ORIGINAL RESEARCH PAPER

EFFECT OF SOCIAL CAPITAL ON POVERTY ALLEVIATION AMONG FISH FARMING HOUSEHOLDS IN OYO STATE, NIGERIA

ABSTRACT

This study investigates the effect of social capital investment on poverty reduction among fish farming households of Oyo State, Nigeria. A multistage sampling technique was adopted in the selection of the respondents. Primary data were collected using a structured questionnaire from a representative sample size of 359 households in four local government areas representing the four agricultural zones, namely Ibadan-ibarapa, Oyo, Ogbomoso and Saki in Oyo State, Nigeria. The study used a multinomial logit regression model to examine the effect of social capital on household poverty. The estimates of the regression model indicated that, in addition to the socio-economic characteristics of some households, social capital endowments have significant effect on the probability of a household being poor. The study concluded that, among other factors, social capital is very important in reducing household's poverty. It was therefore recommended that stakeholders should be encouraged to invest in households' social capital to accelerate poverty reduction among the fish farmers in the study area

1. INTRODUCTION

Fisheries and aquaculture are essential parts of agriculture in Nigeria that is found to have the capacity to increase the country's GDP (Gross Domestic Product) and solve the unemployment problem for our teeming youths if adequately managed. Fish is an important source of food, income, employment, and recreation for people around the world and it is a very important source of animal protein for both man and livestock in developed and developing countries [1]. Fish accounts for one-third of the animal protein because of its high-quality protein content and affordability offers additional variety and a comparatively cheap meal of the equivalent nutritional value of beef. It may therefore be efficiently utilised to supplement the predominantly low-protein and high-carbohydrate content of the average Nigerian diet [2]..

According to [1], the current demand for fish in Nigeria mostly outstrips the local production. Nigeria is the largest fish consumer in Africa and among the largest fish consumers in the world with over 1.5 million tons of fish consumed annually. [3] reported that there is growth in fish production in Nigeria and this was attributed to increased activities of aquaculture. The need for aquaculture activities arose from the decrease in supply from ocean fisheries as a result of over-fishing, habitat destruction and pollutions, hence, the need to meet up with demands for fish [4]. This lead to the emergence of aquaculture as an economic resource undertaken by a large number of people especially the small-scale farmers in Nigeria because it contribute to sustainable development and poverty reduction by generating income and employment. Regardless of these attributes the fish farming households remained poor.

One of the most pathetic features of the Nigerian economy today is that a majority of its populace is living in a state of destitution while the remaining insignificant minority lives in affluence. Nigeria is a resource-endowed country but the citizens are among the poorest in the world [5]. Consequently, Nigeria exists in paradox of a rich country inhabited by poor people. With regards to this, huge resources have been devoted to poverty alleviation by successive governments. In spite of this efforts geared towards poverty reduction, the living conditions of people in Nigeria have not witnessed a significant growth not withstanding growth in Gross Domestic income Product [6]. The United Nations Development Programme report on human development reveals that Nigeria is one of the poorest countries in the world with a human development index (HDI) of 0.530 and ranked 157th out of 189 countries[7].

Poverty among fishing households can be reduced if they establish good connections among themselves. This will foster a system with continuous returns, good social interaction and connection within and between fish farmers' group. The study by [8] reported that the differences in economic outcomes at the individual, households or community level cannot be fully explained by differences in the use of conventional inputs such as land, labour and physical capital. The role played by social capital on poverty reduction and improvement in welfare is therefore gaining recognition in the world over. Social capital, a multidimensional concept has no unique definition commonly accepted within the social sciences scholars. It may be defined as the networks, norms and trusts which exist among people staying together and contributing financial capital, human capital and physical capital to benefit the members of an association, [9]. To this end, social capital has been described as an empirically elusive concept, yet has also been heralded as the glue that holds communities together.

The prevailing economic situation in Nigeria and the importance attached to social capital as a solution to social interaction provides for an examination of its relevance to poverty reduction. In view of this fact, the study focused on investigating if investment in social capital can influence household poverty status among fish farmers in Oyo state, Nigeria. Specifically, it categorise the fish farmers into different poverty status, profiled the identified social capital dimension available in the study area based on poverty status, identify the general fishing activities and challenges encountered during farming activities. In addition it examines the influence of social capital and other factors on household poverty level.

2. THE CONCEPT OF SOCIAL CAPITAL

Social capital refers to the internal social and cultural coherence of society, the norms and values that govern interactions among people and the institutions in which they are embedded. Social capital is the glue that holds societies together and without which there can be no economic growth or human well-being. It is referred to as the goodwill, fellowship, mutual sympathy and social intercourses which make tangible substances add up for most people in their daily lives. Although the concept of social capital can be understood differently, there has been a visible convergence towards a definition that focuses on networks, shared norms and values that facilitate cooperation within and among groups, [10].

According to [11], social capital is the networks of social relations that may provide individuals and groups with access to resources and support. It is as an important resource as physical or human capital in household production systems contributing to individual, household or group productivity and welfare outcomes. The central idea of the network approach framework is that social networks are valuable asset that generates an income stream for the household. Social capital is built during interactions, which occur for social, cultural, or religious reasons. It enables people to build communities, to commit themselves to one another, and to knit social order. It is argued that a sense of belonging and the concrete experience of social networks can benefit people [13].

