



1 over the past half century. This has been largely due to the lack of  
 2 consideration of local poverty issues, inappropriate implementation,  
 3 and management procedures. Thus, poverty reduction refers to the  
 4 implementation of appropriate strategies for suitable use of scarce  
 5 resources by the maximum impact on poor through allocation of  
 6 resources to activities that have the potential to contribute in reducing  
 7 deprivation and vulnerability in poor communities (Asante and  
 8 Aye, 2004). Agricultural extension services could not commendably  
 9 achieve the goals without addressing the most vulnerable farmers in  
 10 developing countries (Sachs, 2006; World Bank, 2008). Dercon (2008)  
 11 stated that the lower rates of poverty were contributed by investing in  
 12 infrastructure and also in agricultural extension services. The findings  
 13 regarding agriculture extension showed that at least one extension visit  
 14 reduces headcount poverty by 9.8% and increases consumption growth  
 15 by 7.1%. Approximately 75% of global poor people live in rural localities  
 16 and generally make their living necessities from the land where they  
 17 live. In Pakistan, the 6<sup>th</sup> most populous country of the world, more than  
 18 60% of the population is also living in rural areas and associated with  
 19 farming for their livelihoods. Out of this massive rural people, majority  
 20 are facing the problem of poverty (IFAD, 2016). Hence, Williams (1983)  
 21 noted the perilous state of poverty among the rural fish farmers despite  
 22 their enormous contribution to the nation's development. It is therefore  
 23 pertinent to seek ways of alleviating their poverty situation by tackling  
 24 headlong all problems they may encounter in their productive activities.

25 Under the fluctuating agricultural situation, it has been understood  
 26 that fish farming plays a vigorous role in providing livelihood safety  
 27 to the farmers globally. Nigerian fish farming has been in existence for  
 28 over 40 years (Ekwegh, 2005). It is in fact the world's fastest growing  
 29 source of animal food, outpacing terrestrial meat production, and the  
 30 captured fisheries (Ogunremi *et al.*, 2013). Implicitly, consumption of  
 31 fish has great potential to augment daily protein intake that is needed  
 32 by human beings. This realization gives fish production, processing,  
 33 and marketing in Nigeria widespread acceptability as there is no  
 34 taboo placed on it by any religious or cultural belief (Adebayo and  
 35 Nzeh, 2012). Fish farming serves as a primary source of income and  
 36 a profitable venture and it is rapidly expanding and that is the more  
 37 reason Nigerian government has made several attempts over the years  
 38 to increase productivity of fish farmers through institutional reforms  
 39 and various economic measures (Soyemi and Haliso, 2015). In view  
 40 of this, the study intends to assess the effectiveness of agricultural  
 41 extension services in reducing poverty among fish farmers in the coastal  
 42 region of Ondo State, Nigeria. Specifically, the study intends to describe  
 43 the socioeconomic characteristics of the respondents, identify types of  
 44 agricultural extension service rendered to the fish farmers, and identify  
 45 types of constraints militating effective utilization of agricultural  
 46 extension service rendered to the fish farmers. It was hypothesized that  
 47 no significant relationship exists between respondents' socioeconomic  
 48 characteristic and effectiveness of agricultural extension services in  
 49 reducing poverty.

## 50 METHODS

51 Ondo State is a state in southwestern Nigeria. It was created on  
 52 February 03, 1976, from the former Western State. Ondo State borders  
 53 Ekiti State to the north, Kogi State to the northeast, Edo State to the  
 54 east, Delta State to the southeast, Ogun State to the southwest, Osun  
 55 State to the northwest, and the Atlantic Ocean to the south. The state  
 56 lies between longitudes 4°30" and 6° East of the Greenwich Meridian  
 57 and 5°45" and 8° 15" North of the equator. The state's capital is Akure,  
 58 the former capital of the ancient Akure Kingdom. Ondo State includes  
 59 mangrove-swamp forest near the Bights of Benin. Ondo State is the  
 60 19<sup>th</sup> most populated state in the country and the 25<sup>th</sup>-largest state by  
 61 landmass. The state is predominantly Yoruba and the Yoruba language is  
 62 commonly spoken. Ondo State that is made up of 18 Local Government  
 63 Areas (LGAs) is located in the South Western Zone of Nigeria. Ondo  
 64 State is in south west of Nigeria and it is bounded by the coastal region  
 65 of the Atlantic Ocean. Being a riverine area, the dwellers are mostly  
 66 artisanal fishermen. Two LGAs, Ilaje and Ese-Odo, are prominent in

