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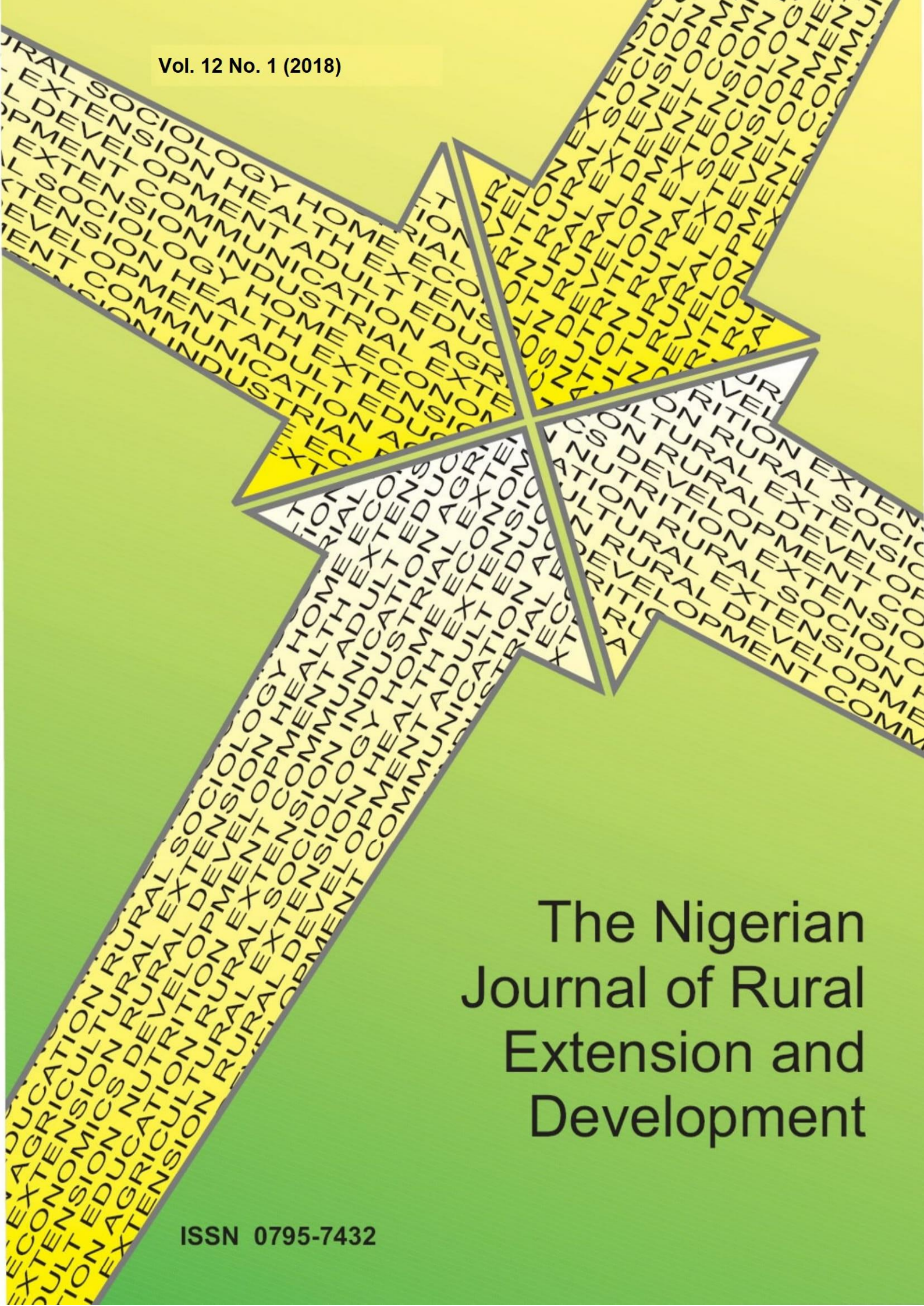

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THE NIGERIAN JOURNAL OF RURAL EXTENSION AND DEVELOPMENT (NJRED)

Aims and Scope

The Nigerian Journal of Rural Extension and Development (NJRED), a referred journal, is an annual publication of the Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria. The journal is intended to encourage systematic and continuous publication of practical ideas and empirical research work in the area of Rural Extension and Development as it relates to Rural Development, Women in Development. Agriculture and Extension Education, Rural Sociology, Livelihood, Mass and Extension Communication, Health and Nutrition Extension, Home Economics, Adult Education and Multi-disciplinary Rural Extension issues.

In addition, the Journal publishes book reviews and research and research –in-brief articles.

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Constraints to women's adoption of improved agricultural technologies introduced by Women in Agriculture in Edo State, Nigeria

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ABSTRACT

The contribution of new technology to economic growth can only be realized such technology is widely diffused and adopted. This study was conducted to analyse factors affecting women's adoption of improved agricultural technologies introduced by Women In Agriculture (WIA) in Edo State. A multi-stage sampling procedure was used to select 144 women from three Local Government Areas of Edo South ecological zones**.** An interview schedule was used to collect data and both descriptive and inferential statistics such as frequency, percentages, percentages, mean and chi-square was used to analyse the data at p=0.05. Results show that the women were aware of all technologies introduced to them by WIA, however, *gaari* processing, dry and wet seasons vegetable production, and use of oil palm seedlings were the major ones adopted by the women. in the study area as these technologies rank 1st, 2nd, 3rd and 4th respectively, Market problem (79.9%, 85.4%), lack of access to credit (83.3%, 87.5%) were constraints identified by women as affecting the adoption of both production and processing technologies introduced to the them as these have the highest percentage among many others. Marital status (χ^2= 53.163), education (χ^2=25.48), major occupation (χ^2= 52.47), source of land (χ^2=28.576) and source of input (χ^2=36.653) had significant relationships with adoption of agricultural technologies. Socio-economic, environmental and technological factors should be considered by researchers when introducing a technology. Technologies that build on assets which the poor women already have are more likely to be adopted.

Keywords: Technology adoption, Agricultural technologies, Women In Agriculture (WIA)

INTRODUCTION

Agriculture plays an important role in economic growth, enhancing food security, poverty reduction and rural development. It is the main source of income for around 2.5 billion people in the developing world (FAO, 2003). Smallholder agriculture is identified as a vital development tool for achieving the Sustainable Development Goals, one of which is to reduce the number of people suffering from extreme poverty and hunger by 2015 (World Bank, 2008). However majority of small holder farmers rely on traditional method of farming using hoes and cutlasses and this has lowered the level of productivity. Over 70% of maize produced in developing countries comes from smallholder farmers who use traditional methods of production (Muzari *et al.,* 2012). These farmers generally obtain very low crop yields because of the local varieties used by farmers which have low potential, most of the maize is grown under rain-fed conditions and irrigation is used only in limited areas, little or no fertilizers are used and pest control is not adequate (Muzari *et al.,* 2012).

This has triggered much of discussion on the need to increase productivity and sustainability in agriculture globally but very little information is available on specific means to achieve this aim. Increasing agricultural productivity is critical to meeting expected rising demand for food and fibre, as such, it is important to examine recent performance in cases of modern agricultural technologies (Challa, 2013). Agricultural technologies are seen as important routes out of poverty in most developing countries; however the rate of adoption of these technologies has remained low in most of these countries (Uaiene, Amdt and Masters (2009). Adoption of improved technologies increases productions, leading to constant socio-economic development. Adoption of improved agricultural technologies has been associated with higher earnings and reduced poverty; improved nutritional status; lower staple food prices; increased employment opportunities as well as earnings for landless laborers (Kasirye, 2010). Adoption of improved technologies is believed to be a major factor in the success of the green revolution experienced in Asian countries (Ravallion and Chen, 2004; Kasirye, 2010). On the other hand, non-adopters can hardly maintain their marginal livelihood with socio-economic stagnation leading to deprivation (Jain *et al.*, 2009).

Women are the key farmers, food producers and natural resource managers, in most countries of sub-Sahara Africa. This is because they provide 65% – 89% of food, provide nearly half of farm labour, shoulder over 90% of domestic responsibilities and work twice as many hours as men (Mtsor and Idisi, 2004). Akpabio (2005) also reported that women carry over 80 tonnes of fuel, water and farm produce for a distance of more than one kilometre over the course of a year. Women play significant and crucial roles in agricultural development and allied fields including crop production livestock production (Oyegbami,2016), horticulture, post-harvest operations, agro forestry, fisheries, and the likes.

The nature and extent of women's involvement in agriculture, no doubt, varies greatly from region to region. Even within a region, their involvement varies widely among different ecological sub-zones, farming systems, castes, classes and stages in the family cycle. But regardless of these variations, there is hardly any activity in agricultural production, except ploughing in which women are not actively involved (Uzomah 2011). Studies on women in agriculture conducted in Nigeria by Ogunbameru and Pandey, (1992), Ironkwe and Ekwe (1998), all point to the conclusion that women contribute far more to agricultural production than has generally been acknowledged. Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and home makers. Yahaya (2002) recorded that 76% of women from Oyo and Bauchi state are actively involved in farming activities or are engaged in their husband farms.

In Nigeria women supply most of the needed labours in agricultural activities and this is the most important factor of production, even women in seclusion (purdah) generate substantial income through food crop processing (Yahaya, 2002). Despite all efforts made by women in contributing to agricultural development there are still restriction in their roles as farmers due to unequal right and unequal access to land and control over resources, as asserted by technical centre for agricultural and rural Co-operation (CTA 2000).

The Women In-Agriculture (WIA) sub-component of the Agricultural Development Programme (ADPs) was instituted in 1988 to address gender specific agricultural problem. The focus was on food, nutrition, processing, storage and utilization of crop and livestock produce; in order to raise women's income and living standard through business oriented farming and processing strategies. Ever since the introduction of the (WIA) programme in Nigeria, and with the current emphasis on participatory extension, various efforts have be made to elicit various levels of information on the activities and effectiveness of the programme in specific limited areas in Nigeria. This study therefore aimed at finding out factors affecting the adoption of improved technologies introduce by WIA in Edo State.

Objective of the study

The broad objective of the study was to find out factors affecting the adoption of agricultural technologies among women in Edo State, Nigeria.

The specific objectives were to:

- examine the socio-economic characteristics of the women in the study area.
- identify selected technologies introduced by WIA to women in the study area
- find out women's awareness and adoption of specific agricultural technologies introduced by WIA program.
- investigate constraints to adoption of selected technologies by women in the study area

Hypothesis of the study

There is no significant relation between socio-economic characteristic of women and the adoption of improved technologies introduced by WIA in the study area

METHODOLOGY

Study area - The study was carried out in Edo State. The state is one of the 36 States in Nigeria and has three distinct ecological zones. These are the mangrove swamp forest to the south, the tropical rainforest in the middle and the guinea savannah to the north. The State shares boundaries with Delta State in the South and South east, Kogi State in the north and northeast, River Niger in the East and Ondo State in the west. The State occupies an area of 19,283.93Km2 with a population of 3,218,332 people (NPC, 2006). The annual rainfall varies from 2500mm in the southern parts to 1500mm in the northern parts with high annual temperature of about 30oc. The people are predominantly farmers, growing mainly food crops such as, yam, cassava, plantain, maize, melon, pepper and cash crops such as pineapples, pawpaw, palm produce, cashew and rubber and they also involve in trades.

Sampling technique and sample size - The population of this study comprise of women farmers registered with WIA**.**A multi-stage sampling procedure was used to select 144 women

for the study. The first stage was random selection of three Local Government Areas from Edo South ecological zone**.** The second stage involved selection of six communities from the selected three local government areas to make a total of 18 communities. The third stage involved random selection of 8 women from each community who had contact with WIA, to give a total of 144 women used for the study.

Data collection and analysis - A well-structured interview schedule was used to collect information on the socio-economic characteristics of women, awareness and adoption of selected technologies and women's perceived factors affecting technology adoption. Descriptive statistics such as frequency counts and percentages were used to present results. Chi-square analysis was used to test the relationship that exists between the socio-economic characteristics of women and adoption of selected technologies.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 shows the socio-economic characteristics of the women in the study area. The age distribution shows that majority (73.5%) of the women were between the age of 26-55 years with a mean age of 49 years. It implies that the respondents are still young and are therefore still active and should be inquisitive to want to adopt new or improved technology. Age is also assumed to be a determinant of adoption of new technology. According to Kariyasa and Dewi (2011), Older farmers are assumed to have more knowledge and experience and are better able to evaluate technology information than younger farmers. On contrary age has been found to have a negative relationship with adoption of technology. This relationship is explained by Adesina and Zinnah (1993) that as farmers grow older, there is an increase in risk aversion and a decreased interest in long term investment in the farm. On the other hand younger farmers are typically less risk-averters and are more willing to try new technologies. More than half (56.2%) of the women were married, and all the women had one form of education or the other. This implies that most of them will be able to read and write to some extent and will be able to comprehend the technicalities involved in any new technology. Education of the farmer has been assumed to have a positive influence on farmers' decision to adopt new technology. Education level of a farmer increases his or her ability to obtain; process and use information relevant to adoption of a new technology (Mignouna *et a*l., 2011; Lavison 2013). About half (50.04%) of the women were into farming as major occupation, while only 23.6 % were processors among others. This will make them adopt improved farming technologies that may be introduced to them because they would want to increase their agricultural production as well as income. Most of the women (63.8%) had household size of between 4-7 individuals with a mean household size of 6 persons. Their household size can serve as a source of family labour for their farming activities. It was also discovered that most (90.6%) of the women had farm size of about 2 hectares. These farm size, though small are ample enough for their activities and can enable them adopt new technologies. Most (72.8%) of the respondents had a monthly income of between N15,001 and N50,000 with a mean income of N48,950 which is relatively low compared to the high cost of living in the study area. Adoption of improved technology will lead to an increase in income.

The result also show that 59.8% of the women got their input (planting materials) from open markets, while 16.0% sourced theirs from families and friends and 24.3% from the state ADP. Farmers are more likely to source for planting materials from sources that are convenient for them. However, it is better to source for input from reliable sources like ADPs and research institute so as to be sure of the source such input or technology. Furthermore, 50.7% of the women got credit from their personal savings and had little access (9.7%) to loan especially from financial institutions. Access to credit can be a stimulus to technology adoption.

Table 1: Distribution of respondents by their socioeconomic characteristics (n=144)

Variable	Frequency	Percentage Mean
Age		
≤ 25	5	3.5
26-35	11	7.6
36-45	38	26.4 49 years
46-55	56	39.2
≥ 56	34	23.8
Marital status		
Single	25	17.4
Married	81	56.2
Divorced	13	9.0
Widowed	25	17.4

Variable	Frequency	Percentage Mean
Education		
Adult education	35	24.3
Primary	30	20.8
Secondary	15	10.4
Tertiary	64	44.5
Major occupation		
Artisan	13	9.0
Civil servant	10	6.9
Farming	72	50.0
Processing	34	23.6
Trader	15	10.4
Household size		
≤ 3	14	9.7
4-7	94	65.3 6.1
≥ 8	36	25.0
Farm size (acres)		
≤8	125	86.8
9-15	15	10.4 4.1
≥ 16	4	2.7
Income		
≤ 15,000	8	5.6
15,001-50,000	99	68.8
50,001-85,000	16	11.2 48,950
85,001-120,000	15	10.4
≥120,0001	6	4.2
Source of input		
ADP	35	24.3
Friends/relatives	23	16.0
Open market	86	59.8
Source of credit		
Bank	14	9.7
Cooperative	28	19.4
Friends/relatives	29	20.1
Personal savings	73	50.7

Awareness of selected technologies introduced by WIA to women

Awareness of a technology always precedes adoption. Table 2 shows four production and four processing technologies that were selected out of the ones introduced to the women in the study area by WIA. The result shows that the women were aware of all the technologies introduced, however *gaari* processing (86.5%), dry season (84.3%) and wet season vegetable production (81.2%) and use of oil palm seedling (75.0%) were the most popular technologies among the women in the study area as these technologies rank 1st, 2nd, 3rd and 4th, respectively. Although the difference in percentage of awareness may be due to the fact that some women are into farming as major occupation, while others were into processing and will most likely concentrate on technologies that concern them. The use of improved cocoa seedlings (59.7%) and plantain chips processing (62.5%) were also popular technologies among the women.

Table 2: Distribution of respondents by awareness of selected technologies introduced by WIA . n=144

Technology introduced	Aware	Rank	Not aware
Production technologies			
Dry season vegetable production	120 (84.3)	2nd	24 (16.7)
Wet season vegetable production	117 (81.2)	3rd	27 (18.8)
Use of improved cocoa seedlings	86 (59.7)	8th	58 (40.3)
Use of oil palm seedlings	108 (75.0)	4th	36 (29.0)
Processing technologies			
Pineapple chips processing	102 (70.1)	5th	42 (29.2)
Gari processing	126 (86.5)	1st	18 (12.5)
Plantain chips processing	90 (62.5)	7th	54 (37.5)
Soya milk processing	93 (64.6)	6th	51 (35.4)

Source: Field Survey, 2016
Figures in parentheses are percentages

Adoption of selected technologies

Table 3 shows the adoption of the various technologies introduced to the women in the study area. Findings reveal that *gaari* processing (86.5%), dry season (84.3%) and wet season (81.2%) vegetable production and use of oil palm seedling (75%) were the most adopted technologies as these ranked 1st, 2nd , 3rd and 4th, respectively. According to the women, these technologies have increased their production and income and that is why they maintain their adoption status of these technologies. Furthermore, only 5.6% of the women who adopted *gaari* processing discontinued its use, while it was not adopted by 16.7%. According to some of the women, lack of access to credit and high cost of cassava tubers were reasons for discontinuance and non-adoption of gaari processing According to Doss (2003) Characteristic of a technology is a precondition of adopting it, trialability or a degree to which a potential adopter can try something out on a small scale first before adopting it completely is a major determinant of technology adoption

Table 3: Distribution of respondents by adoption of the various technologies introduced by WIA (n=144)

Technology introduced	Adopted and still using	Adopted but discontinued	Do not adopt
Production technologies			
Dry season vegetable production	60 (41.6)	42 (29.2)	42 (29.2)
Wet season vegetable production	82 (56.9)	22 (15.3)	40 (27.8)
Use of improved cocoa seedlings	77 (53.5)	32 (22.2)	35 (24.3)
Use of oil palm seedlings	43 (29.9)	40 (27.8)	61 (42.3)
Processing technologies			
Pineapple chips processing	64 (44.4)	21 (14.6)	59 (41.0)
Gari processing	112 (77.7)	8 (5.6)	24 (16.7)
Plantain chips processing	60 (41.5)	24 (16.6)	60 (41.5)
Soya milk processing	44 (30.6)	18 (12.5)	82 (56.9)

*Percentages are in parentheses

Constraints to adoption of selected technologies introduced by WIA to women

Table 4 shows constraints to the adoption of selected technologies introduced by WIA to women. Out of the four processing technologies identified (soymilk processing, gari processing, pineapple chips and plantain chips processing), 53.5%, 48.6%, 59% and 62.5% of the women indicated high cost of input as constraints the adoption of these technologies. This corroborates the submission of Mwangi and Kariuki (2015) that the cost of technologies is a major constraint in technology adoption. Lack of control over production resources like land, capital, climate and many other factors were also identified by the women as factors affecting technology adoption. This was indicated by 79.9%, 70.1%, 66.7% and 68.1% of women in soymilk, *gaari*, pineapple chips and plantain chips processing, respectively. Other factors identified were pest and diseases, complexity of technology and market problem which were identified by few of the women.

The production technologies identified were dry season vegetable production, wet season vegetable production, use of improved cocoa seedling and use of improved oil palm seedling. Also, 64.6%, 40.3%, 52.1% and 49.3% of the women indicated high cost of input as factors affecting adoption of these technologies, respectively. Ndove*et al* (2006) submitted that high cost of input like fertilizer and high breed seed reduces the adoption of some technologies. Lack of control over production resources was also one reason given by the women as affecting technology adoption. An example given by some of the women was the negative effect of climate on crop production, especially on some crops like cassava, tomatoes and maize with associated effect of diseases and pest infestation which lead to low productivity. Lack of capital and lack of access to credit also constrained women's adoption of technologies. It is believed that access to credit promotes the adoption of risky technologies through relaxation of the liquidity constraint as well as through the boosting of household's-risk bearing ability (Simtowe and Zeller, 2006).

This is because with an option of borrowing, a household can do away with risk reducing but inefficient income diversification strategies and concentrate on more risky but efficient investment.

Distribution of respondents by specific constraints to adoption of selected technologies (n=144)

Technologies	High cost of input	Pest & disease problem	Complexity of technology	Marketing problem	Lack of access to credit	Lack of control over production resources
Production technologies						
Dry season vegetable production	93 (64.6)	81 (56.2)	62 (43.1)	114 (79.2)	115 (79.9)	76 (65.3)
Wet season vegetable production	58 (40.3)	75 (52.1)	66 (45.8)	113 (78.5)	98 (68.1)	101 (70.1)
Use of improved cocoa seedlings	75 (52.1)	93 (64.6)	70 (48.6)	99 (68.7)	120 (83.3)	99 (68.7)
Use of oil palm seedlings	71 (49.3)	92 (63.9)	73 (50.7)	91(63.2)	90 (62.5)	93(64.6)
Processing technologies						
Soya milk processing	77 (53.5)	71 (49.3)	75 (52.1)	123 (85.4)	116 (0.6)	115 (79.9)
Pineapple chips processing	85 (59.0)	62 (43.1)	76 (52.8)	107 (74.3)	126 (87.5)	96 (66.7)
Gari processing	70 (48.6)	69 (47.9)	71 49.3)	99 ((68.7)	119 (82.6)	101 (70.1)
Plantain chips processing	90 (62.5)	66 (45.8)	82(57.1)	10371.5)	122 (84.7)	98 (68.1)

Relationship between respondents' selected socio-economic characteristics and level of adoption of agricultural technologies introduced by WIA

The result in Table 5 shows the Chi-square analysis of relationship between respondents' socio-economic characteristics and their adoption of agricultural technologies. The result shows marital status (χ^2= 53.163, p= 0.000), education (χ^2=25.481, p=0.013), religion (χ^2=21.659, p=0.010), major occupation (χ^2= 52.471, p= 0.001), source of land (χ^2=28.576, p=0.018) and source of input (χ^2=36.653, p=0.000) had significant relationships with adoption of agricultural technologies. This implies that the marital status, education, religion, major occupation, source of land and source of input are the determinants of adoption of agricultural technologies in the study area. For instance, the more educated a women farmer, the higher she is likely be willing to adopt new agricultural technologies introduced to her production and processing enterprises. For instance a study by Okunlola *et al.* (2011) on adoption of new technologies by fish farmers found that the level of education had a positive and significant influence on adoption of the technology. This is because higher education influences respondents' attitudes and thoughts making them more open, rational and able to analyze the benefits of the new technology (Waller *et al.,* 1998). This eases the introduction of a new innovation which ultimately affects the adoption process (Adebiyi and Okunlola, 2010) Furthermore, source of land may likely affect technology adoption especially where the land is inherited, but a farmer that purchased land for farming will want to increase production for increased income thus would likely adopt new or improved technology. This also applies to source of input, if the inputs are from a reliable source; it is likely to be adopted by women except where high cost is an impediment.

Table 5: Chi-square test of the relationship between socio-economic characteristics of respondents and the level of adoption of agricultural technologies introduced by WIA

Variables	X^2	Df	p – value	Remark
Age	18.480	12	0.102	NS
Marital status	53.163	12	0.000	S
Education	25.481	12	0.013	S
Major occupation	52.471	24	0.001	S
Household size	7.535	6	0.274	NS
Farm size	2.004	6	0.919	NS
Income	19.573	12	0.076	NS
Source of land	28.576	15	0.018	S
Source of credit	19.952	12	0.068	NS
Source of input	36.653	9	0.000	S

P>0.05 = Not significant (NS)

CONCLUSION AND RECOMMENDATION

The study has shown that majority of the women in the study were aware of selected technologies introduced to them by WIA. Also, about half of the women adopted and are still using some of the technologies like *gaari* processing, wet season vegetable production and use of oil palm seedling, while some of the women though adopted but later discontinued adoption. Reasons given for discontinuance were high cost of input, lack of credit facilities, pest and disease problem, complexity of technology, market problem and lack of control over production resources (land, capital, climate) among many others. Marital status, education, major occupation, source of land and source of input were significant to adoption of selected technologies. Based on findings from the study, it is recommended that some factors such as environmental factors, status (educational and economic) of the farmer, type of technology, should be considered by researchers when introducing a technology to the farmer. Technologies that build on asset which the farmers already have are more likely to be adopted faster.

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Utilisation of risk transfer measures among commercial poultry farmers in Oyo State, Nigeria

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ABSTRACT

Poultry farming like other agricultural enterprises is subject to many risks and uncertainties that are beyond the control of farmers. Farmers cannot bear these risks and uncertainties alone, hence transfer or share the risks involved in the production. The study investigated the utilisation of risk transfer measures among commercial poultry farmers in Oyo state. A total of 120 respondents were sampled through a multi stage sampling procedure. Data obtained were subjected to both descriptive and inferential statistics. Results reveal that respondents had mean age of 41.28±9.6years, were males (70.8%), married (90.8%), and with mean estimated monthly income of N163, 691.70. Level of awareness of risk transfer measures was high among 61.7% of the respondents, although level of utilisation of risk transfer measure was low for 59.2%. Lack of finance (1.12) was the most severe constraint militating against the utilisation of risk transfer measures. Results also indicate that contract and outsourcing of day old chick were the risk transfer measures mostly utilised by respondents. However, insurance was least utilised by the respondents. Significant relationships existed between marital status (x^2=8.420), source of information (x^2=29.189), farm ownership structure (x^2=7.123) and utilisation of risk transfer measures. Awareness of risk transfer measures (r=0.180) correlated with utilisaton of risk transfer measures at p=0.05. Utilisation of risk transfer measures was low in the study area, while insurance was not used by majority of the farmers. Thus, the study recommends that finance and adequate information should be provided to promote and improve the utilisation of risk transfer measures.

Keywords: Risk transfer measures, Production outsourcing, Contract marketing, Agricultural insurance

INTRODUCTION

Agricultural production is very vulnerable to the unpredictability of nature. It is subject to many risks and uncertainties as it occur in all economic and business activities unlike the industrial sector (Aina and Omonona, 2012). Farmers are confronted on a daily basis with an ever-changing landscape of possible price, yield, post-harvest losses, product prices, vagaries of nature such as inclement weather conditions, pests and diseases, natural hazards such as floods and fire outbreaks and other outcomes that affect their financial returns and overall welfare (Aina and Omonona, 2012; Nmadu and Peter, 2010). The variations in productivity induced by nature cannot be fully accommodated by farmers. As a result of this, risk management is an integral part of the general management of the farming business. Farmers implement diverse risk management strategies in the context of their production plans, the available portfolio of financial, physical and human capital, and the degree of aversion to risk (Harwood, Heifner, Coble, Perry, and Somwaru, 1999).

Farmers have many options in managing agricultural risks. It includes information collection (risk prevention); risk exposure reduction/avoidance such as selection of less risky technologies, production diversification; cooperative participation, options of farm financing and insurance schemes (risk transfer) (Hardaker, Huirne, Anderson and Lien 2004). Indeed most producers combine the use of many different strategies and tools (Velandia, Rejesus, Knight and Sherrick 2009; Harwood *et. al.*, 1999).

Agricultural production is risky (Babalola, 2014) and the riskiness may be attributed to several factors that are beyond the control of producers. The poultry farmer cannot predict the probability of occurrence of any of these and cannot bear these risks and uncertainties alone, he is faced with the option of transferring or sharing the risks involved in the production (Akintunde, 2015). Risk transfer is one of the common techniques of risk management in agriculture. It involves the transfer of risk to some participants and institutions that might be better able to cope with it. Common examples include futures and options contracts (such as contract marketing and production contract), crop insurance, and fire as well as hail insurance, (Alan, Craig, James, Micheal and Cole 2004).

The Nigerian poultry sector experiences many problems such as avian influenza which lead to loss of many stock in the country with negative impact, rise in price of feed, floods, fire out-break and inadequate credit with the global financial crisis (Timothy, 2012). These factors bring about uncertainty in poultry production; thus affecting the

supply of poultry products in the markets. The events of a number of periods of price uncertainty and movement (volatility) have caused farms to fall into bankruptcy, farmers leaving the business or falling into semi-permanent poverty traps and consumers to face spiraling costs for food and consequently, decline in the growth of the poultry sector (Adeyemo and Onikoyi, 2012). Also, lack of accurate information on the mitigation strategies in the livestock sector, combined with insufficient veterinary and breeding services, non-existent or inadequate regulations concerning production, commerce and animal health control are also other important obstacles to the management of risks in poultry production (FAO, 2008).

As part of governments' efforts to enhance food production in Nigeria, the Federal government of Nigeria launched the Nigerian Agricultural Insurance Scheme (NAIS) and Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) (Farayola, Adedeji, Popoola, and Amao, 2013). Strohm and Hoeffler (2006) argue that contract farming has been gaining popularity in developing countries and that contracts are an integral part of the production of broilers, turkeys and eggs. Much of the price risk is reduced in contract farming by the use of a pre-determined price rather than the market price (Martinetz, 2005). By specializing in the various phases of production, contracting can reduce participants' exposure to production or price risk.

Risk transfer measure can be a means of increasing the scale of production which in the long run can ameliorate the problem of low protein intake, and bring about the massive production of protein food items at competitive cost to make them affordable to the general masses. However, the utilisation of risk transfer has not received so much attention as most research are tailored towards insurance which is a measure of risk transfer, while few studies exist on contract and outsourcing. Given such deficiencies, this research is designed to contribute to existing literature by pulling together insurance; contract and outsourcing as measures of risk transfer, positing that utilisation of risk transfer are likely to depend on the awareness of risk transfer measures. Utilisation of risk transfer measures among commercial poultry farmers is expected to boost their production, hence the need to ascertain the extent to which they are used.

Objectives

The study assessed the extent of utilisation of risk transfer measures among commercial poultry farmers in Oyo state, with the following specific objectives:

1. describe the socioeconomic characteristics of the poultry farmers;
2. ascertain the awareness of farmers of the risk transfer measures;
3. determine the risk transfer measures employed by poultry farmers in the study area;
4. identify the constraints faced by the farmers in the use of risk transfer measures.

Hypotheses

The hypotheses of the study are stated in the null form as follows:

$H_0$1: there is no significant relationship between the socioeconomic characteristics of the poultry farmers and their utilisation of risk transfer measures.

$H_0$2: there is no significant relationship between poultry farmers' awareness of risk transfer measures and their utilisation of risk transfer measures.

$H_0$3: there is no significant relationship between the constraints faced by the farmers and their utilisation of risk transfer measures.

METHODOLOGY

The study was conducted in Oyo state, Nigeria. The population of the study consisted of commercial poultry farmers that do not produce for the purpose of consumption alone but for sale. A multi-stage sampling procedure was employed. The first stage involved selection of three of the 33 local government areas in Oyo State which is based on those with the highest number of registered members of the Poultry Association of Nigeria (PAN). They are; Lagelu, Egbeda and Akinyele. The second stage was the proportionate sampling of 50% of the registered members in the selected local government using simple random sampling, from the record of 90, 80 and 70 registered poultry farmers with PAN in Lagelu, Egbeda and Akinyele local government areas, respectively. A total of 120 (including 45, 40 and 35 respondents respectively) were used for the study. Data for the study were collected from primary source using a structured questionnaire consisting of open and close ended questions. The farmers were asked to indicate the extent to which they utilise the forms of risk transfer measures which was measured on a three point scale of Always, partially andnot utilised with scores of 2, 1 and 0, respectively. The mean score was computed and used to group the respondents

into high and low levels of utilisation of risk transfer measures.

A list of risk transfer measures was presented to respondents and they were asked to indicate if they are aware of the measures or not and the responses were measured as Aware and Not aware and scored as 1 and 0, respectively. The mean score was computed and used to determine the extent of respondents' awareness of risk transfer measures which was grouped as high or low. Respondents indicated the constraints they encounter in the utlisation of risk transfer measures from the list provided on a 3 point scale ofNot a constraint, mild constrain and Severe constraint which were scored 0, 1 and 2 respectively. The mean scores were computed and used to rank from the most severe constraint among respondents. Data were described using frequency count, percentages and mean. Chi-square and Pearson Product Moment Correlation (PPMC) were used to test the hypotheses.

RESULTS AND DISCUSSION

Majority (74.2%) of the respondents fell within the age range of 31 to 50 years, while 12.5% were above 50 years of age (Table 1). Respondents had a mean age of 41.28±9.6 years. This is an indication that majority of the commercial poultry farmers were still in their active years and hence, they are economically productive. This result agrees with that of Akinbile, Akinpelu and Akwiwu (2013). According to Zhang and Flick (2001), age determines the level of involvement of farmers in farming activities. Majority (70.8%) of the respondents were male. This suggests that poultry farming may be labour intensive which makes it less attractive to the females. This corroborates the findings of Olaniyi, Adesiyan and Ayoade (2008) who reported that the drudgery nature, physical and energy demand as well as capital-intensiveness of investment required for poultry production could discourage women from involvement in poultry production. Majority (90.8%) of the farmers were married. That most of them were married could imply that majority of them had opportunity for family labour. Also having a family of dependants comes with a level of responsibility. The result is in agreement with Olaniyi *et.al.* (2008) who reported that majority of the respondents were married and are considered to be responsible and rational in taking decisions. It is therefore expected that married poultry farmers would be more likely to take steps to manage agricultural risk. Also, majority (67.5%) of the commercial poultry farmers were Christians, while the remaining (32.5%) were Muslims. This is in agreement with the findings of Akinbile *et. al.* (2013) that religion could play a role in management of risk at the farm level because farmers may be spiritual and adopt prayers as a means to manage risk

Almost all (97.5%) the commercial poultry farmers had below 20 years of commercial poultry farming experience. A very small percentage (2.5%) of the respondents had above 20 years experience and the mean years of farming experience was 7.93 years. This suggests that majority of the respondents may be lacking in the ability to manage agricultural risks that experience could have taught them; this may have a negative impact on farmers' utilisation of risk transfer measures. There is high level of literacy among the commercial poultry farmers as majority (94.1%) of the respondents have attained one form of tertiary education or the other and 19.2% had postgraduate education while, only 5.9% of the respondents had secondary education. This corroborates the findings of Olaniyi *et. al.* (2008) that the relative high level of literacy is expected to enhance innovativeness of farmers.

Majority (84.2%) of the farmers operated a sole proprietorship farm which means that they carry out most of the activities on their own possibly due to lack of finance to expand the business or to manage agricultural risk. This result corresponds with the findings of Olajide (2014) that majority of the crop farmers operate a sole proprietorship farm. Farm size was classified following Subhash, Joynal and Fakhrul (1999), Ojo (2003) and Olasunkanmi (2008). Farms having <1000 birds were considered as small farms, 1000-3000 as medium farms and those having 3000 and above birds as large farms. Table 1 reveals that majority (54.2%) of the respondents had medium farms with stock size of between 1000 and 5000 birds. Overall, mean poultry farm size was 2,508 birds. Smallholder farmers may differ in their utilisation of risk transfer measures from their medium and large holding counterparts. The respondents had a general mean monthly income of N163,691.70 as their net monthly income from poultry farming. A high disparity existed between the observed minimum estimated monthly income of N3,000.00 and the maximum N4,000,000.00. This can be attributed to the farm/stock size which is highly dispersed. This is in agreement with Akinbile *et. al.* (2013) that small scale farmers are expected to be more risk seeking than managers of large farms. Hence, income is expected to have a negative influence on utilisation of risk management strategies.