In essence, the assumption of the network approach is that individuals' involvement and participation can have positive socioeconomic consequences, not only for the individual household but also for the community at large that is, having social attachment and relationship with others in social activities, [13]. Lastly, the concept of social capital involves the value of social networks, bonding similar people and bridging between diverse people, with norms of reciprocity". Thus, social capital has three main dimensions: Bonding social capital referring to

strong family ties, bridging social capital referring to weak ties among friends and acquaintances and more formal ties linking members of voluntary organizations [14].

3. MATERIALS AND METHODS

A. Study area and Sampling technique

The study was conducted in Oyo State Nigeria. Oyo State is located in the south western part of Nigeria. It has a land area of 27,140 square kilometers located between latitude 90N and 190N of the equator and between longitude 2.50 and 50E of the prime meridian. Primary data were used for the study. A multistage sampling technique was adopted in the selection of the respondents. There are four agricultural zones in Oyo State of Nigeria out of which a local government area each was selected purposively based on concentration of aquaculture fishermen in each zone. The second stage involved random selection of two out of 10 cells in each of the selected local government areas, three villages from each of the cells selected making a total of six villages per LGA and 24 villages for the four LGAs selected. The third stage was the sampling of 15 fishing households per village, making a total of 360 respondents for the study.

B. Operationalization and Measurement of variables

The dependent variable is the poverty status of the fishing households which is measured by the relative poverty ratio (RPR) through the use of household per capita expenditure (PCE). The *per capita* expenditure for the households was obtained by the sum of all household monthly expenditure on food and non-food items and then divided by the household size. A household is non poor when per capita monthly expenditure fall above or is equal to two-third of the mean per capita expenditure (scored = 3). A household is categorized as poor when per capita expenditure falls below two-third of the mean monthly per capita expenditure. The poor household was further categorized into core poor (scored = 1) when per capita expenditure falls below 1//3 mean per capita expenditure and moderately poor (scored =2) when per capita expenditure falls in between 1/3 and 2/3 mean per capita expenditure.

On another hand, the social capital dimensions as used by other literatures such as [8, 12] among others includes: (a). Meeting attendance index obtained by summing up attendance of household members at meetings and relating it to the number of scheduled meetings per annum by the associations they belong to. The value was

then multiplied by 100. (b). Heterogeneity index which is an aggregation of diversity of members in the three most important groups to the households. A maximum score of 10 was allotted to each group representing the highest level of heterogeneity. To obtain an index, the sum of the three scores for each household was divided by 30 the maximum score and multiplied by 100 hundred.

(c). Decision-making index is the sum of how households rank their participations in decision making for the three most important groups to them. The average of the rank for the three groups was estimated and multiplied *by* 100 per household. (d). Membership density is the average number of membership in social groups per household as estimated divided by the total number of association available in the area and multiplied by 100. (e). Labour contribution represent the number of days that household members confirmed to have worked for their groups. It is the number of days worked by household members or number of days worked per year as membership contribution. (f).Cash contribution index is the amount paid as membership due per annum in a group. This was obtained by the sum of the total cash contributed to the various associations which the household belongs. Cash contribution can also reveal respondents' commitment to the group.

C. Model Specification

Multinomial logistic regression was used to predict a nominal dependent variable given one or more independent variables. It is sometimes considered an extension of binomial logistic regression to allow for a dependent variable with more than two categories. The response variable poverty category was treated as categorical under the assumption that the levels poverty status do not have natural ordering and the Stata analytical package was allowed to choose the referent group, that is, the moderately poor category with highest frequency. The multinomial logit model has a response probability of:

$$P\left(\frac{y=j}{X}\right) = \frac{\exp(X\beta_j)}{\left[1+\sum_{h=1}^{j}\exp\left(X\beta_h\right)\right],\quad j=1,2,and\ 3} \qquad \ldots 1$$

Where β_j = K X 1, j = 1, 2 and 3 when j = 1, the model reduces to the binary logit model. The multinomial logit model is estimated by maximum likelihood.

$$P_{j1} = \frac{e^{\beta_1 X_j}}{1+e^{\beta_1 X_j}+e^{\beta_2 X_j}}$$

$$P_{j2} = \frac{e^{\beta_2 X_j}}{1+e^{\beta_1 X_j}+e^{\beta_2 X_j}} \qquad \ldots 2$$

$$P_{j3} = \frac{1}{1+e^{\beta_1 X_j}+e^{\beta_2 X_j}}$$

Where P = (1, 2 and 3 for core poor moderately poor and non poor categories respectively)

$X_j = X_1, X_2 \ldots X_n$

X1 = Labour contribution (Man-days)

X2 = Cash contribution (₦)

X3 = Decision making index

X4 = Meeting attendance index

X5 = Heterogeneity index

X6 = Membership density (index)

X7 = Sex (Male = 1, 0 otherwise)

X8 = Age (years)

X9 = Education (years)

X10 = Marital Status (1= married, 0 otherwise)

X11 = Household size (actual number)

X12 = Farming experience (years)

X13 = No. of ponds (actual number)

X14 = Secondary occupation (Yes =1, 0 otherwise)

4. RESULTS AND DISCUSSIONS

A. Respondents Poverty profile

Table 1 presents the poverty profile of the fishermen. About 20 percent of them fall into the core poor category with a monthly mean per capita expenditure (MPCE) of ₦5, 255.90 ($15). This indicated that an average core poor household spent less than $1 per day. The minimum and maximum PCE are ₦1, 820 and ₦6, 839 respectively. A larger part of the respondents, 44 percent were categorised as moderately poor with MPCE of ₦9, 521.22 ($26.5) which is equally less than $1 per day per household in that category.