67 the fisheries industry. A multi-stage random sampling technique was  
 68 used to select four communities, two from each LGA. Each community  
 69 was divided into five wards from which two wards were selected. In  
 70 each ward, ten fish farmers were randomly selected giving a total of  
 71 80 fish farmers which constituted the sample for the study. Data for  
 72 the research consist of primary and secondary data. The instrument  
 73 for data collection consists of a well-structured interview schedule  
 74 that contains both close-ended and open-ended questions. The study  
 75 contains both dependent and independent variables. The dependent  
 76 variable was effectiveness of agricultural extension services in reducing  
 77 poverty among fish farmers. This was measured on 3 points rating scale  
 78 of very effective -3, effective -2, and not effective -1. The independent  
 79 variables which are the selected socioeconomic, types of agricultural  
 80 extension service rendered, and types of constraints militating effective  
 81 utilization of agricultural extension service rendered were measured  
 82 accordingly. Data collected was analyzed using both descriptive  
 83 statistics such as frequency counts and percentage and inferential  
 84 statistics such as Chi-square and Pearson product moment correlation.

## 85 RESULTS AND DISCUSSION

### 86 Socioeconomic characteristics

#### 87 Age

88 Table 1 show that 35% of the respondents were between the age range  
 89 of 30 and 39 while 36.3% were between the age ranges of 40 and 49  
 90 and 23.7% were between the age ranges of 50 and 59. Only 5% of  
 91 the respondents were 60 years of age and above. The mean age was  
 92 45 years. This implies that <60% of the respondents are adults which  
 93 are in their active productive age; hence, there exists greater potential  
 94 for increasing fish output in the area. This finding is in line with the  
 95 findings of Olasunkanmi (2012) and Oloayo *et al.* (2016) that the mean  
 96 age of fish farmers was 40 and 45 years. The reason for this particular  
 97 age composition could be attributed to the fact that fish farming is  
 98 relatively their source of livelihood. Furthermore, the result is in  
 99 conformity with the findings of Ofuoku *et al.* (2008) that young and  
 100 adult are involved in fish farming as well as Adeokun *et al.*, (2006) in  
 similar study reported that more youths are among fish farmers.

#### 101 Sex

102 As shown on Table 1, the majority 68.7% of the fish farmers were male  
 103 while 31.3% were female; however, it should be noted that women  
 104 were also actively involved in fishing. The implication is that women  
 105 had additional responsibility of fishing to fish processing and marketing  
 106 which were their roles in most of the fishing communities. In a similar  
 107 study, Inoni and Oyaide, 2007 reported that the role of women in fishing  
 108 cannot be over emphasized.

#### 109 Marital status

110 Similarly, Table 1 shows that 11.2% of the respondents were single  
 111 while 78.8% of the respondents were married. Furthermore, 2.5%  
 112 were divorced and 7.5% were widowed. The implication is that married  
 113 fish farmers would have helping hands from the family members. In  
 114 any venture where there are more youths, there is the tendency of  
 115 sustenance over the years. This result agreed with the report of Ekong  
 116 (2002) that at 25 years and above, most rural people are married in  
 117 most Nigerian communities. Marriage is an important factor in the  
 118 livelihood of individuals as it is perceived to confer responsibility on  
 119 individuals (Oladoja *et al.*, 2008). Oladoja (2000) asserted that the  
 120 marriage institution is still cherished and an indication of economic  
 121 responsibilities of the respondents in caring for dependents.

