

## SURMOUNTING THE CHALLENGES OF POVERTY THROUGH AQUACULTURE FARMING IN OGUN STATE, NIGERIA

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**To cite this article (APA):** Oludipe, B. B., & Odulate, L. O. (2024). Surmounting the challenges of poverty through aquaculture farming in Ogun State, Nigeria. *AAU Journal of Business Educators*, 4(2), 319-329

### Abstract

*The study examined how the challenges of poverty could be solved through aquaculture farming in Ogun State. Three research questions guided the study. A descriptive survey research design was used to actualize the purpose of the study. The population of the study comprised aquaculture farmers in Ogun State, Nigeria. Using multi-stage sampling technique, a sample of 300 aquaculture farmers were selected from Ogun East Senatorial District of Ogun State. The authors developed a questionnaire, titled: Fish farming and poverty Reduction questionnaire with coefficient values of 0.79. Frequency counts and percentage were used to analyze data collected from the respondents. Descriptive statistics of mean was used for analyzing research questions 1 and 2. Research question 3 was answered using regression statistic. The findings revealed that construction of modern pond, stocking operation, improvement of fingerling breed, feed formulation technique, feeding operation, marketing information and spawning operation were among the knowledge of aquaculture among farmers' in Ogun state. This implied that greater numbers of the farmers examined have greater knowledge on aquaculture. Fulfillment of protein demand of the country, prevents food insecurity, creates jobs which settle the employment issue, prolific and profitable, generates income for individuals and attracts foreign exchange and capable of increasing the country's GDP were among the prospects of aquaculture in Ogun state, Nigeria. Independent variable (aquaculture farming) was found to be significant and strongly determine poverty reduction with the P- value less than 0.05 and magnitude of aquaculture framing ( $B = 0.426$ ,  $t = 8.772$ ,  $p < 0.5$ ). This implied that about 63.8% poverty reduction among farmers could be attributed towards aquaculture farming. The study recommended among others that provision of capital (credit) for construction of ponds in order to increase pond areas and improved supply of quality fingerlings and fish feed to farmers.*

**Keywords:** Aquaculture, Challenges, Surmounting Poverty

### Introduction

Policies that will promote growth in income are likely to lead into poverty reduction. For instance, with respect to agriculture, changes in price will provide incentive for agriculture production and specialization, which in turn may lead to growth and distribution of income through employment generalization and revenue enhancement and consequently poverty reduction. Improvement in farmers' productivity and output would lead to income growth (all things being equal) and consequently poverty reduction. According to Olawepo (2010), the majority of the rural populace in Nigeria either depends entirely on farming activities for survival and generation of income or depends on these activities to supplement their main sources of income. Olawepo suggested that the income

levels of farmer may be attributed to certain crucial factors and understanding these factors may hold the keys to effective rural development policy making. This in part led to the submission of Olatona (2017) who pointed out that a closer look at the determinants of farmer income provides an in-depth knowledge into the factor that explain low income yields and poverty in rural regions where these rural farmers constitute about 90% of the total population. Olatona suggested that any rural development policy aimed at poverty reduction should concentrate on farming, which is the main occupation of the poor, who lack access to credit, farm input and implements and are unable to save or own production infrastructure. It is worthy of note that alleviation of poverty, though always an aim of development assistance, has been brought more sharply into focus in the Nigeria's development policies.