On a contrary, the non-poor households accounted for about 37 percent of the fishermen. Their MPCE accounted for ₦17, 274.99 ($48) which is about $1 per day. However, the MPCE of non-poor category accounted for over 300% of the MPCE of the core poor category. The minimum PCE for this group is ₦12, 670.67 and

maximum PCE is ₦37, 783.33. On the aggregate, MPCE is ₦11,518.91 ($32) which is about $1 per day per fish farming household.

Table 1: Respondents poverty profile

Poverty status	Freq (%)	Mean PCE	Std. Dev.	Minimum	Maximum
Core poor	70 (19.50)	5,255.90	1,430.61	1,820	6,839.57
Moderately poor	158 (44.01)	9,521.22	1,772.91	7,012.5	12,513
Non poor	131 (36.49)	17,274.99	4,630.72	12,670.67	37,783.33
Total (Pooled)	**359 (100.00)**	**11,518.91**	**5,578.51**	**1,820**	**37,783.33**

Source: Field survey 2018

B. Socio Economic features of the respondents

The profiled socio economic characteristics in relation to their poverty status are provided in Table 2. The result showed that the non-poor recorded the lowest percentage (10.69%) for farmers that were less or 30 years old relative to others. However, this category accounted for the highest percentage (59.54%) of farmers who were between 31 and 40 years old. The moderately poor have the highest percentage for respondents between 41-50years (24.68%) while the core poor recorded highest representation for ages between 51-60 years (14.29%) and those above 60 years of age (12.86%). The average age of the fishermen in the study area is 40 years which is an indication that the respondents were still within their active years; hence they possessed the strength to withstand the rigours of fishing activities.

More women were involved in fish farming activities among the core poor households (30%) compared with other categories. While among the male fish farmers, the non-poor category has the highest representation of 79.39 percent. In addition to that, about 86 percent of the non-poor households were married, 9.16 percent were single with 2.29 percent which is the least representing those who were either separated or divorced. The highest percentage value for single fish farmers belong to the core poor category (39.29%). It is noteworthy that none of the core poor category indicated they were widowed, although 10 percent of them were separated from their spouses. The pooled results revealed that majority of the households were married (74.65%).

About 54 percent of the core poor category has between 7 and 9 household members and this accounted for the highest value when compared with other categories. The moderately poor farmers recorded the least value

for households with 3 household members or less. The non-poor households have no record for having more than 9 household members. The average household size is 6 members which is relatively fair. The more the number of the household members the more the needs increase and this tends more to impoverishment.

As the number of years of fish farming increases for the non-poor category, the percentage representation decreases across board. About 57 percent of the core poor farmers have 5 years fish farming experience or less, while the moderately poor recorded the highest percentage value for those who have between 6 to 10 years experience. The average fish farming experience is about 7 years which is enough to acquire the technical know-how of fishing activities. Majority of the fish farmers have between 1 and 2 fish ponds for their farming activities. About 51 percent of the moderately poor operated two different ponds for their fishing activities while 19.08 percent of the non-poor categories have three ponds. However, low percentage of the respondents for all the categories operates four ponds at a time for their farming activities. On the average, the number of ponds operated by the farmers in the study area is about two.

The income generated from fishing activities in the study area revealed that more household received less income relatively for the three categories under consideration. This is an indication that increase in income reduces the percentage representation of the farmers. However, the non-poor category recorded the highest percentage (27.48%) for farmers who earned over ₦450,000 ($1,250) when compared to 10.76 and 2.86 percents for moderately poor and core poor categories. The mean income generated from fish farming activities is ₦ 203,141 ($564). Majority of the fish farmers from the core poor and the non-poor categories, i.e. 60 and 77.10 percent respectively had no secondary occupation to generate additional income while 26 .58 percent of the moderately poor farmers were involved in trading to augment income from fish farming activities.

Table 2: Profiled socio economic features of the farmers relative to their poverty status