#### 122 Years spent schooling

123 Result presented in Table 1 revealed that 7.5% have no formal education  
 124 while 2.5% spent between 1 and 6 years schooling and 36.2% spent  
 125 7–12 years schooling. Furthermore, 53.8% spent 13 years and above  
 126 schooling. This implies that majority of the respondents are educated  
 127 and will be able to make wise and rational decisions concerning their  
 128 fish farming business. It could also be suggested that the educational

**Table 1: Distribution of respondents by to their socioeconomic characteristics (n=80)**

Socioeconomic variables	Frequency	Percentage	Mean
Age (years)			
30-39	28	35	45
40-49	29	36.3	
50-59	19	23.7	
>60	4	5	
Sex			
Male	55	68.7	
Female	25	31.3	
Marital status			
Single	9	11.2	
Married	63	78.8	
Divorced	2	2.5	
Widowed	6	7.5	
Years spent schooling			
1-6	2	2.5	14.2
7-12	29	36.2	
>13	43	53.8	
No formal education	6	7.5	
Household size (persons)			
<3	7	8.8	4
3-4	39	48.7	
5-6	32	40	
>7	2	2.5	
Annual income (Naira)			
<500,000	15	18.7	858,275
500,000-999,000	55	44	
1,000,000-1,499,000	14	17.5	
>1,500,000	7	8.8	
Fish farming experience (years)			
<5	33	41.2	6.5
5-9	27	33.8	
10-14	14	17.5	
>15	6	7.5	
Types of fish farmed			
Catfish	58	72.5	
Tilapia	7	8.8	
Both	15	18.7	
Membership of social group			
Yes	42	52.5	
No	38	47.5	
Access to agric extension agent			
Yes	80	100	

Source: Field survey; 2021

exposure of respondents in the study area was responsible for smaller household size which is at variance with the traditional African rural communities. However, Eyo (2006) reported generally low level of education among fish farmers in a similar study.

#### Household size

Results presented in Table 1 show that 8.8% of the respondents have <3 persons in their household while 48.7% have between 3 and 4 persons in their household and 40% have between 5 and 6 persons in their household. Furthermore, 2.5% have 7 persons and above in their household with the mean household size been 4 persons. This implies that the respondents have smaller household size. The results negate the assumption that rural communities are dominated by large household size which characterizes polygamous homes. The implication could be because of various enlightenment campaign embarked upon by the government at various levels and non-governmental organizations on the need for birth control.

#### Annual income

Table 1 show that 18.7% of the respondents earn <#500,000 while 55% earn between #500,000-#999,000 and 17.5% earn #1,000,000-#1,499,999. Furthermore, 8.8% earn #1,500,000 and

above with a mean annual income of #858,275. This implies that fish farming is a lucrative business in the study area.

#### Fish farming experience

Result presented on Table 1 shows that 41.2% of the respondents have <5 years of fish farming experience while 33.8% of the respondents have between 5 and 9 years of fish farming experience and 17.5% of the respondents have between 10 and 14 years of fish farming experience. Furthermore, 7.5% of the respondents have 15 years and above experience in fish farming business with a mean fish farming experience of 6.5 years. This implies that majority of respondents could be regarded as new entrants into fish farming business which is in line with Olaoye *et al.* (2016) in their finding that majority of the respondents having 5 years of fish farming experience; however, Adefalu *et al.* (2013) opined that more years of farming experience are needed to facilitate the acquisition of skills in fish farming.

#### Type of fish farmed

Result in Table 1 shows that 72.5% of the fish farmers reared catfish while 8.8% reared tilapia fish and 18.7% reared both catfish and tilapia fish. This implies that almost all the respondents in the study area reared catfish. This finding corroborates the findings of Ogunlade (2007) and Ijatuyi (2010) that catfish have more resistance and are easy to farm in warm climates like the Nigerian tropical type.