Poverty is a problem for both developing and developed countries around the world. Poverty is a plague afflicting people all over the world and it is considered one of the symptoms or manifestation of underdevelopment. Poverty is a situation where people have unreasonably low living standards compared with others, cannot afford to buy necessities, and experience real deprivation and hardship in everyday life (McClelland, 2015). It is obvious that poverty is far more than financial insufficiency and can manifest in the form of unemployment, homelessness, hunger, inability to access education and healthcare. Ajamu (2005) observed that until recently, poverty was understood largely in terms of income or a lack of essential commodities. To be poor means that one could not afford the cost of providing a proper diet or home. But poverty is about more than a shortfall in income or calorie intake. It is about the denial of opportunities and choices that are widely regarded as essential to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and respect of others. Poverty is a vicious cycle that keeps the poor in a state of destitution and utter disillusionment. Poverty is the main cause of hunger and malnutrition, which are aggravated by rapid population growth, policy inadequacies and inconsistencies or weak administrative capabilities, unhealthy food storage and processing techniques (Sanni, 2016). Okuneye (2015) pointed out that the social dimension of poverty is largely a gender issue since the greatest weight of poverty is borne by women household heads and children from poor homes. However, he added that the conventional notion depicts poverty as a condition in which people are below a specified minimum income level and are unable to provide or satisfy the basic necessities of life needed for an acceptable standard of living.

One way to address poverty levels among the farmers in some of the poor communities located in developing regions involves small-scale aquaculture as part of a diversified livelihood strategy. As indicated by Kawarazuka and Bene (2017), compared to other food sources, fish offer advantages as they may be more available and consumed for preference in various regions of the developed world. Aquaculture or fish farming is very important not only as a source of animal protein to ensure food security but also to improve employment and income towards the elimination of poverty in developing countries (Okezie, Igwe, Nnabugwu & Okezie, 2015). Flake and Nzeke (2017) stated that fish is the cheapest source of animal protein and represents a significant proportion of animal protein in the diet of most developing countries, including Nigeria. Globally, fish accounts for about 17 percent of animal protein intake and 6.7 % of all protein consumed by humans (Food and Agriculture Organization of the United Nations (FAO), 2016). There are two main sources of fish in Nigeria-domestic production and imports. The domestic component consists of artisanal fishing and fish farming, the latter of which involves rearing fish to a marketable size in an enclosed water body (Ogundari & Ojo, 2014; Olawumi, Dipeolu & Bamiro, 2016). Aquaculture mainly supplements the unpredictable production from capture (Nature stock)/artisanal fisheries. Though it has been practiced in Nigeria for over forty years, fish farming has not contributed notably to domestic production figures. The total fish demand for Nigeria, based on the 2014 population estimate of 180 million persons, was

3.32 million tones and the domestic fish production from aquaculture, artisanal fishing and industrial fisheries for 2014 was 1.123 million tones (Fishery Committee for the west central Gulf of Guinea, 2016). In 2015, fisheries including aquaculture, contributed 0.5 percent to the Gross Domestic production (GDP) of Nigeria (Central Bank of Nigeria, 2015). There is the potential to increase domestic as the country has more than 12 million hectares of inland waters suitable for fish farming development (Inoni, 2017). Aquaculture is dominated by smallholder producers. Smallholder fish farming production is broadly characterized as a dynamic and evolving subsector that is employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water resources. The activities of this sub-sector, conducted full-time, part or just seasonally, are often targeted at supplying fish and fisheries products to local domestic markets, as well as for subsistence consumption. Smallholder fish farmers amongst them are those who produce with stocking capacity of less than 2000 fingerlings (Omitoyin, 2017).

Generally, smallholder farmers constitute about 80% of the farming population in Nigeria. Smallholder aquaculture in Nigeria is practiced under four major systems: extensive, semi-intensive integrated and intensive. The extensive system, according to Omitoyin (2017), is characterized by low stocking density, low production with little or no nutritional inputs and low investment cost. In the semi-intensive culture system, fish is stocked at a higher stocking density than the extensive system and fed with supplementary feed to support the natural food supply (Ozigbo, Anyadike, Adegbite & Kolawole, 2014). There is usually pond fertilization to increase the nutrient requirements in the semi-intensive culture system. Its production cost is usually moderate, and its yield is higher than the case in the extensive system—above 10,000kg/ha/year (Omitoyin, 2017). The integrated system is the culture of fish alongside other forms of agriculture. It is a farming system where resources are efficiently utilized and recycled to achieve higher production than would be obtained from a single production system (Otubusin, 2014). Devendra (2015) viewed integrated fish farming as a multiple land-use approach which combines aquaculture with other agriculture (crop and animals) production systems. On the other hand, intensive fish culture system is one where fishes are stocked at a high density and fed exclusively on a nutritionally-balanced diet to meet their nutrient requirements (Ozigbo *et. al.*, 2014).

