are not operating at full capacity.

Globally, 142 million tonnes of captures fisheries and aquaculture were produced in year 2008. (State of World fisheries and aquaculture Report 2008) China, India, Japan, South Korea and the Philippines produced 80.0 percent of the 21.6 million tonnes world fish production from fish farming. However, world fish production estimation was 145.1 million tonnes (World Fisheries Report, 2010). The quality of fish protein is high because it contains amino acids in the amount and proportions required for good nutrition and provides a good source of vitamins, minerals and iodine (Edward and Damaine, 2002).

Fish meats are tender, light and easily digestible because they contain very little connective tissues. Therefore, liver can digest them easily without any difficulty. Fish bone is also

beneficial as they supply calcium and phosphorus essential for bone and teeth formation (Edward and Damaine, 2002). Despite an abundant endowment of human and natural resources, Nigeria depends largely on importation to meet its fish consumption needs. Nigeria is a maritime state of about 140 million people, with a coastline measuring approximately 853 kilometers. Of the 36 states of the federation, nine are located on the coast where the waves of the Atlantic Ocean lap against the land (*The Fish Site News, 2010*). With this scenario, the natural expectation is that Nigeria should not only be self-sufficient in fish production but should also be an exporter of aquatic foods.

Sadly, Nigeria imports between 700,000 and 900,000 metric tons of fish annually to partially meet a shortfall of 1,800,000 metric tons. Fish is a good source of animal protein, which is essential for healthy human growth. In fact, to many Nigerians on the coastal areas, creeks and rivers, fish is their only source of protein. The shortfall has resulted in a low annual per capita consumption rate of 7.5 kg as against the 13 kg recommended by the Food and Agriculture Organization (*FAO REPORT, 2010*).

Olawunmi (2002) shows that fish farming could easily be established in the area such as Ile Ife due to relatively low cost of establishment. Fapohunda and Godstates (2007) carried out a study on Biometry and composition of fish species in Owena reservoir in Ondo State, Nigeria. The study concluded that there were fourteen fish species belonging to nine families. Two of these families - characidae and clariidae were the dominant fish families in the reservoir. George (2005) reported that fish is an important component in the human diet especially for the poor. His study revealed that though, they consume less, many low income people depend on fish as a major source of animal protein in Bangladesh. Yusuf, *et al.*, (2002) carried out a study on the economics of fish farming in Ibadan metropolis; the gross margin analysis revealed that medium scale farmers derived the highest return of N1.55 for every N1.00 spent on production. This was followed by large scale farmers with a gross margin of N1.34. They however, stated that fixed inputs, labour, fertilizer, feeds and fingerlings significantly affected the value of fish produced.

Lakra and Ayyappan (2002) carried out a research on the recent advances in technologies application to aquaculture. The study revealed that the subject has assumed greater importance in recent years in the development of agriculture and human health. The study concluded that the increased application of technological tools could certainly revolutionise our fish farming besides its roles in biodiversity conservation. Also, Deji *et al.*, (2005) reported in the study on the influence of demographic and socio-economic characteristics of women farmers on their adoption of improved cassava varieties that years of schooling, numbers of children assisting in farm activities, source of credit, income and source of farm land were positive but not significantly related to the adoption of improved cassava varieties in the study area. The study concluded that demographic and socio-economic characteristics of respondents had no significant influence on their decision to adopt agricultural innovation.

However, literatures revealed quite a number of studies conducted on fish farming in Nigeria and Oyo state in particular but none seems to have been done in relation to gender and given the significance of fish as a guarantor of livelihood, a means of hunger and poverty reduction as well as a means of food and nutrition security to people of Oyo State, an empirical study of the type of resource used and the level of efficiency achieved is of practical value on account of the insights that such a study will provide for the understanding of the technologies used in fish production. Therefore, the study aimed to unveil the gender

gap in the adoption of fish farming technologies in Afijio Local Government Areas of Oyo State.

METHODOLOGY

The study was carried out in Afijio Local Government Areas of Oyo State. A multi-stage Sampling is the method of sampling populations that occur naturally in groups and is common in ecological field studies. This sampling method requires special statistical analysis that account for this sample structure. Several analytical methods were used for comparing means from two stage sampling.