Majority of the respondents (51.7%) obtained information on risk management from other farmers, while 45% obtained information from professionals and only a few (9.2%) received information from extension agents. This implies that more poultry farmers obtain information from their colleagues. This result corroborates the findings of Olajide (2014) that friends/family was

the major source of information on agricultural risk management.

Table 1: Distribution of respondent based on selected socio-economic characteristics

Variables	Frequency	Percentage	Mean
Age			
<30	16	13.3	41.28
31-40	48	40.0	
41-50	41	34.2	
51-60	11	9.2	
61-70	3	2.5	
>70	1	8	
Total	120	100	
Sex			
Male	85	70.8	
Female	35	29.2	
Total	120	100	
Marital status			
Single	11	9.2	
Married	109	90.8	
Total	120	100	
Religion			
Christianity	81	67.5	
Islam	39	32.5	
Total	120	100	
Educational status			
Secondary education	5	4.2	
N.C.E	14	11.7	
O.N.D	8	6.7	
H.N.D	25	20.8	
B.Sc.	43	35.8	
Postgraduate	23	19.2	
Trainee nurse	2	1.7	
Total	120	100	
Farm Experience			
1-5	63	52.5	
6-10	33	27.5	
11-15	9	7.5	
16-20	12	10.0	
>21	3	2.5	
Total	120	100	
Farm ownership structure			
Sole proprietorship	101	84.2	
Company	13	10.8	
Partnership	6	5	
Total	120	100	
Stock size			
<1000	37	30.8	2508
1000-5000	65	54.2	
>5000	18	15.5	
Total	120	100	
Estimated monthly income			
10000-50000	45	37.5	163,691.70
51000-100000	39	32.5	
101000-150000	12	10.0	
151000-20000	11	9.2	
>200000	13	10.8	
Total	120	100	
Source of information			
Other farmers	62*	51.7	
Extension workers	11*	9.2	

Variables	Frequency	Percentage	Mean
Print media	14*	11.7	
Electronic media	22*	18.3	
Professionals	54*	45.0	

Source: Field survey, 2016

Multiple responses*

Respondents' awareness of risk transfer measures

Results in Table 2 reveals that majority of the respondents were aware of risk transfer measures. They were more aware of insurance, marketing contract and outsourcing of farming activities. This implies that there is high level of awareness of risk transfer measures (Table 3) in the study area which may be as a result of their high level of education which enable them to have access to various sources of information. This corroborates the findings of Farayola *et al.* (2013) that majority of the farmers were aware of Agricultural Insurance Scheme.

Table 2: Distribution of respondents based on the awareness of risk transfer measures (n=120)

S/N	Statements	Mean	Rank
1	Nigerian Agricultural insurance corporation (NAIC) as an agricultural insurance scheme.	0.90	1st
2	An insurance policy is an effective means of managing risk	0.88	2nd
3	Marketing contract is a means of managing risk	0.82	3rd
4	The contractor in production contract has control over the production process	0.61	9th
5	Chicks drugs and feed can be provided to another farmer to deliver the birds in 8weeks or at market size	0.74	7th
6	Outsourcing can improve productivity of poultry enterprise	0.77	5th
7	Production contracts help to ensure continuous supply of product and to meet production deadline	0.76	6th
8	Security can be outsourced for the farm	0.74	7th
9	Veterinary service can be outsourced	0.81	4th

Source: Field survey, 2016

Table 3: Distribution of respondents based on their level of awareness of risk transfer measures

Level of awareness	Frequency	%	Minimum	Maximum	Standard deviation	Mean
Low (0-7)	46	38.3	0	9	1.94	7.03
High (7.03-9)	74	61.7				
Total	120	100				

Source: Field survey, 2016

Constraints to utilisation of risk transfer measures

Result on Table 4 reveals that lack of finance (1.12) was ranked highest in order of severity. This may be as a result of lack of access to credit facilities. Lack of adequate information was ranked second (1.00), while high cost of outsourcing and inability to pay contract by the end contract were ranked third (0.83) in order of severity. The least severe constraint was lack of formal education (0.59) which implies that majority of the respondents had formal education hence, do not perceive lack of formal education as a constraint to the utilisation of risk transfer measures.

Table 4: Distribution of respondents based on the constraints to utilisation risk transfer measures (n=120)

SN	Constraints to the use of risk transfer measures	Mean	Rank
1	High cost of insurance	0.82	5th
2	Lack formal education	0.59	8th
3	Lack of finance	1.12	1st
4	Lack of adequate information	1.00	2nd
5	Cost of obtaining information	0.76	6th
6	Short life span of contract	0.63	7th
7	Inability to pay contract by the end of the contract	0.82	4th

SN	Constraints to the use of risk transfer measures	Mean	Rank
8	High cost of outsourcing	0.83	3rd

Source: Field survey, 2016

Respondents' utilisation of risk transfer measure

Results on Table 5 reveal that of all the listed risk transfer measures, marketing contract; contract sale of eggs (1.18) was ranked highest, followed by contract sale of day old chicks (1.17), contract sale of other farm produce (1.09) and outsourcing day old chick (1.07). This implies that contract and outsourcing were the risk transfer measures mostly utilised by the respondents. However for insurance; poultry insurance policy against heat loss (0.44), poultry insurance policy against bird flu (0.63), personal insurance (0.63) and basic poultry insurance policy (0.66) were least utilised by the respondents. This implies that insurance was least utilised by majority of the poultry farmers in the study area. The result further reveals that majority of the respondents did not utilise insurance but utilised contract and outsourcing. This can be attributed to the small and medium scale of production practiced by majority of the respondents.

Table 5: Distribution of respondents based on utilisation of risk transfer measures

S/N	Transfer measures	Mean	Rank
	Insurance		
1	Poultry insurance policy against heat loss	0.44	14th
2	Poultry insurance policy with bird flu	0.63	12th
3	Basic poultry insurance policy	0.66	11th
4	Personal insurance	0.63	12th
	Contract		
	Production contract		
5	Contract day old chicks	1.17	2nd
6	Contract feed	1.03	5th
7	Contract point of lay	0.98	8th
8	Contract 8 weeks broiler	0.98	8th
	Marketing contract		
9	Contract sales of egg	1.18	1st
10	Contract sales of your other farm produce	1.09	3rd
	Outsourcing		
11	Outsource veterinary service	1.03	5th
12	Outsource day old chicks	1.07	4th
13	Outsource your feed	1.00	7th
14	Outsource farm security	0.84	10th

Source: Field survey, 2016

Respondents' level of utilisation of risk transfer measures

The result on Table 6 reveals that there was low level of utilisation risk transfer measures by more of the respondents in the study area. This result is in agreement with the findings on respondents' utilisation of insurance and contract on Table 5 that there is low level of utilisation of insurance and production contract which can be attributed to the farm size of the poultry farmers in the study area. This is despite the fact that utilisation of marketing contract and outsourcing is high.

Table 6: Distribution of respondents based on the level of utilisation of risk transfer measures

Level of utilization	Frequency	%	Minimum	Maximum	Mean	Standard deviation
Low (0-12)	71	59.2	0	28	12.73	6.67
High (12.73-28)	49	40.8				
Total	120	100				

Source: Field survey, 2016

Relationship between respondents' socio-economic characteristics and their utilisation of risk transfer measures.

Table 7 shows that marital status (χ^2= 8.420, p ≤ 0.05), source of information (χ^2=29.189 p ≤ 0.05) and farm ownership structure (χ^2 = 7.123, p ≤ 0.05) were significantly related to utilisation of risk transfer measure. However, sex (χ^2=0.015, p ≤ 0.05), years of education (r = 0.073, p ≤ 0.05) were not significantly related to utilisation of risk transfer measures.

The positive significant relationship between marital status and utilisation of risk transfer measures suggests that a direct relationship exist between marital status and utilisation of risk transfer measures. More of the respondents that were single highly utilised risk transfer measures when compared with the respondents that were married. This implies that more farmers that were single highly utilised risk transfer measures. The positive significant relationship between source of information and utilisation of risk transfer measures suggests a direct relationship between source of information and utilisation of risk transfer measures. This implies that the more the farmers are able to access information from the widely used source (friends/families/relatives), the more they utilise risk transfer measures. The positive significant relationship that exists between farm ownership structure and utilisation of risk transfer measures suggests a direct relationship between farm ownership structure and utilisation of risk transfer measures. Majority of the respondents that operate large scale company and partnership utilise risk transfer measures while only few 36% out of the 65% that operate sole proprietorship highly utilise risk transfer measures. This suggests that respondents that operate large scale company and partnership are better equipped to utilise risk transfer measures than those in sole proprietorship.

Age, years of education and years of farming experience had no significant relationship with utilization of risk transfer measures. This indicates that the variables are not important in explaining the risk transfer measures that respondents utilized.

Table 7: Relationship between respondents' socio-economic characteristics and utilisation of risk transfer measures

Variables	N	x^2-value	p-value	Decision
Sex	120	0.015	0.903	Not significant
Marital status	120	8.420	0.040	Significant
Farm ownership structure	120	7.123	0.028	Significant
Information source	120	29.189	0.015	Significant

Source: Field survey, 2016. Significant @ p≤0.05

Table 8: Correlation between respondents' socio-economic characteristics and utilisation of risk transfer measures

Variables	N	r-value	p-value	Decision
Age	120	-0.025	0.787	Not significant
Years of education	120	0.073	0.427	Not significant
Years of farming experience	120	0.112	0.223	Not significant

Source: Field survey, 2016. Significant @ p≤0.05

Relationship between respondents' awareness and their utilisation of risk transfer measures.

The result of correlation on Table 9 reveals that there was significant relationship between respondents' awareness of risk transfer measures and utilisation of risk transfer measures (r = 0.180, p ≤ 0.05). This implies that poultry farmers' awareness of risk transfer measures lead to the utilisation of risk transfer measures. This result agrees with *a priori* expectation that awareness of an innovation will influence its use.

Relationship between constraints and utilisation of risk transfer measures.

Table 9 shows that there was no significant relationship between constraints encountered and utilisation of risk transfer measures (r = -0.128, p = ≤ 0.05). This implies that there were generally severe constraints to utilisation of risk transfer measures but they do not influence utilisation of risk transfer measures. Rather, there are other variables aside constraints that influence farmers' utilisation of risk transfer measures.

Table 9: Correlation between risk awareness, constraints and utilisation of risk transfer

Variable	N	r-value	p-value	Decision
Awareness	120	0.180	0.049	Significant
Constraints	120	-0.128	0.164	Not significant

Source: Field survey, 2016. Significant @ $p \leq 0.05$

CONCLUSION AND RECOMMENDATION

There was high level of awareness of risk transfer measures among poultry farmers in the study area; however the level of utilisation of risk transfer measures was low. Lack of finance severely limited utilisation of risk transfer measures. Correlation was found to exist between farmers awareness of risk, farm ownership structure, information sources explored and utilisation of risk transfer measures. Therefore, adequate and frequent information on risk transfer measures utilisation should be provided, while timely access to credit will culminate into expansion of farm ownership structure which is required to promote and improve utilisation of risk transfer measures available.

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Peri-Urban farmers' perception of profitability of catfish production in Osogbo Metropolis, Osun State, Nigeria

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ABSTRACT

This study analysed the peri-urban farmers' perception of profitability of catfish production in Osogbo metropolis, Osun State, Nigeria. The socio-economic characteristics of the respondents, the cost and returns on catfish production, gross margin and factors influencing gross margin of catfish production were identified. Simple random sampling technique was used to select 90 respondents. Data were obtained through a structured and validated interview schedule. Descriptive statistics, budgetary technique and multiple regression models were used to analyze the data. The results of the study show that majority (91.1%) of the catfish farmers were in their active age of less than 60 years, with the mean age of 45years while the majority (75.56%) of the respondents were male. The farmers perceived that catfish farming was profitable ($\bar{x}$ = 4.08). Catfish farmer perceived the venture profitable but with the high cost of feed and labour. It has an average gross margin of ₦897,843.6 per annum and the Rate of Return on investment of ₦1.35.The budgetary analysis shows that the cost of raising one fish from fingerlings to table size of 1.45kg, average weight was ₦312.21 with accrued profit of ₦412.79. The average gross profit margin per catfish farmer was ₦897,843.6 per annum. The Regression analysis showed that feed and labour costs were the factors influencing gross margin profit negatively, while fish price and fish stocked cost influenced gross margin profit positively. In conclusion, Ministry of Agriculture should educate the farmers on how to reduce the cost of feeding and labour to enhance production and maximise profit.

Keywords: Peri-Urban farming, Perception, Profitability, Catfish farmer, Catfish production.

INTRODUCTION

Nigeria is predominantly an agrarian country, where the greatest percentage of the population is engaged in farming. In spite of the dominance of the oil export sector in foreign exchange earnings, agriculture remains the backbone of the rural economy in Nigeria. It provides direct employment to about 30.57 per cent of the population (World Bank, 2010). The contribution of agriculture to Nigeria's gross domestic product (GDP) went from 64 percent in 1960 to 46 percent in 2010 and is about 21.1 per cent in 2016 (Global Finance Magazine, 2017). This is as a result of the decimal performance of its sub-sectors. With the exception of crop sub-sector, livestock share of agricultural GDP declined from 24 percent in 1980 to 6 percent in 2010; forestry from 4 percent to 1 percent and fishery from 11 percent to 3 percent, respectively (Udah *et al*., 2015). The fishery sub-sector provides full-time employment to over 12 million people, which constitutes about 3% of the active population of the nation; another 11 million people indirectly earn their livelihoods from activities related to fisheries (Food and Agriculture Organization, FAO, 1999). Fish farming generates employment directly and indirectly in terms of people employed in the production of fishing output and other allied businesses (Olagunju *et al.,* 2007). Fish is the most important animal protein food available in the tropics (Ali *et al.,* 2008). It provides about 40% of the dietary intake of animal protein of the average Nigerian (Federal Department of Fisheries, FDF, 1997). Apart from human consumption and nutritional well-being, fish is important for animal feed and a source of raw materials in allied industries. It also contributes to rural and peri-urban development, increasing export opportunities, effective administration of natural resources and conservation of biological diversity (Esu *et al.,* 2009).

Fish farming is the sub-set of aquaculture that focuses on the rearing of fish under controlled or semi-controlled conditions for economic and social benefits (Anthonio and Akinwumi, 2002). Fishing, like any other hunting activities, has been a major source of food for the human race and has put an end to the unsavoury outbreak of anaemia, kwashiorkor and so on. According to Ayinla (2007), the most reliable source of protein for many people in the developing economies is and could continue to be fish. According to Food and Agriculture Organization (2002), fisheries products represented a major source of export revenue for developing countries, amounting to over US $ 20 billion per annum in the late 1990s. This exceeded the values obtained from the exports of meat, dairy, cereals, vegetables, fruit, sugar, coffee, tobacco and

oilseeds in 1997 from developing countries (International Trade Centre, 2002).

It has been shown that Nigeria can substitute fish importation with domestic production to create jobs, reduce poverty in rural and peri-urban areas where 70% of the population lives and ease the balance of payments deficits (Areola, 2007). However, Food Agricultural Organisation (F.A.O.) (2007) indicated that Nigeria imports about 560,000 tons of fish estimated at about $400 million annually while annual domestic fish supply in Nigeria stands at about 400,000 tons. This makes Nigeria one of the largest importers of fish in the developing world.

The story of aquaculture in Nigeria is essentially the story of catfish culture and the hope of fish supply in Nigeria hangs on its development and culture. The most commonly cultured species of fish in Nigeria include catfish, tilapia, and carp (Olagunju *et al.*, 2007). Catfish farming is a branch of agriculture that is grouped under aquaculture. It is the manipulation of the freshwater body to achieve the desired result in raising catfish species to a marketable size. Catfish farming began in Nigeria in the 20th century with the establishment of a catfish farm at the experimental station in Panyam Jos, a State in North Central Nigeria. The African Catfish is a species of catfish of the family Clariidae and its scientific name is *Clarias gariepinus* which was named by Burchell in 1822. In most countries, it fetches a higher price than tilapia as it can be sold live at the market as they have a market value two to three times that of tilapia (Emokaro, 2010). According to Olagunju, *et al*., (2007), it requires less space, time, money and has a higher feed conversion rate. Consequently, many fish farmers in Nigeria focus on catfish because it adapts well to culture environment, can easily be retailed live and it attracts the premium price. Catfish are suitable for stocking in ponds and they tolerate low dissolved oxygen better than other common species in the country.

The importance of catfish itself cannot be overemphasised. According to Anoop *et al*., (2009), it provides food for the populace, it allows for improved protein nutrition because it has a high biological value in terms of high protein retention in the body, higher protein assimilation as compared to other protein sources, low cholesterol content and one of the safest sources of animal protein. Many species of fish are farm produced all over the world, but Catfish is taking the lead because of its uniqueness. Catfish has wide acceptability as food in Nigeria, the demand for Catfish in Nigeria is unprecedented so much so that no matter the quantity supplied into the market, it would be consumed by ready buyers. This is so because of its low caloric value, low carbohydrate content, high in protein, low in fat, it is quick and easy to prepare and above all, it tastes great (Vanguard, 2009).

Fish is very important in the diet of many Nigerians, high in nutritional value with the complete array of amino acids, vitamins, and minerals. In addition, fish products are relatively cheaper compared to beef, pork and other animal protein sources in the country. Fish contribute more than 60% of the world supply of protein, especially in the developing countries. However, the African catfish species (*Clarias gariepinus* or *lazera*) are the most resistant and widely accepted and highly valued fish that are cultivated in Nigeria. It is a major species reared in Nigeria. According to Ozigbo *et al.,* (2013) *Clarias* spp. (*C. lazera* or *gariepinus*) popularly known as Catfish has the following characteristics: Its body has no scales, has omnivorous feeding habit, preys heavily on other species and even on its own fry and fingerlings, usually it is not stocked alone but along with tilapia which provides food for it and it has relatively slow growth rate when compared with common Carp and *Heterotis spp.*

Despite the increase in fish production in Nigeria, production level is still very low and this has been attributed to high cost of input, lack of credit to fish farmers at low-interest rate, lack of skilled manpower and an ineffective aquaculture extension service system (Oota, 2012). Adewumi and Olaleye, (2011); George *et al.,* (2010) and Nwiro, (2012) found out that a number of problems confronting the production of catfish; being a major species in Nigeria. Prominent among these are Poor management skills, inadequate supply of good quality seed, lack of capital, high cost of feed, inadequate information, faulty data collection, lack of environmental impact consideration and marketing of products. According to Oluwasola and Ige (2015), fish feed constituted 79.18% of the total operating cost and the amount of labour, and quantity of feed used were significant determinants of net income in catfish production. If the associated problems of production, especially the twin issue of feed production and fingerling supply are tackled, Nigeria will soon become a world exporter of catfish.

In Nigeria, aquaculture development has been driven by social and economic objectives, such as nutrition improvement in rural areas, generation of supplementary income, diversification of income activities, and the creation of employment (Chilaka *et al*.,2014). Profitability is the financial reward that farmers get from its produce. It is the primary goal of all business outfits. The basis of farmer's decision for venturing into farming operation and allocating their scarce resources in the production depends on the relative profits gained (Carlso,

2001; Don 2009). Profit is a function of farm type, size, location and commodity produced as well as yield, output price and operational cost which include both fixed and variable cost (Blank, 2002; Jolejole *et al*., 2009). Farm profitability is the key to fish production enterprise as fish farmers would only embrace new technologies if they are profitable (Ashley-Dejo *et al*., 2016). Government policies and decisions affect farmers profit (Acquaah, 2005). Studies have been carried out on profitability of fish production using gross margin analysis in many part of Nigeria and it was confirmed that fish production is profitable; these include Ashaolu *et al*., (2005); Olagunju *et al*., (2007); Raufu *et al*.,(2007); Emokaro and Ekunwe (2009); Okwu and Acheneje (2011); Olaoye and Odebiyi (2011) and Tunde *et al*.(2015).

Despite perceived profitability of catfish farming with a projected return on investment of 70% to 80% catfish farmers in Lagos are grappling with myriad of challenges that leave a sour taste in their mouths. According to REJOPRAO's(2017) investigation into catfish farming in Lagos, Nigeria, the problems bedevilling catfish farming in Lagos State ranges from theft, under-pricing, inability to identify Runts from Shoots, high cost of fish feeds; high mortality rate of fingerlings, poor funding, and epileptic power supply to instability on market. While some Lagos catfish farmers struggle to remain in business; many others who lack the financial muscle and professional skills are quitting; at a time Nigeria's annual fish import bill, according to Audu Ogbe, minister of Agriculture, stands at a staggering $700 million.

Hence, this study analyzed the peri-urban famers perception of profitability of catfish production in Osogbo metropolis, Osun State, Nigeria. The study specifically determined the socio-economic characteristics of the catfish farmers; estimated the cost and returns of catfish production; assessed the gross margin of catfish production; as well as investigated the factors influencing gross margin of catfish production in the study area.

METHODOLOGY

Oshogbo is the capital and the seat of power of Osun State government. Many farmers practiced fish farming on the available land close to the source of perennial water and their houses in the peripheral of the town as the source of employment and income generation. Primary data were obtained from respondents through well-structured and validated interview schedule. The information scope of the interview schedule was based on the socio-economic characteristics of the respondents (age, marital status, years of experience), other information such as the cost of fingerlings, feed, and labour, as well as, quantity harvested among others. Simple random sampling technique was used to select 90 respondents which represent 75% of the total population, based on the list of Catfish Farmers Association of Nigeria (CAFAN) in Osogbo metropolis. Each farmer on the list was represented with a number on a card and the cards were shuffled and picked randomly one after the other. The data obtained were analyzed using the descriptive statistics, budgetary technique and multiple regression models. Farmers' perception was measured using Likert-scale of Strongly agreed (5), Agreed (4), Undecided (3), Disagreed (2) and Strongly Disagreed (1) for positive questions and vice versa for negative ones.

RESULTS AND DISCUSSION

Socioeconomic characteristics of catfish farmers

Age: Table 1 shows that 82.18 percent of the respondents were in age bracket between 30 and 60 years. The mean age of the farmers was 45years. The age distribution showed that catfish farming is practiced among the middle-aged farmers. This indicates that most of the respondents can withstand the rigors associated with the trade.

Sex: Table 1 shows that 75.56 percent of the respondents were males while 24.44 percent of were female. This corroborates Fregene *et al.,* (2011) that farming is an occupation that is gender sensitive. This also corroborates Adewumi and Olaleye, (2011); George *et al.,* (2010) and Nwiro, (2012) that catfish farming business is faced with a lot of risks and uncertainties that could be bear by men. It could be associated with the drudgery of fish farming.

Marital status: Table 1 shows that 74.44 percent of the respondents were married. Twenty percent of them were single while 5.56 percent were widowed. This implies that the respondents would have access to family labour.

Household Size: Table 1 shows that 58.89 percent of the respondents had household sizes of between 1 and 5 while 40 percent had household sizes of between 6 and 10. The mean household size was 5. The result showed that majority of the farmers had the small household size between 1 and 5. This is an indication that there would be the reduction in household expenditure which would not affect the quantum of income realizable from the enterprise.

Educational status: As shown in Table 1, the majority (74.44%) had tertiary education and16.67percent had secondary education. This indicates that the respondents would not have difficulty in adopting any of innovation introduced by change agents in fish production. Education makes a person responsive to new ideas.

Source of capital: Table 1 shows that majority (71.11%) of the respondents invested personal savings on their fish farming while 10 percent borrowed money from relatives and friends, and from Cooperatives societies. This might be as a result of the bureaucracy in obtaining the loan from the financial institutions or as a result of high-interest rate. This finding corroborates Oota, (2012) that lack of credit to fish farmers at low-interest rate, lack of skilled manpower and an ineffective aquaculture extension service system are some of the impediments to catfish production.

Annual income: Table 1 shows that 33.31percent of the respondents earned less than ₦500,000 annually and 38.86percent of the respondents earned between ₦500,000 and ₦1,000,000 annually. The mean of respondents' annual income was ₦869,259.3. This indicates that catfish farming is a profitable venture.

Farming experience: Table 1 shows that 33.33 percent of the respondents had between 1 and 5 years experience. 35.56 percent of the respondents had between 6 and 10 years experience in catfish farming, while only 17.78percent had between 16 and 20 years experience in catfish production. The mean farming experience was 9 years. The result indicated that the enterprise is young but not new to the respondents.

Table 1: Distribution of respondents by their Socioeconomic characteristics n=90)

Variables	Frequency	Percentage	Mean
Age			
<30	8	8.88	45
30- 60	74	82.18	
>60	8	8.88	
Sex			
Female	22	24.44	
Male	68	75.56	
Marital Status			
Single	18	20.00	
Married	67	74.44	
Widowed	5	5.56	
Household size			
1-5	53	58.89	5
6-10	36	40.00	
11-15	1	1.11	
Education Status			
Tertiary education	67	74.44	
Secondary education	15	16.67	
Primary education	6	6.67	
No formal education	2	2.22	
Source of capital			
Personal savings	64	71.11	
Relatives and friends	9	10.00	
Cooperatives	9	10.00	
Commercial bank	4	4.44	
Agricultural Bank	4	4.44	
Farmers' income (₦)			
<500000	30	33.31	869,259.3
500000 - 1000000	35	38.86	
1000001- 1500000	10	11.1	
1500001-2000000	10	11.1	
Above 2000000	5	5.55	
Farming experience (years)			
1-5	30	33.33	9
6-10	32	35.56	
11-15	12	13.33	
16-20	16	17.78	

Source: *Field survey, 2016*

Perception of the peri-urban farmers' of the catfish profitability

Table 3 shows the perception of the catfish farmers' profitability. The result shows that Catfish production is a profitable venture in Osogbo

metropolis ($\bar{x}$ = 4.08)" This corroborate the findings of Ashley-Dejo *et al*., (2016) that farm profitability is the key to fish production enterprise as fish farmers would only embrace fish farming if it is profitable. Furthermore, I believe that more than half of the cost of catfish production is spent on purchasing of feeds ($\bar{x}$ = 3.21), the cost of hiring labour for catfish production in Oshogbo metropolis is on the high side ($\bar{x}$ = 2.77) and high seed capital is needed to start catfish production ($\bar{x}$ = 2.95). This show that costs of feed, labour and capital investment on fish farming is at high side. This finding confirms the finding of Oluwasola and Ige (2015), that fish feed constituted 79.18% of the total operating cost and the amount of labour, and quantity of feed used were significant determinants of net income in catfish production. Also, Climate change has great adverse effect on catfish production in Oshogbo metropolis ($\bar{x}$ = 2.86). Adverse effect of climate change could result into harsh environment and shortage of water availability for the fish and high cost of production for the fish farmers. However, I don't have much experience in catfish production when I started ($\bar{x}$ = 2.39) were at very high level of their perception.

In contrary, I run my catfish farm at a loss ($\bar{x}$ = 1.35), expenses on diseases and parasites control take a bulk chunk of cost of catfish production ($\bar{x}$ = 1.31) and transportation cost is a major problem in catfish production ($\bar{x}$ = 1.26) were at a very low side of their perception. This may be as a result of inexperience in fish farming, stocking runt breeds and poor management skill. This findings corroborate Oota, (2012) that low returns on fish farming could be attributed to high cost of input, lack of credit to fish farmers at low-interest rate, lack of skilled manpower and an ineffective aquaculture extension service system. This is also in agreement with Adewumi and Olaleye, (2011); George *et al.,* (2010) and Nwiro, (2012) findings that a number of problems confronting the production of catfish are Poor management skills, inadequate supply of good quality seed, lack of capital, high cost of feed, inadequate information, faulty data collection, lack of environmental impact consideration and marketing of products.

Table 3: Distribution of the respondents according to their perception of catfish profitability (n = 90)

Statements	Mean ($\bar{x}$)	SD
Catfish production is a profitable venture in Osogbo metropolis	4.08	1.20
I believe that more than half of the cost of catfish production is spent on purchasing of feeds	3.21	1.16
The cost of hiring labour for catfish production in Osogbo metropolis is on the high side	2.77	1.25
I don't have much experience in catfish production when I started	2.39	1.24
High seed capital is needed to start catfish production	2.95	1.07
High cost of good fingerlings is challenge to catfish production	2.31	1.20
Scarcity of good source of fingerlings is a great challenge to catfish farming	2.06	1.05
Climate change has great adverse effect on catfish production in Osogbo metropolis	2.86	1.36
There is the available market for catfish produce in Osogbo metropolis	2.23	1.30
There is inadequate electricity supply which affects catfish production negatively	1.90	1.10
Expenses on diseases and parasite control take a bulk chunk of cost catfish production	1.31	1.20
Transportation cost is a major problem in catfish production	1.26	1.25
I run my catfish farm at a loss	1.35	1.22
I believe that much experience is necessary for catfish production	1.92	1.06

Source: Field survey, 2016

Annual cost and return of catfish farmers

As shown in Table 4, the average fish stocked per year was 2152. The average total variable cost of catfish enterprise was ₦662,676.4. The average total revenue was ₦1,560,520, and the total average gross margin was ₦897,843.6. The rate of return on investment was ₦1.35 which indicates that for every ₦1 the farmers invest on each fish would fetch ₦1.35 in return. This indicates that catfish production is a profitable venture. Table 4 clearly shows that the cost of feed for fish constitute 90.71 percent of the total variable cost. This finding corroborates Oluwasola and Ige (2015) that fish feed constituted 79.18% of the total operating cost. Labour constituted only 1.70 percent of the total variable cost. The low cost could have resulted from the use of family labour by the majority of the catfish farmers who were married with moderate family sizes.

Table 4: Annual Cost and Return Analysis per fish farmer (Two production cycle) n=90

Item	Average Value	Scale
Total Revenue	₦1,560,520	
Average number of fish stocked per the year	2152	
Average fish stocked at 1st production cycle	1102	
Average fish stocked at 2nd production cycle	1150	
Variable Cost		**% of TVC**
Cost of feed	₦ 608,199.2	90.71
Cost of fingerlings	₦ 41,979.44	0.21
Cost of labour	₦11,238.89	1.70
Cost of lime	₦1,997.26	0.24
Cost of drug	₦1,825.41	0.12
Cost of electricity	₦4,005.88	0.11
Cost of transportation	₦2,639.88	0.01
Total Variable Cost	₦662,676.4	100
Gross margin (TR-TVC)	₦897,843.6	
Rate of Return (GM/TVC) on investment	₦1.35	

***Source**: Field survey, 2016*

Cost and return per unit fish from fingerlings to table size

Table 5 shows the cost and returns of a unit fish from fingerlings to table size. The average total variable cost of one fish was ₦312.21. The average weight of the fish was 1.45kg. The average total revenue was ₦725, and the total average gross margin was ₦412.79. This shows that the cost of raising one fish from fingerlings to table size was ₦312.21, and ₦412.79 was realized as the profit. The rate of return on investment was ₦1.35 which indicates that for every ₦1 the farmers invested would yield ₦1.35 in return.

Table 5: Cost and Return Analysis per unit fish (from fingerlings to table size)

Item	Average Value	Scale
Total Revenue (P_Q.Q)	₦725	
Average weight of the fish	1.45kg	
Price of fish per kg	₦500	
Variable Cost		**% of TVC**
Cost of feed	₦282.62	90.52
Cost of Fingerlings	₦19.51	6.25
Cost of labour	₦5.22	1.67
Cost of lime	₦0.93	0.30
Cost of drug	₦0.84	0.27
Cost of electricity	₦1.86	0.60
Cost of transportation	₦1.23	0.39
Total Variable Cost	**₦312.21**	**100**
Gross margin (TR-TVC)	₦412.79	
Rate of Return (GM/TVC) on investment	₦1.35	

Source: Field survey, 2016

Factors influencing gross margin of catfish production in the study area

Table 6 shows normal regression analysis of the factors influencing gross margin of catfish production in the study area. There is a positive relationship between fish price, and gross margin, this implies that as fish price increases by 1 unit, the gross margin increases by 3.83 unit, and it's statistically significant at 1% level.

There was also a negative relationship between feed cost and gross margin, this implies that as fish cost increases by 1unit, the gross margin decreases by 0.16 unit and the fish cost is statistically significant at 5% level.

In similar vein, there was a negative relationship between labour cost and gross margin, this implies that as labour cost increases by 1unit, the gross margin decreases by 10.90 unit, and vice-versa, and labour cost is statistically significant at 10% level.

There was a positive relationship between fish stock cost, and the gross margin, this implies that as fish stock cost increases by 1 unit, the gross margin increases by 12.10unit, and it's statistically significant at 1% level.

The R-squared was 0.74; this implies that 74% of the explanatory variables had positive impacts on the response variables.

The result reveals that F was significant at 1% level which indicates a good fit of the regression line.

Table 6: Factors influencing gross margin of catfish production

Gross margin	Coefficient	Std. Err.	t	P>t
Fish price	3.83***	1.10	3.61	0.001
Feed cost	-0.16**	0.072	-2.20	0.030
Labour cost	-10.90*	6.294	-1.73	0.087
Electricity cost	-6.49 ^{NS}	13.167	-0.49	0.623
Fish stock cost	12.10***	1.053	11.50	0.000
Constant	-2001698	528673.7	-3.79	0.000
R^2	0.7408			
Adj	R^2	0.7254		
F	48.02			
Prob>F	0.000	`		

Source: *Field survey, 2016*
* significant at 10% (p<0.1)
** significant at 5% (p<0.05)
***significant at 1% (p<0.01)
NS- Not significant

CONCLUSION AND RECOMMENDATION

It was concluded that catfish production is a profitable venture in the study area. Nevertheless, there are some factors influencing gross margin of catfish production in the study area which are fish price, the cost of feed, and the cost of labour.

Based on the findings of this study, it is therefore suggested that:

- Effort should be made to bring down the cost of feeds by exploring alternative sources of feed for catfish through well-funded researches.
- Policies that will guarantee sale and price stability should be put in place, this will go a long way to further increase the economic return from catfish marketing in the study area in particular and in the nation as a whole.
- The government through the Ministry of Agriculture should encourage more people to invest in catfish farming by making inputs available to farmers at a subsidized price.
- More fishery specialists and extension officers should be encouraged through incentives, training, and financial support to carry out their duties through regular and constant seminars, workshops and conferences to motivate catfish farmers to adopt new technologies that would enhance catfish productivity in Osun state.