Socio eco.	Core poor		Moderately poor		Non poor		Pooled	
Characteristics	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Age (Mean= 40.21)								
<=30	16	22.86	37	23.42	14	10.69	67	18.66
31-40	21	30.00	53	33.54	78	59.54	152	42.34
41-50	14	20.00	39	24.68	25	19.08	78	21.73
51-60	10	14.29	21	13.29	12	9.16	43	11.98
>60	9	12.86	8	5.06	2	1.53	19	5.29
Sex								
Female	21	30.00	36	22.78	27	20.61	84	23.40
Male	49	70.00	122	77.22	104	79.39	275	76.60
Marital status								
Single	24	34.29	29	18.35	12	9.16	65	18.11
Married	39	55.71	116	73.42	113	86.26	268	74.65
Separated	7	10.00	9	5.70	3	2.29	19	5.29
Widowed	0	0.00	4	2.53	3	2.29	7	1.95
Household size (Mean= 5.88)								
<=3	8	11.43	15	9.49	26	19.85	49	13.65
4 – 6	22	31.43	79	50.00	68	51.91	169	47.08
7 – 9	38	54.29	53	33.54	37	28.24	128	35.65
>9	2	2.86	11	6.96	0	0.00	13	3.62
Fishing Exp (Mean =6.95)								
<=5	40	57.14	51	32.28	61	46.56	152	42.34
6 – 10	13	18.57	74	46.84	58	44.27	145	40.39
11 – 15	15	21.43	26	16.46	9	6.87	50	13.93
15 – 20	2	2.86	7	4.43	3	2.29	12	3.34
No of fish pond (Mean=1.91)								
1	27	38.57	54	34.18	53	40.46	134	37.33
2	29	41.43	81	51.27	40	30.53	150	41.78
3	12	17.14	13	8.23	25	19.08	50	13.93
4	2	2.86	5	6.33	13	9.92	25	6.97
Income (Mean=₦203,141.30)								
<=100000	39	55.71	67	42.41	61	46.56	167	46.52
100001-150000	18	25.71	22	13.92	15	11.45	55	15.32
150001-300000	10	14.29	31	19.62	10	7.63	51	14.21
300000-450000	1	1.43	21	13.29	9	6.87	31	8.64
>450000	2	2.86	17	10.76	36	27.48	55	15.32
Sec. Occupation								
None	42	60.00	67	42.41	101	77.10	210	58.50
Transport Service	4	5.71	5	3.16	2	1.54	11	3.05
Artisan	9	12.86	14	8.86	6	4.58	29	8.08
Trading	5	7.14	42	26.58	11	8.39	58	16.16
Farming	10	14.29	30	18.99	11	8.39	51	14.21
Total	**70**	**100.00**	**158**	**100.00**	**131**	**100.00**	**359**	**100.00**

Source: Field survey 2018

C. Sources of social capital and its dimensions

Table 3 presents the various social capital sources that were available for social networking in the study area. Religious group recorded the highest percentage for all the poverty categories identified. Among the core poor category, next to religious group (68%) is membership in community based association (54.29%). This is followed by membership in gender association (47%), age group (44.29%), and Occupational group (40%). Among the least representation in this category are political group (25.71%), cultural group and Non-governmental organizations (22.86%).

The moderately poor category has the highest representation for religious group (78.48%), followed by membership in community based association (56.96%), parents teachers association (55.06%), occupational group (54.43%) and cooperative society (50%). It is worthy of note that the moderately poor group have the highest cooperative membership relative to other poverty categories. The least sources of social capital in the study area for this category are membership in age group and non- governmental organizations, (29.75%), cultural group (22.15%), sports club and gender based association (21.52%), and lastly youth association (14.56%).

Membership in the occupational group (67.18%) and the parents' teachers association (61.83%) were next to the religious groups among the non-poor category. This is followed by membership in cooperative society (49.62%), community based association (48.09) and Traders association (46.56%). The least representation among the non-poor was membership in sports club (18.32%), political group (17.56%), cultural group and youth association (9.92%). The aggregate result showed that religious group had the highest percentage (75.49%) while the least were membership in cultural group and youth association with percentage values of 17.83 and 16.71 respectively. This indicates that membership in group activities foster social interaction.

Table 3: Available sources of social network in the study area

Available Social networks	Corepoor		ModeratelyPoor		Nonpoor		Pooled	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Community Assoc.	38	54.29	90	56.96	63	48.09	191	53.20
Gender Assoc.grp	33	47.14	34	21.52	40	30.53	107	29.81
Age group	31	44.29	47	29.75	46	35.11	124	34.54
Traders' Assoc	21	30.00	76	48.10	61	46.56	158	44.01
Parent Teachers Assoc.	30	42.86	87	55.06	81	61.83	198	55.15

Religious Group	48	68.57	124	78.48	99	75.57	271	75.49
Occupational Group	28	40.00	86	54.43	88	67.18	202	56.27
Cooperative Society	24	34.29	79	50.00	65	49.62	168	46.80
Cultural group	16	22.86	35	22.15	13	9.92	64	17.83
Sports Club	21	30.00	34	21.52	24	18.32	79	22.01
Youth Assoc.	24	34.29	23	14.56	13	9.92	60	16.71
Political group	18	25.71	51	32.28	23	17.56	92	25.63
Non Governmental Org.	16	22.86	47	29.75	47	35.88	110	30.64

Source: Field survey 2018

The profiled social capital dimensions are as presented in Table 4. From the table, most of the respondents for all the categories recorded highest value of 20-40 percent memberships in various social associations at the local level, while only 9.49 percent of the moderately poor category have 60 -80 percent membership in social groups. The average membership index of 39 percent indicated that participation in local institution activities is well below average in the study area. The measure of diversity in each social organization is also very low. The non-poor category recorded the least value (0.76%) for organizations that have above 40 percent diversity in their group that is, heterogeneity index. However, it recorded the highest value (46%) for social groups with 10-20% diversity. The core poor category has the largest percentage (41.43%) for the more diversified group that is, those above 40% in diversity. The average diversity is about 25 percent which is very low relative to other social capital dimensions used in the study area.