#### Member of social group

Table 1 show that 52.5% of the respondents in the study area belonged to one social group or the other while 47.5% of the respondents do not belonged to any social group. This agrees with the findings of Ijatuyi (2010) that majority (60%) of the respondents in the study area belonged to one social group or the other. Association membership provides an easier opportunity of securing loan from association and government. Bolorunduro *et al.* (2004) opined that one of the best ways of reducing the recycling constant of subsistence in rural agriculture is through economic empowerment of the rural peasants, which can take place through their participation in cooperative activities.

#### Access to agricultural extension agents

Furthermore, all the respondents (100%) have access to agricultural extension agents. This implies the all the respondents will equally have access to all the agricultural extension services rendered in the study area.

#### Types of agricultural extension services rendered to the fish farmers

The prime objective of fisheries extension is to persuade and empower aqua farmers and fishing communities to improve their socioeconomic condition and quality of life by making improvement in their farming practices resulting in increased fish production and income; hence, data presented in Table 2 show that all the respondents have access to the different types of agricultural extension services rendered in the study area (100%) while 93% of the respondents indicated that technology transfer is the type of extension service rendered to them, 90% indicated information and support services, 89% indicated food safety and quality, 75% indicated marketing and distribution while 88% indicated sustainable fisheries. Furthermore, 96% indicated credit and finance, 72% organizational and capacity development, 67% entrepreneurship development while 100% of the fish farmers indicated safety measures, and 58% of them indicated new extensionist approaches as type of extension service rendered to them. Similarly, 48% indicated leasing of ponds, 97% of the fish farmers indicated training to fish farmers as the type of extension service rendered while 88% indicated input supply, and 92% of the respondents indicated technical expertise as type of extension service rendered to them in the study area. This indicates that the respondents have access to various types of agricultural extension services that might assist them in boosting their fish farming business.

**Table 2: Distribution of respondents by types of agricultural extension services rendered to the fish farmers (n=80)**

Characteristics	Frequency	Percentage
Access to types of services rendered		
Yes	80	100
Types of services rendered		
Technology transfer	*74	93
Information and support services	72	90
Food safety and quality	71	89
Marketing and distribution	60	75
Sustainable fisheries	70	88
Credit and finance	77	96
Organizational and capacity development	58	72
Entrepreneurship development	54	67
Safety measures	80	100
New extensionist	46	58
Leasing of ponds	38	48
Training to fish farmers	78	97
Input supply	70	88
Technical expertise	74	92

Source: Field survey; 2021, \*Multiple responses

#### Types of agricultural extension services rendered utilized by the fish farmers

Result presented in Table 3 shows that 76% of the respondents utilized technology transfer, 100% utilized information and support services, 100% utilized food safety and quality, 77% utilized marketing and distribution while 58% utilized sustainable fisheries. Furthermore, 100% utilized credit and finance, 32% utilized organizational and capacity development, 47% utilized entrepreneurship development while 100% of the fish farmers utilized safety measures, and 72% of them utilized new extensionist approaches. Similarly, 28% utilized leasing of ponds, 67% of the fish farmers utilized training to fish farmers while 85% utilized input supply, and 100% of the respondents utilized technical expertise. This indicates that more than half of the agricultural extension services rendered to the fish farmers were utilized. Although it is also equally important that while providing agricultural extension services support to these respondents for developing their fish farming practices, utmost care should be taken that recommendations suggested are in line with the need, means, and ability of individuals and the communities, and at the same time, these are economically viable and socially acceptable.

#### Effectiveness of agricultural extension services in reducing poverty

Table 4 shows that 85% of the respondents indicated that agricultural extension services are very effective in reducing poverty among fish farmers while 15% of the respondents indicated that agricultural extension services are effective in reducing poverty among fish farmers. The finding indicates that agricultural extension services are a useful tool in poverty reduction in the study area because the net profit of the fish farmers who utilized the rendered extension services increased as compared to those who did not utilize the rendered extension services; hence, the rendered extension services made a big difference in the achievement of the fish farmers in relation to their production level and consequently their net profits.