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Determinants of crop farmers' utilization of agricultural insurance scheme in Osun State, Nigeria

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ABSTRACT

The Nigeria Agricultural Insurance Scheme (NAIS) was implemented with the aim of cushioning economic losses in agricultural production, and reducing high risk and uncertainties often associated with agricultural enterprise such as pest and disease invasion, crop failure and natural disasters. Hence, this study investigated the determinants of utilization of NAIS among crop farmers in Osun State by examining the socio-economic characteristics, insurance characteristics, knowledge on agricultural insurance scheme, constraints and utilisation of agricultural insurance. Using a multi-stage sampling procedure, 60% of insured crop farmers in the study area were randomly selected given a total of 132 respondents. Data were analysed using descriptive statistics, Chi-square, Pearson Product Moment Correlation and multiple linear regression at $\alpha_{0.05}$. The results reveal that mean age of respondents was 41.9 years, 80.3% were males, 93.9% were married, and 53.0% had tertiary education. The mean monthly income from agricultural activity was ₦27, 231. Over half (50.8%) of respondents derive credit from commercial banks and had an average farm size of 9.30 acres. Radio (0.23) was the most preferred source of information and the use of crop insurance policy as collateral to obtain loan was the reasons for insuring crop. Knowledge of agricultural insurance was high among 54.5% of the respondents. Delay in indemnity by insurance companies (0.84) was the most severe constraints to utilization. About two-third (64.6%) had high level of utilisation of agricultural insurance scheme. Education ($\beta = 0.329$), use of hired labour ($\beta = 0.228$), years of farming experience ($\beta = 0.295$), and constraints to utilisation ($\beta = -0.275$) were predictors of utilization of agricultural insurance. It is recommended that the scheme should hasten the indemnification of clients.

Keywords: Crop farmers, Delayed indemnity, Agricultural insurance scheme utilisation.

INTRODUCTION

Agriculture comprises the entire range of technologies associated with the production of useful products from plants and animals, including soil cultivation, crop and livestock management, and the activities of processing and marketing (Epetimehin, 2010). The agricultural enterprises face a number of risks which are often interconnected. Generally, six types of risk are encountered in agricultural enterprises; these include production risks, price and market risks, regulatory risks, technological risks, financial risks, and human resources risks (Schaffnit-Chatterjee, 2009). The wide range of uncertainties and risks characterising the agricultural business creates the need for insurance of agricultural businesses. The uncertainties and risk could be due to the variable economic and biophysical environments. While some of these sources of risk are also common to other industries, many are specific to agriculture because farmers often sustain losses from a variety of factors which are totally unforeseen at the onset of the farming season. Such risks associated with agriculture and crop production in particular include flood, vagaries in weather conditions, market failure, communal clashes, fire disasters, unpredictable rainfall pattern, economic policy changes, land losses as well as pest and disease attack (Oluyole, 2011).

Sometimes, economic losses and risk are beyond the coping capacity of the farmers. Consequently, farmers are keen to avoid risks which might threaten their livelihoods and this is often reflected in their farming practices. The risk avoidance behaviour influences the levels and types of inputs they use and the aggregate levels of output produced. According to Aderinola and Abdulkadir (2007) high risk and uncertainties often associated with agriculture is one of the reasons for the perpetual food deficit in the country because farmers are often reluctant to adopt output increasing practices, if these are perceived to increase their exposure to risk. At least notionally, there is a trade-off between the levels of risks that farmers can withstand and their level of production. Thus, the need for government at all levels and various institutions to assist farmers through provision of credit and insurance schemes

In the absence of such assistance, Ajakaiye (2001) posited that smallholder farmers in many developing countries of the World, including

Nigeria are trapped in the vicious cycle of poverty. The cycle is characterized by low productivity and low farm income which leave farmers with virtually no savings and capital required to transform their production technology and manage the risk involved in farming. Local farmers often devise helpful measures to minimize risks such as: crop rotation and crop-diversification, intercropping, planting stress-tolerant varieties, tillage systems, share tenancy, contractual inter-linking, development of non-farm sources of income such as handcrafts and handlooms as well as socio-cultural strategies which distribute risks within the extended family, and information financial arrangements. However, some economic losses from agricultural activities are beyond these measures and the problem of residual risks remains, hence the need for a reliable agricultural insurance. World Bank (2005) noted that in situations of economic losses, agricultural insurance schemes can play a major role, and considerably strengthen the security of farmers.

Further to this, due to the risks inherent in crop production which lead to farm income uncertainty and low or no profit, many farmers express fears on their ability to meet overhead costs and family needs. Similarly, many formal lending institutions express fear in farmers' capability to repay loans because of probability of loss in crop production. These institutions try to reduce the likelihood of poor loan recovery by reducing amount of loan to agriculture and in some cases seek unreasonable collateral from farmers before granting loans. This suggest the need for agricultural risk management in form of agricultural insurance to help raise agricultural production by helping farmers invest in more productive agricultural business activities (Nnadi, Chikaire, Echetama, Ihenacho, Umunnakwe and Utazi, 2013).

Insurance is a form of risk management used to guard against contingent losses. It is defined conventionally as the equitable transfer of a risk or loss from one entity to another in exchange for a premium or a guaranteed and quantifiable small loss to prevent a large one (Gollier, 2003). Insurance comes in different forms. The agricultural insurance is a special line of property insurance applied to agricultural firms. Agricultural insurance, in its widest sense may be defined as the stabilization of income, employment, price and supplies of agricultural products by means of regular and deliberate savings and accumulation of funds in small instalments by many in favourable time periods to defend some or few of the participants in bad time periods (Arene, 2005).

Therefore, the Agricultural Insurance Scheme (NAIS) was established to offer protection to local farmers from effects of natural disasters. Specifically, the scheme was designed to promote agricultural production; provide financial support to farmers in the event of losses arising from natural disasters; increase the flow of agricultural credit from lending institutions to the farmers and minimize the need for emergency assistance provided by the government during periods of agricultural disaster (NAIC, 2007). However, it is been observed that the utilization of agricultural insurance seems to be at low ebb and suggests a need to x-ray the factors determining the use of agricultural insurance scheme. Several studies such as Akinrinola and Okunola (2014), Farayola, Adedeji, Popoola and Amao (2013) Nwosu, Oguom, Lemchi. Ben–Chendo, Henri-Ukoha, Onyeagocha and Ibeawuchi (2010) investigated the Nigeria Agricultural Insurance Scheme. Yet, no study has highlighted the determinants of utilisation of Nigeria Agricultural Insurance Scheme among crop farmers. It was against this backdrop that the study was carried out to ascertain the determinants of crop farmer's utilization of Agricultural Insurance Scheme in Osun State, Nigeria with specific highlights on the socioeconomic characteristics, insurance characteristics of respondents, knowledge on agricultural insurance, constraints to utilization of Agricultural Insurance Scheme and utilization of Agricultural Insurance Scheme.

Study Hypotheses

There was no significant relationship between selected socioeconomics characteristics and utilization of Agricultural Insurance Scheme and there was no significant contribution of independent variables to utilization of Agriculture Insurance Scheme.

METHODOLOGY

Study area - The study was carried out in Osun State, Nigeria. The state is located in the South western part of Nigeria and covers an area of approximately 14,875km^2. Osun state was carved out of Old Oyo State on August 27, 1991. Its capital is Oshogbo. Osun State is landlocked and occupies 9,251 square kilometres. Osun State shares borders with Kwara State to the North, Oyo State to the West, Ogun State to the South, and Ondo and Ekiti States to the East. It has 3 senatorial district which are Osun south, north and central. Each senatorial district has 10 local government areas. It has a population of three million, four hundred and twenty three thousand, five hundred and thirty five people (3,423,535) (National Population Commission, 2006).The people of the state are mostly farmers, producing such food crops such as yam, maize, cassava, beans and cocoyam, and cash crops which include kolanut, cocoa and oil palm.

Population of the study - The population for the study was made up of all insured crop farmers in Osun State.

Sampling procedure and sample size - Multi stage sampling procedure was used in selecting respondents for the study. Osun state is divided into three senatorial districts which are Osun East, Osun Central and Osun West. Each senatorial district has 10 LGAs and 10% of the LGAs were selected which were Ilesha west, Odo-otin and Iwo Local Government Areas. From the list of Nigeria Agricultural Insurance Scheme farmer, Ilesha west and Odo-otin had 50 insured crop farmers each, while Iwo had120 insured crop farmers. Simple random sampling was used to select 60% of the insured crop farmers from each local government areas. To give a sample size of 132 respondents

Method of data collection and analysis - Interview schedule was used to collect data from the respondents. Data collected were analyzed with the aid of descriptive and inferential statistics. Descriptive tools such as frequency, distribution, mean, percentages and inferential statistics used was chi-square, PPMC Pearson Product Moment Correlation, and multiple regression

Model specifications of the determination of utilisation of agricultural insurance scheme - In order to assess the factors affecting the utilisation of agricultural insurance scheme, a multiple linear regression model was run using the Ordinary Least Squares (OLS) method. The level of significance of the variables was tested using a t-test at a 5% level of significance. A constant (α) indicates the rate of utilisation of insurance scheme holding other factors constant. The error term (μ) was included to account for the other factors other than the tested variables.

A Multiple Linear Regression Model of the factors affecting the utilisation of agricultural insurance scheme was specified as below:

$$UAIS = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + \beta7X7 + \beta8X8 + \beta9X9 + \beta10X10 + .\mu$$

Where:

UAIS = utilisation of agricultural insurance scheme (dependent Variable)

α = Constant (intercept)

X1 = Age of the farmer in years

X2 = sex (male=1, otherwise=0)

X3 = Marital status (married=1, otherwise=0)

X4 = Education level (tertiary=1, otherwise=0)

X5 = Source of credit (bank=1, otherwise=0)

X6 = Source of labour (hired labour=1, otherwise=0)

X7 = Farm size in acres

X8 = Experience in cropping in years

X9 = Knowledge of NAIS

X10 = Constraints to utilisation

μ = Random error term

Utilisation of agricultural insurance is expected to change by a certain factor, β (coefficient) if any of the above variables increases by one unit.

Measurement of Variables

Dependent Variable - Utilization of Agricultural Insurance Scheme was measured by construction of statement across components of the scheme on a 3 point scale of never, sometimes and always and scored 0, 1 and 2 respectively. The minimum score was 3 and maximum 14.

Independent variables

Socioeconomic characteristics of respondents - Age, years of farming experience, farm size and income were measured in interval level. While, sex, marital status, level of education, household size, religion, and membership in social association were measured at nominal level

Insurance characteristics of respondents - Source of information on agricultural insurance scheme, reasons for insurance, amount insurance covers, years of insurance, claim, loss and compensation paid

Knowledge of agricultural insurance - Lists of ten knowledge items was presented to test the knowledge on agricultural insurance using two response options of "YES" and "NO" options. Correct responses were scored 1, while incorrect responses were scored 0. Level of knowledge was categorised into high and low using the mean as benchmark.

Constraints in accessing agricultural insurance - Twelve (12) possible constraints to utilization of agricultural insurance were presented and respondents were asked to indicate the level of severity. This was measured on a 3 point scale of Not severe constrain, severe constraints and very severe with assigned scores of 0, 1 and 2, respectively. The mean scores were used to rank the constraints in order of severity

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

The age distribution of the respondents ranged between 26 and 66 years. Results on Table 1 reveal that 43.9% of respondents were between 36 and 45 years, while 22.7% were between 46 and 55 years. Respondents' mean age was 42 years. It can be inferred that majority of the insured crop farmers are middle aged. This may be due to the fact that it is within the age bracket that people are innovative (Asiabaka, 1998). Also result reveals that 80.3% of the respondents were males, while 19.7% were females. This implies that more males are involved in crop production and insured their farms compared to females. This is in consonance with Ayoola (2009) that male farmers are involved in crop production, while female farmers engage in the other value chain activities in agricultural enterprise like processing and marketing. Also it suggests that more male farmers insure their crop than females. This may be because males are decision makers and control the funds which are needed in insurance.

Result on Table 1 further reveals that 93.9% of the respondents were married, while 12.0% were single. This implies that majority of the respondents were married as crop farming can sustain or help the family to ensure steady flow of income and a need to insure their farming enterprise. This corroborates the findings of Falola *et al* (2013) that crop production is a means of catering for households. On educational attainment, Table 1 reveals that a larger percent (53.0%) of respondents had tertiary education and27.3% had secondary education. This implies that majority of the farmers had secondary school education and above. Education could affect the source and utilization of information which is important for utilization of insurance scheme. This corroborates Oladeji and Oyesola (2000) that education plays a major role in information utilization as it necessary for proper processing of information.

Results on Table 1 reveal that over 40% of respondents earned above ₦40, 000.00k monthly and30.3% of the respondents earned between ₦25,000 and ₦40,000 monthly from agricultural activities. The mean income of respondents was ₦27, 231. This implies that agricultural activities are profitable enterprises. This is in-line with the findings of Amaza and Maurice (2005) when they opined that farmers earn as high as ₦22, 100 to ₦32,000 monthly from agricultural activities

Also, result on Table 1 reveals that the mean year of experience of respondents was 18.5 years. About 40% had farming experience of between 1 and 10 years, while 33.3% had between 11 and 20 years of experience. This suggests that farmers in the study area have ample experience in crop production and have been engaged in crop production for a relatively long time. This is in-line with Muhammad-Lawal, Falola and Omotesho (2009) that crop production is an age-long venture in the rural areas.

Respondents' source of credit ranged from bank loan (50.8%) and cooperative society (22.7%) (Table 1). This implies that a larger percentage of respondents sourced credit from the bank, which may be a reason for insuring their farms. As insurance will provide security to pay loan in eventuality of disaster or crop failure also banks required that farmers insured their farms. This is consistent with Churchill (2008) who opined that insurance provide greater economic and psychological security to the poor as it reduces exposure to multiple risks and cushions the impact of a disaster

The mean farm size was 9.30 acres, 43.9% of respondents cultivated had between 2 and 9 acres as revealed on Table 1. This implies a relatively large acreage of land are cultivated by crop farmers in the study area. Also majority (78.8%) of respondents used hired labour as compared to only 10.6% that use self-labour. This implies the predominance of hired labour crop farmers. The use of hired labour is likely due to the high labour required for crop production, large farm size and the need to enhance production. This corroborates the findings of Fakayode *et al* (2012) that in order to improve productivity crop farmers employ hired labour due to the hectic and time consuming nature crop production.

Table 1: Distribution of respondents by their socioeconomic characteristics

Variables	Categories	Frequency	Percent	Mean
Age (years)	26-35	26	19.7	
	36-45	58	43.9	
	46-55	30	22.7	41.9 years
	56-66	18	13.6	
Sex	Male	106	80.3	
	Female	26	19.7	
Marital status	Single	8	6.1	
	Married	124	93.9	
Household size	1-3 persons	14	10.7	

Variables	Categories	Frequency	Percent	Mean
	4-6 persons	55	41.3	5.9 persons
	7-9 persons	56	42.7	
	10-12 persons	7	5.3	
Education level	No formal Education	2	1.5	
	Primary	24	18.2	
	Secondary	70	53.0	
	Tertiary	36	27.3	
Monthly Income (Naira)	Less than 10,000	4	3.0	
	10,000 -25,000	30	22.7	
	Above 25000-40,000	40	30.3	N27, 231
	Above 40,000	58	43.9	
Years of cropping	1-10 years	52	39.4	
	11-20 years	44	33.3	18.5 years
	21-30 years	18	13.6	
	31-40 years	18	13.6	
Sources of credit	Personal	7	5.3	
	Family	20	15.2	
	Cooperative	30	22.7	
	Money lender	8	6.1	
	Bank	67	50.8	
Farm size (acres)	< and equal 1	20	15.2	
	2-9	58	43.9	9.30 acres
	10-17	34	25.8	
	18-25	12	9.09	
	>25	8	6.06	
Sources of labour	Self	14	10.6	
	Family	4	3.0	
	Hired	104	78.8	
	Association	10	7.6	

Insurance characteristics of insured crop farmers

Results on Table 2 reveal that the mean amount insurance covered was ₦316,667. Majority (78.5%) of the respondents' insurance covered between ₦100,000 and ₦500,000 annually, 12.3% covered less than ₦100,000, while only 3.1% insured above a million naira. More than two-third (69.7%) of the respondents had insured for between 1 and 3 years, and the mean years of insurance was 2.67 years. This suggests that the agricultural insurance scheme is yet to be fully accepted by crop farmers. Although half of insured crop farmers had ever suffered loss, only 13.6% had ever received claim. Results on Table 2 also reveal that radio (95.5%), cooperative society (81.1%), television (74.2%), extension agents (69.7) and newspapers (33.3%) were the sources of information used for agricultural insurance. Radio (95.5%) was the most preferred source of information, followed by cooperative society (81.1%) and television (74.2%). This implies that radio and cooperative society were used to access information on crop insurance. The high use of cooperative was because majority of the farmers belonged to cooperative society, while the high use of radio likely because it is easy to use and it is relatively cheap. This is in consonance with the findings of Fadairo, Olajide and Yahaya (2011) that radio is one of the most widely used source of information among farmers.

Table 2: Distribution of respondents by insurance characteristics

Variables	Frequency (n=132)	Percentage	Mean
Amount insurance cover (Naira)			
Less than 100,000	16	12.1	
100,000 to 500,000	104	78.8	₦316,667
Above 500,000 to 1,000,000	8	6.1	
Above 1,000,000	4	3.0	
Years of insurance			
Less than a year	12	9.1	
1 –3 years	92	69.7	2.67 years
4 - 5 years	28	21.2	

Variables	Frequency (n=132)	Percentage	Mean
Suffered loss			
No	66	50	
Yes	66	50	
Received claim			
No	114	86.4	
Yes	18	13.6	
Sources of information on insurance*			
Radio	126	95.5	0.95
Cooperative society	107	81.1	0.81
Television	98	74.2	0.74
Extension agent	92	69.7	0.70
Newspaper	44	33.3	0.33

*Multiple responses

Table 3 reveals that the use of crop insurance policy as collateral to obtain loan (3.40) ranked first among reasons for insuring crop, followed by cushioning the effect in case of loss (3.00) enhancement of confidence for greater investment in crop production (2.50). This implies that insurance policy is one of the requirements needed to access agricultural loans. Thus, this indicates that the objectives of the Nigerian Agricultural Insurance Scheme to increase access of farmers to credits is been achieved. The result is similar to Akinrinola and Okunola (2014) who found that all participants of agricultural insurance scheme in Ondo State used their insurance policy to obtain loan.

Table 3: Distribution of respondents by reason for insuring crops

Reason for insuring crop	Weighted Sum	Mean	Rank
Use of crop insurance policy as collateral to obtain loan	221	3.40	1st
To cushion the effect in case of loss	198	3.00	2nd
Enhance confidence for greater investment in crop production	165	2.50	3rd
To benefit from government programmes	147	2.29	4th
To ensure a considerable measure of security in farm income	148	2.27	5th
To increase profits	123	1.95	6th

Respondents' knowledge on agricultural insurance scheme

Table 4 reveals that respondents were knowledgeable on the ownership of Nigeria Agricultural Insurance (100%), how life insurance works (97.0%), the function of a broker in insurance sales (95.5%) and who an underwrite is (83.3%). Furthermore, Table 5 reveals that 54.5% of respondents had high level of knowledge on agricultural insurance scheme. This implies that a larger percent are knowledgeable on Nigeria Agricultural Insurance Scheme

Table 4: Distribution of respondents by knowledge of agricultural insurance scheme

Knowledge	Incorrect		Correct	
	Freq.	%	Freq.	%
Nigeria agricultural insurance scheme is owned by Government	0	0	132	100
Life insurance is an insurance is kept in force throughout a person's whole life and which pays a benefit upon the persons death	4	3.0	128	97.0
Broker is an insurance sales person that searches for client	6	4.5	126	95.5
Underwrite is an individual trained in evaluating risk and determining rates and coverage for them	22	16.7	110	83.3
Agent is an individual who sells and services insurance policies	26	19.7	106	80.3
The scope of protection provided under an insurance policy is called coverage	30	22.7	102	77.3
Premium is not the price of insurance protection for a specialized risk for a specified period of time	38	28.8	94	71.2
Destruction of the victim of a loss by payment repair or replacement is called indemnity	56	42.4	76	57.6
Underwriting is not the process of selecting risk for insurance and	56	42.4	76	57.6

Knowledge	Incorrect		Correct	
	Freq.	%	Freq.	%
classifying them according to their degree of insurability A circumstance that increase the likelihood or probable severity of profit is called hazard	64	48.5	68	51.5

Table 5: Categorisation of respondents by knowledge of agricultural insurance scheme

Knowledge	Frequency	Percent	Min.	Max.	Mean	S D
Low	60	45.5	4	10	7.71	1.62
High	72	54.5				
Total	132	100				

Constraint to use of agricultural insurance

Table 6 presents the constraints to utilization of agricultural insurance. It reveals that delay in indemnity by insurance companies (0.84) was the most severe constraints to utilization of agricultural insurance, excess bureaucracy in administrative process (0.83) ranked second, while illiteracy among farmers (0.73) and technicalities involved in utilization (0.56) were ranked third and fourth, respectively. This implies that delay in indemnification of loss to client was the most severe constraint that has mostly affected the utilization of the scheme. This supports the findings of Farayola *et al* (2013) that the major problem faced by the farmers under agricultural insurance scheme was that of delay in indemnity.

Table 6: Distribution of respondents by constraint to use of agricultural insurance scheme

Constraints	Not a constraints		Mild constraints		Severe constraints		Mean	Rank
	F	%	F	%	F	%		
Delay in indemnity by insurance companies	60	45.5	32	24.2	40	30.3	0.84	1st
Excess bureaucracy in administrative process	56	42.4	42	31.8	34	25.8	0.83	2nd
Illiteracy among farmers	50	37.9	68	51.5	14	10.6	0.73	3rd
Technicalities involved in utilisation	72	54.5	46	34.8	14	10.6	0.56	4th
Lack of access to agricultural insurance	68	51.5	60	45.5	4	3.0	0.52	5th
High cost of agricultural insurance policy	80	60.6	44	33.3	8	6.1	0.45	6th
Lack of finance to obtain insurance policy	80	60.6	50	37.9	2	1.5	0.41	7th
Lack of information on insurance policies	88	66.7	36	27.3	8	6.1	0.39	8th
Cultural beliefs on agricultural insurance	94	71.2	34	25.8	4	3.0	0.32	9th
Religious beliefs on agricultural insurance	102	77.3	28	21.2	2	1.5	0.24	10th

Utilization of agricultural insurance

Table 7 shows that reinsure of policy when it expires (1.04) was the most used aspect of insurance policy scheme, while payment of premium (0.91) and payment to obtain policy (0.91) were second. Submission of valid document after clients suffered loss (0.90) ranked fourth. It is noted that getting of claims when loss occurred (0.10) was the least. This implies that majority of the respondents did the necessary obligation necessary for their insurance policy and submit a valid document when they suffer loss. However, most of are yet to get benefits even as and when due. This could be a reason why some farmers are apprehensive about agricultural insurance. Furthermore, Table 8 reveals that 64.6% of respondents had high level of utilisation of agricultural insurance scheme. This may be necessitated by the fact that agricultural insurance is a component under the Quick Impact Intervention Programme (QIIP) of Osun State government.

Table 7: Distribution of respondents by utilization of agricultural insurance

Utilization of agricultural insurance	Never		Seldom		Always		Mean	Rank
	F	%	F	%	F	%		
Do you insure when your policy expires	4	3.0	2	1.5	126	95.5	1.04	1st
How often do you pay your obtain policy	4	3.0	2	1.5	126	95.5	0.91	2nd
How often do you pay your premium	4	3.0	2	1.5	126	95.5	0.91	2nd
Do you submit a valid document after you suffered loss	35	26.5	14	10.6	83	62.9	0.90	4th
How often do NAIC officers visit your farm	12	9.1	54	40.9	66	50.0	0.84	5th
Do NAIC entertain your claims	53	40.2	52	39.4	27	20.5	0.47	7th
How often do you get your claim	115	87.1	2	1.5	15	11.4	0.10	8th
How often do engage the service of a broker	112	84.8	13	9.8	7	5.3	0.07	6th

Table 8: Categorisation of respondents by utilisation of agricultural insurance scheme

Utilisation	Frequency	Percent	Min.	Max.	Mean	SD
Low	47	35.6	3	14	9.79	2.15
High	85	64.4				
Total	132	100				

Hypotheses testing

Hypothesis one tested for significant relationship between the selected socio economic characteristics of respondents and their level of utilisation of agricultural insurance scheme. Results on Table 9 reveals that there was significant relationship between years of farming experience (r= 0.252 p=0.003) and utilisation of agricultural insurance scheme. This also suggests that that farming experience could enhance utilization of agricultural insurance in order to cushion effect of loss. Significant relationship existed between level of education (χ^2 = 25.826, p=0.000) and utilisation of agricultural insurance. This implies that utilisation of agricultural insurance is determined by the level of education of the respondents.

Table 9: Chi-square and correlation analysis of selected socioeconomic characteristics and utilisation of agricultural insurance scheme

Variable	χ^2	Cc	Df	r	P	Decision
Level of education	25.826*	0.405	3		0.000	Significant
Income	4.024	0.172	3		0.259	Not significant
Age				0.064	0.469	Not significant
Farming experience				0.252*	0.003	Significant
Farm size				0.072	0.409	Not significant

*= significant at p≤ 0.05

Determinants of utilisation of agricultural insurance scheme

Multiple linear regression analysis was used to determine utilisation of agricultural insurance scheme in the study area. The result also reveals that the R^2 value was 0.325 which indicates that the independent variables in the regression model explain 32.5% of the dependent variable (utilisation of agricultural insurance scheme). Tertiary education (β=0.329), years of farming experience (β=2.76), use of hired labour (β=2.73) and constraints to utilisation (β=-0.275) significant contributed to utilisation of agricultural insurance. This implies that having a tertiary education, higher years of farming experience, use of hired labour and constraints to utilisation were predictors of utilisation of agricultural insurance. The coefficient of constraints was negative implying that with increase constraints there is decrease in utilisation of agricultural insurance.

Table 10: Determinants of utilization of agricultural insurance Scheme

Explanatory variable	Standardized error	β- value	t-value	Sig value
(Constant)	2.205		5.300	0.000
Age	0.023	-0.129	-1.279	0.204
Sex	0.444	0.025	0.300	0.765
Married	0.804	0.046	0.510	0.611
Tertiary education	0.437	0.329	3.633	0.000
Bank as source of credit	0.346	-0.010	-0.127	0.899
Hired labour	0.433	0.228	2.764	0.007
farm size	0.020	0.082	0.897	0.371
years of farming experience	0.021	0.295	2.734	0.007
Knowledge of NAIS	0.117	0.023	0.264	0.792
Constraints to utilization	0.043	-0.275	-3.212	0.002

$R^2 = 0.325$ F = 4.78 R = 0.570 Adjusted R^2=0.26 Std. Error of the estimate= 1.85

* Significant at 5% level of significance

Table 11: Multiple Regression analysis utilization of agricultural insurance scheme

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	198.207	12	16.517	4.779	0.000
Residual	411.270	119	3.456		
Total	609.477	131			

Dependent Variable: NAIS utilisation

Predictors**:** (Constant): age, sex, married, tertiary education, bank as source of credit, hired labour, farm size, years of cropping experience, knowledge of NAIS, attitude, constraints and sources of information

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that utilisation of agricultural insurance was high, use of insurance policy to collect loan was the main reason for utilisation, while delay in indemnity by insurance companies was the most severe constraint. Level of education, use of hired labour, years of farming experience and constraints to utilisation were the key predictors of utilisation of agricultural insurance. It is therefore recommended that the scheme should hasten the indemnification of client and increase the awareness of other benefits of the scheme so that farmers will take insurance cover and not because it is a prerequisite for loan accessibility.

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Perceived environmental effects of charcoal production among rural dwellers in rainforest and Guinea Savannah Agro-ecological zones of Nigeria

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ABSTRACT

Charcoal production constitutes serious environmental problems to most developing countries of the world. Hence, this study assessed perceived environmental effects of charcoal production among the rural dwellers in rainforest and guinea savannah zones of Nigeria. Multi-stage sampling procedure was used to select 83 and 85 charcoal producers in guinea savannah and rainforest zones, respectively. Data was collected through the use of structured interview schedule and analysed using both descriptive and inferential statistics. Results show that the mean age was 43 years, 90.5% were males, 90.6% were married. Majority (80.0%) of the respondents made use of earth mound method of charcoal production and 52.9% of respondents produced between 32-32000kg of charcoal per annum. Most respondents (62.7%) perceived that charcoal production could lead to erosion, 62.4% reduce the available trees for future use (62.4%) and reduce available air in the environment (54.1%). While 51.8% perceived that micro organism may not be threatened because of charcoal production activities. Significant difference existed in the perceived environmental effects of charcoal production between rainforest and guinea savannah agro-ecological zones (F=14.62). There is need for the government to quickly work on other available and affordable alternative household energy sources.

Keywords*:* Deforestation, Energy, Earth mound method, Charcoal production

INTRODUCTION

The link between forests and provision of energy is obvious all over the world since forests provide food, fuel wood for cooking, herbs, and medicine. Moreover, forests make the most direct contribution to the goals of eradication of poverty and hunger as well as environmental sustainability in the rural areas. Forests have an indirect role in meeting the Millennium Development Goals (MDGs). This is through the socio-economic and environmental functions of the goals. A large gap exists between the demand and supply of energy in Nigeria, because nearly 70% of the populace are involved in subsistence-based ventures and live in the rural communities (World Bank, 2004). Thus, reliance on natural resources for food and energy implies that people source for their daily needs from their immediate environment (World Bank, 2002). Half of the world's population use biomass fuels for cooking and heating, this made the world's production of fuelwood to increase between 1970 and 1995 from 1362.4 million M^3 to 1875.9 million[3](Carney, 1998).

In charcoal production, Nigeria tops the list in Africa with 2314797 tonnes (10^5) in 1992 and 3776300 tonnes (10^5) in 2009 (FAO, 2010). This implies that most African countries, especially Nigeria, still produce and use charcoal without developing modern and sustainable means of getting energy. High dependence on the production and use of charcoal has resulted into environmental degradations during production (Guo, 2007). It is also estimated that about 32 million cubic metres of fuel-wood is consumed in the rural areas of Nigeria annually despite the environmental hazards (Federal Ministry of Environment, 2006).

Deforestation as a result of charcoal production has negative implications for the local environment (increased erosion) and the global environment (acceleration of climate change, threatened biodiversity). The reduction of forest cover also reduces the existing capacity to sequester carbon, and release the already fixed carbon. For instance, the impact of charcoal on forest reserves is devastating for two reasons. First, the wood fuel equivalent is 4-6 times larger, due to the inefficiency of the production process (SEI, 2002). Before, the bulk of charcoal wood is clear-cut from secondary, but now, mainly from primary forests. Emissions during charcoal production are significant. Hence, charcoal leads to considerable deforestation, which is now one of the most pressing environmental problems faced by most African nations including reduction of natural resources on which the poor depend, and land degradation (Friends of the Earth, 2002).

Many African nations have had over three quarters of their forest cover depleted. Moreover, the global warming potential of current and largely inefficient methods of charcoal production (pyrolysis) is

considered to be higher than that of emissions during combustion (IFAD, 2009). Wood is taken illegally from land and producers are under pressure to harvest the wood and make the charcoal as fast as possible. The rural firewood users typically collect small amounts of wood daily, and thus the forestry impact is dispersed and much less severe than the effects of charcoal production.

Despite the laws promulgated by the Federal Government prohibiting illegal felling of trees, charcoal producers keep increasing with an increase in the quantity of charcoal produced. Charcoal production is very prominent in Osun, Ogun, Benue, Kogi, and Niger States of Nigeria where there are forests, and guinea belts that support its production.

However, the potentials of these agro-ecological zones to support charcoal production differ. Raw materials sourcing are major source of environmental depreciation associated with charcoal production. For instance, before now, in the rainforest zone, forest trunks, off-cuts from logs over lands and twigs constitute the materials for charcoal production. Often, deliberate felling of trees and shrubs are the usual practices in the derived and pure savannah. It is pertinent, therefore, to examine various issues of charcoal production and their effects on the environment of charcoal producing communities.

Objectives of the study

The general objective of the study was to assess the perceived environmental effects of charcoal production among the rural dwellers in rainforest and guinea savannah zones of Nigeria.

The specific objectives were to: identify the selected socio-economic characteristics of charcoal producers in the study area; determine the methods used in charcoal production; determine the level of charcoal production; and ascertain the perceived effects of charcoal production on the environment in rural dwellers.

METHODOLOGY

The study area was the rainforest and guinea savannah zones of Nigeria. Nigeria is located between latitudes 4 ^{o} to 14^{o} North and between longitudes 2^{o}2' and 14 ^{o} 30' East. It has a land area of about 923 769 km^{2}. Its total land boundary is 4, 047 km while the coastline is 853 km. The Federal Ministry of Environment of Nigeria (FMEN, 2001) 1993 estimate of irrigated land is 9, 570 km^{2} and arable land about 35 %; 15 % pasture; 10 % forest reserve; 10 % for settlements and the remaining 30 % considered uncultivable for one reason or the other (Iloeje, 2001). Rainfall varies from place to place and from season to season. The total annual rainfall decreases from the south to the north. The southern two-thirds of the country have double peak rainfall while the northern third has a single peak. Similarly annual rainfall totals range from 2,500 mm in the south to less than 400 mm in parts of the extreme north (FMEN, 2001).

Multi-stage sampling procedure was used to select respondents from the population of charcoal producers. From the six agro-ecological zones in Nigeria, rainforest and guinea savannah zone were purposively selected because of their potentials in charcoal production. Fifty percent of rural communities in the zone were selected using simple random sampling technique. Thirty percent of the registered charcoal producers were selected from the population of all registered charcoal producers available in each of the selected communities using simple random sampling technique. A total of eighty three and eighty five charcoal producers were used as respondents in guinea savannah and rainforest zones, respectively for this study. A Likert-type five point rating scale of "strongly agree" to "strongly disagree" (with scores 5-1 for positively worded statements and 1-5 for negatively worded statements respectively), with 18 statement used to asses respondents' perception of environmental effects of charcoal production. Respondents were requested to indicate their opinion on each of the 18 selected statements (nine positive, and nine negative).

RESULTS AND DISCUSSION

Socioeconomic characteristics of charcoal producers

Table 1 indicates that respondents mean age was of 43 years. Across agro-ecological zones, the modal ages were within the same age-range of between 35 and 44 years with 35.1% and 48.1% of respondents in rainforest and guinea savannah zones, respectively belongs to these age range. This shows that they are in their productive ages. This result is in consonance with the study of Stockholm Environment Institute (SEI) (2002), which reported that charcoal production appears to be dominated by the active age-range of between 35 and 45years. Sex is a vital variable on issues relating to livelihood strategies. Majority (88.0% in rainforest and 90.5% in guinea savannah) of respondents were males. The percentage of female respondents is relatively small when compared with their male counterparts. This may be as a result of the rigour involved in some of the activities of charcoal production. This finding agrees with SEI (2002), which revealed that males are more involved in charcoal production. Also in a related study by Charcoal production in South Africa (CHAPOSA)

(2002), it was revealed that 70.0% of charcoal producers were males. Majority of respondents (90.4% in rainforest and 90.6% in the guinea savannah) were married. This implies that a lot of money is realised from the sale of charcoal, which enables those who are married among them to cope with financial responsibilities in their families. Data across the zones reveal that more respondents (59.0%) in the rainforest zone possessed primary school certificate, while, 30.6% of respondents in the guinea savannah attended Quranic School. In the rainforest zone, 54.2% of respondents and 49.4% in guinea savannah had crop farming as primary occupation. Inability to produce charcoal all round the year may prevent some of the producers not to take it as primary occupation. Shacklon *et al* (2006), in a related study, noted that those who have farming as their primary income generating activity have the tendency to be involved in charcoal production because they clear lands which provide easy access to wood for charcoal production. SEI (2002) revealed that only those with required vegetation take charcoal production as their primary occupation. However, across vegetation zones, 81.9% and 82.4% are charcoal producers in the forest and guinea savannah zones, respectively. Charcoal production is, therefore, an activity for income diversification (Barret, *et al*, 2001and UNDP, 2005). Olawoye (2000) also opined that many households engage in several income-generating activities in order to meet their household needs. In order to meet household needs, other sources of income are required. Across the agro-ecological zone, the mean years of experience are 11 for the rainforest zone and 14 guinea savannah zones. Across agro-ecological zones, mean income for rainforest is N190,421.9 (1,269.5 dollar) SD of 55819.4 and N135,929.4 (906.2 dollar) with SD of 559,11.4 for the guinea savannah. Kalumiana (2000) opined that 70.0% of the cash income realised annually in Tanzania was realised in an area suitable for charcoal production.