Regular attendance of social institutions meetings is very important to the benefit that can be derived from participating in such association. The results showed that 31.43 percent of the core poor category has a record of 20-40% meeting attendance. About 49 percent of the moderately poor category recorded 60-80% meeting attendance while 14.50 percent of the non-poor category which is the highest value relative to other categories accounted for those who have record of more than 80% meeting attendance in their various groups. It is noteworthy that increase in percentage meeting attendance reveals a better status for the fish farming households. The average meeting attendance is 58% percent which is the highest mean value for all the various dimensions considered.

Participating in the decision making for any group is as crucial as the meeting attendance. The result revealed that 42.75 percent of the non-poor category has a record of 40-60% participating in decision making in

their social groups, while its 34.29 percent and 32.28 percent for core poor and moderately poor category respectively. None of the core poor and non-poor categories have a record of participation in decision making that is above 80%. The mean decision making index is 46.55 which is next in value to average meeting attendance value.

Labour contribution among fish farmers entails rendering assistance to one another in the course of fish farming activities especially during harvesting period. The result revealed 37.53 percent as an average labour contributed by farmers. The pooled result indicated that 15.60 percent of the fish farmers which represent the lowest value recorded 60-80% labour contribution made within the groups. The table further explained results from cash contribution in various social groups. It revealed that 72.86, 67.09 and 60.31 percents of the core poor, moderately poor and non poor categories of farmers respectively, contributed more than ₦16,000 ($44.44) annually in their various social groups. The least contribution made accounted for the least percentage value for all the categories. The annual mean cash contribution is ₦43,887 ($122) which is fairly large.

Table 4. Profiled social capital dimensions

Social capital	Core poor		ModeratelyPoor		Non poor		Pooled	
Dimensions	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Participation index (Mean =39.02)								
<=20	2	2.86	5	3.16	2	1.53	9	2.51
20.1-40	43	61.43	90	56.96	79	60.31	212	59.05
40.1-60	22	31.43	48	30.38	39	29.77	109	30.36
60.1-80	3	4.29	15	9.49	11	8.40	29	8.08
Heterogeneity index (Mean =24.68)								
<=10	3	4.29	15	9.49	4	3.05	22	6.13
10.1-20	19	27.14	69	43.67	61	46.56	149	41.50
20.1-30	12	17.14	48	30.38	53	40.46	113	31.48
30.1-40	7	10.00	11	6.96	12	9.16	30	8.36
>40	29	41.43	15	9.49	1	0.76	45	12.53
Meeting attendance (Mean =58.01)								
<=20	3	4.29	9	5.70	3	2.29	15	4.18
20.1-40	22	31.43	19	12.03	18	13.74	59	16.43
40.1-60	19	27.14	40	25.32	35	26.72	94	26.18
60.1-80	19	27.14	78	49.37	56	42.75	153	42.62
>80	7	10.00	12	7.59	19	14.50	38	10.58
Decision making (Mean =46.55)								
<=20	3	4.29	5	3.16	4	3.05	12	3.34
20.1-40	25	35.71	63	39.87	41	31.30	129	35.93
40.1-60	24	34.29	51	32.28	56	42.75	131	36.49
60.1-80	18	25.71	33	20.89	30	22.90	81	22.56

>80			6	3.80			6	1.67
Labour contribution (Mean =37.53)								
<=20	15	21.43	36	22.78	30	22.90	81	22.56
20.1-40	27	38.57	69	43.67	44	33.59	140	39.00
40.1-60	12	17.14	36	22.78	34	25.95	82	22.84
60.1-80	16	22.86	17	10.76	23	17.56	56	15.60
Cash contribution (Mean =43,887.52)								
<=4000	6	8.57	6	3.80	5	3.82	17	4.74
4001-8000	4	5.71	15	9.49	11	8.40	30	8.36
8001-12000	3	4.29	17	10.76	24	18.32	44	12.26
12001-16000	6	8.57	14	8.86	12	9.16	32	8.91
>16000	51	72.86	106	67.09	79	60.31	236	65.74
Total	**70**	**100.00**	**158**	**100.00**	**131**	**100.00**	**359**	**100.00**

Source: Field survey 2018

D. Fish management practices adopted by respondents

The general management practices of the fishermen in the study area are presented in Table 5. The table showed that at the onset of farming activities majority of the farmers stocked their ponds with fingerlings for all the categories of household under consideration. While both moderately and core poor categories stocked more of juveniles next to fingerlings, 26.58 and 22.86 percent respectively, about 34 percent of the non-poor stocked their ponds with alley fin. Majority of the non-poor respondents (83.97%) adopted the poly-culture structure of raising fish. This involved raising more than a type of fish species together within the same pond. This is also the case for other categories as well. However, 41 percent of the moderately poor category also practiced integrated fish culturing where feed used for feeding were produced within the farm, which is the use of poultry dung. Monoculture recorded the least percentage value for all the categories.

Majority of the fish farmers sourced the water used from drilled bore hole for the three categories under study. About 23 percent of the core poor category made use of dug well, while 16.46 percent of the moderately poor sourced water from the stream or river closed by. The least source of water used by the fish farmers in the study area is rainfall. About 62 percent of the non-poor farmers used the combination of earthen and concrete pond for raising the fish. The core poor and moderately poor categories used more of fishing trough to raise fish than their non-poor counterpart and this accounted for 35.71 and 32.11 percent, respectively. On the aggregate 14.48 percent of the respondents used either only concrete or earthen pond for fish culturing.