RESULTS AND DISCUSSION

Table 1. Socio- economic characteristics of respondents

Variables stages	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Age				
30 and below	22	13.8	14	35.2
31-60	122	76.3	21	52.5
61 and above	16	10.0	5	12.5
Religion				
Christianity	149	93.1	40	100
Islam	10	6.3	-	-
Traditional	1	0.6	-	-
Sex	120	80.0	40	20.0
Marital Status				
Single	13	8.1	11	27.5
Married	131	81.9	23	52.5
Divorced	3	1.9	6	15.0
Separated	8	5.0	-	-
Widower/Widow	5	3.1	2	5.0
Income level (₦)				
200,000 and below	41	25.7	16	40.0
200,000-400,000	72	45.0	7	17.5
400,000 and above	29	28.1	4	10.0
No response	34	21.3	13	32.5
Level of Education				
No formal Education	50	31.3	16	40.0
Primary Education	7	4.4	6	15.0
Secondary Education	21	13.1	11	27.5
Tertiary Education	8	51.3	7	17.5

Source: Field Survey, 2011

Table 1 show that the mean age of the farmers was 52.70 and standard deviation of 9.26. In addition, in the female category, (35.0%) were found within the age group of 30 and below, (52.5%) were within the age bracket of 31-60 while (12.5%) were within the age group of 61 and above. This implies that majority of the farmers in the study areas were found within the productive age of 31-60 years of age. Hence, they contribute significantly towards agriculture. More so, Table 1 also reveals that majority (93.1%) of male respondents practiced Christianity, (6.3%) percent practiced Islam and very few (0.6%) practiced

traditional religion while in the female category. This implies that Christianity is the dominant religion practiced in the study area. In addition the study revealed that majority (80%) of respondents were male while 20.0 percent were female. It implies that women in the study areas engaged in open water fishing which usually is the predominant occupation of the people in the study areas.

In addition, (81.9%) of male respondents were married, (8.1%) were single, (5.0%) were separated, (1.9%) were divorced while (3.1%) of male respondents were widowers. In the female category (52.5%) were married, (15.0%) were divorced, (27.5%) were single and (5.0%) were widowed respectively. This implies that majority of the respondents were married. Also Table 1 shows that (25.5%) of male respondents earned an annual income of ₦200, 000 and below from fish production, (45.0%) earned income of between ₦200, 000-400,000 while (28.1%) earned income within the range of ₦400, 000 and above annually from fish production. However, in the female category, (40.0%) earned an annual income of ₦200, 000 and below, (17.5%) got between 200,000-400,000 while (10.0%) earned 400,000 and above from fish production this means that male farmers in the study areas generated much capital from fish production than the female. The rationale behind the variability in income was due to land fragmentations that prevail in the study area and the finding is in line with Oladipo et.al, 2011.

In addition, Table 1 also shows that (31.3%) of male respondents did not attain any formal education, (4.4%) spent 1-6 years on education, (13.1%) spent between 6-13 years on education while (51.3%) spent between 14-25 years in formal education. However, in the female category, (40.0%) of respondents did not have formal education, (15.0%) spent between 1-6 years on education, (27.5%) of respondents spent between 6-13 years on education while (17.5%) spent between 14-25 years on education. This implies that (31.3%) of male respondents did not have formal education, (4.4%) had primary education, (13.1%) had secondary education while (51.3%) had post secondary education respectively. It can therefore be deduced from the study that literacy level among male farmers is relatively high.

Involvement of Men and Women in Fish Farming At Different Stages of Fish Production

Table 2. Distribution of Respondents' Level of Involvement at the Various Stages of Fish Production

Variables/ Stages	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Land preparation	110(50)	68.8(31.2)	14(26)	35.0(65.0)
Pond construction	106(54)	66.3(33.7)	16(24)	40.0(60.0)
Pond stocking	110(50)	68.8(31.2)	26(14)	65.0(35.0)
Pond management	112(48)	70.0(30)	14(26)	35.0(65.0)
Fish cropping	109(51)	68.1(31.9)	16(24)	40.0(60.0)
Fish processing	4(154)	2.5(97.5)	36(4)	90.0(10.0)
Marketing	15(145)	9.4(90.6)	36(4)	80.0(20.0)

Note: Figures in brackets represent those that were not engaged in the fish production activities

Source: Field Survey, 2011

Land preparation: Results shown in Table 2 revealed that (68.8%) of male were involved in the various techniques in land preparation compared to (35.0%) female. This may be due to the difficulty involved in land preparation which few female can actually do.

Pond construction: Results presented in Table 2 show that majority (66.3%) of those involved in pond construction were male while female (40.0%) were involved. This may also be due to the nature of the operations involved in fish production.