Table 1: Distribution of charcoal producers by their socio-economic characteristics

Socio-economic characteristics	Guinea savannah Freq.	%	Rainforest zone Freq.	%
Age (Years)	Age Mean=43, SD=8.0		Age Mean=43, SD=8.0	
25-34	8	9.5	7	8.4
35-44	41	48.1	29	35.0
45-54	26	30.5	26	31.3
More than54	10	11.9	-	-
Sex				
Male	77	90.5	73	88.0
Female	8	9.5	10	12.0
Educational Attainment				
Non formal educ.	30	35.3	14	16.9
Koranic school	26	30.0	7	8.4
Pry. School	17	20.6	49	59.0
Sec. school and above	12	14.1	11	15.7
Marital status				
Married	77	90.6	75	90.4
Single	5	5.9	5	6.0
Widow	2	2.3	3	3.6
Divorced	1	1.2	-	-
Primary occupation				
Crop farming	42	49.4	45	54.2
Fishing	30	35.3	9	10.8
Charcoal production	12	14.1	11	13.3
Trading	1	1.2	14	16.9
			4	4.8
Sec. occupation				
Crop farming	14	16.4	10	12.0
Charcoal production	70	82.4	68	81.9
Weaving	1	1.2	1	1.2
Hunting			4	4.9
Years of experience	**M=14 SD=4.2**		**M=11 SD=4.3**	
<5years	6	7.1	9	10.8
6-10	6	7.1	16	19.4

Socio-economic characteristics	Guinea savannah Freq.	%	Rainforest zone Freq.	%
11-15	39	45.8	51	61.4
>15	34	40.0	7	8.4
Annual income from charcoal production	**M=217,336.4 SD=99,571.4**		**M=190,421.9 SD=99571.4**	
Less or equal ₦100.000.00	20	23.5	-	-
100.001-200.000.00	48	56.5	38	45.8
200.001-300.000.00	16	18.8	40	48.1
300.001400.000.00	1	1.2	5	6.1

Methods of charcoal production

Table 2 shows that majority (100.0% and 80.0%) of the respondents made use of earth mound method of charcoal production in rainforest and guinea savannah zone, respectively; while, 20.0% make use of the pit method in guinea savannah zone. This suggests that earth mound is very prominent in the zones. In a related study by Bada *et al* (2009), surface (earth mound) method was found to be the most commonly used method of charcoal production in many parts of Nigeria.

Table 2: Distribution of respondents based on methods of charcoal production

Methods used in charcoal production	Rainforest zone		Guinea savannah	
Earth mound	83	100.0	68	80.0
Pit method	-	-	17	20.0
Total	83	100.0	85	100.0

Respondents' annual output from charcoal production

Table 3 reveals that 52.9% of the respondents produced between 32-32000kg of charcoal per annum while, 41.2% produced between 32032-64000kg in guinea savannah. However, 36.1% produced greater than 128000kg/annum in rainforest zone. CHAPOSA (2002) inferred that the output from charcoal production depends on the season, availability of water, types of wood, vegetation and occupation of the producer.

Table 3: Distribution of respondents based on the annual output from charcoal production in the selected ecological zones

Kilogram of charcoal	Rainforest zone		Guinea savannah	
Total quantity per annum	F	%	F	%
32 – 32000kg	11	13.3	45	52.9
32032– 64000	13	15.6	35	41.2
64032– 96000	25	30.1	-	-
96032-128000	5	4.9	1	1.2
More than 128000	30	36.1	4	4.7
Total	83	100.0	85	100.0

Perceived effects of charcoal production on the environment in the rainforest zone

Table 4 reveals that majority (75.9%, and 63.4%) of respondents in the rainforest zone strongly agreed respectively that continuous involvement in charcoal production may reduce the available trees for future use and that if charcoal production continues it may reduce crop production. Many respondents (51.8%, 55.4% and 61.4%) strongly agreed respectively that micro organisms may not be threatened because of charcoal production, charcoal production may have negative effects on the fertility of agricultural land and that charcoal production could not lead to deforestation.

Table 5 also reveals that 64.7%, 62.4% and 55.3% of the respondents in the guinea savannah strongly agreed respectively that charcoal production could lead to erosion, continues involvement in charcoal production may reduce the available trees for future use and that if charcoal production continues it may reduce production of crops. In addition, 54.1%, 47.1% and 44.7% savannah strongly agreed respectively that charcoal production may reduce available air in the environment; charcoal production may reduce water availability in the

environment and may have negative effects on the fertility of agricultural lands respectively.

This implies that the respondents perceived that charcoal production may have negative effects on the fertility of agriculture land, lead to deforestation, reduce the available trees for future use, reduce organic matter and micro-organisms in the soil, reduce crop production, soil fertility could be enhanced by replanting cut trees and having more trees on land may improve that quality of air and water. Friends of the Earth, (2002), Makhabane (2002), Songsore, (2003), Kammen *et. al.* (2005), UNDP (2005), GTZHERA (2009), Ottu-Danquah (2010), and Msuya, *et. al.*(2011) noted that in most African countries where charcoal production is predominant, problems and challenges such as ecosystem degradation; deforestation, increased erosion, infertile land, low crop yield, acceleration of climate change, threatened biodiversity exist.

Table 4: Distribution of the respondents according to perceived effects of charcoal production on the environment, Rainforest zone N=83

Statements on environmental related problems	SA	A	U	D	SD
Charcoal production could not lead to deforestation	61.4	1.2	-	7.2	30.1
Charcoal production may have negative effects on the fertility of agricultural land	55.4	8.4	-	26.5	9.6
Continuous involvement in charcoal production may reduce the available trees for future use.	75.9	20.5	-	3.6	-
Charcoal production may not lead to immense land degradation.	4.4	33.7	-	4.8	56.6
Charcoal production could expose land to erosion	7.2	12.0	-	7.2	73.5
Charcoal production may encourage quick regeneration of plants	1.2	8.4	-	28.9	60.2
Charcoal production may reduce water availability in the environment	22.9	1.2	1.2	6.0	53.0
Micro-organisms may not be threatened because of charcoal production activities	51.8	16.9	1.2	18.1	22.9
Flooding is not always enhanced during charcoal production	66.3	7.2	-	2.24	8.4
Charcoal production may reduce air availability in the environment	44.6	22.9	-	1.2	37.3
Charcoal production could increase organic matter in the soil	3.6	16.9	-	27.7	66.3
Ashes from charcoal kiln can be useful to the environment	8.4	2.4	-	24.1	63.9
If charcoal production continues it may reduce production of crops	63.4	3.6	-	1.2	4.8
Soil fertility could be enhanced by not replanting cut trees	6.0	30.1	-	24.1	69.9
Having more trees on land may not improve the quality of air and water	4.8	1.2	-	26.5	67.5
Movement of lorries on lands during charcoal production may not compact the soil	47.0	20.5	-	31.3	1.2
Charcoal production may not necessarily change rainfall pattern	38.6	1.2	-	24.1	36.1
Charcoal production could increase the fertility of soil	10.8	7.2	2.4	14.5	65.1

T**able 5: Distribution of the respondents according to perceived effects of charcoal production on the environment, Guinea savannah zone N=85**

Statements on environmental related problems	SA	A	U	D	SD
Charcoal production could not lead to deforestation	27.1	3.5	0.0	30.6	38.8
Charcoal production may have negative effects on the fertility of agricultural land	44.7	11.8	2.4	22.4	18.8
Continuous involvement in charcoal production may reduce the available trees for future use.	62.4	37.6	0.0	0.0	0.0
Charcoal production may not lead to immense land degradation.	37.6	22.9	0.0	14.1	24.4
Charcoal production could expose land to erosion	64.7	8.2	1.2	4.7	21.2
Charcoal production may encourage quick regeneration of plants	18.8	8.2	1.2	28.2	43.5
Charcoal production may reduce water availability in the environment	47.1	27.1	0.0	4.7	21.2
Micro-organisms may not be threatened because of charcoal production activities	22.4	4.7	0.0	25.9	47.1
Flooding is not always enhanced during charcoal production	2.4	32.9	1.2	3.5	60.0
Charcoal production may reduce air availability in the environment	54.1	23.5	0.0	3.5	18.8
Charcoal production could increase organic matter in the soil	2.4	0.0	0.0	45.9	51.8
Ashes from charcoal kiln can be useful to the environment	4.7	8.2	0.0	32.9	54.1

Statements on environmental related problems	SA	A	U	D	SD
If charcoal production continues it may reduce production of crops	55.3	37.6	0.0	2.4	4.7
Soil fertility could be enhanced by not replanting cut trees	0.0	2.4	0.0	29.4	68.2
Having more trees on land may not improve the quality of air and water	0.0	1.2	0.0	44.7	54.1
Movement of lorries on lands during charcoal production may not compact the soil	17.6	1.2	0.0	34.1	47.1
Charcoal production may not necessarily change rainfall pattern	18.8	2.4	0.0	41.2	37.6
Charcoal production could increase the fertility of soil	18.8	20.7	1.2	16.5	43.5

Test of difference in the perceived environmental effects of charcoal production across the agro-ecological zones

Table 6 reveals that there was a significant difference in the perceived environmental effects of charcoal production across the agro-ecological zones (F=14.62). Guinea savannah has a higher perception of the effects of charcoal production on the environment (47.894). The sparsely distributed trees in the guinea savannah coupled with fetching of trees for charcoal production in the zone will lead to greater effects on the environment. The rainforest zone with low mean (39.482) and perceived effects of charcoal production on the environment imply that the environmental effects of charcoal production are lower in this zone. This result is in consonance with the study of Seidel (2008) that the more men move away from the swampy rainforest zone to the savannah in search of forest resources, the more the effects on human beings and on the environment. This could be as a result of high demand for forest trees.

Table 6: Differences in the level of perceived environmental effects of charcoal production across the agro-ecological zones

Parameter	Statistical tool	Df	Sum of square	Mean square	F value	p value	Decision
Perceived environmental effects of charcoal production	Analysis of variance	2	3233.185	1616	16.66	0.00	Significant

Duncan's Multiple Range Test

Duncan Grouping	Mean	N	Zone
	47.894_a	85	Guinea savannah
	39.482_b	83	Rainforest

Letters that are the same are not significantly different

RECOMMENDATIONS

Since, charcoal production may have negative effects on the fertility of agriculture land, lead to deforestation, reduce the available trees for future use, reduce organic matter and micro-organisms in the soil and reduce crop production. It is recommended that natural resources management measures through enforcement of the law that guide the use of the forest resources such as law that will recommend selective/controlled felling of trees be encouraged. In view of the environmental hazards as well as huge benefit accrued from charcoal production by the rural dwellers, there is need for the government to quickly work on other available and affordable alternative household energy sources such as kerosene, solar energy, gas, and uninterrupted electricity as well as alternative sources of income to rural dwellers.

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Benefits derived by rural youths' involvement in oil palm enterprise in Ido local government area of Oyo State, Nigeria

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ABSTRACT

The economic contribution of oil palm among the oil producing crop to the sustainable agricultural productivity in Nigeria is high. This study assessed the benefits derived by rural youths' involvement in oil palm processing activities in Ido local government of Oyo state. A multistage sampling procedure was employed to select 120 respondents for the study. Data were collected via interview schedule on rural youth's socio economic characteristics, involvement in oil palm processing activities, support services needed and the benefits derived. Data were analysed using descriptive and inferential (Chi-square and PPMC) statistics. Results show that most of the respondents were female (79.2%), married (63.3%) with mean age of 26 .6±5.53years. They had oil palm processing as their primary occupation (87.5%) and used self labour (60.8%) with source funding being through personal savings (83.3%). A mostly identified benefit was the supply of raw materials to industries (215.9), engaging youths to prevent restiveness (214.2) and increased standard of living (209.8). More than half (52.2%) of the respondents had low level of support services. The respondents' involvement included crushing, digestion, and heating of the fruit (195.9) and separation of endocarp from the kernel (192.4). Significant relationship existed between involvement and sex (p=0.000), marital status (p=0.011), age (p=0.002) as well as benefits derived (p=0.000). The benefits derived by the involved youth could be sustained with improved level of the support services as they are strong enough to keep them in the enterprise.

Keywords: Support services, Standard of living, Palm kernel, Sustainable agricultural productivity.

INTRODUCTION

Oil palm a native of West African humid tropic has been regarded as the most efficient oilseed crop in the world. It is an important economic agricultural crop in Nigeria as the country was once the largest exporter of its products; this drew the attention of the World Bank to the promotion of the Oil palm business in the country some years back. Currently, 80% of oil palm production in Nigeria comes from dispersed smallholders that use manual processing techniques especially in the rural area. Hence, the economic contributions of oil palm to the sustainable agricultural productivity in Nigeria are high especially through the youth sector of its producing area (Ricardo, 2013).

Studies have shown that the tree crop (Oil palm) has been a source of oil (palm oil and palm kernel oil), source of timber, palm wine, broom, palm kernel cake, fuel and basket among others. Hence, Oil Palm has been a great source of income and employment to the farmers and processors in rural communities of Africa countries and Nigeria in particular as the enterprise is lucrative, capable of alleviating poverty and brings about rural development (Sarku, 2016; Okolo, Solomon and Igene, 2015 and Jamilu, Abdul-Aziz, Jafaru, Sani and Abudu, 2014). The employment it generates even for the youth ranges from basket weavers, broom makers, palm plank dealer, palm wine tapper and seller, palm bunch thresher, palm kernel oil processors, palm oil processors among others. Meanwhile, the palm oil industry is one of the key economic drivers of the agricultural sector in developing countries especially in Nigeria.

Palm Oil has gainfully engaged rural women, men and youth for a livelihood especially its processing as this has been the major product processed from oil palm fruit in Nigeria (Nwankwo, 2016 Eric and Ikhelola, 2007). Palm oil (popularly called red oil) is an essential content of almost every meal in virtually every home with high nutritional values. It is expected that the availability of such enterprise will attract youths, especially in the rural communities, as it generates income and improves standard of living among others. Akin to this is the availability of markets, in both rural and urban areas for palm oil and other products; being an essential raw material for households and industries (Sarku, 2016). The benefits of the enterprise are expected to prevent youth's migration to urban centres in search of 'greener pastures' that may never be. Consequently, the processing of Oil palm to palm oil minimises post-harvest losses, improves digestibility and palatability of the product, facilitates its handling, cooking and storage, adds value to the products, encourages technical and marketing skills in villages, create employment especially among the rural youth (Ohimain, Emeti, Izah and Eretinghe, 2014).

Youth formed a very significant proportion in Nigeria's population especially in rural communities for which their existence and potentials are well known for their contributions to the development of their local communities, especially those with sound physical and mental health (Ekong, 2003; Odebode, 2000 and Akinbode, 1991). However, youth in agriculture has been described as a constituent potent of agricultural development through agrarian reform for promotion of agricultural sector of the economy (Gwanya, 2008 and Jibowo, 2005). They do provide opportunities for generating the farming entrepreneurs and other rural professions. In addition, rural youth enjoy certain life experiences, which can be considered advantageous. These include a greater frequency of interaction with family, and hence less emotional problems. They also enjoy earlier and greater involvement in work roles with opportunity of becoming economically independent earlier than their urban counterparts (Akinbode, 1991 and Eremie, 2002).

Going by the above, the youth in rural communities may have strong desire toward agricultural activities especially oil palm production as it can fulfil the economic and social aspiration of rural youths (Adedoyin, 2005; Adewale, Oladejo and Ogunniyi, 2005). The development of the agricultural sector of the Nigeria's economy therefore depends on involvement of young people, more especially the rural youths. It is therefore pertinent to seek to posit that youth's involvement in oil palm processing will not only boost the much needed narrowed gap of demand and supply of oil palm in the Nigerian markets, improve the socioeconomic life of the rural people; but will also encourage development of vocational agriculture among the rural youths especially with the availability of the needed support services.

Although, there have been few studies on youth involvements in food crop production and processing (Ekong, 2003), many of these studies are without specific age group in focus. Also, several studies have revealed a generally low representation of youths in agriculture and rural development related issues; however, many of such studies focused on arable crop production activities and rural development issues (Ayinde, Torimiro and Koledoye, 2014; Agumagu, Njoku and Ukpongson, 2010). Despite the youth involvement in the processing of oil palm in the rural communities, yet, a dearth of knowledge exists on the assessment of the benefits accrued to the youth that are involved in oil palm processing in order to project the brighter future and to enhance the sustainability of the enterprise in rural community. Hence, there is need to ascertain the benefits derived by rural youths' involvement in oil palm business in Ido local government area of Oyo state, Nigeria along the processing chain of oil palm. To this end, the study determined the socioeconomic characteristics of the respondents, level of their involvement in oil palm processing, the important support services needed to improve their involvements in the enterprises and the specific benefits derived by the youths from their involvements in oil palm enterprises in the study area.

It was hypothesised that no significant relationship existed between the socioeconomic characteristics and youth's involvement in oil palm processing and there is no significant relationship between the benefits derived and the youths' involvements in oil palm processing.

METHODOLOGY

The study was carried out in Ido Local Government area, of Oyo State, Nigeria. Multistage sampling procedure was used to select the respondents for the study. The first stage involved the random selection of 25% of the 12 wards in the study area; Omi Adio, Ayobo and Abidogun were selected. The second stage involved purposive selection of 50 % of the eight (8) settlements in each of the selected wards where palm oil is being predominantly processed. This gave a total of 12 settlements in all with 4 settlements selected from each ward. The third stage involved the random sampling of 10 active youth Palm oil processors from the list of palm oil processors association in each of the communities; hence having 120 respondents for the study. Data was collected using structured questionnaire and also interview schedule to circumvent illiteracy constraints.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

The result in Table 1 shows that close to four-fifth of the respondents were female (79.2%), while a little below two third were married (63.3%); indicating that oil palm processing was dominated by married female. The higher percentage of females implies that their involvement in oil palm processing is higher than that of their male counterpart. This might be due to the more feminine based stages involved in the traditional processing of the oil palm in the study area. This is in agreement with the assertions of Nwanko, (2016) and Ricardo (2013) that palm oil processing is mostly carried out by women. Meanwhile results on respondents' marital status is in line with assertion of Ajayi, Akande, Odejide and Idowu (2010) that rural dwellers respect the marriage institution and considers it as an essential

engagement as being married further implies a brighter future for the business as they resides in the study area and hence be committed to the business than the unmarried.

The findings in Table 1 further show that the mean age and years of formal education of the respondents were 26.6 ±5.5 and 2.1±0.7 years, respectively. The mean age implies that the processors were mostly youth; being young is a good omen for the continuity of oil palm processing enterprise in the study area. However, the respondents mean age of this study is not in agreement with the findings of Ohiman *et al,* (2014) in similar studies; in whose study was dominated by respondents with age range of 31-40 years. Furthermore, the respondents' mean year of formal education indicates that the respondents were not all that literate since traditional oil palm processing is more of psychomotor domain than cognitive domain. However, this trend of the education attainment is in contrast with the findings of Enwelu *et al*, (2016) and Jamilu *et al,* (2014), who found the mean year of formal education of oil palm processors to be 6 years. This implies that higher level of education is not a prerequisite for the processing of oil palm as the higher years of former education does not correlate with traditional processing techniques of oil palm; however, low education of the respondents may hinder adoption and use of modern processing technologies. The respondents' mean family size of 5 persons per household is supported by the research findings of Enwelu *et.al,* (2016) which reported the existence of relatively small household sizes in rural areas; on the other hand the result was in contrast with the findings of Nwankwo, (2016) in the similar studies that discovered the family size of 8.

The result in Table 1 further reveals the respondents' estimated mean monthly income of N15, 154.17, is closely related to the findings of Ohiman *et al,* (2014) that established the monthly net return of the palm oil processing business to be N14, 000 but disagrees with the Enwelu *et al*, (2016) who found the mean monthly income of N 30, 967 in similar study which invariably doubled the mean income of this study. Nevertheless, the result of this study negates the opinion of Ricardo (2013) that the gross income earnings in oil palm production are reasonable enough to encourage women's participation in the business. However, the low income level recorded by this study may be as a result of the seasonality of oil palm processing in the study area; as the respondents may likely diversify their livelihood for survival especially during the off season of the processing period as asserted by Yekinni, Adeniyi and Adebisi, (2017).

Table 1: Distribution of respondents by their socioeconomic characteristics

Variable	Frequency	Percentage (%)	Mean
Sex			
Male	25	20.8	
Female	95	79.2	
Age (years)			
16-25	46	38.4	26.6±5.5
26-30	74	61.1	
Marital status			
Single	43	35.8	
Married	76	63.3	
Divorced	1	0.8	
Educational status			
No formal education	21	17.5	2.1±0.67
Primary	66	55	
Secondary	33	27.5	
Estimated monthly income (₦)			
≤ 10,000	38	31.6	15, 154.17±6505.26
10,001 - 20,000	67	55.8	
21,001 - 30,000	15	12.3	
Household size			
0-5	57	47.5	6
6-10	58	48.8	
11 and above	5	4.2	

Source: Field survey, 2015

Support services needed in oil palm processing

The results according to the weighted scores in Table 2 show that improved technology (200.0) was ranked first among other support services

needed in oil palm processing. This is followed by credit facilities (199.2) and training services (199.2), while the least support services needed identified was the labour (150.8). This implies that the level of the respondents' involvement could be greatly enhanced by improved technologies, credit facilities and training services among others. However, labour will be least contributing factor to the respondents involvement in the oil palm processing business which may be due to the use of self and family labour that are prominent labour sources in rural area. However, the result in Table 3 further reveals that more than half (52.2%) of the oil palm processor fell into the low level of support services availability, which implies that the respondents need more support services in oil palm processing in the area.

Table 2: Distribution of respondents by support services needed in oil palm processing

Support services	Important	Not important	No need at all	Weighted score	Rank
Access to improved technology	100	0.0	0.0	200.0	1st
Access to credit facilities	99.2	0.8	0.0	199.2	2nd
Training services	99.2	0.8	0.0	199.2	2rd
Extension services	98.3	1.7	0.0	198.3	4th
Improved processing technologies	98.3	0.8	0.8	197.4	5th
Youth group formation	95.8	4.2	0.0	195.8	6th
Improved market	95	3.3	1.7	193.3	7th
Packaging strategies	93.3	6.7	0.0	193.3	8th
Food safety measures	92.5	7.5	0.0	192.5	9th
Storage facilities	91.7	8.3	0.0	191.7	10th
Labour	60	30.8	9.2	150.8	11th

Source: Field survey, 2015

Table 3: Categorisation of respondents by level of support services needed in oil palm processing

Category	Frequency	Percentage
Low	63	52.5
High	57	47.5
Total	120	100.0

Source: Field survey, 2015

Respondents' level of involvement in oil palm processing

Information on Table 4 shows the level of respondent's involvement by their weighted scores. Crushing, digestion and heating of the fruit (195.9) were ranked first among other activities in oil palm processing. This is followed by separation of endocarp from the kernel (192.4), while kernel drying and packing (189.9) was ranked third. However, the least activities that the respondents were involved was steam sterilization of bunches (184.2). Meanwhile, Table 4 further reveals that more than three-quarter (79.3%) of the respondents fell into high involvement in palm oil processing which is higher than the finding of Aphunu and Akpobasa, (2010) who found 60.86% youth involvement in palm oil processing. The inference is that the youths might have perceived a brighter future for the oil palm sector of the country which now necessitates their high involvement since past studies had established the lucrative and profitability nature of oil palm enterprise for poverty alleviation in the rural communities (Enwelu, Onyekwo, Nwaalieji, Dimelu, 2016 and Ohiman *et al*, 2012).

Furthermore, the respondents considered crushing, digestion and heating of the fruit as the basic activities that are necessary to be carried out by the oil palm processors, while steam sterilisation could be an optional activity. The findings tend to agree with the findings of Ricardo (2013) who reported active involvement of the youth in agricultural activities due to their zeal, strength, and innovativeness.

Table 4. Distribution of the respondents by level of involvement in oil palm processing

Oil palm processing activities	Not at all	Occasionally	Always	Weighted score	Rank
Crushing, digestion, and heating of the fruit	0.8	2.5	96.7	195.9	1st
Separating the endocarp from the kernel	0.8	5.8	93.3	192.4	2nd
Kernel drying and packing	3.3	3.3	93.3	189.9	3rd

Oil palm processing activities	Not at all	Occasionally	Always	Weighted score	Rank
Oil extraction from macerated fruit (by hand, hydraulic or other machine pressing)	0.8	10	89.2	188.4	4th
Separating fibre from the endocarp	2.5	6.7	90.8	188.3	5th
Stripping fruit from bunches	4.2	5.0	90.8	186.6	6th
Drying, grading, and cracking of the endocarp	4.2	5.8	90	185.8	7th
Palm oil clarification`	3.3	8.3	88.3	184.9	8th
Steam sterilization of bunches	5.0	5.8	89.2	184.2	9th

Source: Field survey (2015)

Table 5: Categorisation of respondents by level of involvement in oil palm processing

Category	Frequency	Percentage
Low	26	21.7
High	94	79.3
Total	120	100.0

Source: Field survey (2015)

Benefits derived from oil palm processing

The most benefit derived from oil palm processing by the respondents by weighted score as indicated on Table 6a was the supplying of raw materials to industries (215.9), this was closely followed by engaging the youths to prevent restiveness (214.2), while increase in standard of living (209.8) was the third benefit derived. Benefits like risk spreading and sharing (187.6) and source of recreation (174.7) were the less beneficial to the respondents in the study area. The result of this study is in consonance with the findings of Adebo, Ayodele, Olowookere, (2015) and Adesiji, Komolafe, Kayode and Paul, (2016) who asserts that palm oil processing enhances income and standard of living of the respondents. This implies that the benefits derived from the oil palm enterprise by the youth are good enough to attract, sustain and retain about one-third (30%) of the respondents who derived a high benefits from oil palm processing (Table 6b). However, the low level of the benefit derived may be attributed to the seasonality of oil palm production; as the income received therein may not be able to sustain them all year round; for instance the mean income of the respondents was ₦15,000.

Table 6a: Distribution of respondents by benefits derived from oil palm processing activities

Benefits	High	Moderate	Low	Not at all	Weighted score	Rank
A means of supplying raw materials to industries	20.0	76.7	2.5	0.8	215.9	1st
A means of engaging youths to prevent restiveness	20.0	75.0	4.2	0.0	214.2	2nd
Increased standard of living	15.8	78.3	5.8	0.0	209.8	3rd
Increased job opportunities	15.0	79.2	5.8	0.0	209.2	4th
Financial independence	19.2	70.8	9.2	0.8	208.4	5th
Improved livelihood ability	14.2	79.2	6.7	0.0	207.7	6th
Guaranteed income source	21.7	64.2	14.2	0.0	207.7	7th
Improved household nutritional and food security	11.7	77.5	10.8	0.0	200.9	8th
It serves as source of employment	15	71.7	11.7	1.7	200.1	9th
Material possession	10.8	77.5	11.7	0.0	199.1	10th
Provision of alternative local energy source	12.5	74.2	12.5	0.8	198.4	11th
Enhanced recognition	17.5	58.3	21.7	2.5	190.8	12th
A means of risk spreading and sharing	4.2	82.5	10	3.3	187.6	13th
It serves as source of recreation	18.3	52.2	15.8	13.3	174.7	14th

Source: Field survey, 2015

Table 6b: Categorisation of respondents by level of benefit derived in oil palm processing

Category	Frequency	Percentage
Low	84	70

High	36	30
Total	120	100.0

Source: Field survey, 2015

Relationship between respondents' socioeconomic characteristics and involvement in oil palm processing

This hypothesis sought to test for the significant relationship between the socioeconomic characteristics and the respondents' involvement in oil palm processing. Findings on Table 7a reveal that respondents sex (χ^2 =12.902; p=0.000) and marital status (χ^2 = 8.938; p=0.011) were significant to involvement in oil palm processing. This indicates that sex and marital status have a positive influence on the level of involvement of the respondents in oil palm processing. This implies that there is a gender role for sustainable palm oil production and that the marital experience or status has a positive influence in the processing of oil palm. This is in consonance with the assertions of Sarku (2016) and Enwelu *et al.* (2016). However, land tenure systems (Self owned [χ^2 =0.189; p=0.664] and Rented [χ^2 =0.459; p=0.498]) and membership of association (χ^2 =0.573, p=0.449) had no significant relationship with their involvement in the enterprise.

Table 7b further shows that youths' involvement in oil palm processing activities was significantly influenced by age (r= 0.277; p=0.002), educational status r= -0.242; p=0.008) and years of experience (r= 0.202; p=0.027). This further implies that the older the respondents the lesser the involvement in oil palm processing activities. This is due to the tasking nature of the enterprise as the activities involved manual production of palm oil are drudgery. Added to this is the significance of educational status that has an inverse relationship with the involvement in the oil palm processing which further implies that the less literate the respondents are, the more involved they will be in oil palm processing, while the year of experience is proportional to the respondents involvement in oil palm processing. The significance of age to involvement in palm oil enterprise as established by the findings of this research is in tandem with that of Nwanko (2016), but contrasts with what his studies upholds for education and years of experience in a similar studies.

Table 7a. Chi-square showing the relationship between socioeconomic characteristics of the respondents and their involvement (n=120)

Variables	χ^2	Df	p-value
Sex	12.902	1	0.000
Religion	1.098	2	0.578
Marital status	8.938	2	0.011
Tenure right ownership			
Self owned	0.189	1	0.664
Rented	0.459	1	0.498
Membership in association	0.573	1	0.449

7b: PPMC showing the relationship between the selected socio-economic characteristics of the respondents and their involvement

Variables	r-value	p-value
Age	0.277	0.002
Educational status	-0.242	0.008
Estimated monthly income	0.080	0.388
Household size	0.067	0.464
Years of experience	0.202	0.027

Correlation between the benefits derived and youths' involvements in oil palm processing

The PPMC result in Table 8 shows that significant relationship existed between benefits derived and involvements of the respondents in oil palm enterprises (r= 0.389; p=0.000). This implies that the more the benefits derived by the respondents, the higher their involvements in oil palm processing will be and vice versa. This is in agreement with the findings of Ohimain *et al*, (2014) that highlighted the significant benefits accrue to the youth processor in the enterprise for their economic and social development.

Table 8: Correlation analysis between the benefits derived and their level of involvement

Variables	r-value	p-value
Benefits	0.389	0.000

Source: Field survey (2015)

CONCLUSION AND RECOMMENDATION

Based on the findings of this study, it was concluded that the respondents were female, married and predominantly youth processors. It was also concluded that the support services needed by the respondent include improved technology, credit facilities, training services and extension services. The respondents had low level of support services hence need more support services in the study area. Also, respondents had high involvement in crushing, digestion, and heating of the fruit; separation of endocarp from the kernel, and kernel drying and packing. Benefits derived by oil palm processors include supplying of raw materials to industries, engagement of youths to prevent restiveness and increased standard of living; nevertheless the respondents derived low level benefit. Significant relationship existed between respondents' sex, marital status, age, educational status, years of experience, benefit derived and their involvementin palm oil processing.

Hence, the study recommends that adult education should be embraced by the respondents in the study area in order to explore the support services that will enhance their involvement in oil palm processing so as to have higher benefits from the enterprise. Consequently, processors should form cooperative groups to pull their resources together in order to have access to improved technology which was their highest needed support services identified in the study.

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Effectiveness of extension service delivery among arable farmers in Irepodun Local Government Area, Kwara State

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ABSTRACT

The study evaluated the effectiveness of extension service delivery among arable crop farmers in Irepodun Local Government Area (LGA), Kwara State. One hundred and twenty farmers were randomly selected from six communities in the LGA. Data were analyzed using descriptive and inferential statistics like mean, frequency, standard deviation, correlation coefficient and chi-square. Findings show that majority (92.5%) of the respondents were male and married (91.7%) with mean age of 49.7±8.00 years. More than half (58.3%) of the farmers had less than 5 contacts with extension agents in a year. The major services delivered to farmers were: creating awareness (93.3%), training and visit to farmers (92.5%), holding scheduled meetings (91.7%), farmers training programme (90.0%), advisory services (82.5%), and marketing facilities (58.3%). Only two (social networks for farmers and organisation of audio-visual shows) out of the thirteen extension services rendered were perceived effective. Farming experience ($r = 0.186$; $p \leq 0.05$), number of years of schooling ($r = -0.247$; $p \leq 0.01$), number of contact with extension agents ($r = 0.356$; $p \leq 0.01$), and number of training received ($r = 0.33$; $p \leq 0.01$) had positive and significant relationship with the effectiveness of extension service delivery. For extension to be more effective there is a need to provide more extension agents so as to ensure effective dissemination of improved practices and discharge of extension duties.

Keywords: Agricultural extension service, Arable crop farmers, Effectiveness.

INTRODUCTION

Human race is totally dependent on agriculture and as the world population continues to grow, there must be continuous reassessment of agricultural practices to optimize their efficiency (Mugabe, 2003). According to Yahaya *et al.* (2000) the diffusion and adoption of innovations remains the back bone of the expected development in agriculture. It has been noted over the years that the development and production of relevant and appropriate technologies is one of the pre-requisites for sustainable agricultural production. Others include dissemination of these technologies as well as their eventual utilization. Nigerian government has addressed the issue of development of appropriate technologies through the establishment of research institutes and creation of universities of technologies and agriculture.

Agricultural extension delivery has its major goal of getting farmers to adopt improved agricultural technological recommendations with a view to increasing yield and productivity. Hence, the attainment of millennium development goal on food security would be influenced by how extension recommendations are packaged to reflect farmers felt need and how effectively they are delivered among their variables (Agbarevo, 2012). The focus of extension services have been poverty alleviation, food security, employment creation, provision of raw materials and the sustainable management of natural resources. The importance of agricultural extension in agricultural development is widely acknowledged, particularly in developing countries such as Nigeria where public participation has been into all aspects of this economy including direct agricultural production (Adedoyin, 2004; Ozor and Madukwe, 2004).