About 34 percent of the core poor and 32.91 percent of the moderately poor respondents raised Catfish and carps species in their farm. However, the farmers claim to raise them in different ponds as carps fish are prey to catfish therefore they are not raised together, while 64.89 percent representing the highest percentage value of the non-poor raised Catfish and Tilapia. Most of the fish farmers sold the harvested fish in fresh form for the three categories under study. In addition 20.61 percent of the moderately poor sold harvested fishes in smoked form. Only a few percentages sold their fishes in frozen form.

Table 5.: General management practices of the respondents.

Fishing general	Core poor		Moderately Poor		Non poor		Pooled	
Management	**Freq**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
Fish size stocked								
Alley fin	12	17.14	31	19.62	44	33.59	87	24.23
Fingerlings	42	60.00	85	53.80	70	53.44	197	54.87
Juveniles	16	22.86	42	26.58	17	12.98	75	20.89
Culture structure								
Monoculture	11	15.71	19	12.03	7	5.34	37	10.31
Poly-culture	34	48.57	74	46.84	110	83.97	218	60.72
Integrated	25	35.71	65	41.14	14	10.69	104	28.97
Source of water								
Borehole	47	67.14	103	65.19	106	80.92	256	71.31
Dug well	16	22.86	26	16.46	13	9.92	55	15.32
Stream/river	5	7.14	29	18.35	11	8.40	45	12.53
Rainfall	2	2.86	0	0.00	1	0.76	3	0.84
Rearing facility								
Earthen &concrete	23	32.86	53	33.54	81	61.83	157	43.73
Concrete pond	9	12.86	27	17.09	19	14.50	52	14.48
Earthen pond	13	18.57	26	16.46	13	9.92	52	14.48
Fish trough	25	35.71	52	32.91	18	13.74	95	26.46
Culture species								
Tilapia only	11	15.71	21	13.29	0	0.00	32	8.91
Catfish only	11	15.71	22	13.92	22	16.79	55	15.32
Carps only	5	7.14	12	7.59	7	5.34	24	6.69
Catfish and carps	24	34.28	52	32.91	17	12.98	93	25.91
Catfish and Tilapia	19	27.14	51	32.28	85	64.89	155	43.18
Marketing pattern								

Sold fresh	49	70.00	113	71.52	82	62.60	244	67.97
Smoked	13	18.58	23	14.56	27	20.61	63	17.55
Frozen	8	11.43	22	13.92	22	16.79	52	14.48
Total	**70**	**100.00**	**158**	**100.00**	**131**	**100.00**	**359**	**100.00**

Source: Field survey 2018

E. Challenges encountered in fish farming activities

Table 6 present the challenges encountered by the fish farmers. Among the core poor category, inadequate capital for fish farming business was experience by 98.57 percent of the respondents, this is closely followed by high cost of feed (95.71%) and flood incidence (90.00%) which can wipe out a fish farm if not properly secured. High cost of stocking (88.57%), incidence of predators such as snake entering the pond (87.14%) and inadequate extension service affect fishing farming activities.

The moderately poor category biggest challenge is high feed cost (97.47%) closely followed by inadequate capital (96.84%). The issue of theft, water shortage and inadequate market facilities to distribute harvested fishes accounted for 75.32, 74.05 and 67.09 percents respectively. In addition, almost all the non-poor category claimed to be challenged with high cost of feed too (99%). Inadequate capitals (93.89%), incidence of predators (91.60%), high cost of stocking and inadequate extension services (90.08%) were also experienced. The least challenge the non-poor farmers had was inadequacy in marketing harvested fishes (53.44%). This is an indication that fish farming in the area is not free from problems.

Table 6.:Fish farming challenges faced by the respondents

Challenges	**Core poor**		**Moderately poor**		**Non-poor**		**pooled**	
Encountered	**Freq**	**Percent**	**Freq.**	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
High cost of feed	67	95.71	154	97.47	130	99.24	351	97.77
Inadequate capital	69	98.57	153	96.84	123	93.89	345	96.10
Inadequate market	53	75.71	106	67.09	70	53.44	229	63.79
Theft	49	70.00	119	75.32	78	59.54	246	68.52
Inadequate Extension Srvc	57	81.43	131	82.91	118	90.08	306	85.24
High borehole drilling cost	55	78.57	142	89.87	113	86.26	310	86.35
Incidence of flood	63	90.00	131	82.91	110	83.97	304	84.68
High cost of stocking	62	88.57	139	87.97	118	90.08	319	88.86

Predators	61	87.14	131	82.91	120	91.60	312	86.91
Water shortage	40	57.14	117	74.05	112	85.50	269	74.93

Source: Field survey 2018

F. Factors affecting household poverty among the fish farmers

Table 7 presents the estimates of the multinomial regression on factors influencing poverty among fish farmers in the study area. In the estimation, the moderately poor category was set as the reference level for both the core poor and the non-poor categories. With reference to the estimate of the core poor category, two social capital variables and four other factors have significant effect on household poverty at varying level of significance. Only meeting attendance and heterogeneity (membership diversity) significantly influence household poverty at 1% level of significance.

Meeting attendance negatively affects poverty. A unit increase in meeting attendance for core poor households will reduce the likelihood of household having improved status by 0.025. This is an indication that excess social group meeting attendance has adverse effect on the household poverty status. This is in line with findings from [15] where meeting attendance was reported to negatively correlate with household well being. On the other hand, the positive influence of heterogeneity index revealed that a unit increase in the level of diversity of a social group will increase the tendency of a household having improved status by 0.06. This means that the more a social group is diversified the better for the household status. This is in agreement with [15, 8 and 12] that social groups with high diversity of members yield better benefits leading to improved household welfare.