Aquaculture has the potential to help expand the resource base for food production and reduce the pressure on conventional sources of fish which are harvested faster than they can be regenerated. For developing countries like Nigeria where the economy is largely agrarian, fish farming can generate significant employment, enhance the socio-economic status of the farmer as well as generate foreign exchange. As observed by Davies (2015), the involvement of small scale aquaculture project towns and villages will create employment and thereby alleviate poverty among youths. With dwindling food production, degrading agriculture environment, widespread poverty and insecurity in Africa, fish farming, even at the backyard provides the poor and hungry with a low cost and readily available strategy to increase food production using less land per caput, and less water without further damage to the environment. Fish farming also has enormous potentials of improving the nutritional standard of the masses of the people. The average protein intake in Nigeria is about 19.38 grams/caput/day which is far below the FAO requirement of 75 g/caput/day (FAO, 2016). Fish contains higher percentage of protein than meat and is important for high nutritive value and significant in improving human health. Fish farming is uniquely placed to reverse the declines in supplies experienced from capture fisheries and has notable potentials for new livelihood opportunities, providing mechanism for lower priced fish, enhanced nutritional security and employment for poor communities (Jagger & Pender, 2012).

Recognizing the benefits of aquaculture and the existing potentials, the government of Nigeria has shown its interest through setting up various national programmes and projects such as the

Aquaculture and inland Fishery projects (AIFP), National accelerated fish production project (NAFPP), Fishing Terminal project (FTP), Fisheries infrastructures provision/Improvement (FIP), and the presidential initiative on Aquaculture (PIA). Part of the plan of the government is to distribute fingerlings to small scale fish farmers free while large scale farmers will be subsidized up to 50% of the (FMAWR, 2008). This is in addition to sensitizing Nigerians to the various methods of fishing farming. Interests in fish farming have increased over the year as a result of the awareness of its importance both to the household to increase protein intake and to the national economy to reverse the ₦150 billion (US \$1 billion) spent annually to import the product. In Nigeria however, fish farming is predominantly an extensive land-based system practiced majorly at small scale subsistent level (Anyawu-Akeredolu, 2015). Large scale commercial fish farming is yet to become widespread with most fish farmers operating small earthen ponds (0.02 to 0.2 ha) (Fagbenro, 2015). In spite of the growing interest shown by the government and the private sector, the gap between the demand of fish in Nigeria (1.3 million metric tonnes annually) and the supply of fish from domestic production (about 0.45 metric tonnes annually) has continued to widen and the extent to which fish farming can reduce poverty and increase income growth among farmers is yet to be ascertained.

### **Statement of the problem**

Despite her enormous oil wealth, Nigeria is confronted with a number of developmental challenges especially in the areas of reducing poverty which currently stands at nearly 75% of its population, providing jobs for the teeming unemployed youths, Estimated at about 39.9 million. Going by an unemployment rate of 23.9% and meeting adequate nutritive requirement of its 200 million people. A key agricultural subsector where government efforts have been directed to solve these three challenges in one fell swoop is through the promotion of fish farming where the nation has huge untapped potentials. The importance of fish farming to the sustainability of animal protein supply in the country cannot be over-emphasized. Regrettably, the supply of food fish has been on the decline. This is due to consistent declines from the country's major source of food fish, the artisanal fisheries, from 90% in 1990 down to 40% in 2006 and 34% in 2019 resulting to about 300,000 metric tonnes. This has prompted the federal Government of Nigeria to package financial Initiative on fisheries and aquaculture development in 2003 to provide financial and technical assistance to government programmes and projects encouraging fish production. Regardless these efforts of government, fish farming has remained low in the country as well as in Ogun State. This has been attributed to inadequate supplies from the local catfish farmers due to the use of poor quality catfish seeds, inadequate information, high cost of feeds, traditional techniques, small size of holdings, poor infrastructural facilities and low capital investment. This backdrop prompted this study to provide empirical data on how to surmount the challenges of poverty through aquaculture farming in Ogun State.