Evaluation is often used to characterize and appraise subjects of interest in a wide range of human enterprises, including the arts, criminal justice, foundations, non-profit organizations, government, health care, and other human services (Datta, 2006). Agricultural extension programmes are therefore under pressure to change because of growing fiscal pressure and questions about the effectiveness and efficiency of their services (Rivera *et al.,* 2000). According to Ekumankma and Nwankwo (2002), the poor exposure of farmers to appropriate agricultural information is one of the major reasons for low yield recorded by many Nigerian farmers. This has been of great concern to agricultural communicators, administrators and policy makers in the country over the years. It is in the light of the foregoing that this study therefore seeks to evaluate the level of effectiveness of extension services delivered to farmers and with the following research objectives:

1. describe the socio-economic characteristics of arable farmers in the study area;
2. identify the services delivered by extension agents to arable crop farmers in the study area;

3. determine the level of effectiveness of the services as perceived by the farmers; and to

4. identify the constraints to extension access in the study area

METHODOLOGY

The study was carried out in Kwara State which is situated between parallels 8Â° and 10Â° north latitudes and 3Â° and 6Â° east longitudes, with Niger State in the north, Kogi State in the east, Oyo, Ekiti and Osun States in the south and an international boundary with the Republic of Benin in the west. Arable farmers in Irepodun Local Government Area of Kwara State constituted the study population. Twenty ADP arable farmers were randomly selected from six villages making 120 farmers. Data collection was done using structured interview schedule. The data was analysed using descriptive and inferential statistics like mean, frequency, standard deviation correlation coefficient and chi-square.

Measurement of variables

The effectiveness of extension service, which is the dependent variable of this study was measured by given farmers 13 item statements on the effectiveness of extension services delivered to farmers based on the objectives of the services on a 5 point scale of very effective, effective, fairly effective, rarely effective and not effective and scores of 5, 4, 3, 2 and 1 were assigned, respectively. The maximum score obtainable was 65 while minimum was13, to ascertain the level of effectiveness of extension service. Based on total scores, farmers were grouped into 3 categories; high, low and medium. This was placed within mean and standard deviation, the low within mean – standard deviation, while medium within mean +/- standard deviation range. The independent variables are the socio-economic characteristics of the farmers.

RESULTS AND DISCUSSION

The mean age of the farmers was 49.7±8.00 years. This implies that they are still strong, vibrant, able bodied, agile, young, men and women who have the strength to embrace farm work and thereby producing high quality farm products. Ajala (2013), cited Tsoho (2004), reported that young farmers have higher aspiration to accept new technologies than conservative older farmers that always seem to be more satisfied with their traditional methods. Study further shows that majority (92.5%) of the farmers were male, while 7.5% were females. This may also be attributed to the fact that arable crop farming is mostly a male dominated work in the study area due to the arduous nature of the tasks involved. However, male dominance in the agricultural sector is a common phenomenon in most communities in the study area. Majority (91.7%) of the arable crop farmers were married, which indicates that farming activities is always made easy due to family labour instead of hired labour, that is, family members are usually engaged in the farm work. Also majority (60%) of the respondents were Muslims.

Majority of the farmers (80.0%) had non-formal and primary education only. This may influence their response to adoption of innovations. Akinleye (2006) submitted that education is an important factor which influences farm productivity. It determines farmers' access to information and adoption of new farming ideas, skills and technology. Farmers with farming experience of 20 years and above were 52.5%. This study further shows that majority of arable crop farmers had long years of farming experience. Simon *et al*, (2013), reported that experience influence farmers' decision to use, discontinue use or reject farm innovations. Such experience is desirable as the greater the experience, the better the farmers are able to cope with shocks and stresses. More than half (53.3%) were involved in mixed cropping, while 40.0% were involved in mixed farming. This further shows that half of the farmers were into mixed cropping. Mixed cropping reduces the risk of crop failure and ensures that farmers have stable income over time. It helps the farmer to spread his harvest over the season and so ensure a regular supply of food. The farmer makes optimal and maximal use of the land at any cropping season.

Table 1: Distribution of respondents by their socio-economic characteristics

Variable	Frequency	Percentage	Mean±Std. Dev
Age (years)			
30.00 - 39.00	14	11.7	
40.00 - 49.00	42	35.0	49.7±8.00
50.00 - 59.00	51	42.5	
60.00+	13	10.8	
Sex			
Male	111	92.5	

Variable	Frequency	Percentage	Mean±Std. Dev
Female	9	7.5	
Marital status			
Married	110	91.7	
Single	3	2.5	
Divorced	3	2.5	
Widowed	4	3.3	
Religion			
Christians	39	32.5	
Muslim	72	60.0	
Traditional	9	7.5	
Level of education			
Non formal	70	57.5	
Primary	27	22.5	
Secondary	17	14.2	
Adult literacy	1	0.8	
Post secondary	1	0.8	
Tertiary	4	3.3	
Years of experience in arable farming			
< 10.00	14	11.7	
10.00 - 19.00	43	35.8	20.1±10.1
20.00+	63	52.5	
Type of farming			
Mono-cropping	8	6.7	
Mixed- cropping	64	53.3	
Mixed- farming	48	40.0	

Source: Field survey, 2015.

Extension services delivered to farmers

Data in Table 2 show the percent delivery of major extension services to farmers as follows: creating awareness of the extension service (93.3%), training and visit to farmers (92.5%), holding scheduled meetings (91.7%), farmers training programme (90.0%), advisory services (82.5%), marketing facilities (58.3%). . It is very clear from the foregoing that all the core extension technical duties that require funding by the extension agencies such as organisation of field days, organisation of method demonstrations, organisation of result demonstrations, organisation of audio-visual shows, cooperative facilities, credit facilities procurement, social networks for farmers have been neglected. This is in line with Ajala *et al*., (2014) Ferroni and Zhou,(2012) and Obiora, (2013) submission that the problems of extension delivery include: poor motivation of extension staff in terms of remuneration, inadequate provision of transport facilities to visit the farmers, living far away from the farmers thereby minimizing interaction between them and the farmers, poor funding since the withdrawal of the World Bank counterpart funding, inadequate capacity building, poor access to information on new technologies, weak or poor linkages between extension and knowledge generating institutions.

Table 2: Distribution of farmers based on the extension services delivered to them

Variable	Frequency	Percentage
Creating awareness of extension services	112	93.3
Training and visit to farmers	111	92.5
Holding scheduled meetings	110	91.7
Farmers training programme	108	90.0
Advisory services	99	82.5
Marketing facilities.	70	58.3
Organisation of field days	62	51.7
Organisation of method demonstrations	54	45.0
Cooperative facilities	53	44.2
Organisation of result demonstrations	49	40.8
Credit facilities procurement	46	38.8
Organisation of audio-visual shows	35	29.2
Social networks for farmers	16	29.2

Effectiveness of extension service

Data in Table 3 show that only social network for farmers (x=3.33) and organization of audio visual show (3.31) are the most effective services provided by the extension agency. This explains the fact that social networking of the farmers by the extension agency is very effective. That is, farmers are not only aware of the social network, but they make use of it effectively to get information and adopt innovations that will improve their standard of living through increase in their farm yield. This agrees with Ben (2013), who opined that social networks have the potential to aid in spreading sustainable agricultural practices in sub-Saharan Africa, where poverty, low yields, and unsustainable practices often go hand-in-hand. It also fall in line with Esther, et al, (2010), report that the contribution of extension service such as social network in improving productivity is essential to understanding effective ways of productivity.

Table 3: Distribution of famers by level of effectiveness of extension services received

Variable	Mean	Rank
Social networks for farmers	3.33*	1st
Organisation of audio-visual shows	3.03*	2nd
Cooperative facilities	2.90	3rd
Credit facilities procurement	2.84	4th
Organisation of method demonstrations	2.80	5th
Organisation of result demostration	2.72	6th
Marketing facilities	2.64	7th
Organisation of field day	2.62	8th
Holding scheduled meetings	1.91	9th
Training and visit to farmers	1.90	10th
Advisory services	1.88	11th
Farmers training programme	1.45	12th
Creating awareness of extension	1.31	13th

**High

Constraints to effectiveness of extension service

As shown in Table 4, the constraints to effective extension services in the study area ranged from absence of extension service (4.38), illiteracy (3.68), lack of money (3.54), lack of access to information (3.44), inappropriate scheduling of meeting (3.41), inadequate extension service (3.29), unavailability of information (3.19), insufficient contact with extension agent (3.15) among others. Illiteracy on the part of the farmers was also among the majority of constraints faced by extension service. This is as a result of farmers not having any formal education which seems to affect them and their crop yield. This also agrees with Umunna (2010) submission that education enables the individual farmers to know how to seek for and apply information on improved farm practices. This is because as the individual gained the ability to read, he is able to extend the scope of his experience through the print media.

Table 5: Distribution of constraints to effectiveness of extension service in the study area

Constraints	Mean	Status
Absence of extenstion services	4.38**	High
Illiteracy	3.68**	High
Lack of money	3.54**	High
Inappropriate scheduling of programmes	3.41**	High
Lack of access to information	3.44**	High
Inadequate extension services	3.29**	High
Insufficient contacts with extension agents	3.15**	High
Unavailability of information sources	3.19**	High
Insufficient SMS	3.09**	High

**High

Test of hypothesis

The test of correlation between some selected socio-economic characteristics of the farmers and the level of effectiveness of the extension services shows that farming experience (r= 0.186), years of schooling (-0.247), number of extension contact (0.356), number of trainings received (0.333) had significant relationship with respondents' rating of effectiveness of the extension services. This implies that the arable farmers' farming experience, years of schooling, number of extension contact, number of trainings received is associated with their productivity and standard of living and by implication the effectiveness of the services delivered by extension to them.

Table 6: Results Chi-square analysis showing significant association between socio-economic characteristics and level of effectiveness of of extension service delivery

Characteristics	χ^2- value	Df	P-value	Decision
Sex	86.70*	1	0.05	S
Marital status	284.5**	3	0.01	S
Religion	23.65	2	0.72	NS
Education level	218.2**	4	0.01	S
Source of information	74.80*	5	0.05	S
Membership of organisation	112.13**	3	0.01	S
Source of capital	34.13*	2	0.05	S

Source: Field survey, 2015.

*Significant at 0.05 level
**Significant at 0.01 level.

Table 7: Results of Correlation analysis showing the relationship between farmers socio-economic characteristics and level of effectiveness of extension service delivery

Variables	Correlation Coefficient (r)	Coefficient of Determination (R^2)	Decision
Age	0.059	0.003481	NS
Farming experience	0.186*	0.034596	S
Farm size	-0.058	0.003364	NS
Year of schooling	-0.247**	0.061009	S
No. of contact with Extension agents	0.356**	0.126736	S
No of trainings receieved	0.333**	0.110889	S
Expenditure total	-0.052	0.002704	NS
Annual income	0.141	0.019881	NS

Source: Field survey, 2015.
*Significant at 0.05 level
**Significant at 0.01 level

CONCLUSION AND RECOMMENDATION

The study revealed that the level of effectiveness of extension service in the study area was very low to have a positive impact the productivity and hence the standard of living of the farmers. This was due to illiteracy, low extension contact, inadequacy of extension services among other constraints. Extension service should be revitalized through proper funding and provision of transport facilities, better remuneration and incentives. There should be provision of more extension agents so as to ensure effective dissemination of extension services. Also, extension agents should be motivated in order to improve the effectiveness of their services.

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Decision making power of rural women for improving their status: Evidences from rural communities of Oyo State, Nigeria

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ABSTRACT

Rural women are often restricted in their ability to make decisions both at the household and community levels thereby reducing their status in the community. This study assessed the decision making power of rural women in Oyo State, Nigeria. Qualitative and Quantitative methods were used to collect data on respondents' socio-economic and enterprise characteristics, decisions on productive and domestic issues and inputs in community decisions. Data were analysed using descriptive statistics (frequencies, percentages, mean, and standard deviation). The study reveals that 40.0% of respondents were within the age range of 31-35 years, 55.6% were crop farmers and they had relatively low level of education and income. The result also indicates that respondents had limited access to personal land. About forty percent of respondents' husbands had primary education and 37.8% with secondary education. Husbands of respondents dominated productive decisions; respondents made sole decisions on some of the domestic issues, joint decisions were also made on domestic issues while respondents had high (75.6%) inputs in right to vote as one of the community decisions. Also, respondents had low (61.1%) productive decision making power, high (65.6%) domestic decision making power, low (68.9%) community decision making power and a relatively high (54.4%) decision making power in the overall. Stakeholders at all levels should give opportunity to women so as to make their voices heard both at the household and community level, this will improve rural women's status and ensure their participation in community and national development.

Keywords: Community, Decision making, Domestic, Rural women

INTRODUCTION

Rural women play a vital role in most economies of the world contributing to about 43% of the agricultural sector and 50% of global labour force (Palacious-Lopez, Christianensen and Kilic, 2017). They engage in household activities and also take part in several livelihood activities with the responsibilities of taking care of the children and elderly. Despite their numerous roles in the household and communities, Dada (2011) affirmed that rural women are less able to participate effectively in decision making and are often deprived of their abilities to contribute their inputs in terms of decision making. Their status in the community remains more of ascribed than achieved as they are left often with household activities with little or nothing to contribute to the larger society. This state will not enable them to realise their potentials and make lives better for them and their community (Pal and Haldar, 2016).

Decision making is the process of reducing the number of available alternative courses of action in given situation (Ekong, 2003). Decision making power has been found to be an important element that will affect the well being of family and that of the community which will help to achieve gender equity and peace in the family (Sultan, 2011). It is established that when women participates in the decision making process at both the household and community level, it will improve their status and position in their communities (Pal and Haldar, 2016).

In most African rural communities, there is a growing difficulty for women to speak or be heard in household decision making process and development matters relating to their communities. Women are often restricted to participate in decision making process because of the patriarchal nature of African set up where men dominates issues even matters that directly concerns women. If they will participate at all, it is directly or indirectly controlled by certain rules or conditions placed by their husbands. This has led to the inability of women to develop their leadership potentials.

Decision making is generally influenced by factors like level of knowledge, achievements, educational level, employment, income and resources available to an individual (Agbelemoge, 2010). Women decision making power may increase when her resources increase and when she is well employed as this will increase her income, giving her a financial power alongside the men folks. Furthermore, Routray, Torondel, Clasen and Schmidt (2017) asserted that societal and cultural barriers are also some of the factors that determine the participation of women in decision making at the household level. In rural areas of Oyo State,

ability of women to make decisions is believed to have been reduced over the years due to the existence of patriarchal ideology which still dominates most rural communities in this area. It is against this background that this study seeks to assess the decision making power of rural women in Oyo State, Nigeria.

Objectives of the study

1. To determine the socio-economic characteristics of respondents in the study area.
2. To identify the enterprise characteristics of respondents in the study area.
3. To ascertain the extent to which respondents make decisions on productive issues in the study area.
4. To determine the extent to which respondents make decisions on domestic issues in the study area.
5. To ascertain the extent to which respondents make inputs on community decisions in the study area.

METHODOLOGY

The study was conducted in Oyo State. Oyo state is one of the six states in South-west Nigeria. It is located between latitudes 6^0N and 9^0N and between longitudes 3^0E and 4^0E. It covers a total landmass of 28, 454km^2. Its Capital is in the ancient city of Ibadan, the most populous city in Africa with a population of over 2.5million. It is bounded in the south by Ogun State, north by Kwara State, bounded by Benue state to the west and partly by the Republic of Benin, while in the east it is bounded by Osun state. It has an annual rainfall ranging from 1,000 to 1,400mm with two rainfall peaks in June and October. The relative humidity is high throughout the year with a mean of 90%. The mean temperature is about 25^0C- 35^0C. The climate favours agricultural activity in its diversity. Crops like maize, yam, cassava, millet, cocoa, palm produce, cashew and citrus are mostly grown in the State.

Multi-stage sampling technique was used to select respondents for this study. At the first stage, the rural LGAs from the 33 LGAs in the State were isolated, making 28 rural LGAs. At the second stage, Ten percent of the rural LGAS were randomly selected which are Orire, Saki east and Kajola LGAs. At the third stage, two communities were randomly selected from each LGA making a total of 6 rural communities which are Elewure and Isemi-ile from Kajola; Ago-amodu and Sepeteri from Saki east and Iluju and Adafila from Orire LGA. At the third stage, snowball sampling technique was used to get the list of rural women farmers from each community: 60 from Elewure, 75 from Isemi-ile, 75 from Ago-amodu, 80 from Sepeteri, 100 from Iluju and 60 from Adafila. At the fourth stage, twenty percent of the list of respondents in each community were randomly selected which are 12, 15, 15, 16, 20 and 12, respectively making a total of 90 rural women farmers that formed the sample size for this study.

Qualitative and Quantitative methods were used to collect data on respondents' socio-economic and enterprise characteristics, decisions on productive and domestic issues and inputs in community decisions. Data were analysed using descriptive statistics (frequencies, percentages, mean, and standard deviation).

Respondents were asked to indicate who makes decisions on some productive (7) and domestic (7) issues like use of land, improvement of land, labour to be used, inputs to be used, buying of livestock, school children will attend, food to be eaten in the house, use of money and so on, which was operationalised on a four point scale of husband's decision (1), sole decision (3), joint (2) decision and no decision (0). For the productive decisions, maximum score was 24.0 while the minimum score was 7.0, mean score obtained was 16.02. Mean and above mean score represent high productive decision-making power and below mean represent low productive decision-making power. Also, maximum and minimum score of 23.0 and 14.0, respectively was obtained for the domestic decisions and the mean score was 19.07. Mean and above mean score represent high domestic decision-making power and below mean represent low domestic decision-making power.

Respondents were asked to indicate the inputs they make as regards community decisions (7) for decisions such as: infrastructures to be built in the community, holding positions in the community, protesting against misbehaviours in the community, right to vote and so on. This was operationalised on a three point scale of No input (0), low input (1) and high input (2). The maximum score was 21.0 and the minimum score was 7.0 and a mean score of 12.9 was obtained. Mean and above mean score represent high community decision making power and below mean represent low community decision making power. The overall decision making power was obtained by pulling the scores of productive, domestic and community decision making power together. The maximum score was 36.0 and the maximum score was 67.0 while the mean is 48.0. Mean and above mean score represent high decision making power and below mean represent decision making power.

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

Table 1 shows that 40.0% of respondents were within the age range of 31-35years and 26.7% were within 26-30 years which implies respondents are in their active and productive years which will enable them to give appropriate opinions on issues both at the household and community levels. This corroborates the findings of Olaolorun (2014) that having a say in household and community decisions is possible when women are matured and married, as they are being respected because they are married. Also, 44.4% of respondents had primary education, 12.2 % with secondary education and 35.5% with no formal education. This suggests that respondents level of education is relatively low which could have influenced their ability to make decisions on pertinent issues as supported by Sultana (2011) that educational level of an individual is a key factor in making decisions. Thirty percent of respondents had an annual income of ₦67,000, 52.2% with ₦67,001-₦134,000 and 16.7% earned ₦134,001-₦201,000. The income of respondents is relatively low and at the poverty margin which could have been a financial boost that will enable them to contribute to meeting household needs, thus, avenue to make decisions on household issues. This is in tandem with the findings of Campbell, Prata and Potts (2012) that income is germane to ability of women to make decisions especially at the household level. Furthermore, results of the study from table 1 indicate that respondents were engaged in farming activities like food crop farming (55.6%), livestock farming (32.2%) and processing of agricultural produce (12.2%). The implication of this is that when women are employed or earn income through productive activities, they become active participants in household and communities matters which is in line with the result of Amugsi, Lartey, Kimani-murage and Mberu (2016) that women become financially autonomous when they are able to earn income. Eighty percent of respondents' husbands were engaged in food crop farming with 3.3 % as artisans and 8.9% into trading. About forty percent of respondents' husbands had primary education and 37.8% had secondary education with 16.7% having no formal education. This implies that men should be able to give their wives opportunity to make family decisions based on their level of education.

Table 1: Distribution of respondents by socioeconomic characteristics

Socioeconomic characteristics	Frequency	Percent	Mean
Age (years)			
16-20	0	0.0	
21-25	10	11.1	
26-30	24	26.7	31±4.5
31-35	36	40.0	
36-40	20	22.2	
Religion			
Christianity	46	51.1	
Islam	40	44.4	
Traditional	4	4.4	
Educational Attainment			
Adult literacy	7	7.8	
Primary	40	44.4	
Secondary	11	12.2	
No formal	32	35.5	
Annual Income (₦)			
0-67000	27	30.0	
67001-134000	47	52.2	
134001-201000	15	16.7	
201001-601008	1	1.1	
Household size			
1-4	17	18.9	
5-8	73	81.1	6 ±1.8
9-12	0	0	
Primary occupation			
Food crop farming	50	55.6	
Livestock farming	29	32.2	
Processing	11	12.2	

Socioeconomic characteristics	Frequency	Percent	Mean
Husband's occupation			
Food crop farming	72	80.0	
Cash crop farming	7	7.8	
Artisans	3	3.3	
Trading	8	8.9	
Husband's educational attainment			
No formal education	15	16.7	
Primary education	37	41.2	
Secondary education	34	37.8	
Adult literacy education	4	4.4	
Total	90	100.0	

Source: Field survey, 2016

Enterprise characteristics

The result on Table 2 shows the enterprise characteristics of respondents. Respondents were into cultivation of different crops like maize, cassava, cowpea, yam and vegetables. Also, 42.2% of the respondents cultivated their crops on less than one acre which implies that respondents do not have access to large area of land for their farming activities. This is in line with the study of Ajadi, Oladele, Ikegami and Tsuruta (2015) that women have limited access to land for agricultural purposes. The result also shows that 7.8% had access to personal land, 38.9% to family land and 31.1% to rented land. This implies that most women in rural areas do not have access to personal land which would have enable them to have permanent structures on their farm and be able to engage in their farm activities without restrictions. This supports the findings of Ajala (2017) that women do not have access to personal land for their agricultural activity which is likely to affect their level of production and income thereby reducing their contribution to household needs and subsequently their decision making power. Fifty percent of the respondents used family labour and 41.1% used hired labour for their farming activities, this suggests that some of the respondents used their children as source of labour on the farm which supports the findings of Alao, Olasore and Aremu (2013) that most children in farming households are used to meet farming labour needs. Also, 41.1% of the respondents still used hired labour on their farm probably because they have extra income that could be used to hire labourers on their farm. Over thirty percent of the respondents had been in their various farming activities for 1-6years and few (7.8%) had experience of about 11-15 years. This implies that respondents have been involved in farming for a while which would have increased their ability to contribute to family needs and also take part in family issues.

Table 2: Distribution of respondents by enterprise characteristics

Type of crops cultivated	Frequency	Percent
Maize	48	53.3
Cassava	42	46.7
Cowpea	11	12.2
Yam	41	45.6
Vegetables	13	14.4
Area of land		
Less than 1	58	64.4
1-3	11	12.2
4-6	3	3.3
7-9	5	5.6
No response	13	14.5
Source of labour		
Family	45	50.0
Hired	37	41.1
Communal	8	8.9
Source of land		
Personal	7	7.8
Rent	28	31.1
Inheritance	15	16.7

Type of crops cultivated	Frequency	Percent
Family	35	38.9
Communal	5	5.6
Years of experience		
1-5	21	23.3
6-10	29	32.2
11-15	7	7.8
16-20	3	3.3
No response	30	33.3
Total	**90**	

Source: Field survey, 2016

Productive decisions of respondents

Table 3 shows that respondents do not make decisions on most of the productive issues. Decisions on use of productive resources (48.9%), labour to be used and buying of livestock (40.0%) were jointly made by respondents and their husbands. Decisions on use of land (40.0%) and improvement on land (74.4%) were solely made by the husband, suggesting that husbands still make decisions on most productive issues despite the fact that women are also farmers, This corroborates the findings of Ajadi *et al* (2015) that despite the involvement of rural women in most agricultural production, they still do not have control over most productive decisions. This implies that the patriarchal nature of African culture still dominates in the study area. This is in line with the findings of Kassa (2015) that men still make decisions on major productive issues except selling off of small livestock and other non-relevant issues. Kinoshita (2003) also affirms women's low status and predominance of men's decision-making power on productive issues.

Table 3: Distribution of respondents according to decisions made on productive issues

Productive issues	Sole decision	Joint decision	Husband decision	No decision
Use of land	4 (4.4)	30 (33.3)	40 (74.4)	16 (17.8)
Improvement on land	4 (4.4)	33 (36.7)	36 (40.0)	17 (18.9)
Labour to be used	4 (4.4)	36 (40.0)	33 (36.7)	17 (18.9)
Inputs to be used	4 (4.4)	35 (38.9)	33 (36.7)	18 (20.0)
To buy livestock	7 (7.8)	36 (40.0)	20 (22.2)	27 (30.0)
To sell livestock	7 (7.8)	39 (43.3)	12 (20.0)	27 (30.0)
Use of productive resources	3 (3.3)	44 (48.9)	28 (31.1)	15 (16.7)

Source: Field survey, 2016

Table 4 shows that respondents had low productive decision making power in the study area. This suggests that on issues pertaining to production, women do not make decision which is due to the fact that they hardly own resources and assets that could give them opportunity to contribute on issues. One of the respondents affirmed this finding during the FGD in Ago-amodu community:

'…….*My husband is the owner of the land that we use for farming, i only help on the farm, i don't decide what we do on the farm except for selling of some of my livestock and I will still inform my husband before selling them……*'

Table 4: Categorisation of respondents' productive decision making power

Category	Score	Percentage	Mean
Low	7.0-15.9	61.1	16.02
High	16.0-24.0	38.9	

Domestic decisions of respondents

The study reveals from Table 5 that decisions on most domestic issues were jointly made, like school the children would attend (61.1%), number of children to be born in the family (72.2%) and purchase of new items in the family (63.3%). This implies that most couples see these family issues as very crucial and calls for joint decisions as ideas from individuals will aid better actualisation of those decisions rather than personal decisions. Campbell, Prata and Potts (2012) affirmed that for women to make sole or joint decisions on family matters, it could be as a result of exposure, education and income. About fifty percent and 32.2% of respondents made joint and sole decision,

respectively on food to be eaten in the house despite the fact that women still prepares the food. Also, 62.2% and 53.3% of respondents made sole decisions on visiting clinics when necessary and using family planning, respectively. This may be because these issues are women issues and some men do not partake in issues like family planning. This corroborates the findings of Akinyemi, Adedini and Odimegwu (2017) that women sometimes make decisions on personal and health related matters which are function of empowerment and education. A discussant during the FGD gave the report in Adafila community that:

> '……*Most decisions that concern the house or my children are taken together with my husband but i don't decide alone in some of these issues because my husband is the head of the family except few ones that concerns me personally*……'

Table 5: Distribution of respondents according to decisions made on domestic issues

Domestic issues	Sole decision	Joint decision	Husband decision	No decision
School children will attend	0 (0)	55 (61.1)	35 (38.9)	0 (0)
Number of children to be born in the family	3 (3.3)	65 (72.2)	22 (24.4)	0 (0)
Food to eat in the house	29 (32.2)	46 (51.1)	15 (16.7)	0 (0)
Visiting clinics when necessary	56 (62.2)	24 (26.7)	10 (11.1)	0 (0)
Use of family planning services	48 (53.3)	35 (38.9)	4 (4.4)	3 (3.3)
Use of money in the family	3 (3.3)	50 (55.6)	37 (41.1)	0 (0)
Purchase of new items in the family	6 (6.7)	57 (63.3)	27 (30.0)	0 (0)

Source: Field survey, 2016

From Table 6, it was found that 65.6% of respondents had high domestic decision making power. This is because respondents made sole decision on some domestic issues like visiting health centres when necessary and use of family planning. This contradicts the findings of Routray *et al* (2017) that women do not make decisions on family issues except they consult their husbands. This finding suggests that rural women do make decisions on issues that are directly related to them either because of its urgency or being women issue.

Table 6: Categorisation of respondents' domestic decision making power

Category	Score	Percentage	Mean
Low	14.0- 18.9	34.4	19.07
High	19.0-23.0	65.6	

Level of inputs in community decision making

From Table 7, 32.2% of the respondents had high input in the involvement of political campaign, 75.6% also had high input in voting, 50.0% had low input to infrastructures to be built in the community, 57.8% had low input to both the use of social amenities and representing members on crucial issues. This implies that enlightenment on the importance of performing one's civic right through voting and involvement in political campaign is being pronounced among rural women as against what we have in the past although most of these campaigns were not beneficial to most of these women on the long run. Also, 50.0% of the respondents do not have any input as regards holding of position in the community which may be due to low status that has been accorded to women over the years as their contribution is not needed in any way. This corroborates the findings of Tanwir and Safdar (2013) that rural women's role in decision-making and contributions to community and group issues remains very minimal. This also supports the statement of a woman during FGD in Isemi-ile community that:

> '……*Our leaders speak often in meetings, I hardly speak on any issue in my group not to talk of making decisions, I don't have the boldness to do so*……'

Table 7: Distribution of respondents on level of inputs in community decisions

Community decisions	High input	Low input	No input
Infrastructures to be built in the community	5 (5.6)	36 (50.0)	49 (54.4)
Holding position in the community	5 (5.6)	40 (44.4)	45 (50.0)
Protesting against misbehaviours in the community	9 (10.0)	37 (41.1)	44 (48.9)
Use of social amenities in the community	7 (7.8)	52 (57.8)	31 (34.4)

Community decisions	High input	Low input	No input
Representing members of the community on crucial issues	6 (6.7)	52 (57.8)	32 (35.6)
Involvement in political campaign	29 (32.2)	45 (50.0)	16 (17.8)
Right to vote	68 (75.6)	15 (16.7)	7 (7.8)

Source: Field survey, 2016

From Table 8, there is low community decision making power among respondents. This implies that women do not get involved in issues pertaining to the community due to patriarchal ideology that dominates most culture in Africa. This is in line with the findings of Ngara and Ayabam (2013) that women are still marginalised when it comes to participation and making decisions on community issues which may be due to low self confidence, cultural and religious barriers.

Table 8: Categorisation of respondents' community decision making power

Category	Score	Percentage	Mean
Low	7.0-12.93	68.9	12.94
High	12.94-21.0	31.1	

Table 9 shows that the overall decision making power of respondents is relatively high (54.4%). This may be due to the fact that respondents make sole decisions on some of the domestic issues; this could have influenced the overall decision making power to be high. This result contradicts the findings of Sultana (20110) that rural women decision making power is low.

Table 9: Categorisation of respondents into overall high and low decision making power

Category	Score	Percentage	Mean
Low	36.0-47.9	45.6	48.03
High	48.0-67.0	54.4	

CONCLUSION AND RECOMMENDATIONS

The study concluded that husbands' of respondents made decisions on most productive issues. Respondents made sole decisions on some of the domestic issues. Also, domestic decisions were jointly made by respondents and their husbands. Respondents had high inputs in political campaign and voting but low inputs in holding of positions in the community and building of infrastructures in the community. The study revealed a low productive, high domestic and low community decision making power. In the overall, respondents in the study area had relatively high decision making power.

Stakeholders at all levels should give opportunity to women to make their voices heard both at the household and community level, this will improve rural women's status and ensure their participation in community and national development.

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Perception of Ecotourism among Tertiary Institution Students in Abeokuta Metropolis, Ogun State, Nigeria

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ABSTRACT

The study determined tertiary students' perception of ecotourism in Abeokuta, Ogun State. Data was garnered from 405 students who were randomly sampled from six tertiary institutions namely; Federal University of Abeokuta (94), Crescent University (23), Federal College of Education Osiele (80), Moshood Abiola Polytechnic Ojere (145), Sacred Heart School of Nursing Lantoro (31) and School of Nursing FMC Idi-Aba (32). The results of this study was presented using descriptive statistical tools such as frequencies, percentages and means, while inferential statistical tool used was Chi Square. The modal age category was 21-25 years (55.1%). Most of the students were female (60.5%) and single (96.8%). The percentages of students in 100 (36.0%) and 200 (32.1%) level were more compared to other levels of study. Students who were aware of ecotourism got to know about it mostly through school (15.6%) and personal interest (11.9%). Only 17.0% indicated awareness of ecotourism initiatives, club or society in their schools, while only 8.6% of the students had ever participated in ecotourism activities.The few students who participated in ecotourism activities engaged in rock climbing (3.2%), sightseeing (1.7%), visitation (1.2%) and trekking (1.5%) once in a while (4.9%). Some (33.6%) of the students indicated lack of information and time (14.8%) as constraining their participation in ecotourism activities. Almost all (90.9%) respondents reflected that they would like to know more about ecotourism. The main reason that stimulates students' interest in ecotourism was to understand the natural environment (46.9%) and get close to nature (20.7%). Most of the students were favourably disposed towards ecotourism bringing about infrastructural development ($\bar{X}$=4.20), positive changes in value system of the community ($\bar{X}$=4.30) and employment opportunity for indigenous population ($\bar{X}$=4.41). Significant relationship existed between institution attended (χ^2 = 0.274, $p<0.01$), level of study (χ^2 = 0.174, $p<0.05$) and perception of ecotourism. The study recommends intensification of ecotourism awareness, ecotourism advocacy and promotion of programmes that will encourage students' participation in ecotourism activities.

Keywords: Ecotourism initiatives, Tertiary level students, Ecotourism awareness, Rock climbing participation

INTRODUCTION

Tourism is an ever growing industry around the world with many countries now dependent on the tourism industry within their countries for continued growth and development. It has penetrated human life as a necessity, as part "created" by man, with man and for man. Tourism whether practiced knowingly or instinctively was and is one of human activities with an extensive search and development from the beginning of mankind especially now, in the 21st century. A report put out by the World Economic Forum states that there was an increase in the number of international tourism receipts from US$2.1 billion to US$622.7 billion between 1950 and 2004. By 2006, the tourism sector accounted for 10.3% of world GDP. Furthermore, in 2006 there were 234 million jobs in the industry, making up 8.2% of total employment worldwide (World Tourism Analysis, 2007). The World Tourism Organisation - UNWTO (2011) has estimated that the industry has grown from 25 million international travelers in 1950 to over 800 million with a projection of 1.2 billion travelers by 2020. Many people involved in travelling especially to long distance to ease tension and maintain a healthy living through a change of environment devoid of all stress of life (Ojewola, 2008).

Tourism can develop and grow when humans have a positive view towards it and when they see their role in the process of the tourism development. When a tourism destination is born, the quality of life of the people around goes through radical changes, which are not necessarily negative. Sometimes, influx of people, traffic difficulty, increase in crime rates and pollution of all environmental resources might be inevitable. Additionally, tourism brings changes that affect the traditional way of life, family relations, the nature of the local structure functioning and many more problems not predictable (Puczko and Ratz, 2005). Ecotourism does not only preserve the environment but also offers opportunities that are unique culturally and within nature which has made it become an avenue for much of the industry to look towards for the future of tourism.

Ecotourism is one of the fast growing sectors of the hospitality and tourism industries worldwide (Buckley, 2000). The term 'ecotourism' first definition was credited to the Mexican Consultant, Hector Ceballos-Lascurain, in July 1983, he stated that ecotourism involves travelling to relatively undisturbed or uncontaminated natural areas with the specific objectives of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural aspects. The International Ecotourism Society - TIES (2002) defined ecotourism as responsible travel to natural areas that conserves the environment and improves the wellbeing of local people. Also, ecotourism is referred to as three inter-linked elements of environment, active learning and sustaining the socio-cultural and natural environments (Weaver, 2001).