The educational level and marital status negatively affect household poverty status at 1% and 5% level of significance. Given that other variable in the model were constant, increase in these variables by a unit will reduce the probability of improvement for the core poor households by 0.107 and 0.932 respectively. This implies that a higher educational level and being married will deteriorate household poverty level. On the contrary, household size and engagement in secondary occupation positively influence household status. An increase in the number of household size will increase the prospect of improving the core poor poverty status by 0.095 while increase engaging in secondary occupation will improve core poverty status by 0.236. It is a known fact that additional income generating activities will aid improvement of household poverty status as more income earned will be used to meet the needs of the household. Increasing household size is expected to have an adverse effect on the

fish farmers, however, a household made up of fewer dependants and more working adults will be an advantage to the household.

With reference to the non-poor category and moderately poor category as the based outcome variable, four social capital variables namely labour contribution, cash contribution; meeting attendance and membership density significantly influence poverty status of the fishing households. Other socio economic variables that affect poverty status in the study area include education, being married, household size, farming experience and secondary occupation.

Labour contribution and meeting attendance significantly affect household poverty status at 5% level of significance. Therefore, a unit increase in man-day contribution and social group meeting attendance for the non-poor households relative to the moderately poor household will increase odds for household improvement by 0.018 and 0.016 accordingly. This implies that more labour contribution will further enhance the livelihood status of the household as well as improved social meeting attendance. This result is in line with the findings of [10] and [16], where participation in social capital lowers poverty. Cash contribution and heterogeneity index influence poverty status negatively. Therefore, an increase in cash contributed and diversity of membership in social groups for the non-poor household will impair the chances of having improved poverty status. This corroborates report from [15] that increasing cash contributed in social group reduces household welfare.

Also, factors such as education, being married and having a secondary livelihood significantly influence the non-poor household positively. A unit increase in the number of years spent in school will increase the tendency of having an enhanced livelihood status for the non-poor fishermen by 0.049 while being married and engaging in more income generating activities will also probability of having enhanced status by 1.527 and 0.510 respectively. Contrary to the estimates for the core poor households, increase in household size for the non-poor will reduce their possibility of having better household poverty status by 0.366. Reason for this is not far-fetched as increased household size will increase demand on income which means higher number of household members will share the income therefore reducing individual problems. This findings is consistent with [16], [10], [17] and [18]. Numbers of years in fishing activities affect household poverty adversely. This indicates that an increment in the number of years used in farming activities will reduce the likelihood of the non-poor fish farmers of having an improved poverty status by 0.074. This is an indication of conservativeness due to failure of fishery innovations introduced in the past.

Table 7. Estimated multinomial regression of factors affecting household poverty

Povtycatg	Coef.	Std. Err.	Z
corepoor			
labcontribution	0.0100	0.0085	1.18
cashcontribution	0.0000	0.0000	0.98
decisionmakingind	-0.0076	0.0110	-0.69
meetgattind	-0.0253***	0.0082	-3.10
heterogeneity	0.0601***	0.0128	4.68
membershipdensit	0.0106	0.0129	0.82
sex	-0.2556	0.3739	-0.68
age	0.0003	0.0181	0.02
education	-0.1066***	0.0379	-2.81
ms_dummy	-0.9321**	0.4031	-2.31
hhsize	0.2338**	0.0915	2.55
fishfarmgexp	-0.0162	0.0502	-0.32
nooffishpond	-0.0949	0.2151	-0.44
Sec.Occupation	0.2358**	0.1111	2.12
_cons	-1.3892*	1.4180	-1.97
moderatelypoor	(baseoutcome)		
nonpoor			
labcontribution	0.0178**	0.0075	2.36
cashcontribution	0.0000***	0.0000	-3.59
decisionmakingind	0.0102	0.0089	1.15
meetgattind	0.0163**	0.0070	2.32
heterogeneity	-0.0220*	0.0133	-1.66
membershipdensit	-0.0044	0.0098	-0.45
sex	0.1291	0.3191	0.40
age	0.0036	0.0156	0.23
education	0.0491*	0.0289	1.70
ms_dummy	1.5271***	0.3814	4.00
Hhsize	-0.3659***	0.0786	-4.65
fishfarmgexp	-0.0743*	0.0421	-1.77
nooffishpond	0.1134	0.1525	0.74
Sec.occupation	0.5103***	0.1012	5.04
_cons	-1.8530**	1.1387	-2.11
Number of obs = 359	LR chi2(28) = 180.14		
Prob > chi2 = 0.0000	Log likelihood = -286.1061		
Pseudo R2 = 0.2394			

Sources: Multinomial logit estimates from data analysis

The marginal effects of factors influencing households being poor are presented in Table 8. The effect of partial for these factors is estimated using the approximate difference in the odds of being poor when these

determinants change. The results of the marginal effect of a unit increase in household meeting attendance on the conditional probability of being poor is -58.02 which implied that the probability of household being poor decreases by 58% per unit increase in household meeting attendance. Also, the marginal effect of a unit increase in household years of schooling, and engaging in secondary occupation on the conditional probability of being poor is -7.15 and -1.26 respectively, implying that the probability of being poor reduces by 7.15% and 1.26% per unit increase in years of schooling and engaging in secondary activities accordingly.