### **Purpose of the Study**

The purpose of the study was to examine the:

1. level of the knowledge of aquaculture farming among farmer's in Ogun State, Nigeria.
2. prospects of aquaculture farming in Ogun State, Nigeria.
3. extent to which aquaculture farming can help to surmount poverty among farmer's in Ogun State.

### **Research Questions**

The following research questions guided the study.

*Research Question 1:* What is the level of the knowledge of aquaculture farming among farmer's in Ogun State, Nigeria?

*Research Question 2:* What are the prospects of aquaculture farming in Ogun State, Nigeria?

*Research Question 3:* To what extent does aquaculture farming can help to surmount poverty among farmer's in Ogun State?

### **Theoretical Framework**

The theory of market participation has developed many different perspectives, including asset-based approaches and agricultural developmental theory approaches. These two theories were developed by Boughton (2007) who viewed market participation as both a cause and a consequence of economic development. Markets offer households the opportunity to specialize according to comparative advantage and thereby enjoy welfare gains from trade. Recognition of the potential of market-led paradigm of agricultural development during the 1980's in which market liberalization policy agendas were widely promoted in Sub-Saharan Africa and other low-income regions. Furthermore, as household's disposable income increases, so does demand for variety in goods and services, thereby increasing demand-side market participation, which further increased the demand for cash and thus supply-side market participation. The standard process of agrarian and rural transformation therefore involves households' transition from a model of subsistence, in which most inputs are provided for and most outputs consumed internally, to a market engagement mode, with inputs and products increasingly purchased and sold off the farm. The asset-based theory was summarized as the market share of agricultural output increases, input utilization decisions and output combinations are progressively guided by profit maximization objectives. The process leads to the systematic substitution of non-traded inputs with purchased inputs, the gradual decline of integrated farming systems, and the emergence of specialized high-value farm enterprises.

### **Methods**

#### ***Research Design***

The study used a descriptive survey research design to achieve the purpose of the study. This design is considered appropriate because the researcher intends to investigate the existing phenomena the way it is without any manipulation.

#### ***Population and Sampling Procedure***

The population of the study comprised all aquaculture farmers in Ogun State, Nigeria. Using purposive sampling technique, a total of 300 aquaculture farmers in Ogun State were selected as sample size of the study.

#### ***Research Instrument***

The authors constructed a structured questionnaire, titled: fish Farming and Poverty Reduction Questionnaire, which were used for data collection.

#### ***Instrument Validity and Reliability***

The initial draft of the instrument was subjected to face and contents validity by the experts in Agricultural Science. To ensure the reliability of the instrument, a test-retest reliability method was carried out. Copies of the instrument were administered on a sample of 30 aquaculture farmers in a separate local government outside the geographical scope of the study. The purpose is to determine



the stability and consistency of the instruments. Pearson Product Moment Correlation Coefficient (PPMCC) was used to determine the level of reliability coefficient, which yielded a coefficient value of 0.79. This implied that the instrument was reliable.

### **Data Collection Procedure**

Data were collected from the questionnaire administration. The questionnaire was administered on the respondents with the help of research assistants. After the completion of the administration, copies of the questionnaire were collected and coded for analysis.

### **Data Analysis**

Frequency counts and percentage were used for analyzing data on socio-demographic characteristics of the respondents. Descriptive statistics of mean was used for analyzing research questions 1 and 2. Research 3 was answered using regression analysis. Any mean score of 2.5 and above was regarded as agreed while any one below 2.5 regarded as disagreed. For regression analysis, when P value is less than significance level ( $P < .05$ ), the variable is significant.