However, Singh *et al* (2007) suggests that ecotourists consist of three types; soft, structured and hard ecotourists. The structured ecotourists prefer intellectual interpretation, third party organization of the trips and using travel experts. Sometimes, structured ecotourists are likely to visit less well-known destinations and consider themselves dedicated ecotourists. Ecotourism can mean different things to different groups involved but ultimately it must bring about satisfaction. It is worthy of note that ecotourism provides one way to help educate the community to protect and conserve the environment through travel. It helps create and maintain a sustainable environment for both residents and tourists, and more importantly for the next generation. Broadly speaking, ecotourism refers to tourism that is based on nature but seeks to minimize harmful impacts and better still, seeks to promote conservation which is solely attainable through community resources and participation. Ecotourism becomes easy to be practiced and managed when there are creation of some protected areas. How human beings perceive their physical and social environment is crucial in that this will directly affect their view towards their physical and social environment.

Perceptions are socially and culturally constructed, and often interrelated with many influencing factors such as religion, cultural and ethnic background, collective pressure, laws and regulations. All these factors make up people's values and opinions. In a way, the degree to which an individual is aware of ecotourism is directly related to his/her perception about ecotourism. However, perception of ecotourism could best be assessed among tertiary student in that they are the leaders of tomorrow. It is recognized that education is the most efficient way to change people's thinking or perception about a particular problem; or a way to bring about desired change in their attitude. It is noteworthy that education is a vital tool to a country's sustainable development.

Ecotourism and sustainable development are intertwined in that conservation and preservation of the environment is crucial to attaining sustainable development. Sustainable development is a way of thinking about how we organize our lives and works using limited natural resources in order to satisfy needs, not only for our generation, but also for future generation. Through education, it is possible not only to understand sustainable development concept, but also to promote and to improve the capability of people to address it with responsibility. Many people do not understand what ecotourism really means and consequently, abuse of the concept is prevalent. This study is hinged on the need to address poor awareness that many people have about ecotourism. The knowledge of a population's perception about ecotourism would help managers and operators of ecotourism plan the development of the industry. In this regard, it is considered that opinions of persons in tertiary institutions where ecotourism landmarks are situated are important. Weaver (2001) argues that misrepresentations of ecotourism is common in various places and state a reason for this as the lack of familiarity of the public with ecotourism criteria. Proper perception of ecotourism is a requisite to making it a powerful instrument for preservation of nature with favourable outcome for local populations, including a wide range of satisfaction. Therefore, the study was premised on the following objectives

1. To determine the personal characteristics of the students.
2. To assess students' awareness of ecotourism.
3. To assess students' participation in ecotourism activities
4. To identify constraints to participation.
5. To assess the level of interest in ecotourism among the students.
6. To determine students' perception of ecotourism.

METHODOLOGY

The study area was Abeokuta in Ogun State; an ancient town dating back to the 19th century has its origin linked to Ile-Ife, the cradle of the Yoruba race. The town derives its name from a huge rock called '*Olumo'*. The name Abeokuta in Yoruba language means 'under the rock or beneath the stone'. Abeokuta lies in the tropics within the rainforest belt of the southwestern part of Nigeria. It is located amidst a group of granite rocks of

natural formation and has an average height of about 280 meters above sea level. Students of tertiary institutions in Abeokuta metropolis constitute the population of this study. A structured questionnaire was used to elicit responses from students. Data was gathered from a total of 405 students who were randomly sampled from six tertiary institutions proportionate to size. Five percent of the departments/units were sampled, from where ten percent of the students were randomly sampled namely; Federal University of Abeokuta (94), Crescent University (23), Federal College of Education Osiele (80), Moshood Abiola Polytechnic Ojere (145), Sacred Heart School of Nursing Lantoro (31) and School of Nursing FMC Idi-Aba (32). The results of this study was presented using descriptive statistical tools such as frequencies, percentages and means while inferential statistical tool used was Chi Square.

RESULTS AND DISCUSSION

Personal characteristics of respondents

The modal age category was 21-25 years (55.1%), implying that respondents are still in their prime ages and the quest for knowledge is expected to be high. Hence, interest of respondents in ecotourism can be aroused or stimulated. This result is consistent with Ogunjinmi (2016) who conducted a study among students of the Department of Ecotourism and Wildlife Management, Federal University of Technology, Akure, Nigeria and found that most of the students (58.3%) are between the age brackets of 21-22 years. Similarly, Mirjam (2013) also found that most students surveyed in University of Shkodra, Albania with respect to perception of tourism are between 21-25 years. More so, youths like adventures that is beneficial and highly rewarding. In this study, the females (60.5%) were more than males (39.5%). It is noteworthy that the two nursing schools sampled for this study might have contributed to number of females compared to males. Majority of the respondents were still single (96.8%), indicating that they can fully concentrate on their study with minimum or no distraction. There were more students from Moshood Abiola Polytechnic Ojere (35.8%) and Federal University of Abeokuta (23.2%) compared to students from other tertiary institutions. The percentages of students in 100 (36.0%) and 200 (32.1%) level were more compared to other levels of study. Furthermore, students in faculty of science (30.6%) were more compared to students from other faculties. Students in Faculty of Education and Agriculture were 15.1% and 19.5%, respectively. Thus, awareness of ecotourism among students might be sparing as students are from wide varieties of departments which might not take ecotourism as a course of study. Awareness of ecotourism requires a level of exposure which students need in order to broaden their horizon and sharpen their perspective towards ecotourism potentials, particularly in a nations' economy.

Table 1: Distribution of respondents based on their personal characteristics

Variables	Categories	Frequency	Percentages
Age	15 – 20	147	36.3
	21 – 25	223	55.1
	26 – 30	32	7.9
	31 – 35	3	0.7
Sex	Male	160	39.5
	Female	245	60.5
Marital status	Single	392	96.8
	Married	13	3.2
Institution	Federal University of Abeokuta	94	23.2
	Crescent University	23	5.7
	Federal College of Education, Osiele	80	19.8
	Moshood Abiola Polytechnic, Ojere	145	35.8
	Sacred Heart School of Nursing Lantoro	31	7.6
	School of Nursing FMC Idi-Aba	32	7.9
Level	100	146	36.0
	200	130	32.1
	300	65	16.0
	400	23	5.7
	500	36	8.9
	700	5	1.2
Course of study	Art	15	3.7
	Science	124	30.6
	Education	61	15.1
	Social science	45	11.1

Variables	Categories	Frequency	Percentages
	Agriculture	79	19.5
	Engineering	16	4.0
	Others	65	16.0

Awareness of ecotourism

Table 2 reveals that less than half of the students (42.7%) were aware of ecotourism. This implies that the awareness of ecotourism among students in tertiary institutions is low in the study area and this will not encourage students' participation in ecotourism activities. This is because knowledge is vital in every life endeavour. The low level of students' awareness of ecotourism is tantamount to their low knowledge level. Cini *et al* (2015) research revealed that for the majority of students surveyed, their knowledge of ecotourism remains scarce. Students who were aware of ecotourism got to know about it mostly through school (15.6%) and personal interest (11.9%). This implies that exposure of students to importance and benefits of ecotourism while in school become pertinent coupled with their personal interest. Only 17.0% indicated awareness of ecotourism initiatives, club or society in their schools. Also, 17.0% of the students were aware that there are ecotourism sites in their schools. It was found that 11.8% of students indicated one ecotourism site, 3.0% students indicated 2 sites, while 2.2% students indicated that they had more than two ecotourism sites.

Table 2: Distribution of respondents based on their awareness of ecotourism

	Variables	Frequency	Percentages
A	Are you aware of ecotourism?		
	Yes	173	42.7
	No	232	57.3
B	If yes, indicate the medium		
1	School	63	15.6
2	Personal interest	48	11.9
3	Television	11	2.7
4	Radio	1	0.2
5	Print Media	7	1.7
6	Friends	31	7.7
7	Others	2	0.5
	Neutral	242	2.4
C	Awareness of ecotourism initiatives, club or society in students' schools		
	Yes	69	17.0
	No	336	83.0
D	Ecotourism site awareness		
	Yes	69	17.0
	No	336	83.0
	If yes, indicate number of sites		
	1 Site	48	11.8
	2 Sites	12	3.0
	3 Sites	7	1.7
	4 Sites	2	0.5

Participation in ecotourism activities

The result in Table 3 shows that only 8.6% of the students had ever participated in ecotourism activities. This is at variance with Günay and Akıncı (2017) who found that 38.8% of tertiary students engaged in ecotourism activities. The few students who participated in ecotourism activities engaged in rock climbing (3.2%), sightseeing (1.7%), visitation (1.2%), trekking (1.5%) and cruising (1.0%) once in a while (4.9%). This implies low level of students' participation in ecotourism activities which might not favour ecotourism promotion among students in tertiary institution. Consequently, students after graduation will not be encouraged to engage in any endeavor that is associated with ecotourism due to deficient knowledge of its benefits. Furthermore, 33.6% of the students indicated lack of information as constraining their participation in ecotourism

activities, 14.8% indicated lack of time, while 34.1% did not indicate any constraint to participation. It could be inferred from the result of this study that information on ecotourism potentials will be an effective tool in stimulating students' participation in ecotourism activities in tertiary institutions. Other constraints militating against students' participation in ecotourism activities were cost (7.2%), lack of interest (6.2%) and safety (4.2%).

Table 3: Distribution of respondents based on their participation in ecotourism activities

	Variables	Frequency	Percentages
A	Have you ever participated in ecotourism activities?		
	Yes	35	8.6
B	If yes, indicate activities		
1	Rock/Mountain climbing	13	3.2
2	Sight seeing	7	1.7
3	Visitation	5	1.2
4	Walking/Trekking	6	1.5
5	Cruising	4	1.0
C	Frequency of participation in ecotourism activities		
1	Forthnightly	1	0.2
2	Monthly	3	0.7
3	Seldomly	8	2.0
4	Yearly	1	0.7
5	Once in a while	20	4.9

Table 4: constraints to students' participation in ecotourism activities

Constraints	Frequency	Percentage
Safety	17	4.2
Lack of interest	25	6.2
Cost	29	7.2
Lack of time	60	14.8
Lack of information	136	33.6
Neutral	138	34.1

Interest in ecotourism

Table 4 shows that almost all (90.9%) the respondents reflected that they would like to know more about ecotourism. The main reason that stimulates students' interest in ecotourism was to understand the natural environment (46.9%) and get close to nature (20.7%). This result aligns with Günay and Akıncı (2017) who found that 17.6% and 29.5% of tertiary students' interest in ecotourism is stimulated by seeing cultural/historical attractions and seeing natural beauties, respectively. Few students indicated relaxation (8.9%) and fun/pleasure (7.2%) as reasons for their interest in ecotourism. Very few of the respondents indicated lack of time (6.6%), lack of information (1.0%) and boredom (1.5%) as reasons for lack of interest in ecotourism. It could be inferred from the result of this study that if students are well informed on ecotourism, they will have adequate knowledge which would have spurred their perception of and interest in ecotourism.

Table 5: Distribution of respondents based on their interest in ecotourism

	Variables	Frequency	Percentages
A	Are you interested in knowing more about ecotourism?		
	Yes	368	90.9
B	If yes, state reason		
1	To understand natural environment	190	46.9
2	To get close to nature	76	18.8
3	For relaxation	30	7.4
4	For fun and pleasure	29	7.2
5	Habit	10	2.5
6	For environmental actions	11	2.7

	Variables	Frequency	Percentages
7	To understand environment and to get close to nature	8	2.0
C	Reasons for lack of interest		
1	Lack of time	27	6.6
2	Boring	6	1.5
3	Lack of information	4	1.0

Perception of ecotourism

Table 5 presents students' perception of ecotourism and it was found that most students were favourably disposed towards ecotourism bringing about infrastructural development ($\bar{X}$=4.20), positive changes in value system of the community ($\bar{X}$=4.30), employment opportunity for indigenous population ($\bar{X}$=4.41), recreational opportunities ($\bar{X}$=4.45), source of revenue generation for the government ($\bar{X}$=4.22), incentive for the protection and conservation of natural resources ($\bar{X}$=4.21) and conservation of wild plants and animals ($\bar{X}$=4.26). The result of this study implies that students are favourably disposed to ecotourism, hence it could be inferred that any initiation on ecotourism promotion will be welcomed. Students are mostly youths and when they are well groomed with the nitty-gritty of ecotourism while in school they will be able to influence the larger society, thereby paving way for a better economy that is well balanced. The result of this study is consistent with Mirjam (2013) who found that tertiary students had favourable perception towards the positive economic and socio-cultural impacts of ecotourism.

Table 6: Distribution of respondents based on their perception of ecotourism

S/N	Perception statements	SA	A	U	D	SD	Mean
1	Ecotourism will encourage infrastructural development	38.5	44.2	6.7	2.2	2.7	4.20
2	Ecotourism brings about positive changes in value systems of the community	39.3	47.4	5.9	0.2	1.5	4.30
3	Ecotourism brings change to traditional culture	20.7	37.0	16.8	9.4	8.9	3.60
4	Ecotourism creates employment opportunity for indigenous population	40.2	42.2	7.4	1.7	2.0	4.41
5	Ecotourism enhance acculturation	25.9	43.2	18.8	3.0	2.5	3.93
6	Ecotourism provide incentive for the protection and conservation of natural resources	36.3	43.7	8.1	2.5	1.2	4.21
7	Ecotourism promote the conservation of wild plants and animals	43.2	37.0	7.4	2.2	2.5	4.26
8	Ecotourism increases recreational opportunities	36.8	42.2	10.4	1.2	2.5	4.45
9	Ecotourism increases revenue of local government through visitation by tourist	40.2	40.0	8.6	1.7	2.5	4.22
10	Ecotourism boosts preservation of nation integrity	27.2	46.2	12.6	2.5	3.5	3.99
11	Ecotourism encourage sustenance of cultural activities by local residents	25.7	44.4	17.3	2.0	3.5	3.93
12	Ecotourism makes awareness of the potentials of the community possible	26.9	48.4	12.6	1.5	3.2	4.02
13	Destruction of natural beauty by establishment/presence of hotels and other tourist facilities	15.3	21.5	16.3	20.0	19.8	2.91
14	Ecotourism promote erosion of local culture	15.3	31.4	22.7	9.9	13.1	3.27
15	There is possibility of preserving cultural or historical based attraction through ecotourism	33.3	42.7	11.4	2.2	3.5	4.08

Test of relationship between students' personal characteristics and perception of ecotourism

The result of the Chi square relationship between students' personal characteristics and perception of ecotourism shows that the relationships between institution attended (χ^2 = 0.274, p<0.01), level of study (χ^2 = 0.174, p<0.05) and perception of ecotourism were significant. This implies that school and level of study had influence on students' perception of ecotourism.

Table 7: Chi square analysis of students' personal characteristics and perception of ecotourism

Variables	df	χ^2	p-value	Decision
Sex	1	0.000	0.993	Not significant
Age	3	0.042	0.871	Not significant
Marital status	1	0.021	0.679	Not significant
Institution	5	0.274	0.000	Significant
Level	5	0.174	0.027	Significant

CONCLUSION AND RECOMMENDATIONS

Based on the findings from this study, it can be inferred that awareness of ecotourism potentials is still sparing among students of tertiary institutions. This has resulted in low participation in ecotourism activities by students. However, favourable perception of ecotourism by students as found in this study serve as a ladder that could be used for ecotourism promotion. The study recommends intensification of ecotourism awareness, ecotourism advocacy and promotion of programs that will encourage students' participation in ecotourism activities.

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Reporting of aquaculture issues in Nigerian newspapers

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ABSTRACT

Newspapers, like other media types determine to a large extent the level of attention given to an issue by the government and the public due to the coverage of such issues. This study assessed the reportage of aquaculture issues in selected Nigerian newspapers with a view to ascertain its importance in the day-to-day lives of the reading public. Variables measured included types of story, sources, placement and space allotted to aquaculture related stories. Data were analysed using both descriptive (frequency, percentage) and inferential (Analysis of Variance) statistics at $p<0.05$. Results show that production was the most reported issues (38.9%) in area of the value chain, while the combination of production and marketing were the least reported (8.3%). Government officials (37.5%) provided most of the information disseminated by the media. The mean space allotted to aquaculture issues was 240.9722cm^2, while 51cm^2 and 600cm^2 were the minimum and maximum, respectively. Majority of the articles (90.3%) were placed on less important pages of the newspapers. The quantum of coverage of aquaculture issues by the media in Nigeria dailies was limited and prominence was low. Nigeria's press needs to do more in the coverage of aquaculture issues.

Keywords: Aquaculture issues, content analysis, coverage, Nigerian newspapers

INTRODUCTION

The mass media is a very important communication outlet and has been found to play very significant roles in the change process. One of the ways in which the media performs this role is through its agenda setting role (Van den Ban and Hawkins, 1996). The media introduces new topics and issues and sustains discussion around such with the aim of influencing the media consumers' opinions and behaviours towards the issues. It is also potent in the area of awareness creation as well as diffusion of personal value systems that are favourable to innovations, mobility, achievement and consumption (Mc Quail, 1987). The mass media can also be useful in removing obstacles in the transition process from traditionalism to modernity (Lenner, 1958); Wesseler and Brinkman, 2002).

In the field of agriculture, the mass media has been quite useful in the diffusion of new technologies. In fact, in many African countries, it has complemented and virtually become part and parcel of the extension delivery system. Among the different mass media types, the print media as exemplified by the newspapers deserves a special mention as an important source of agricultural information to farmers (Padre and Tripp, 2003). This is because newspapers are enduring and very popular print media organ which can be read and re-read at one's convenience. This feature allows for a fuller and better understanding of their contents and therefore helps in the process of information exchange and behaviour change (Albrecht *et al.,* 1989; Lightfoot, 2003). In essence, the newspapers are potent and fundamental tools for technology transfer in the aid of agricultural and rural development.

Aina (1990) and Fett (1972) stated that the successes recorded in agricultural production in certain North and South American countries can be attributed to the relative ease of access to agricultural information, as contained in newspapers. In Nigeria however, the case is a bit different as Agumagu (1988), Olowu (1990) and Mundy and Sultan (1999) reported that the level of reportage of agricultural and rural development news by newspapers was low, despite the importance of agriculture to the Nigeria's economy. Reasons adduced for the poor performance of the print media in this regard include; financial and space constraints, illiteracy and language barrier, lack of participation, poor revenue generating potential, personal values and the belief of the editor, advertisers and media owners (Ozowa, 1995; Van den Ban and Hawkins, 1996; Mundy and Sultan, 1999; Nwachukwu, 2005).

In the meantime, a recent review of the situation showed that in spite of these enormous challenges, newspapers in Nigeria still devote spaces for reportage of rural and agricultural based news (Fawole and Olajide, 2012a). However, it is doubtful whether reportage of aquaculture issues by Nigerian newspapers had been given deserved attention over the years, despite the increasing contribution of the sector to the Nation's Gross Domestic Product (GDP).

The society as a whole will not be aware of the contribution of aquaculture to the economy and the challenges faced by main actors in the aquaculture value chain, if Nigerian newspapers traditionally charged with setting agenda around development issues give no meaningful attention or focus.

To accelerate the development of the aquaculture sector, it is imperative that relevant issues are covered in the nation's newspapers. These issues could be problems (such as post-harvest loss) facing the sector so that awareness can be created or success stories from aquaculture entrepreneurs that could arouse interest of the populace to engage in aqulculture-based enterprise, thereby stemming unemployment. In essence, there is a need for the media (newspapers) to fill the gap between the main actors (farmers) in aquaculture and the policy regulators or agencies by making known the challenges they face and calling on the required agencies to solve these problems promptly. This ensures that more attention is paid to the plight of the farmers and consequently leads to increased productivity and efficiency and consequently, a rapid growth of the economy.

In the light of the aforesaid, this study therefore, investigated the coverage of aquaculture issues in three Nigerian newspapers namely; Vanguard, The Nation and Punch and sought answers to the following research questions:

1. What types of aquaculture stories do these newspapers report?
2. What are the sources of information quoted in the reported stories?
3. What is the space allotted to these stories?
4. Where are the aquaculture stories placed in these newspapers?
5. What is the frequency of reportage of these stories?

METHODOLOGY

Content analysis was adopted for this study. Three national daily newspaper in Nigeria made up the population for content analysis. The national dailies include; Vanguard, Punch and The Nations. The consideration for choosing these is because of the extent of readership and influence attributed to national newspaper (Media Reach OMD Nigeria, 2014) and total bias in news.

The coverage of aquaculture issues by the media is not certain though there are indications that such issues are routinely reported in the newspaper. Therefore for the purpose of this study, time frame for the study was from September 1st, 2016 to August 31st, 2017. This is because the recession faced by the economy was well pronounced during this period and there was a national cry for agricultural development. The government officially confirmed that the economy was officially in recession on August 31st 2016. And on September 05, 2017, the National Bureau of Statistics announced that the Nigerian economy was out of recession.

Sampling procedure and sample size

For the purpose of this study, three widely read newspaper were selected for the purpose of data collection and analysis for this study. Newspapers articles for this study were gathered from Kenneth Dike Library University of Ibadan (research library data base) using keywords "aquaculture issues". Articles that were selected for the research include; news articles, feature article and culled article.

Purposive sampling technique was used to select three Nigerian daily newspapers that have wide coverage of readers and report aquaculture issues which according to Media Reach OMD Nigeria (2014) include: The Punch, Vanguard and The Nation. Systematic random sampling technique was used to select newspapers editions of Mondays, Wednesdays, Fridays and Sundays only in each week within the selected time frame.

A total of 72 articles drawn from the three Nigerian tabloids constituted the population of this study. Nineteen aquaculture articles and stories were obtained from The Nation, while 31 and 22 articles were obtained from Vanguard and Punch, respectively. Only 72 aquaculture articles were used from 478 editions of newspapers.

Data analyses

Descriptive statistics (frequencies and percentages) and inferential statistics (ANOVA) were used to arrange and describe and test the hypotheses, respectively.

RESULTS AND DISCUSSION

Aquaculture issues reported in the newspapers

From the analysis of the reviewed aquaculture issues reported in the Nation, Vanguard and the Punch as shown in Table 4.1, production was the most reported area of the value chain (28 out of 72 overall articles, representing 38.9%). While the combination of production and marketing were the least reported (6 out of 72 articles, representing 8.3%).

This shows that the newspapers gave more attention to the production area. This reflects a traditional approach to the field of agriculture. A

lot still needs to be done in changing the outlook of an average Nigerian to appreciate that agriculture as a field is a complete value chain that goes beyond production. This current outlook may prove detrimental to efforts being made to reduce post-harvest losses, because there would be reduced sensitisation and awareness creation on issues relating to processing and marketing.

Table 1: Distribution of aquaculture issues reported in the Dailies

Types of news	Frequency	Percentage (%)
Marketing	7	9.7
Processing	8	11.1
Production	28	38.9
Production and marketing	6	8.3
Production and processing	8	11.1
Processing and marketing	7	9.7
Production, marketing and processing	8	11.1
Total	**72**	**100.0**

Source: Newspaper Content Analysis, 2018

Sources of information quoted in the reported stories

Government officials provided the most information to the media (27 times out of 72 articles, representing 37.5%), while news reporters and fish farmers were both the lowest (both 6 out of 72, representing 8.3%). University scientists and fish farmers should provide more information to news organisations. Likewise, editors should seek more information from them. University scientists and fish farmers are repositories of knowledge and skills that should be engaged along with other sources of information. Information from government officials may be biased towards the government, and this may prove detrimental to fish farmers. This affirms the result of Fawole and Olajide 2012a) who also reported government officials as main sources of news on climate change.

Table 2: Distribution of sources of information on aquaculture in Nigeria's dailies

Sources of Information	Frequency	Percentage (%)
Government officials	27	37.5
Research Institutes	24	33.3
University scientists	9	12.5
News reporters	6	8.3
Fish farmers	6	8.3
Total	72	100

Source: Newspaper Content Analysis, 2018

Space Allotted to the Stories

The mean space allotted to aquaculture issues was 240.9722cm^2, while 51cm^2 and 600cm^2 were the minimum and maximum, respectively. The area of space with the highest percentage allotted to the articles was between 101 and 200cm^2 representing 37.9%, while the lowest was between both 1 to 100cm^2 and 501 to 600cm^2, representing 7.0%. It is evident from the result that little space was accorded the coverage of aquaculture related news in the Dailies. This suggests that aquaculture issues were not considered to be important by the editors of the dailies considering GOI (2001) assertion that the more space allotted to an issue, the more importance editors attach to such issues. Therefore, if aquaculture issues are intended to be deemed important by the reading audience, more space should be allotted to aquaculture issues in the newspapers. If more space is allotted, more information will be revealed to the public.

Table 3: Distribution of aquaculture issues based on space allotted in the dailies

Space Allotted	Frequency	Percentage (%)
1-100	5	7.0
101-200	26	37.9
201-300	20	23.7
301-400	10	14.9
401-500	6	9.4
501-600	5	7.0
TOTAL	72	100

Source: Newspaper Content Analysis, 2018

Placement of aquaculture stories in the newspapers

Majority of the articles were not given the required prominence they deserve. Out of 72 articles, only 5 (6.9%) were on the front page, 2 (2.8%) were on the back page, none was in the middle page, while 65 (90.3%) of the articles were on other pages, which reduces its prominence. This is in accordance with previous findings on the placement of agricultural issues in Nigerian newspapers. Several studies (Olowu and Yahaya, 1993; Fawole and Olowu, 1997; Fawole and Olajide, 2012a; Fawole and Olajide 2012b; Olajide and Fawole, 2014) have reported non-strategic placement of agricultural related news items in Nigerian newspapers. It is however noted that media hype in Nigeria's daily normally revolves around issues like politics, economic, sports and entertainment (Olajide and Fawole, 2014), as they generate more revenue for the newspaper agency. To achieve the desired outcome in the awareness of aquaculture issues, it is important that media agencies give priority to aquaculture issues as given to politics, sports and entertainment, by placing them in strategic locations on the newsapers as generally, the populace are captivated by news items that are either placed in front pages, middle or back pages as they seem to be more important to other articles not captured in these positions.

Table 4: Distribution of aquaculture issues based on placement of articles in the newspapers

Placement	Frequency	Percentage (%)
Front page	5	6.9
Back page	2	2.8
Middle page	0	0
Other pages	65	90.3
TOTAL	72	100

Source: Newspaper Content Analysis, 2018

Test of Difference in the space alloted to aquaculture issues among the Newspapers

Result on Table 6 reveals that there was no significant difference (F= 1.997, P= .143) in the space alloted to aquaculture issues among the selected newspapers. This implies that space allotted to aquaculture issues does not vary among the selected newspapers. The space allotted is generally low and this could affect the importance attached to the issues by the readers.

Table 6: Analysis of variance (ANOVA) test of difference in the space alloted to aquaculture issues among the newspapers

Variable	Sum of squares	Df	Mean square	F value	P value	Decision
Between Groups	65400.809	2	32700.405	1.997	0.143	NS
Within Groups	1129715.135	69	16372.683			
Total	1195115.944	71				

Source: Newspaper Content Analysis, 2018

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it was observed that the volume of coverage of aquaculture issues by the media in Nigeria dailies was limited in addition to the low prominence given to them. This is an indication that information on aquaculture issues in Nigerian newspapers is not enough to set agenda for public debate on the issue, awareness of the issue and as such educate or sensitise readers on the issues. In addition, the nature of information sourced as well as the sources of information on the issue are too restricted to get a better appreciation of the prospects and challenges of the aquaculture sub-sector.

It is therefore recommended that:

i. Editors should place more aquaculture issues on strategic pages, such as the front, back or middle pages of their newspapers. This is because these positions attract more attention of the public.

ii. More space should be allotted to aquaculture issues in the newspapers. If more space is allotted, more information will be revealed to the public.

iii. Journalists should source for more information covering marketing and processing of aquaculture products. This will reduce major

problems such as post-harvest losses incurred by fish farmers.

iv. University scientists and fish farmers should provide more information to news organisations. Likewise, editors should seek more information from them.

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Fish farmers' adoption of improved management practices in Ogun state, Nigeria

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ABSTRACT

The study examined the adoption of Improved Management Practices (IMPs) among fish farmers in Ogun state, Nigeria. A structured interview schedule was utilized in obtaining information from 108 respondents. Means, frequency and percentage were used in describing the data, while chi-square and Pearson Product Moment Correlation (PPMC) were used in testing the hypotheses. The study reveals that majority (83.3%) were within the age range of 35-45 years, and mostly males (54.6%). Most respondents (58.3%) were married, had primary (36.1%) and secondary (13.9%) education. Majority (55.6%) of the respondents had farming experience of 1-5 years, feed their fishes with both local (38.0%) and improved feeds (30.6%). Most respondents (61.1%) were small scale farmers and earned #51,000 - #100,000 as annual income. Inadequate capital (75.0%), poverty (51.9%) and paper policy of government (49.1%) were identified as severe constraints militating against respondents' adoption of IMPs. Rate of adoption of IMPs among fish farmers in the study area was high for (59.3%) of the respondents. There were significant relationship between farmers' experience (x^2=10.908, p=0.004) constraints (r=0.359, p=0.000) and adoption of IMPs. It is recommended that fish farmers should be encouraged and mobilized to form cooperative groups in order to gain easy access to credit. Extension agent should organise special training in on-farm feed formulating for fish farmers for attainment of cheaper feeds using locally available feedstuffs.

Keywords: Fish Farmers, Improved Management Practices, Fish feed stuff.

INTRODUCTION

In Nigeria, the role of fish farming in achieving household and national food security and poverty alleviation cannot be over-emphasized. Fish farming, an artificial method of raising fish for human consumption, is an ancient practice that can provide profitable means of livelihood for both rural and urban dwellers (Salu *et al*., 2014). Fish is an important protein source for teeming Nigerian population, consisting about 60% of the total protein intake in adults especially in rural areas. Adekoya and Miller (2004) cited by Kainga *et al.* (2016), asserted that fish farming generates employment directly or indirectly in terms of people employed in the production of fish and other allied businesses. It also generates income for all categories of people involved in fish farming and thus contributes to the national income (Olagunju, Adesiyan and Ezekiel, 2007). According to Central Bank of Nigeria (CBN, 2005), fisheries occupy an important position in the agricultural sector of the Nigeria's economy. The contribution of the fishery sub-sector to GDP rose from ₦76.76 billion in 2001 to ₦162.61 billion in 2005 (CBN, 2005).

However, the gap between supply and demand for fish in Nigeria is widening. Almost all natural fish stocks in the country have been over-exploited, yet human population increases and hence demand for fish continues to increase significantly. According to Dauda (2010) cited by Salau *et al.* (2014), national fish demand in Nigeria is 1.85 million metric tonnes while domestic production is about 0.51 million metric tons. Nigeria currently imports 0.7 million metric tons of frozen fish annually (CBN, 2005) making it the highest importer of frozen fish in the world, at annual foreign exchange cost of ₦35 billion (CBN, 2005, Ofuoku *et al*., 2008 and Salau *et al.* 2014). Access to accurate and adequate information on fish production technologies by farmers is essential for increased fish production. Such information must come from reliable sources, at the right time, and farmers should be able to adopt them correctly.

Aphunu and Agwu (2014) submitted that adoption of improved aquaculture technologies strengthens production and thus increases fish food security and economic growth at individual and national levels as it increases farmers' competence in knowledge, skill and techniques in aquaculture management practices. Ogun state is one of the states in Nigeria that has great fisheries potentials. The state is blessed with so many streams and ponds that can be harnessed for fish farming.

In spite of this great potential, fish farming in Ogun state is still poorly developed (OGADEP, 2016).

According to Amali and Solomon (2001), some of the challenges to increased fish production in Nigeria and Ogun state in particular include inadequate fingerling production, lack of earth-moving equipment, high cost of feeds, low capital investment and non-adoption of improved management practices by the fish farmers.

To this end, many international, government and non-governmental agencies have made frantic efforts to fund research institutions to develop modern fishery technologies and innovations that have been disseminated (Adelodun and Fregene, 2016) to farmers for increased productivity. Some of these improved production technologies or practices include improved technologies in pond construction and maintenance, modern fishing gears, inlet and outlet devices in ponds, fertilization and liming of fish pond, fortification of fish feeds using root and tuber crops, prevention and control of fish diseases, control of water quality and use of aerated containers for transporting fingerlings to reduce stress and mortality.

However, it is not known to what extent these technologies or improved management practices have been adopted by fish farmers in the state, and what constrained them from adopting the improved management practices. It is against this backdrop that this study was carried out to examine the adoption of improved management practices by the fish farmers in Ogun state, Nigeria. The specific objectives were to:

i. Describe socio-economic characteristics of fish farmers in the study area.

ii. Identify respondents' sources of information on improved management practices.

iii. Identify constraints facing fish farmers in adopting improved management practices.

iv. Determine the adoption of improved management practices by the respondents in the study area.

Hypotheses

Hypothesis 1: There is no significant relationship between respondents' socioeconomic characteristics and their adoption of improved management practices

Hypothesis 2: There is no significant relationship between constraints to adoption and their adoption of improved management practices

METHODOLOGY

The study was carried out in Ogun state, Nigeria. Ogun state covers a land area of approximately 16,409,26 square kilometers with a population of about 3,728,098 people (NPC, 2006). The state lies within latitude 6^0N ad 8^0N and longitude 2.5^0E and 50^0E. The state has a tropical climate with mean annual rainfall of about 1500 millimetres and temperature range of 25^0C – 35^0C.

The area is an agrarian community that engaged in crop, fishery and poultry production. The state is blessed with streams an ponds that can favourably support fish farming. The research design was a descriptive survey method and fish farmers that registered with Ogun State Agricultural Development Programmes (OGADEP) were used as respondents. Multi stage sampling procedure was employed for the study. Ogun state is divided into four agricultural extension zones namely: Egba, Yewa, Remo and Ijebu zones. In the first stage two extension blocks were randomly selected from each zone. The second stage was selection of two cells in each of the eight blocks, giving a total of sixteen cells. The third stage involved the simple random selection of 5% fish farmers registered with OGADEP in each cell which gave a total of one hundred and eight fish farmers (108). A structured questionnaire was used to collect data from the respondents. Descriptive statistical tools such as percentage, frequency counts and mean were used to describe socio-economic characteristics of the respondents. Chi-square and Pearson Product Moment Correlation were used to test formulated hypotheses at 0.05 level of significance.

Level of rate of adoption of fish farmers' improved management practices was measured on a 2-point scale and was scored as Adopted (AD=1) and Not Yet Adopted (NYA=0). Adoption score was computed by summing up respondents' score for each IMP. This results to a minimum score of 0 and maximum score of 15. From this, mean score was calculated and used as criterion to categorize respondents' adoption level into high and low. Respondents who scores fell below the mean score were categorized as low and those that fell on the mean score and above were categorized high.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Age distribution of the respondents as presented in Table 1 shows that most (83.3%) were within the age range of 35-35 years, (11.1%) were 46-55 years and few respondents (5.6%) fell within the range of 56-65 years of age. This implies that respondents were in their productive age ad have vigour to engage in fish farming. Age is an important factor when considering fish farming. It has been argued that age in some instances, could be on entry criterion for some livelihood activities.