Pond stocking: Among the respondents interviewed, it was observed that (68.8%) of men were involved in pond stocking techniques introduced through the ADP and (35.0%) of female respondents were involved in pond stocking technique as shown in Table 2. This analysis shows that pond stocking was gender unbalanced in the study area.

Management of pond: Results Table 2 reveal that (70.0%) of male respondents were involved in pond management techniques which involves activities such as fertilizer application, changing of water, liming etc, while (65.0%) of the female respondents involved at this stage of fish production.

Cropping of fish: Results presented in Table 2 show that harvesting of fish is a tedious operation that required more energy that is the reasons (68.1%) of male respondents were found to be involved in it as against (40.0%) of female respondents.

Processing of fish: Table 2 revealed that processing of fish is mainly done by female respondents (90.0%) while only 2.5% men respondents were involved.

Marketing of fish: Results gathered in Table 2 also show that majority (80.0%) of female were found to be involved at this stage of fish production, while only (9.4%) of male were involved at this stage of fish production. This shows that women were more involved in marketing of fish like any other agricultural produce.

Level of Adoption of Available Fish Farming Technologies

Table 3. Distribution of respondents’ level of adoption of selected fish farming technologies

Variables	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Pond construction	50(110)	31.3(68.7)	15(25)	37.5(62.5)
Pond stocking	44(116)	27.5(72.5)	3(37)	7.5(92.5)
Water management	44(116)	27.5(72.5)	12(28)	30.0(70)
Integrated farming	7(153)	4.4(95.6)	2(38)	5.0(95)
Weed control	45(115)	28.1(71.9)	9(31)	22.5(77.5)
Race-way method	40(120)	25.0(75)	6(34)	15.0(85)
Re-circulatory method	5(155)	3.1(96.9)	-(40)	- (100)
Transportation of fish	13(147)	8.1(91.9)	3(37)	7.5(92.5)
Stocking density	22(138)	13.8(86.2)	3(37)	7.5(92.5)

Note: Figures in bracket represent those that did not adopt the technologies

Source: Field Survey, 2011

Pond construction: Results in Table 3 reveal that (31.3%) of male respondents adopted pond constructions as one of the fish farming technologies while only (37.5%) of female adopted.

Pond stocking: Table 3 also revealed that only (27.5%) of male respondents adopted the technique of stocking pond while majority (76.5%) did not adopt. Also, (7.5%) of female respondents adopted this technique in fish production.

Water quality management: Table 3 shows that (27.5%) of male respondents interviewed for the study adopted water management techniques while (30.0%) of female respondents adopted this technique. This analysis shows that majority of respondents did not adopt this technique in fish production

Integrated fish farming: Results in Table 3 show that very few male respondents (4.4%) adopted integrated fish farming technology while only (5.0%) of female respondents adopted the technique in fish production

Weed control: Table 3 shows that only (28.10%) of male respondents practiced the various techniques used to control weeds introduced to them by the extension agents as against 73.0 percent who did not adopt. In the female category, (22.5%) adopted the techniques. This analysis reveals that fish diseases may be common in the study area as there is a gross low of fish production through fish farming in the study area. Similarly, inability to adopt this technology may even serve as a discouraging factor for the adoption of other technologies.

Race way method: This is one of the important fish farming technologies that is commonly adopted. Data show in Table 3 revealed that (25.0%) of male respondents adopted this technology while only (75.0%) did not adopt. In other words, (15.0%) of female respondents adopted the technique.

Water re-circulatory method: Results in Table 3 reveal that only (3.0%) of respondents adopted this technique while none of the female respondents adopted the technology. The characteristics of this technology such as cost implications and complexity may be responsible for its extremely low rate of adoption. Similarly, limited number of knowledgeable personnel who can install this technology may also be responsible for the low level of adoption in the study areas.

Transportation of fingerlings: Results in Table 3 show that (8.1%) of male respondents adopted the techniques involved in transporting fingerlings while (7.5%) of female respondents adopted the techniques. This analysis shows that majority of the respondents mainly depend on fingerlings got from their farms.

Stocking density: Results in Table 3 below reveal that (13.8%) of male respondents adopted the recommended stocking density in fish production while only (7.5%) adopted. The above information shows that most fish farmers may likely be experiencing low yield due to the low adoption of stocking density.

Generally, there was a very low level of adoption of the various technologies in fish production. This could be due to the complexity and high cost of the technology as well as adopters' characteristics as supported by (Rogers (1962); Clark and Akinbode (1968); and Jibowo (2000).