## **Results**

**Table 1: Socio-demographic characteristics of the respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male Farmers	257	85.67
Female Farmers	43	14.33
Total	300	100
<b>Religion</b>	<b>Frequency</b>	<b>Percentage</b>
Christians	179	59.67
Muslims	121	40.33
<b>Occupations</b>	<b>Frequency</b>	<b>Percentage</b>
Civil Servant	79	26.33
Business	166	55.33
Trader	55	18.33
<b>Level of Education</b>	<b>Frequency</b>	<b>Percentage</b>
FSLC	19	6.333
SSCE	99	33.00
OND\NCE	124	41.33
HND\B.Sc	38	12.67
M.Sc	20	6.667

Table 1 revealed that 257 respondents representing 85.67% were male while 14.33% were female farmers. 59.67% of the respondents were Christians and 40.33% were Muslims. 26.33% were civil servants, 55.33% were business man and only 18.33% were traders. 6.333% of the sample size

were those with first leaving school certificate, 33% with SSCE, 41.33% with OND\NCE, 12.67% with HND\B.Sc. and 6.667% were those with M.Sc. holders.

*Research Question 1:* What is the level of the knowledge of aquaculture among farmer's in Ogun State, Nigeria?

**Table 2: Mean responses on the knowledge of aquaculture among farmers' in Ogun State, Nigeria.**

Knowledge of Aquaculture	Mean	Remarks
I have knowledge on construction of modern pond	3.77	Agreed
I have knowledge on stocking operation	2.57	Agreed
I have knowledge on improvement of fingerling breed.	3.71	Agreed
I have knowledge on feed formulation technique	2.67	Agreed
I have knowledge on feeding operation	2.61	Agreed
I have knowledge on marketing information	2.87	Agreed
I have knowledge on spawning operation	3.04	Agreed
I have knowledge on preservation method	2.41	Disagreed