This result is in agreement with that of Salau *et al.* (2014) and Ashley-Dejo *et al.* (2013) who carried out similar studies in Nassarawa and Oyo states, Nigeria and reported same age distribution of fish farmers. The result on respondents' sex in Table 1 reveals that majority of the respondents (54.6%) were males while (45.4%) were females. This implies that more males involved in fish farming than females in the study area. This result is concomitant with that of Usman *et al.* (2016) who carried out similar study in Adamawa state, Nigeria and observed that fish farming in the state dominated by males. It also agreed with that of Ewebiyi and Olatunji (2018) who observed that fish farming in Ijebu Ode Local Government Area of Ogun State was male dominated. The marital status of respondents as indicated in Table 1 shows that greater proportion (58.3%) were married while (35.2%) were single. Obviously, the married farmers have more responsibilities to provide for their families hence are more likely to engage in fish farming as a complimentary activity to meet up with their economic needs. This result is in line with that of Aweto and Ademuyiwa (2017) who observed same marital status of the respondents in Lagos State, Nigeria.

Respondents' religion affiliation result reveals that most respondents (63.9%) were Christians while (36.1%) were Muslims. This result agrees with that of Ashley-Dejo *et al.* (2013) in Oyo state. The implication is that more Christians engaged in fish farming than Muslims in the study area. Table 1 also shows distribution of the respondents based on their education attainment. Analysis of results revealed that more than quarter respondents (28.7%) had primary education, (36.1%) had secondary education, while (1.3%) had vocational and adult education. Education is very important and it can likely influence adoption of innovation among fish farmers. It is believed that respondents who had formal education may have been exposed to some theories and practices of fish farming to some extent in the subject of agricultural science which forms part of the primary and secondary school curriculum in Nigeria (Adebiyi, 2008). Concerning farming experience of the respondents, most (55.6%) had 1-5 years experience, and more than one-third (33.3%) had 6-10 years farming experience This implies that respondents in the study area are experienced farmers as majority (88.9%) had 1-10 years experience. This result is in agreement with that of Ipadeola *et al.* (2018) who carried out similar study and reported that fish farming in Ogun state was carried out by experienced farmers. This is expected to impact on them positively on adoption of improved management practices. Most respondents (61.1%) had 1-5 ponds, (29.6%) had 6-10 ponds, while (4.6%) and (3.7%) had 11-15 and 16-20 ponds respectively. This result implies fish farmers in the study area are small scale holders. This may be attributed to socio-economic status of the respondents and unfavourable government policy on fish production in the state (Ewebiyi and Olatunji, 2018).

The result of analysis on type of feeds used by the fish farmers to feed their fishes reveals that (38.0%) fed their fishes with local feed, (30.6%) used imported feed, (19.9%) used concentrated feed and (17.6%) fed their fish with pellet. This result implies that fish farmers in the study area had access and could afford to feed their fishes with local and imported feeds. This result is in tandem with the findings of Salau *et al.* (2014) in Nassarawa state, Nigeria and Rozana and Roslina (2015) in Malaysia who reported that fish farmers mostly had access and could afforded to feed their fishes with local and imported feeds.

On fish farmers' income, the result shows that majority of respondents (59.1%) earned income less than ₦50,000 and more than quarter of them earned ₦51,000 and ₦100,000 as income. This may be attributed to small scale farming operating by the respondents. This result is in agreement with that of Ewebiyi and Olatunji (2018) who also reported low income among fish farmers in Ijebu Ode Local Government Area of Ogun State, Nigeria.

Table 1: Distribution of respondents' by socio-economic characteristics

Variables	Frequency	Percent
Sex		
Male	59	54.6
Female	49	45.4
Age (Years)		
<35	51	47.2
36-45	39	36.1
46-55	12	11.1
56-65	6	5.6
Marital Status		
Single	38	35.2
Married	63	58.3

Variables	Frequency	Percent
Divorced	3	2.8
Widowed	1	0.9
Religion		
Christianity	69	63.9
Muslim	39	36.1
Educational Status		
Primary education	31	28.7
Secondary education	39	36.1
Vocational education	15	13.9
Adult education	23	21.3
Years of Farming		
1 -5	60	55.6
6 – 10	36	33.3
11 – 15	8	7.4
16 – 20	4	3.7
Number of Ponds		
1 – 5	66	61.1
6 – 10	32	29.6
11 – 15	5	4.6
16 – 20	4	3.7
> 21	1	0.9
Types of Feed		
Local feed	41	38.0
Imported feed	33	30.6
Concentrated feed	15	13.9
Pellet feed	19	17.6
Income (Naira)		
Less or equal #50000	65	59.1
51,000 – 100,000	28	25.5
101,000 – 150,000	12	10.9
151,000 – 200,000	4	3.6
>200,000	1	0.9

Source: Field survey, 2018

Respondents' sources of information on IMPs

The result of respondents' information sources in Table 2 reveals that co-farmers (84.3%) friends and family (76.9%) and radio (63.9%) were the main sources of their information on improved management practices, as well as extension agents (53.7%) and cooperative society (48.1%). This implies that respondents are not cut away from latest development on improved management practices and this may favourable predispose fish farmers in the study area to be fully aware of improved management practices and use them to maximize productivity and income towards enhancement of better standard of living of fish farmers in the study area. This result agrees with the findings of Salau *et al.* (2014) who observed radio and co-farmers as main sources of respondents' information on improved management practices in fish farming in Nasarawa state, Nigeria.

Table 2: Distribution of respondents' by sources of information

Items	Frequency	Percent
Radio	69	63.9
Extension agent	58	53.7
Friends and family	83	76.9
Newspaper	50	46.3
Co-farmers	91	84.3
Online resources	55	50.9
T.V. broadcasts	50	46.3
Cooperative society	52	48.1
Schools	46	42.6

Items	Frequency	Percent
Experience over time	81	75.0
Posters	46	42.6
Extension guide	56	51.9

Source: Field survey, 2018

Respondents' adoption of improved management practices

The result of analysis reveals that most of the improved management practices (IMPs) listed in Table 3a were highly adopted such as feed formulation (92.6%), water quality maintenance (90.7%), fish stocking (89.8%), liming (88.9%), control f pests and diseases (88.0%). Only few, pond construction (50.65), fish breeding (47.2%) and sampling (41.3%) were adopted at average level. The overall adoption rate of improved management practices as shown in Table 3b revealed that most respondents (71.4%) adopted at high level while (28.6%) fell within low level of adoption. This result concurred with the findings of Ashley-Dejo *et al*. (2013) and Salau *et al.* (2014) who carried out similar studies in Oyo and Nassarawa states, Nigeria and respectively observed high level of adoption of improved fishery technologies among their respondents.

Table 3a: Respondents' adoption of improved management practices

IMPs	Adopted (AD)	Not Yet Adopted (NYA)	Mean
Legal permit	66.7	33.3	1.59
Site selection	88.9	11.1	1.98
Pond construction	50.6	49.4	1.54
Water quality control	90.7	9.3	2.12
Liming	88.9	11.1	1.98
Fish stocking	89.8	10.2	2.06
Fertilization	78.7	21.3	1.93
Feed formulation	92.6	7.4	2.22
Control of pests and diseases	88.0	12.0	1.95
Weed control	70..4	29.6	1.81
Sampling	41.3	58.7	1.44
Fish breeding	47.2	52.8	1.50
Marketing	74.1	25.9	1.84
Harvesting	83.3	16.7	1.94
Record keeping	51.0	49.0	1.55

Source: Field survey, 2018

Table 3b: Level of adoption of improved management practices

Level	Freq	Percent	Mean	SD	Minimum	Maximum
Low	31	28.6	27.08	6.426	0.00	15.00
High	77	71.4				

Source: Field survey, 2018

Constraints to adoption of improved management practices

Numerous constraints were identified as restraining fish farmers from adopting IMPs in the study area (Table 4). According to the result of the analysis, a large number of respondents (75.0%, 68.5% and 51.9%) respectively observed inadequate capital, high cost and poverty as severe constraints to adoption of IMPs. Also, nearly half (49.1%, 41.7% and 40.7%) opined that paper policy of government, inadequate dissemination of information and lack of storage facilities were severe constraints to adoption of IMPs. According to Ewebiyi and Olatunji (2018), Bolorunduro and Adesehenwa (2004), adoption of improved management practices depends on cost, favourable government policy on fish farming, adequate and functional storage facilities. The implication of this result is that respondents may not be able to adopt improved management practices as a result of aforementioned problems.

Table 4: Distribution of constraints to adoption of improved management practices

Constraints	Severe	Mild	Not a constraint	Mean
Government policies	49.1	28.7	22.2	1.27
Inadequate capital	75.0	21.3	3.7	1.71
High cost	68.5	17.6	13.9	1.55
Incidence	24.1	62.0	13.9	1.10
Lack of storage facilities	40.7	44.4	14.8	1.26
Water scarcity	26.9	28.7	44.4	0.82
Poor water quality	24.1	42.6	33.3	0.91
Farm microcredit	28.7	46.3	25.0	1.04
Inadequate dissemination of information	41.7	35.2	23.1	1.12
Poverty	51.9	25.9	22.2	1.30
Inadequate records	41.7	38.9	19.4	1.22
Conservatism	26.9	47..2	25.9	1.01
Illiteracy	33.3	27.8	38.9	0.94
Inadequate extension agents	33.3	32.4	34.3	0.99

Source: Field survey, 2018

Analysis of selected fish farmers characteristics, constraints to adoption and adoption of IMPs

Table 5 presents the results of the inferential statistical analysis of respondents, socio-economic characteristics, constraints to adoption and adoption of IMPs. Experience (x^2=10.908, p=0.004) was significantly related to their adoption of IMPs. This implies that fish farmers with wider experience are more favourably disposed to adoption of IMPs for fish farming. The result further reveals that constraints (r=0.359, p=0.000) also had a significant relationship with their adoption of IMPs. This implies that constraints faced by the respondents posed a threat to their adoption of IMPs.

Table 5: Analysis of selected respondents' socio-economic characteristics, constraints to adoption and adoption of IMPs

Variables	χ^2	df	r-value	p-value	Decision
Experience	10.908	2		0.004	Significant
Constraints			0.359	0.000	Significant

Source: Field Survey, 2018

CONCLUSION

This study examined fish farmers' adoption of Improved Management Practices in Ogun state, Nigeria. Results showed that respondents were predominantly males with low level of education, they were in their productive active years. Co-farmers, friends and family, radio and cooperative societies were respondents' sources of information on improved management practices. Most of the respondents were small-scale producers. Experience and constraints were significantly related to respondents' adoption of improved management practices. Inadequate capital and storage facilities, poverty and paper policy of government on fish production in Nigeria were identified by the respondents as severe constraints hindering adoption of improved management practices. Respondents' level of adoption of improved management practices in the study area was high.

RECOMMENDATIONS

In the light of the major findings of this study, the following policy recommendations are advanced for enhancement of sustainable high adoption of improved management practices, productivity, income and better standard of living among fish farmers in the study area.

i. Fish farmers in the study area should be encouraged and mobilized to form cooperative groups in order to gain easy access to credit.

ii. Extension agents should organize special training in on-farm feed formulation for fish farmers to enable them formulate cheaper fish feeds using locally available feedstuffs.

iii. Other channels of information, notably mass media should be used by the extension agents to disseminate improve management practices to the fish farmers in the study area.

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Farmers' access to agro-industries as alternative market for agricultural produce in Ife-East Local Government Area of Osun State

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ABSTRACT

This paper examined farmers' access to agro-industries as alternative market for agricultural produce in Ife-East Local Government Area of Osun State. Primary data were collected with the aid of well-structured questionnaire from a total of randomly selected120 farmers from Ife-East Local Government Area (LGA) of Osun State. Data were analysed using descriptive statistics and probit regression analytical technique. Results reveal that the mean age of respondents from the study area was 55 years. Majority (95.0%) had farming as their primary occupation and all the respondents had access to agro-industries. The binary probit regression model reveals marital status (-0.93) and secondary education (0.55) affected farmers' access to agro-industries. The study concluded that farmers had access to and benefited from agro-industries but faced challenges such as poor road network, low levels of human capital as well as lack of good storage facilities. The study therefore recommended that communities, private organizations and government should partner to provide modern infrastructures such as accessible road network, improved storage facilities. Also, private organizations and government should motivate, encourage and equip agro-industries that are still in their infancy. The key policy implication is that there is need to improve on the efficiency of agro-industries' services in the study area as well as more synergy between the farm, farmers and industries.

Keywords: Agro-industries, Alternative market, Market Access, Agricultural produce

INTRODUCTION

The fight against hunger in order to improve food security particularly in the world's poorest countries is enough to give priority to the issue of losses in the agricultural sector (FAO, 2010). This is because these losses indicate a waste of productive agricultural resources that could have been channelled into more viable ends (Adepoju, 2014). According to FAO (2011), more than one-third of the food produced globally for human consumption is either lost or wasted and this amounts to about 1.3 billion tons per year. Furthermore, most of the food crops produced globally is never consumed as a result of damage which affects crops after harvest (Meena *et al*., 2009). This is because farmers do not always get market for their produce immediately after harvest.

Similarly, short-term success in raising production on the part of farmers without complementary support to marketing can result in oversupplying local markets, which then translates into volatile or reduced incomes for farmers (Ferris, 2009), hence, for farmers to raise their income, improve their standard of living and for households to attain food security, there is a need for an alternative market which would not only reduce the stress of getting the crops to the local market but will also curb the minimum crop losses due to delayed marketing. Therefore, agro-industries serve as an appropriate enterprise to help achieve this. An agro industry is one which specializes in the processing of agricultural produce. According to Tersoo (2013), agro-industrialization is a dynamic integrated production process and a synergy or symbioses between agriculture and industry. This new sector directly interfaces with both agriculture and industry and thereby provides a link between the two sectors making them more contributory to economic development.

Agro-industries, in most developing countries are important because of their contribution to value-addition of agricultural produce which according to Wilkinson and Rocha (2009) is as high as 66 per cent. These agro-industries generate demand for agricultural raw materials which in turn creates work opportunities at the farm level and contributes to increased demand for agricultural inputs (such as fertilizers, feeds and veterinary products amongst others) that tends to rise with new investments in agro-industries (Carlos *et al*., 2012; Wilkinson and Rocha, 2009). Against the backdrop of the fact that agro-industries are uniquely situated between natural sources of food supply (on the farmers' side) and the dynamics of demand for food and fibre (on the consumers' side), promotion of agro-enterprise development can have numerous benefits

for diversification and value-addition (Reardon, 2007).

The agro-enterprise approach in eliminating hunger and improving farmers' standard of living is a means of refocusing production-based efforts within a market-based framework. Though it does not replace traditional agricultural development, it does however require a new way of thinking about agriculture: one that recognizes the market as the driver in the system and requires that investments be aligned with market needs and evaluated against market performance (that is, sales volumes, product quality, profit, and timeliness) (Ferris, 2009).

Moreover, the continued increased awareness of consumer together with food contamination scares has led to tighter food safety laws. In response, agro-food companies developed strategies involving the different players at different levels of the value chain to achieve undistorted information exchanges and track and trace efficiency (Matopoulos, Vlachopoulou and Manthou, 2005). It incorporates ideas on chain-wide thinking, competitive production, collective marketing, product diversification, as well as adding value to construct a path out of poverty for farmers (Ferris, 2009). The potential of Ife-East Local Government in producing crops such as cocoa, cassava, plantain, yam, maize, vegetables, fruits is enormous with each farming household cultivating an average of 14.3ha being the highest in the zone (Babayemi *et. al*, 2014). The farmers have marketable surplus which can serve as raw materials for agro-industries. Because of this potentials, agro-industries such as United States based Hershey Company, German International Co-operation (GIZ), IDH (The Sustainable Trade Initiative) Oxfam Novib, Continaf, Ferrero, Petra Foods Limited and Farmers' Development Union (FADU) have partnered with the farmers (Essiet, 2013).It is against this background that this study addressed the following research questions:

1. What are the socio-economic characteristics of the farming households?
2. What is respondents' extent of access to available agro-industries?
3. What are the benefits derivable for patronizing agro- industries?
4. What are the challenges for accessing agro-industries for sales of agricultural produces?
5. What are the factors that influence farmers' access to agro-industries in Ife East LGA?

METHODOLOGY

The population of the study was the farming households in Ife East LGA of Osun State. Agriculture is the major source of income of the people. Information was elicited through the use of a well-structured questionnaire. A multistage sampling procedure was used to select respondents for the study. In the first stage, 6 villages were randomly selected from the LGA. In the second stage, 20 farming households from each of the villages were randomly selected and using the list of farming households from the Osun State Agricultural Development Programme (OSSADEP), a systematic random sampling technique was used to select the 120 respondents for the study. The result of the study was summarized using descriptive statistics such as frequency counts, percentages, mean, and standard deviation, while the factors influencing farmers' access to agro-industries were determined with binary probit regression.

Results and discussion

The result from Table 1 shows that majority (65.9%) of the farmers were within the age group of 50 – 69 years while very few (5.9%) of the farmers were within the age group of 70 – 89 years with the mean age of 54.98years. This indicates that most of the respondents are adults but still active. This result was however far from being similar to that of Ekwe *et al* (2011) who found the mean age of farmers to be 45 years. The findings also show that 60.8% of the respondents were males while the remaining (39.2%) were females. This indicates that males were most active and involved in the hard work or job risks that farming offers.

Results of this study further show that majority (79.2%) of the respondents were married while only 5.8% were separated. This shows that majority of the respondents were married with their respective spouses assisting in the farming operation at times thereby reducing cost of hiring labour. The result agrees with Salau (2013) who also reported that there were more married farmers for his study. Also, majority (63.3%) of the respondents had a household size of between 1 – 5 members, while 36.7% had a household size of between 6 – 10 members. The mean household size was 5 members. The result contradicts Ukoha *et al* (2010) who reported the mean household size of his respondents to be approximately 11.

Also, majority (95.0%) of the respondents had farming as their primary occupation, while only 5.0% were involved in trading as primary occupation. However, 21.7% of the respondents engaged in farming as their secondary occupation,

while others engage in other enterprises such as trading, civil service or artisan. It was also revealed that 36.7% made an annual income between ₦50,000 – ₦100,000, and 47.5% made an annual income between ₦101,000 – ₦200,000. However their mean annual income was ₦135,658.33. Table 1 shows that majority (60.8%) of farmers were members of one or more social organizations, while 39.2% of farmers did not belong to any social organization. The implication of this is that majority of respondents in the study area will have access to better infrastructures and incentives which social organizations offer. Findings also show that 75.0% of the respondents were permanent residents of the area, while 25.0% were dual residents.

Furthermore, Table 1 reveals that few (39.2%) of farmers had contact with extension agents, while 60.8% of farmers in the area had no contact with extension agents. The implication of this result is that farmers with no contact with extension agents were at great risks because it is believed that through extension visits, farmers become better informed about farm management planning and new technologies. However, it is envisaged that this shortcoming might had been eased through their contact with agents from agro-industries since all the farmers interviewed claimed to have contact with agro-industries.

Table 1: Distribution of respondents by socio-economic characteristics

Socio-economic characteristics	Frequency	Percentage	Mean
Age (Years)			
30 – 49	34	28.3	54.98 years
50 – 69	79	65.9	
70 – 89	7	5.9	
Sex			
Male	73	60.8	
Female	47	39.2	
Marital status			
Single	1	0.8	
Divorced	8	6.7	
Widowed	9	7.5	
Separated	7	5.8	
Married	95	79.2	
Household size			
1 – 5	76	63.3	5.01 people
6 – 10	44	36.7	
Level of education			
No formal education	11	9.2	
Primary education	19	15.8	
Secondary education	77	64.2	
Tertiary education	13	10.8	
Primary occupation			
Farming	114	95.0	
Trading	6	5.0	
Secondary occupation			
Farming	26	21.7	
Trading	57	47.5	
Civil servant	7	5.8	
Artisan	30	25.0	
Level of income (₦)			
50,000 – 100,000	44	36.7	
101,000 – 200,000	57	47.5	₦135,658.33
201,000 – 300,000	19	15.8	
Membership of social organization			
Yes			
No	73	60.8	
	47	39.2	
Residency status			
Permanent resident	90	75.0	

Socio-economic characteristics	Frequency	Percentage	Mean
Dual resident	30	25.0	
Contact with extension agent			
Yes	47	39.2	
No	73	60.8	
Contact with agro-industries			
Yes	120	100.0	

Types of agro-industries accessible to respondents

The finding on Table 2 shows that 99.2% of respondents often had access to the manufacturers of food products who could convert the raw forms of the produced commodities into processed products. Result also shows that majority (83.3%) of the respondents claimed not to have access to Beverages and Tobacco industries. This could be so because there are no Beverages and Tobacco industries in Ife but the ones available are farther away from Ife and as such farmers tend to defer from journeying to such places in order to cut costs. Also, data presented show that 71.7% of respondents had access to textiles and clothing industries, while 28.3%% did not have access to industry. Majority (80.0%) had access to wood product and furniture industries of which 39.1% often had access. About 57% and 64% had access to paper, paper product and printing as well as rubber and rubber product industries, respectively. However, 22.5% and 28.3% often had access to the industries. Majority (75.0%) of 96.7% of those who had access to feed mill industries accessed the industry often. Also, 80.0% and only 39.1% had access to and often access wood product and furniture industries respectively. Also, 56.7% and 64.2% of the respondents interviewed claim to have access to paper, paper product and printing as well as rubber and rubber product industries, respectively. The result further reveals that 96.7% and 75.0% of the respondents interviewed had access to and often access feed mill industries, respectively. This is so because there are many local feed mill industries in Ife that could utilize agricultural commodities as ingredients in the making of feeds. The result agrees with that of FAO (1997) and Henson and Cranfield (2009) that the agro-industrial sector accessible to users include manufacturers of food, beverages and tobacco, textiles and clothing, wood products and furniture, paper, paper products and printing, and rubber and rubber products, however in no particular order.

The implication of this result is that farmers might want to increase their production of the materials for whom or which they could easily access their industries and they will limit the production of the produce for which they have difficulty in accessing its industries.

Table 2: Distribution of respondents by various types of agro-industries accessible to respondents and extent of access to agro-industries

		*Accessibility	Extent of access		
	Types of agro-industries		Often	Rarely	Not at all
1	Manufacturers of food products	119 (99.2)	98 (81.7)	21 (17.5)	1 (0.8)
2	Beverages and tobacco	20 (16.7)	9 (7.5)	11 (9.2)	100 (83.3)
3	Textiles and clothing	86 (71.7)	32 (26.7)	54 (45.0)	34 (28.3)
4	Wood products and furniture	96 (80.0)	47 (39.1)	46 (38.3)	27 (22.5)
5	Paper, Paper Products and Printing	68 (56.7)	27 (22.5)	41 (34.2)	52 (43.3)
6	Rubber and Rubber Products	77 (64.2)	34 (28.3)	43 (35.8)	43 (35.8)
7	Feed mill	116 (96.7)	90 (75.0)	26 (21.7)	4 (3.3)

Source: Field survey, 2016
* Multiple responses recorded

Benefits derivable for patronizing agro-industries

Table 3 shows that all the respondents interviewed claimed they derived benefit from patronizing agro-industries. The benefits derived from agro-industries for the sale of agricultural products however varies. Respondents claimed that the major benefit derived from agro-industries lies in the fact they (agro-enterprises) generate demand for agricultural raw materials (99.2%). Respondents also claimed that the benefit they derive from agro-industries was in the area of promotion of agro-enterprise development (91.7%), work opportunities at the farm level (90.8%), Value addition to products (90.0%) and access to good seeds and seedlings (90.0%). This result agrees with Henson and Cranfield (2009) who submitted that agro-industrialization presents valuable opportunities and benefits for developing countries.

This is an indication that the respondents benefitted economically from agro-processing industries, and it is believed to have improved the welfare and wellbeing, an evidence of human development through the patronage of agro-industries. The result can be summarized to be in consonance with Henson and Cranfield (2009) who not only submitted that aggro-industries are traditionally based on the utilization of voluminous inputs but that it also helps to reduce the loss of agricultural product as a result of its perishable nature and that of da Silva and Baker (2009) who opined that agro-industries ensure a high demand for labour to stimulate business.

Table 3: Distribution of respondents by benefits derivable from patronizing agro-industries

S/N	Statement	Frequency	Percentages
1	Agro-processing enterprises generate demand for agricultural raw materials	119	99.2
2	High levels of labour (employment) sourcing from communities	39	32.5
3	Work opportunities at the farm level	109	90.8
4	Increased demand for agricultural inputs produce	108	90.0
5	High demand for ancillary agro-processing inputs, such as packaging items and product ingredients	91	75.8
6	Helps to get crucial inputs and services which some have no access	82	68.3
7	Reduction in the number of intermediaries at several stages (Production to Marketing)	92	76.7
8	The availability of agro-industries avail farming households the opportunities to sell their products with less stress which invariably increased willingness to increase their level of production	101	84.2
9	Direct sales of produce from farm to the market	103	85.8
10	Reduction in the loss of agricultural produce due to lack of good storage facilities, poor road networks, pest and diseases infestation, climate change effects	73	60.8
11	Better links with financial institutions	96	80.0
12	Value addition to products	108	90.0
13	Promotion of agro-enterprise development	110	91.7
14	Increase in per capita incomes	102	85.0
15	Higher urbanization	79	65.8
16	Ease of transportation of goods and services	44	36.7
17	Access to good seeds and seedlings	108	90.0

Challenges of access to agro-industries

Table 4 shows the challenges faced in accessing agro-industries. The mean ranking results reveal the major challenge faced by respondents in accessing agro-industries. The result shows that pest and disease infestation ($\bar{x}$=2.51) as well as climate change effects on their produce ($\bar{x}$=2.51) were part of the major challenges faced by them in accessing agro-industries. Also, poor road network ($\bar{x}$=2.49) and the fact that high-value domestic markets are still in their infancy ($\bar{x}$=2.49) were also seen as challenges encountered in accessing agro-industries. Other challenges were low levels of human capital ($\bar{x}$=2.28), as well as lack of good and efficient storage facilities ($\bar{x}$=2.39). This result implies that respondents have various challenges/constraints in accessing agro-industries for the sale of their agricultural produce, an indication that these farmers are more or less limited which consequently affect the level of their access to agro-industries for the sale of agricultural produce and could have limited their efficiency and effectiveness in production. The result can be summarized to be in agreement with Henson and Cranfield (2009) who indicated that some of the challenges associated with agro-industries is the coordination of activities vertically and horizontally (integration), improved infrastructure and access to finance.

Table 4: Distribution of respondents by challenges in accessing agro-industries

S/N	Statement	Very severe	Severe	Minor constraints	Not at all	Mean	Rank

1	High-value domestic markets are in their infancy	66 (55.0)	47(39.2)	7 (5.8)	0 (0.0)	2.49 0.608*	8.5
2	Traditional supply chains for agro-food products generally predominate	28 (23.3)	70 (58.3)	21 (17.5)	1 (0.8)	2.04 0.666*	3
3	The formal agro-processing sector is small, and may even be stagnating	34 (28.3)	55 (45.8)	30 (25.0)	1 (0.8)	2.02 0.756*	2
4	There is little or no integration along the supply chain	23 (19.2)	55 (45.8)	39 (32.5)	3 (2.5)	1.82 0.767*	1
5	Entry costs to private agro-processing tend to be high	39 (32.5)	59 (49.2)	20 (16.7)	2 (1.7)	2.13 0.740*	4
6	Low levels of human capital	47 (39.2)	61 (50.8)	11 (9.2)	1 (0.8)	2.28 0.663*	6
7	Greater innovative capacity	34 (28.3)	70 (58.3)	16 (13.3)	0 (0.0)	2.15 0.630*	5
8	Lack of good storage facilities	52 (43.3)	63 (52.5)	5 (4.2)	0 (0.0)	2.39 0.569*	7
9	Poor road network	61 (50.8)	57 (47.5)	2 (1.7)	0 (0.0)	2.49 0.534*	8.5
10	Pest and diseases infestation	64 (53.3)	53 (44.2)	3 (2.5)	0 (0.0)	2.51 0.550*	10.5
11	Climate change effects	69 (57.5)	43 (35.8)	8 (6.7)	0 (0.0)	2.51 0.622*	10.5

Source: Field Survey, 2016. The figures in bracket are the percentages while the ones in asterisks are the standard deviation

Level of Challenges in patronizing agro-industries

The result from table 4b shows that though 31.7% of the respondents did not face any challenge in accessing the industries, majority (60.8%) of them opined that the challenges faced by them were minor, while only few (7.5%) submitted that they faced severe challenges in accessing the agro-allied industries. However, 67.3% of the respondents faced some challenges in accessing agro-industries.

Table 4b: Level of Challenges in patronizing agro-industries

Challenges faced in accessing industries	Frequency	Percentage
Not a challenge	38	31.7
Minor challenge	73	60.8
Severe challenge	9	7.5

Factors influencing farmers' access to agro-industries

Results of the maximum likelihood estimation of the binary probit model are presented in Table 5. The log likelihood of -74.957801 was significant at the 1 per cent level of significance. Out of the nine variables, only two variables were significant enough to influence respondents' access to agro-industries, these are marital status and secondary occupation.

The coefficient of marital status (-0.9280844) was negatively significant, implying that the likelihood of the married having access to agro-industries is lower among farmers. This is because the married have a lot of responsibility to take care of and might not have the necessary time to travel long distance before they could access agro-industries unlike the single who have enough time to themselves and might not have much dependants who depend on them for their daily needs. This result agrees with Wilkinson and Rocha (2009) who submitted that single-person households have

an increasing access to make use of agro-industries products.

Similarly, the coefficient of secondary occupation (-0.5498063) was negatively significant. This implies that the likelihood of those involved in farming as their secondary occupation might not have time to access agro-industries; this is because the time that would have been spent to search for agro-industries is been spent on the farm unlike others who have the time to do other jobs that might give them the opportunity to search and access agro-industries.

Table 5: Factors influencing farmers' access to agro-industries

Variable	Coefficient	Standard error	P > |z|
Sex	0.3460951	0.2758637	0.210
Marital status	-0.9280844	0.3217943	0.004***
Secondary occupation	-0.5498063	0.3275856	0.093*
Primary occupation	0.4845123	0.5460292	0.375
Residency status	0.0139717	0.3053066	0.963
Age	-0.0032248	0.0155422	0.836
Level of income	-3.70E-07	2.24E-06	0.869
Membership of social organization	-0.0565648	0.2906656	0.846
Access to extension agent	-0.1548906	0.2501534	0.536
Log likelihood	-74.957801		

***@ 1% , *@ 10%

CONCLUSION AND RECOMMENDATION

The study was conducted to determine the factors influencing farmers' access to agro-industries as alternative market for agricultural produce in Ife-East Local Government Area of Osun State. It identified marital status and secondary occupation as the only factors that significantly influenced farmers' access to agro-industries. The study therefore recommended that communities, private organizations and government should partner to provide modern infrastructures such as accessible road network, improved storage facilities. also private organizations and government should motivate, encourage and equip agro-industries that are still in their infancy.

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Rural households' use of coping strategies to manage farming risks in Saki agricultural zone of Oyo state, Nigeria

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ABSTRACT

Need for agricultural risk management in developing countries cannot be over emphasised because the activities are risk prone. This study analysed risk management strategies in farming activities among rural households in Saki agricultural zone of Oyo state. Multistage procedure was used to select 120 farmers and structured questionnaire was used to collect data for the astudy. Descriptive (mean and percentages) and inferential (PPMC) statistical tools were used for analysis. More (55.0%) of the farmers experienced high level of risks such as lesser yield than expected (183.3), illness (168.4) and increased indebtedness (166.7) among others. More (57.5%) of them used coping strategies substantially while 55.0% experienced lower level of constraints to use coping strategies. Significant relationship existed between respondents' age (r=-0.194), household size (r=0.057) and farm size (r=-0.103) and use of coping strategies. Risks associated with farming activities are serious and farmers should be educated on use of appropriate strategies.

Keywords: Coping strategies, Farming activities, Risks management, Rural households

INTRODUCTION

The performance and dynamics of rural households' livelihood have been identified as being sub-optimal in developing countries, Nigeria inclusive. They have been constrained in their activities due to substantial exposure to various kinds of risks in their farming activities. The exposures to risks impair the growth and potentials of their enterprises and hence vulnerability to their livelihood (Salimonu, 2007). Risk involves the the possibility losing something of value such as physical health, social status, emotional well being or financial wealth, which can be gained or lost. Risk is basically an interaction with uncertainty.

Risks play important role in farmers' decision making processes and therefore affect agricultural productivity and thus growth and development. Agricultural sector faces various types of risks challenges that manifest in terms of income risk, climatic risks, economic fluctuations, labour problems (illness or deaths), harvest failure (due to drought, flooding, etc). Individual-specific shocks make rural people vulnerable to serious hardship; for instance, obligations to extended family and lack of credit facilities affect the ability of individuals to invest. Risk is thus a central issue that affects different aspects of people's welfare in the developing world. Nature of risks can be assessed in terms of the frequency and intensity of shocks and the persistence of their impact (Morduch, 1999). Relatively small but frequent shocks are more easily to deal with than large, infrequent negative shocks. Shocks can be idiosyncratic or common. These are issues that cause hardship or exacerbate the effect of shocks on income.

Vulnerability to livelihood refers to exposure to livelihood contingencies, stress and difficulty in coping with them in a defenceless manner i.e. lack of means to cope without damaging loss (Chambers, 2006). Coping with vulnerability will be possible when the capacity to cope with livelihood risks and shocks (i.e. resilience) are imbued in individuals, societies and relevant institutions. Adger (2000) refers to social resilience as the 'ability of human communities to withstand external shocks …and recover from such perturbations'.

In rural areas, risks are present in all management decisions; as a result of price fluctuations, yield and resource uncertainty. The existence of such risks has been found to alter household behaviour in ways that entrench decisions that lead to sub-optimal performance. Households in risky environments are expected to have developed strategies to cope with and manage various kinds of risks. Coping strategies are the unplanned short-term reactions to unanticipated farming failure; while risk management or adaptive strategies involve planned attempts to spread risks and reduce 'risk covariance' between different livelihood components (Ellis, 2000). While the distinction between risk management and risk coping strategies is useful from theoretical perspective, its importance is less crucial from a practical point of view. On daily basis, farmers experience "the fear and the fate" at the same time (Dercon, 2007). Despite these strategies, vulnerability to poverty linked to risks remains high. These risks and

uncertainties easily trigger food shortages, deterioration in nutritional status and destitution (Pinstrup-Anderson *et al*., 2001).

Many researchers (Adebusuyi, 2004; Alderman, 2008) have documented that risks made farmers to be less willing to undertake activities and investments that have substantial financial outcomes, which thereby limit the opportunities to use assets as collaterals and/or insurance. Therefore constraints that limit access to loans continuously impede the potential to grow their livelihood activities.

Many small-scale farmers in the developing countries face significant income uncertainty, and rural dwellers/farmers that live from harvest to harvest do not have much room for error. Variables such as fluctuating crop prices can make a significant difference in how much a rural family earns in a year. Farmers may be unwilling to take on additional risks by borrowing and making long-term investments due to these uncertainties. This reluctance is thought to contribute to the decision of many farmers not to invest in improved technologies such as hybrid seeds, fertiliser or irrigation that could potentially improve crop yields.