RESULT OF TESTED HYPOTHESES

Hypothesis 1: There is no significant difference between men and women fish farmers' level of involvement in fish farming activities.

Table 4. ANOVA on the level of involvement of men and women in fish farming activities

VARIABLE	F-VALUE	P-VALUE
Land preparation	25.975	0.000**
Pond construction	36.190	0.000**
Pond stocking	28.315	0.000**
Pond management	25.975	0.000**
Cropping of fish	40.752	0.000**
Processing of fish	0.474	0.492
Fish marketing	4.481	0.010**

Note: ** Signifies that F is significant at $p < 0.01$

Source: Field Survey, 2011.

Results in Table 4 show that at both 0.05 and 0.01 levels of significance, there was significant difference in the level of involvement in land preparation (F= 25.975, $p < 0.05$ and 0.01) between men and women fish farmers. This statistical variation could be as a result of the difficulty of the task involved in pond management. This makes more men to be involved than female like every other farming activity except in processing and marketing of agricultural produce.

Similarly, Table 4 also shows that at 0.01 level of significance, there was significant gender difference in the level of involvement of men and women in pond construction (F= 36.190, $p < 0.01$). This disparity could also be traced to the nature of the activity. Also, at 0.01 level of significance, it was observed that there was significant difference in pond stocking (F= 28.315) between men and women fish farmers as shown in Table 5. This significant difference indicates that men were more engaged in pond stocking than women.

Furthermore, there was significant difference in water quality management of pond at 0.01 level of significance (F=25.975) between men and women fish farmers. This disparity was due to gender discrimination in the study area. More so, there was significant difference (F=40.752) between men and women fish farmers level of involvement in cropping of fish at the significant level of 0.01. This statistical difference could also be explained from the point that male were more involved in fish farming activities than female.

Lastly, Table 4 reveals that at 0.01 level of significance a significant gender difference (F= 4.481) was observed in marketing of fish between men and women fish farmers. This disparity could be due to the fact that women engage more in marketing of agricultural produce than their men counterparts. However, processing of fish was not significant at either 0.01 or 0.05 significant level. This indicates that is a secondary operation that can be carried out irrespective of gender

Hypothesis 2: There was no significant difference between men and women fish farmers' level of adoption of fish farming technologies.

Results in Table 5 show that at 0.05 level of significance, there was significant difference (F= 10.309, $p < 0.05$) between men and women level of adoption of fish feeding technology. This could be due to the factors associated with the embodies and unembodies technology involved in fish production. However, pond construction, pond stocking, integrated fish farming, weed control techniques, water recycle method, transportation of fingerlings techniques, stocking density techniques, fertilizer application techniques, liming techniques

and cropping methods were not significant at either 0.05 and .01 level of significant as shown in Table 4.

Table 5. ANOVA on the level of adoption of available fish farming technologies

VARIABLE	F-VALUE	P-VALUE
Pond construction	1.277	0.260
Pond stocking	0.028	0.868
Water management	8.288	0.050*
Integrated fish farming	0.029	0.865
Weed control	1.238	0.267
Race-way method	4.839	0.050*
Water recycle method	1.072	0.302
Transportation of fish	0.607	0.437
Socking density	0.283	0.595
Fertilizer application	1.915	0.168
Liming	1.610	0.206
Cropping methods	0.243	0.623
Feeding of fish	10.309	0.473*

Note: * Signifies that F is significant at $p < 0.05$ level while **F significant at 0.01.

CONCLUSIONS

Fish farmers in the study area were characterized by older aged, with Christianity as major religion and dominated by male. Relatively high proportion did not have formal education with low annual income from fish production. Males were more involved at the various stages of fish production except in marketing of fish where majority were found to be women. This was further buttressed with the test of hypotheses where there were significant differences in almost all the stages of fish production at $p < 0.01$ except in marketing. This shows that gender differences exist in fish production. Also, the study revealed that there was a low level of adoption in almost all the available technologies across gender. This could be due to poor motivations and low ratio of extension staff to farmers which is one of the problems facing extension service in Nigeria.

RECOMMENDATIONS

In view of the above analysis, enlightenment campaigns aiming at improving fish production for improved socio-economic livelihood of the farmers through adoption of fish farming technologies should be organised at the local, State and National levels. Efforts at increasing the number of extension visits should be made so as to enhance gender balance in the level of adoption of fishery technologies especially among female farmers as women play significant roles in agricultural production in Nigeria. In addition, gender equality principles should be mainstreamed into technology development through effective programmes, clear linkage and active gender participation in fish farmers in Nigeria.

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