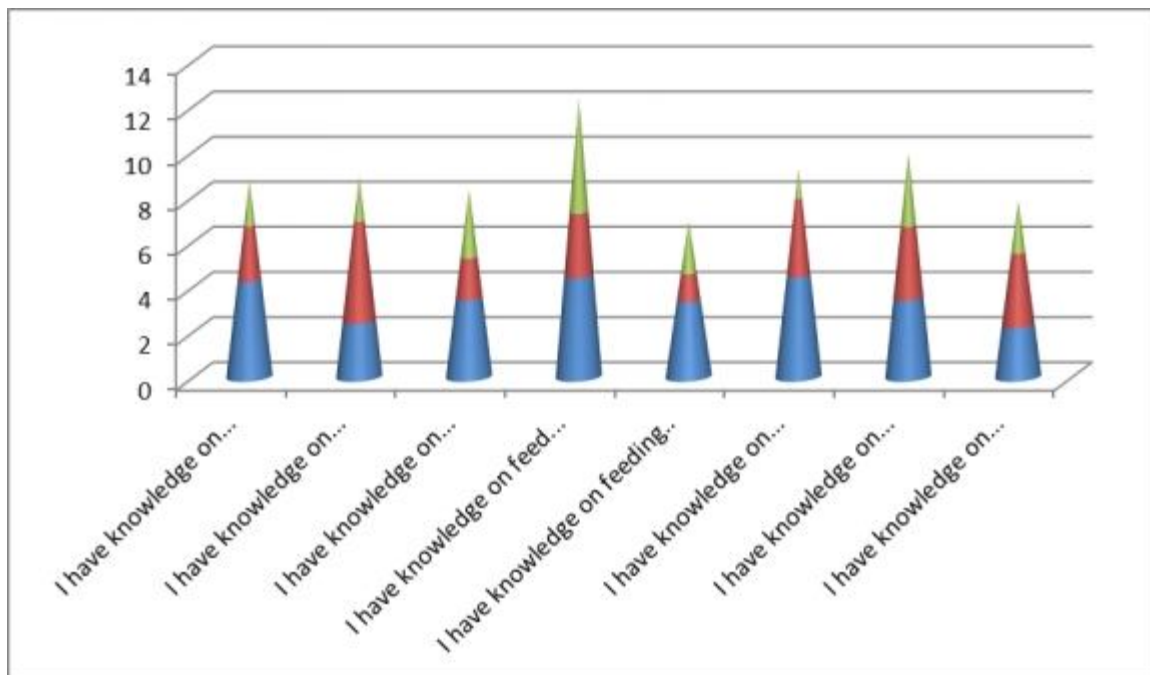


Figure 1: Bar- chart representing knowledge of aquaculture among farmer

Table 2 indicated that construction of modern pond, stocking operation, improvement of fingerling breed; feed formulation technique, feeding operation, marketing information, and spawning

operation were among the knowledge of aquaculture among farmers in Ogun State. This implied that greater numbers of the farmers examined have greater knowledge on aquaculture.

*Research Question 2:* What is the level of the knowledge of aquaculture among farmer's in Ogun State, Nigeria?

**Table 3: Mean responses on the prospect of aquaculture in Ogun state, Nigeria**

Prospect of aquaculture	Mean	Remarks
It fulfils protein demand of the county	2.65	agreed
Help prevent food insecurity	2.77	agreed
Create job which settle the unemployment issue	2.82	agreed
It is prolific and profitable	3.61	agreed
Generate income for individuals	3.40	agreed
Attract foreign exchange and capable of increasing the country's GDP	3.01	agreed