#### Types of constraints militating effective utilization of agricultural extension service rendered to the fish farmers

Result presented in Table 5 shows that 82% of the respondents identified weak linkages of research and training centers with extension workers and users as a constraint militating effective utilization of agricultural extension service rendered, 100% identified lack of properly qualified/trained extension personal while 98% identified inadequate number of grass root workers, and 85% identified lack of clear extension strategies. Furthermore, 88% identified laying much emphasis on welfare than development.

**Table 3: Distribution of respondents by types of agricultural extension services rendered utilized by the fish farmers (n=80)**

Types of services rendered utilized	Frequency	Percentage
Technology transfer	*61	76
Information and support services	80	100
Food safety and quality	80	100
Marketing and distribution	62	77
Sustainable fisheries	46	58
Credit and finance	80	100
Organizational and capacity development	26	32
Entrepreneurship development	38	47
Safety measures	80	100
New extensionist	58	72
Leasing of ponds	22	28
Training to fish farmers	54	67
Input supply	68	85
Technical expertise	80	100

Source: Field survey; 2021, \*Multiple responses

**Table 4: Distribution of respondents by effectiveness of agricultural extension services in reducing poverty among fish farmers**

Effectiveness	Frequency	Percentage
Very effective	68	85
Effective	12	15
Total	80	100.0

Source: Field survey; 2021

**Table 5: Distribution of respondents by types of constraints militating effective utilization of agricultural extension service rendered to the fish farmers (n=80)**

Types of constraints	Frequency	Percentage
Weak linkages of research and training Centers with extension workers and users	*66	82
Lack of properly qualified/trained extension personal	80	100
Inadequate number of grass root workers	78	98
Lack of clear extension strategies	68	85
Emphasis on welfare than development	70	88
Emphasis on technology than its transfer to end users	60	75
Inadequate infrastructure facilities	64	80
More water area per extension worker	54	67
Lack of incentives for field staff	80	100
Lack of clear cut job descriptions	72	90

Source: Field survey; 2021

Similarly, 75% identified laying much emphasis on technology than its transfer to end users, 80% of the respondents identified inadequate infrastructure facilities, 67% identified more water area per extension worker while 100% identified lack of incentives for field staff, and 90% identified that lack of clear cut job descriptions as a constraints militating effective utilization of agricultural extension service rendered in the study area.

#### Hypothesis testing

Table 6 shows the Pearson correlation analysis of the relationship between respondents' socioeconomic characteristics and effectiveness of agricultural extension services in reducing poverty. It was observed that there was positive and significant relationships between respondents' age ( $r=0.532$ ;  $p\leq 0.05$ ); number of years spent schooling ( $r=0.589$ ;  $p\leq 0.05$ ); household size ( $r=0.117$ ;  $p\leq 0.05$ ); annual income ( $r=0.515$ ;  $p\leq 0.05$ ); fish farming experience ( $r=0.146$ ;  $p\leq 0.05$ ); and effectiveness of agricultural extension services in reducing poverty.

**Table 6: Significant relationship between respondents' socioeconomic characteristics and effectiveness of agricultural extension services in reducing poverty**

Socioeconomic characteristics	r(correlation coefficient)	p-value	Decision
Age	*0.532	0.005	S
Number of years spent schooling	*0.589	0.005	S
Household size	*0.117	0.005	S
Annual income	*0.515	0.005	S
Fish farming experience	**0.146	0.001	S

\*Correlation is significant at 5%, \*\*Correlation is significant at 1%, S: Significant

## CONCLUSION AND RECOMMENDATIONS

From the findings, the study concludes that all respondents have access to the different types of agricultural extension services rendered in the study area and consequently and utilized such services hence the effectiveness of agricultural extension services in reducing poverty. The study therefore recommended that more qualified/trained extension personnel should be employed by the government and adequate incentives should be made available to the field staff. Furthermore, more emphasis should be laid on technology transfer to end users than the technology itself and linkages of research and training centers with extension workers and users should be strengthened.

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