However, the marginal effect of a unit increase in cash contribution, heretogeneity (group diversity), and household size on the conditional probability of being poor are 43,887, 24.68 and 5.88 respectively. This implied that the probability of a household being poor increases by ₦43,887 per unit increase cash contributed, 24.68% per unit increase in group diversity and 5.88% per unit increase in farming household size. The finding is in line with partial effect results of [19] where households chances of being poor increases with addition of new household members.

Table 8. Marginal effects of significant variables from multinomial logit model

Variable	dy/dx	Probability Change
cashcontribution	0.0000	43887.5000
meetgattendance	-0.0037	-58.0161
heterogeneity	0.0080	24.6840
education	-0.0147	-7.1449
ms_dummy*	-0.2037	-0.7465
Hhsize	0.0439	5.8802
Sec.occ*	-0.0328	-1.2646

(*) dy/dx is for discrete change of dummy variable from 0 to 1

y = Pr(povtycatg==0) (predict) = 0.1443036

5. Conclusion and recommendation

This study provides empirically confirmation that investment in social capital can reduce household poverty status. It is evident as revealed from the regression estimates that excess meeting attendance affect poor households

while it enhances the non-poor households. An increase in the diversity of social group affects the non-poor category adversely while it improves the core poor households. Education, being married among other factors can be used to complement social capital to in order to improve the fish farming household poverty status. It is therefore recommended that fish farmers participate in social group activities at the local level and also engage in other income generating activities that can cushion income from farming activities.

REFERENCES

1. Ozigbo E. Anyadike C., Adegbite O.and Kolawole P. Review of Aquaculture Production and Management in Nigeria American. Journal of Experimental Agriculture (2014). 4(10): 1137-1151
2. Akpabio, I.A and Inyang, E.B Major constraints affecting aquaculture development in Akwa Ibom State, Nigeria African Journal of Aquatic Science (2007) 32(1): 45–50
3. FDF, Federal Department of Fisheries. Fisheries Statistics of Nigeria Projected human population; fish demand and supply in Nigeria from 2000 – 2015 (2008).56.
4. Adedeji OB, Okocha RC. Constraint to Aquaculture Development in Nigeria and Way Forward. Veterinary Public Health and Preventive Medicine, University of Ibadan, Nigeria; (2011).
5. Okunmadewa, F. 'Nigeria: Protecting the Vulnerable from Oil Price Shock'. Twelve Convocation lecture, LAUTECH, Ogbomoso, Oyo State Nigeria, April 21, (2015)
6. National Bureau of Statistics (2013) "Annual Abstract of Statistics." NBS, Abuja
7. (UNDP) 2018 http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/NGA.pdf
8. Adepoju, A., Oni, O., Omonona, B. and Oyekale A. "Social Capital and Rural Farming Households" Welfare in Southwest Nigeria" World Rural Observations (2011) 3(3): 150-161.
9. Kabiru Jinjiri Ringim and Sayedi Ndagi Shuaib Influence of Social Capital on Consumption Per Capita Income and Poverty Alleviation in Tertiary Institution Cooperative Thrift and Credit Society. Mediterranean Journal of Social Sciences (2017). 8 (3): 35 – 43.

10. Tenzin, G., Otsuka, K., Natsuda, K. Impact of Social Capital on Poverty: A Case of Rural Households in Eastern Bhutan. Ritsumeikan Center for Asia Pacific Studies (RCAPS) Working Paper Series RWP-13004. (2013)
11. Imandoust, S.B.. Relationship between education and social capital. *International Journal of Humanities and Social Science* (2011) 1(12):52–57.
12. Yusuf, S.A. Social Capital and Household Welfare in Kwara State, Journal of Human Ecol., (2008) 23 (3): 219-229
13. Iyanda, J.O., Afolami, C.A., Obayelu, A.E., and Ladebo , O.J. Social Capital and Access to Credit among Cassava Farming Households in Ogun State, Nigeria. Journal of Agriculture and Environmental Sciences, (2014). 3(2): 175-196
14. Sabatini, F. Social Capital Gateway, Resource for the Study of Social Capital. Department of Public Economics University of Rome La Sapienza. (2005)
15. Olowe, O. O; Okunmadewa, F. Yusuf, S. A; Oni, O.Effects of Social Capital on Well-Being of Rural Households in Southwest Nigeria. *Journal of Agriculture and Veterinary Science* (2014). *7,(12)*
16. Nasution, A., Rustiadi, E., Juanda, B., Hadi, S. Two-way causality between social capital and poverty in rural Indonesia. Asian Social Science, (2015) 11(13): 139-150.
17. Grootaert, C. *Social capital, household welfare and poverty in Indonesia* (1999). 2148 World Bank Publications.
18. Datt, G., & Jolliffe, D. Determinants of poverty in Egypt: 1997. *Food Consumption and Nutrition Division Discussion Paper*, 75. Washington, DC: International Food Policy Research Institute (IFPRI). (1999).
19. Ernan R, Ahmadriswan N. Can Social Capital Investment Reduce Poverty in Rural Indonesia? International Journal of Economics and Financial Issues, (2017), 7(2):109-117.