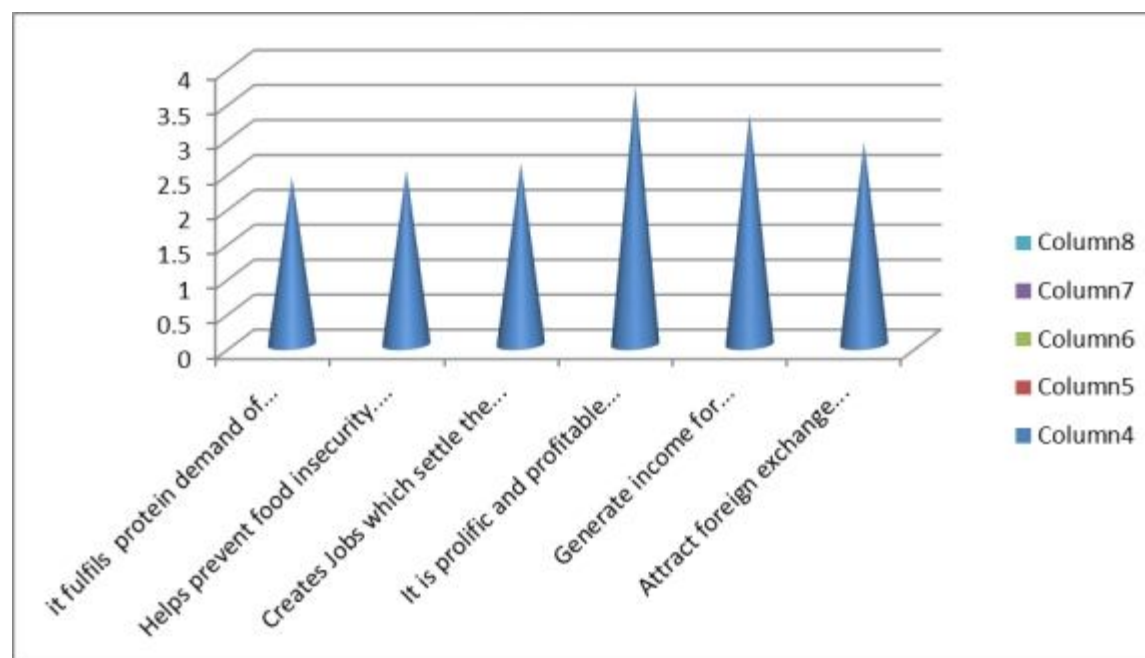


Figure 2: Bar- chat representing the prospect of aquaculture among the farmers

Table 3 indicated that fulfillment of protein demand of the country, prevent food insecurity , creates jobs which settle the all employment issue , prolific and profitable , generate income of individual and attract foreign exchange and capable of increasing the country's GDP were among the prospect of aquaculture in Ogun state , Nigeria.

*Research Question 3:* To what extent does aquaculture farming can help to surmount poverty among farmer's in Ogun State?



**Table 4: Extent Aquaculture farming reduce poverty farmers' in ogun state**

Model	unstandardized	standardized	t	p	Coefficients
Coefficients					
	B	Std. Error	Beta		
(Constant)	1.619	2.247	.721	.472	
Aquaculture farming	.638	.073	.426	8.772	.000

*Dependent Variable: Poverty reduction*

Source: Field Survey, 2021

Table 4 showed that independent variable (Aquaculture farming) was found to be significant and strongly determine poverty reduction with the P-value less than 0.05 and magnitude of aquaculture farming (B=0.426, t=8.772, p<.05). This implied that about 63.8% poverty reductions among farmers could be attributed towards aquaculture farming.

## Discussion

The finding of the study revealed that construction of modern pond, stocking operation, improvement of fingerling breed, feed formulation technique, feeding operation marketing information, and spawning operation were among the knowledge of agriculture among farmers' in Ogun State. This implied that greater numbers of the farmers examine have greater knowledge and agriculture. This finding correlate with Obiero, Waidbatcher, Nyawanda, Munguti, Manyala and Kaunda-Arara (2019) found that fish farming is a profitable business. Linear regression revealed that profitability of fish farmers was influenced by the price of feed, price of fingerling and the cost of labour.

The finding also revealed that fulfillment of protein demand of the country, prevent food insecurity, creates job which settle the unemployment issue, prolific and profitable, generate income of individual and attract foreign exchange and capable of increasing the country GDP were among the prospect of agriculture in Ogun State, Nigeria. It was also revealed that agriculture farming determines poverty reduction and that about 63.8% poverty reduction among farmers could be attributed towards aquaculture farming. This finding corroborates with MulokoZIA, Mmanda, Onyango, Lundh, Tamatamah and Berg (2020) indicated that fish farming contributed on average 13% to house hold income and that id explained 5% of the variation of the household income while 84% of the was due to non-fish sources.

## Conclusion

Having examine how the challenge of poverty could be solve through Aquaculture in Ogun State, the following conclusions were drawn based on the finding that construction of modern ponds, stocking operation, improvement of fingerling brood, feed formulation technique. Feeding operation, marketing information, and spawning operation were among the knowledge of Aquaculture among farmers. Protein demand, prevents food insecurity, creates job which settle the unemployment issue, prolific and profitable, generate income for individuals and attract foreign exchange and capable of increasing the country GDP were among the prospects of aquaculture. Independent Variable

(Aquaculture farming) was found to be significant and strongly determine poverty reduction. This implied that 63.8% poverty reduction among farmers could be attributed towards aquaculture farming.

### **Recommendations**

Based on the finding, the following recommendations were raised.

Should endeavour to provide capital for construction of ponds in order increase pond area, improved supply of quality fingerling and fish feed to farmers

Should endeavour to encourage fish farmers to establish cooperative to facilitate fish marketing and strengthen provision of extension services to train farmers in improve farming and management practice

Fishing house hold should be implemented and improved crop farmers fishermen access to technological.

Should endeavour to strengthen the capacity of fish farmers irrespective of their demographics and socioeconomic status and the need to promote an overall enabling environment in order to increase their response to technological changes and participation in the development in fish farming.

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