Choices of strategies to manage risks and shocks vary among people due to so many factors. Informal risk-sharing strategies such as assistance from family members, friends, local savings among others like these, provide limited protection and their sustainability is in doubt. Public safety nets like government intervention, provisions from non-governmental organisations might be beneficial, but the impacts are at times limited and they may have negative externalities on households not covered by the safety net. This research therefore deemed it important to study the use of coping strategies in the management risks among rural households in Saki agricultural zone of Oyo state. Specifically, the study considered the following objectives:

1. ascertained the socioeconomic characteristics of the respondents in the study area
2. identified the risks respondents encountered in their farming activities
3. determined how the respondents perceived the use of coping strategies to manage the risks encountered
4. determined the extent to which risks encountered are resolved by the use of coping strategies

The study hypothesised that there was no significant relationship between the respondents' socioeconomic characteristics and the risks encountered.

METHODOLOGY

This study was carried out in Saki agricultural zone of Oyo state, Nigeria. It is located within the geographical coordinates of latitudes 8°17' and $9^0$03' North and longitudes $2^0$47' and 3°57' East. The zone covered eight local government areas viz. Olorunsogo, Irepo, Oorelope, Iwajowa, Saki-East, Kajola, Atisbo and Saki-West. Most of the inhabitants of the area are involved in agricultural enterprises. The area is often referred to as the food basket of Oyo State because of its agricultural activities.

Multistage sampling procedure was used to select the respondents for the study. There was a random selection of 50% of the 8 blocks in the agricultural zone to give Saki West, Saki East, Atisbo and Iwajowa blocks. Three ADP cells were selected from each of the selected blocks, resulting in 12 cells. At the third stage, systematic sampling technique was used to select 10 households from each of the selected cells to give a total of 120 respondents. Data was collected from the respondents using a structured questionnaire, which was administered as interview schedule. The descriptive statistics such as frequencies and percentages and inferential statistics; Pearson Product Moment Correlation (PPMC) were used to analyse the data at p=0.05.

RESULT DISCUSSION

Socioeconomic characteristics

Result in Table 1 shows that most (90.0%) of the respondents were male. This is expected as male are more conspicuous in agricultural enterprises. The finding is in consonance with earlier study by Azarian *et al* (2012), who found similar trend in gender involvement in agriculture. It was also found that most of the respondents were between 40 and 61 years of age. With the mean age at 50 years, it implies that the farming population is still in relatively active ages. The result also reveals that most (84.2%) of the respondents were married. This is an indication of the fact that marriage is held as a very serious institution especially in rural areas; as no adult would be deemed responsible without it (Yekinni and Ajayi, 2011). Mean household size of 9 persons indicated that the respondents had fairly large households, which is a normal trend in rural areas (Yekinni, 2011). Respondents had 7 years as the mean years of formal education, which implies that they were fairly educated in the study area. Most (90.8%) of

the respondents were involved in agriculture as primary occupation. The finding is expected because most inhabitants of rural areas depend on agricultural activities (Ghanem, 2015). A mean monthly income of ₦16,751 ($88.16) is an indication of appreciably low income from the respondents in the study area.

Table 1: Distribution of respondents by socioeconomic characteristics

Variable	Frequency	Percentage	Mean
Sex			
Male	108	90	
Female	12	10	
Age			
18-39	19	13.4	
40-50	45	37.5	50
51-61	47	39.2	
62-75	12	10	
Religion			
Christianity	54	35.0	
Islam	57	64.2	
Traditional	9	0.8	
Marital status			
Single	7	5.8	
Married	101	84.2	
Widowed	12	10	
Household Size			
1-4	12	10.0	
5-8	52	43.3	9
9-13	50	41.7	
14-17	4	3.3	
>17	2	1.7	
Years of Formal Education			
No formal education	22	18.3	
1 to 6 years	54	45.0	
7 to 12 years	40	33.3	7
> 12 years	4	3.3	
Primary occupation			
Farming	109	90.8	
Trading	3	2.5	
Civil service	8	6.7	
Secondary occupation			
None	4	3.4	
Farming	11	9.2	
Trading	68	56.7	
Artisans	21	17.5	
Driving	18	15.0	
Monthly income (Naira)			
1660-18680	96	80	
18681-35700	9	7.5	
35701-52720	8	6.7	16,751
52721-69720	4	3.3	
67721-85000	3	2.5	

Risks encountered in farming activities

Result in Table 2 shows that the risks mostly encountered by the respondents, in order of prevalence were; having lesser yield than expected (183.3), personal illness (168.4), increased debt burden (166.7), farm injury (124.9), lack of market to sell produce (110.0) and loss of crop (108.3). This implies that the risks experienced by most farmers in the study area concerned issues of health and economy. The finding suggests that the risks farmers encountered are critical and expose them to substantial uncertainties about their livelihood enterprises. This is in line with the finding of Donye and Ani (2012), who found similar situation with farmers and their enterprises.

Table 2: Distribution of respondents by risks encountered, n = 120

Risk	Always	Rarely	Never	Weighted Score
Lesser yield than expected	85.0	13.3	1.7	183.3
Personal illness	69.2	30.0	0.8	168.4
Increase in debt load	70.0	26.7	3.3	166.7
Farm injury	25.8	73.3	0.8	124.9
Lack of market for farm produce	15.8	78.3	5.8	110.0
Loss of crop due to erosion/flood	12.5	83.3	4.2	108.3
Chemical poisoning	5.8	80.0	14.2	91.6
Weather	25.0	13.3	61.7	63.3
Animal distortion	8.3	6.7	85.0	23.3
Pest infestation	2.5	5.0	92.5	10.0

The index of risk encountered by the respondents was categorised into two; low and high levels using the mean criterion. The result reveals that 45.0% of the respondents had low level of risk, while 55.0% of them had high level of risk. This implies that farmers experienced relatively high level of risk in the study area.

Table 3: Distribution of respondents by level of risks encountered

Level of risk	Frequency	Percent
Low	54	45.0
High	66	55.0
Total	120	100.0

Use of coping strategies to manage risks

Result from the survey, in Table 4 shows that the coping strategies used by most of the respondents, in order of prevalence were; adopting improved storage facility (95.8%), borrowing money (95.0%), adjustment to farming activities (95.0%), relying on government intervention (90.8%) and reducing use of labour on the farm (81.7%) among other strategies used. The finding shows that strategies mostly adopted are not, by their nature, able to resolve risks reasonably. For instance, sale of asset, which will most probably resolve the risks was least used by most of the respondents. The finding is in consonance with that of Deressa *et al* (2009), who found that farmers used to borrow from relatives, eat less, depend on food aids and engage in off farm employment as coping strategies when they experience risks.

Table 4: Distribution of respondents by their use of coping strategies for risk management

Coping strategies	Frequency	Percentage
Use of improved or modern storage facilities	115	95.8
Borrowing money	114	95.0
Adjustment to farming activities	114	95.0
Rely on government intervention	109	90.8
Labour reduction	98	81.7
Adoption of diseases resistance varieties	92	76.7
Changing of children's school	92	76.7
Reduction in frequency, quantity and quality of meals	80	66.7
Reduction in social and ceremonial activities	78	65.0
Involvement in savings association	68	56.7
Illegal activities	65	54.2
Temporary out-migration	58	48.3
Permanent out-migration	56	46.7
Sales of assets	32	26.7

The index of coping strategies used was categorised into high and low levels based on mean criterion. The result on Table 5 shows that 57.5% of the respondents used the coping strategies substantially.

Table 5: Distribution of respondents by level of use of coping strategies

Level of use	Frequency	Percent
Low	51	42.5
High	69	57.5
Total	120	100

Level of risk resolution achieved

The study pursued the extent to which the respondents were able to have their risks resolved through the use of the various coping strategies. The result on Figure 1 shows that 74.2% of the respondents did not have their risks resolved through the use of the strategies. This finding confirms the insinuation that the coping strategies mostly used by the respondents would not inherently be able to resolve their risks.

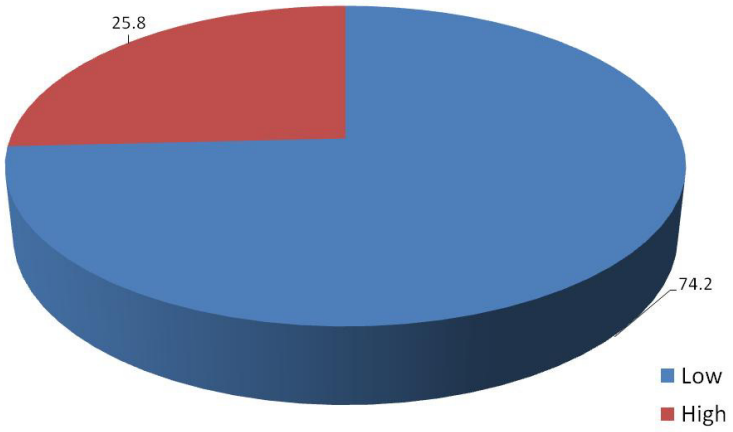

Fig 1: Distribution of respondents by levels of resolution of risks

Relationship between socioeconomic characteristics and use of coping strategies

The variables in the hypothesis were tested using the Pearson's Product Moment Correlation (PPMC). Result of the analysis in Table 7 shows that age (r=0.267) and years of formal education (-0.181) were significantly related to the use of coping strategies. The finding meant that older farming used more of the strategies and educated farmers used less of the strategies. The finding implies that age may have conferred experiences on old respondents to have known what strategies to use.. The fact that more educated respondents used less of the coping strategies may be due to the fact that their education discouraged them from using them substantially; this is due to the fact that most of the coping strategies used were not effective.

Table 7: Statistical analysis of respondents' socioeconomic characteristics and use of coping strategies

Variable	r-values	p-value	Decision
Age	0.267**	0.003	Significant
Years of education	-0.181*	0.047	Significant
Household size	0.055	0.551	Not significant
Monthly income	-0.026	0.777	Not significant

CONCLUSION

The respondents in the study area encountered substantial risks in their enterprises but mostly used methods that do not resolve their risks. There is the need for concerted efforts from the agricultural and rural development stakeholders to decipher appropriate coping strategies and recommend/promote such to the farmers as their enterprises are inherently risky.

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Biometric characteristics of sampled snails in Makurdi metropolis, Benue state Nigeria

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ABSTRACT

Snails are one of the most diverse groups of animals usually found in cool environment. Knowledge on microhabitat and snails biometric is important to snail farmers and researchers. This study investigated the biometric characteristics (snail length, diameter and weight) and assessed the floristic composition of their habitat from April to October 2013. (Achusa, Agbough, University of Agriculture Makurdi, NASME and Makurdi Zoological garden) were selected. Descriptive statistics and ANOVA were used for data analysis. Three species of snails were identified (Achatina achatina, Achatina depravata and Bulinus truncatus) and a total of 2,030 snails were collected. Daniellia oliveri formed the dominant plant species; however, both sample locations had a considerable composition of both vegetation species and snails species sampled. The mean shell weight of A. achatina (10.63 + 7.13g) is higher than A. depravata and B. truncates. The mean shell length of A. achatina was significantly different ($P<0.05$) from A. depravata and B. truncates. The mean shell diameter of A. achatina (5.29 + 1.04cm) was higher compared with A. depravata and B. truncates which were not significantly different ($p>0.05$).To ensure sustainable availability of snail in Makurdi metropolis the establishment of commercial snail farms that can meet the short-fall between demand and supply from the wild during the rainy season is imperative.

Keywords: Microhabitat, snails biometric, species

INTRODUCTION

Snails are bilaterally symmetrical invertebrates with soft-segmented exoskeleton in the form of calcareous shells. They belong to the phylum mollusca and class Gastropoda (Ramzy, 2009). In West Africa, snails dwell mostly in humid forest and urban areas from where they are gathered by villagers for consumption and other uses (Ademosun and Omidiji, 1999). These snails belong to a group of livestock called micro livestock as a result of small body size (Agbogidi, *et al.*, 2008). Both terrestrial and aquatic snails range in size from about 1mm long to the giant African snails, which occasionally grow up to 312mm (12¼ cm) in length. Most breeds vary in their adaptability to the environment, egg size, size at day old, size at maturity and growth rate (Amusan and Omidiji, 1999). Ajetunmobi and Olayemi (2002), maintained that the difference in size may be explained partly by differences in the length of the aestivation period.

Under natural conditions, snails are exposed to a range of varying and often interacting environmental factors that produce collective effect on them and it is usually difficult to separate the effect of any one factor from others (Cameron and Pokryszko, 2005). Gastropods are one of the most versatile groups of molluscs, characterized by an extraordinary biodiversity and capacity to adapt to various environmental conditions. Biometric variations of snail shells have been documented, but their major determinants are poorly understood (Barker, 2005). Thus, distance between two populations can induce shell size variability within species (Madec and Bellido, 2007). According to Olawoyin and Ogogo, (2006) shell length is a better predictor of body weight for growing snails. However, weight gain could be subject to changes in environmental factors that could trigger desiccation, and reduce the weight of the snails.

In Nigeria, wild snails and other species are on the decline due to frequent exploitation, deforestation, and other human activities (Oke *et al*., 2008). Snails present a wide variety of terrestrial habitats which undoubtedly has influenced snail diversity. However, humans have used snails for food for many generations and despite this, most of the scientific work done on snail in West Africa has been from the point of view of feeding and animal parasitology where snails act as intermediate host of pathogenic nematodes (Wosu, 2003). Consequently there is heightened interest in commercial production of snails and the demand to produce high yield is on the increase.

Biometric data and urban microhabitat of snails in the area is of critical importance since there is a sharp decline in its abundance in the few remaining natural habitat (Tyowua *et al*., 2017). Snails constitute a seasonal industry upon which some of the rural economics depend. The research work therefore explored the urban microhabitat and

snails' biometrics characteristic in terms of weight and length.

METHODOLOGY

The study was carried out in Makurdi metropolis, Benue State, Nigeria. Makurdi lies within the Southern Guinea Savannah Zone, between latitude 7° 38' to 7° 52'N and longitude 8° 20' to 8° 38'E (Fig.1). The soils are moderately deep to very deep, ranging in depth from 55cm on the crest and upper-slope to 200cm in the lower-slope. The terrain is basically an undulating plain. Its relief ranges between 83m to 167m above sea level. The drainage system comprises of tributaries of river Benue which include Bar and Demekpe. The wet season is from April to October while the dry season is from November to March and the average annual rainfall was between 150 and 180 mm, relative humidity is between 60% and 80% but decrease in the early month of dry season (Jimoh *et al.,* 2009). The vegetation of the area is characterized by pattern of secondary forests regrowth interspersed by extensive savanna with very tall grasses and was primarily dominated by trees species like *Daniellia oliveri, Prosopis africana* and *Parkia biglobosa* while predominant grasses include A*ndropogon gayanus, Hyparrhenia involucrata* and *Imperata cylindrical. Chromolaena odoratum* is a common herb in the area especially close to river bank (Idoga., 2005).

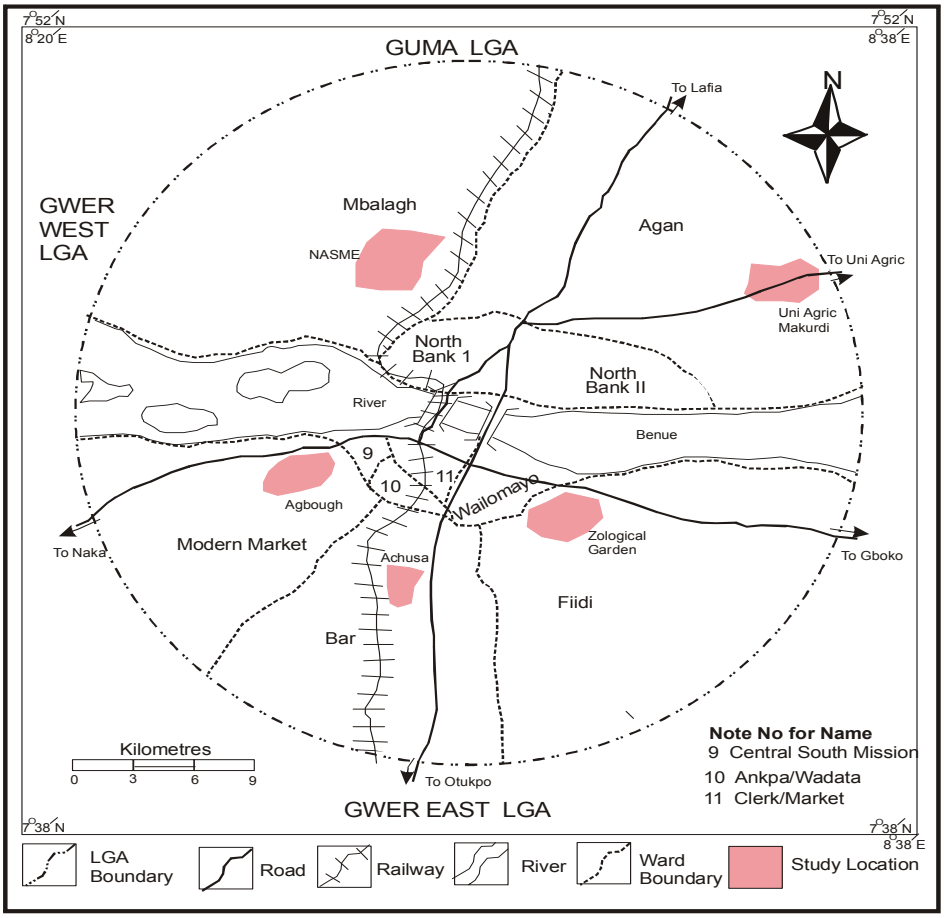

Figure 1: Map of Makurdi Local Government Area showing study location
Source: Ministry of Lands and Survey Makurdi, (2013)

Data Collection

Eleven (11) council wards namely: Mbalagh, Agan, North Bank I, North Bank II, Fiidi, Bar, Modern Market, Walomayo, Akpan Wadata, Central South mission and Clerk market ward were mapped. Five (5) council wards which had evidence of snails' presence were purposively selected and a location in each of the council ward was randomly selected through balloting, namely Zoological Garden (Fiidi), Achusa (Bar), University of Agriculture (Agan), Agbough (Modern market) and Nigerian Army School of Military Engineering (NASME) (Mbalagh), respectively. In each of the locations, a

30m x 30m plot was laid and six 5m x 30m sub-plots were demarcated for sample collection in each location. The plots were marked with flagging tapes. A total of thirty (30) sub-plots were searched for snail for thirty minutes. This was done four times per month from April to October 2013. The time quantitative searches method by various investigators (Emberton *et al.,* 1996; Bishop, 1977; Cameron and Pokryszko, 2005) was adopted. The searching covered both day and night time and commenced at 6.30am to 9.30am and 6 to 7pm when snails were still very active as adopted by (Ajayi, 1978). Snails were handpicked with gloved hands from trees, bushes and ground surface and placed in plastic container and taken to the Fisheries laboratory in the University of Agriculture Makurdi for identification. Woody plant and shrubs species were identified in each of the 30m x 30m plot and all the herbaceous species using $1m^2$ quadrat frame within sub-plots.

Biometric measurements of collected snails

The following measurements were taken; weight of shell/snail with meat using sensitive electronic balance of 0.00g sensitivity. Shell length-using rope and meter rule and shell diameter-using vernier caliper at the widest part for each snail.

Data Analysis

Descriptive statistics was used for description of snails' characteristic and Analysis of variance (ANOVA) was used to test for significant difference set at α=0.05. Data was further subjected to Duncan multiple Range test to separate the differences among means for snail biometric characteristics.

RESULTS AND DISCUSSIONS

Microhabitat of the sample locations

Sixteen woody plants species in 10 families were identified in the study locations (Table 1). *Daniellia oliveri* was the dominant species with 22.3%, followed by *Azadirachta indica* (16.6%) and the least occurring species were *Pseudocedrela kotschyi Sarcocephalus latifolius and Allophylus africanus* with 1.4% respectively. The result of herbaceous species at different locations presented in Table 2 reveal the presence of nineteen herbaceous species representing 12 families in the various areas. Both locations present a suitable range condition in protected urban vegetation for snails' survival. In the same vain, the occurrence and composition of forage species may be attributed to the availability of suitable microhabitat composition in terms of shelter, food and oviposition site by the snails. This is in line with the report by Ikpa *et al.,* (2006) and Joseph (2008) that snails thrive well in suitable range environments.

Table 1: Woody plant composition across locations in the study area

Species	Family	Locations						
		Achusa	Agbough	NASEM	UAM	MZG	Frq	%
Mangifera indica Linn.	Anacardiaceae	4	1	3	1	3	12	8.63
Annona senegalensis pers.	Annonaceae	0	0	0	3	5	8	5.76
Elaeis guineensis Jacq.	Arecaceae	4	2	2	4	10	22	15.83
Newbouldia laevis (P. Beauv.) Seemann exBureau	Bignoniaceae	2	0	0	2	0	4	2.88
*Terminalia catappa (*Singapore almond) - Cabi	Combretaceae	1	0	2	0	0	3	2.16
Terminalia glaucescens Planch. Ex Benth.	„	0	0	0	2	2	4	2.88
Anthoclesta djalonesis A.Chev.	Gentianaceae	0	0	4	6	0	10	7.19
Acacia sieberiana var. Sieberiana	Leguminosae	1	0	0	0	2	3	2.16
Daniellia oliveri (Rolfe) Hutch. & Dalz.	„	0	0	6	10	15	31	22.30
Prosopis africana (Guill. & Perr.) Taub	„	0	0	0	0	2	2	1.44
Azadirachta indica A. Juss	Meliaceae	2	1	5	8	7	23	16.55

Species	Family	Locations						
		Achusa	Agbough	NASEM	UAM	MZG	Frq	%
Pseudocedrela kotschyi (Schweinf.) Harms	,,	0	0	0	2	0	2	1.44
Ficus exasperata Vahl	,,	0	1	0	4	3	8	5.76
Sarcocephalus latifolius (JE Sm) EA Bruce	Rubiaceae	0	2	0	0	0	2	1.44
Allophylus africanus P.Beauv	Sapindaceae	0	1	0	0	1	2	1.44
Vitex doniana Sweet	Verbenaceae		0	0	2	1	3	2.16
Total		**14**	**8**	**22**	**44**	**51**	**139**	**100**

Source: Field Survey, 2013

Key: NASME = Nigerian Army School of Military Engineering, UAM = University of Agriculture Makurdi, MZG = Makurdi Zoological Garden

Table 2: Identified herbaceous species across locations in the study area

Species	Family	Locations				
		Achusa	Agbough	NASME	UAM	MZG
Ageratum conyzoides L.	Asteraceae	×	×	×	✓	×
Amaranthus spinosus L..	Amaranthaceae	✓	×	×	×	×
Combretum nigricans Lepr. ex Guill. & Perr.	Combretaceae	✓	×	✓	✓	✓
Luffa cylindrica (L.) Roem., Syn. Monogr.	Cucurbitaceae	✓	✓	✓	✓	×
yperus iria L.	Cyperaceae	✓	×	×	×	✓
Indigofera arrecta - Hochst. ex A.Rich.	Fabaceae.	X	✓	✓	✓	✓
Echinochloa colona L. Link	Gramineae	×	×	×	✓	✓
Centrosema pubescens Benth.	Leguminosae	×	×	×	✓	×
Tephrosia maxima (L.) Pers.	,,	×	✓	×	×	×
Sida acuta Burm.	Malvaceae	X	x	✓	✓	✓
Urena lobata L.	,,	✓	✓	X	x	✓
Andropogon gayanus Kunth	Poaceae	✓	×	×	×	×
Cynodon dactylon (L.) Pers. var. Dactylon	,,	×	×	×	✓	×
Imperata cylindrica (Linnaeus)	,,	✓	×	×	×	×
Panicum maximum Jacq.	,,	×	×	×	✓	×
Paspalum orbiculare G. Forster	,,	✓	×	×	×	×
Pennisetum unisetum (Nees) Benth.	,,	✓	×	×	✓	✓
Physalis angulata L.	Solanaceae,	×	✓	×	×	×
Cissus rufescens var. doeringii (Gilg & Brandt) Desc.	Vitaceae	×	×	×	×	✓

Source: Field Survey, 2013

Snail Samples: Three species of snails identified include two edible land species and one non-edible species, that is *Achatina achatina* , *Achatina depravata and Bulinus truncatus* (Plates 1- 3). *B. truncatus* is recognized as an intermediate host for schistosomiasis in Nigeria and not been consumed (Agi and Okwuosa 2001). *A. achatina* was the most abundant species (1,386*),* followed by *A. depravata* (159) and *B. truncates* (129) throughout the period of snail collection (Fig. 2). This indicates a relatively high occurrence and abundance of snail population sampled. Among the sampled snail species *A. achatina* has the advantage of high adaptability, survivability, highly prolificacy and fleshier. In terms of location, the Zoological garden area had the highest (n = 505) snails collected, followed by the Achusa location (n = 409) and the least was NASME with (n = 329). Snail species concentration observed more at Makurdi zoological garden and Achusa, could be attributed to the fact that both locations form part of the tributaries along the shores of River Benue, and present a favourable effect of both vegetation and soil on snail habitat preference. Habitat across locations had some type of savanna vegetation sparsely distributed within or at the verge of the sample locations. Snails were often seen clustering around vegetation and some floating on waterborne pieces of wood or plant

materials. Whitton (1975) and Obureke *et al.,* (1987) attributed the clustering of snails around plants to be due to high oxygen gradient produced by these plants. The mean distribution of snails collected from the selected locations was significantly different ($p<0.05$).

Plate 1: Adult *Achatina depravata* (edible)

Plate 2: Adult *Achatina achatina* (edible)

Plate 3: Adult *Bulinus truncatus* (a vector)

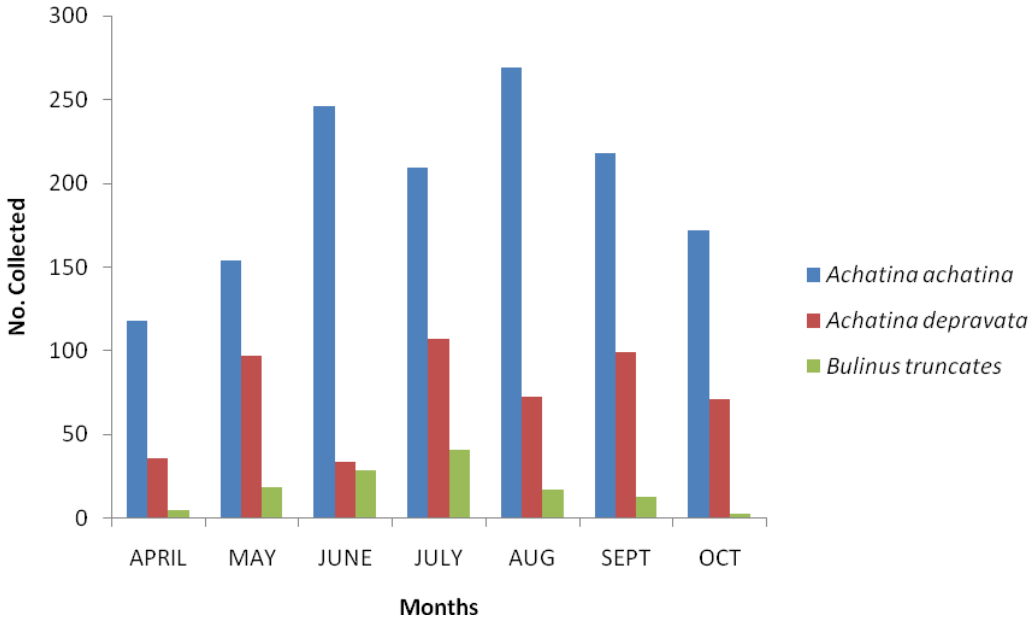

Fig 2: Number of Snails species collected during the study period

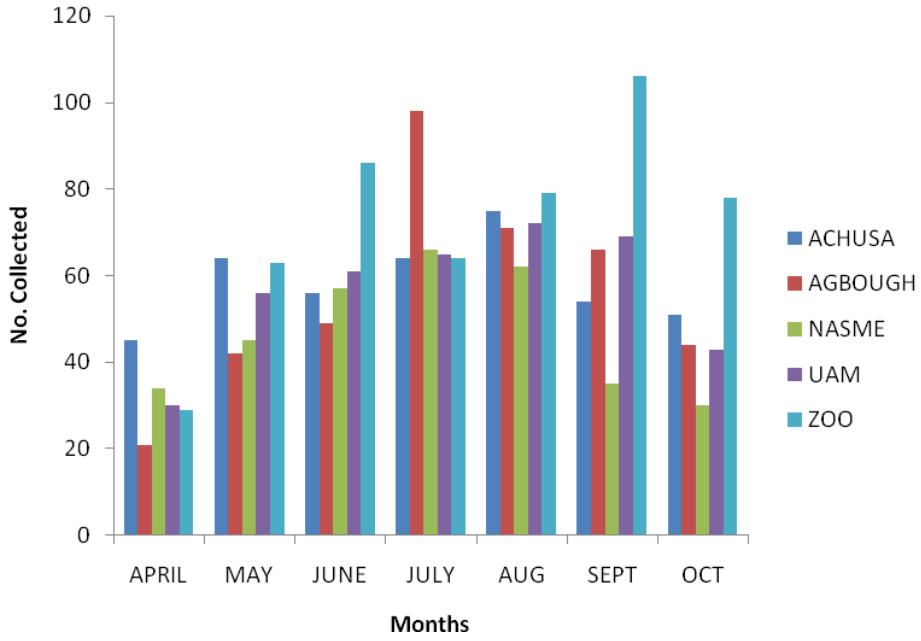

Fig 3: Distribution and abundance of snails collected for seven months

Snail Biometrics: The mean shell weight of sampled snail species at UAM was the highest with 11.22 - 5.19g and the least mean species weight of 8.05 ± 4.54g at NASME. Furthermore, the mean shell weight of *A. achatina* (10.63 - 7.13g) was higher than *A. depravata and B. truncatus.* The mean shell length of *A. achatina* was significantly different (P<0.05) from A. depravata and B. truncates. The mean shell diameter of *A. achatina* (5.29 - 1.04cm) was higher compared with *A. depravata* and *B. truncatus* which were not significantly different (P>0.05) (Tables 3 – 5). The biometric characteristics showed significant difference (p<0.05) with regard to the weight gain and length variation of the three snails obtained at the five different locations which indicates a growth indicator. Similarly, Olawoyin and Ogogo (2006) reported shell length as a better predictor of body weight for growing snails. However, weight gain could be subject to changes in environmental factors that could trigger desiccation, and reduce the weight of the snails. There are many of such factors that affect snails, and even determine their distribution in their natural environment (Ikpa *et*

al., 2006). Given such possibility, the whole mean weight of snails alone may therefore, may not be a better option for assessing the growth in snails, since it could drastically be influenced by environmental factors. Also Hodasi, (1979) and Omole *et al*. (2000) reported that diets containing higher percent protein were optimal for the growth of snails. This could be attributed to the enhanced growth performance of snails on diet present and the positive correlation between growth performance, shell length and shell width. A positive correlation between live weight gain, shell length gain, and shell width gain had been established especially in growing snails (Odunaiya and Akinnusi, 2008).

The general trend was an increase in length diameter and weight of snails within seven months period during the major and minor peak snail season of 2013. This reveals that length and weight gain of sampled snails in the major peak snail season were higher than those of the minor peak snail season of April, 2013. This agrees with the reports of Stephen, (1999) and Frest (2004). The increase in the shell length and shell diameter indicates that leaves of plants as well as the diets aid in the entire body growth of the snails (Ejidike, 2002). Favourable climate and low level of habitat disturbance have enabled the snails to grow significantly faster at levels that may be comparable to those raised under controlled feeding regimes in captive environment (Goodman, 2003).

Table 3: Mean shell weight (g) of snails species sampled in five different locations

Locations	*Achatina achatina*	*Achatina depravata*	*Bulinus truncatus*	Mean weight Total
Achusa	15.29 ± 10.67	9.36 ± 4.22	9.47 ± 4.65	9.90^{b} ± 5.51
Agbough	6.66 ± 3.29	7.59 ± 4.23	8.52 ± 4.07	8.12^{d} ± 4.09
NASME	14.12 ± 4.16	7.78 ± 3.55	7.97 ± 4.67	8.05^{de} ± 4.54
UAM	11.57 ± 5.74	12.27 ± 5.56	10.73 ± 4.93	11.22^{a}± 5.19
MZG	9.26 ± 4.37	9.08 ± 4.80	9.68 ± 4.76	9.47^{c} ± 4.73
Mean ± SD	10.63^{a} ± 7.13	9.38^{b} ± 4.95	9.33^{bc} ± 4.72	

Means in the same row/column followed by different superscripts differ significantly ($p<0.05$)
Species*Location F= 6.024, P<0.05

Table 4: Mean shell length (cm) of snails species at five different locations

Location	*Achatina achatina*	*Achatina depravata*	*Bulinus truncates*
Achusa	5.61 ± 1.47	5.39 ± 1.16	5.44 ± 1.26
Agbough	5.41 ± 0.87	5.05 ± 1.43	4.97 ± 1.26
NASME	4.92± 0.59	5.15 ± 1.31	5.26 ± 1.28
UAM	5.63 ± 1.13	5.66 ± 1.23	5.68 ± 1.91
MZG	5.57 ± 1.37	5.32 ± 1.17	5.14 ± 1.31
Mean±SD	5.52^{a} ± 0.35	5.32^{b} ± 1.27	5.29^{bc} ± 1.04

Means in the same row followed by different superscripts differ significantly ($p<0.05$)
Species*Location F=1.813, P<0.05

Table 5: Mean shell diameter (cm) of snails species sampled at five different locations

Locations	*Achatina achatina*	*Achatina depravata*	*Bulinus truncates*
Achusa	2.78± 0.69	2.07 ± 0.29	2.12 ± 0.31
Agbough	2.40 ± 0.10	1.89 ± 0.29	1.99 ± 0.21
NASME	2.80 ± 0.57	2.06 ± 0.26	2.06 ± 0.32

Locations	*Achatina achatina*	*Achatina depravata*	*Bulinus truncates*
UAM	2.43 ± 0.68	2.25 ± 0.31	2.12 ± 1.17
MZG	2.51 ± 0.63	2.10 ± 0.35	2.09 ± 0.33
Mean ±SD	2.53 [a] ± 0.61	2.11 [bc] ± 0.32	2.13 [b] ± 0.60

Means in the same row followed by different superscripts differ significantly ($p<0.05$)
Species*Location $F=21.402$, $p<0.05$

CONCLUSIONS

Three species of snails *(Achatina achatina*, *Achatina depravata* and *Bulinus truncates)* were identified. *Daniallia oliveri* dominated the woody species. Snails were more concentrated in Achusa and Makurdi zoological garden. Snails in the study areas increased in length, diameter and weight. Shell length indicated the weight of the snails. Snails' are vulnerable to changes in environmental conditions and many species of land snails are living close to their thermal and desiccation tolerance due to the removal of the shade trees in their habitat because of deforestation and habitat loss. Various microhabitats may be used for the rearing of snails, depending on the suitability and availability of such-microhabitats to ensure sustainability and productivity. It is hereby recommended that people should be educated on the effect of snails' overexploitation and preservation of urban vegetation should be encouraged to enhance snails' survival and populations increase.

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