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Farm Households Income Sources Diversification Behaviour in Nigeria

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Abstract
The time lag inherent in agricultural production leads to an atmosphere of imperfect knowledge which could be reduced by diversity in income sources. The study examined the farm households' income sources diversification behaviour in South Western Nigeria. A multi-stage random sampling technique was used to select 250 rural farm households in the study area while the data collected were subjected to analytical techniques such as descriptive statistics, the Simpson index of diversity and Tobit regression model. The results show that the mean age of respondents was 41years while the majority (83.4%) were married. Most (79.2%) of the households were headed by men while 74.2 percent of the respondents were educated. The mean household size was 9 and the distribution of respondents by the type of diversity in income sources showed that the majority earned their income from production of two or more crops. The average number of income sources was 5 while the Simpson index of diversity revealed a high level of income diversification of 0.8 in the study area. Regression analysis shows, age, household income, household size, access to extension services, farming experience, distance to market, membership of association and marital status to be the main determinants of diversity of income sources among respondents. It was recommended that in order to improve the standard of living of rural households, effort should be geared towards diversifying to high-value crops.
Key words: Diversification, income, households, Simpson index, farm, production, crops.

1.0 Introduction

In a variety of ways agricultural production process is unlike other types of business, the gestation lag is much longer in farming than in industrial production. The production lag for agricultural products may be brief as in broilers, or of intermediate length of time as in arable crops production, or very long as in the case of raising beef cattle and growing permanent crops. The time lag inherent in farming business creates an atmosphere of imperfect knowledge because when the farmer decides on what and how to produce during the planting season he does so on some expectations about future yields and prices, and these expectations are usually subject to some errors. Closely related to the time factor is the biological nature of farm production. Animals and plants undergo the normal biological process of growth and death in the course of their being produced, and in-between these two extremes they suffer from disease and pest infestations. Thus, to some extent the farmer has little control over the amount of production accruable to him at harvest. Also, the relatively low price elasticity of demand for basic food crops implies that an increase in farm output causes farm income to fall. This often encourages price and income instability in agricultural production. Diversification is one of the methods at the farm level by which farmers can reduce imperfect knowledge and raise farm income.

The fundamental value of agricultural sector in the growth and development of the African most populous country's economy is indicated in its contribution as source of food and raw materials for agro-industrial processing and the linkage effect with employment income and market opportunities for industrial output and reduction in poverty (NEEDS, 2007). According to World Bank (1999) estimate, agricultural sector contributions to Nigerian Gross Domestic Product (GDP) increase at an annual rate of 2.9 percent in 1990 through 1998. Due to bad agricultural policies in Nigeria, the contribution of this sector to GDP has declined from 7.40 percent in 2006 to 2.61 percent in 2013. The total land area of Nigeria is 92.4 million hectares out of which 91 million hectares are suitable for cultivation. Approximately half of this cultivable area is put under effective permanent and arable crops cultivation while the rest is covered by forest wood, weeds, pastures, buildings, etc.

Agriculture provides staple foods which are taken in the form of plant products such as; tuber crops like yam, cocoyam, cassava, fruits like oranges, mango, guava, beverages like, cocoa, coffee, kolanut, grains like maize, rice, millet, spices like pepper, ginger and animal products like meat and eggs. Also, agriculture and other Agro-based industries in Nigeria provide employment opportunities for over 75 percent of the entire population (NBS, 2012). Job opportunities are provided by agriculture for middlemen, transporters, scientists, traders and retailers of agricultural products.

However, despite the enormous contribution of agriculture to the Nigeria economy it is confronted by a number of problems, these include low prices during harvest, weak linkage of agro-industrial sector resulting into surpluses and wastages. Nigerian agricultural persisting problem of access to credit particularly at rural level, weak marketing structure, continued reliance on rudimentary tools and cultural practices, poor state of rural infrastructure especially roads, resulting in increased cost of farming operations, and transportation of produce, poor research co-ordination and weak linkage of research and extension and finally ageing farming population and lows return to investment which makes agriculture less attractive to young able bodied men (NEEDS,2007).

From the foregoing the farmers are unable to bear the weight posted by the problems stated above and thus are forced to diversify to support themselves and their households.

Over the years, in the developing economy, attention has been shifted to research on diversification of income among farm households. Diversification of income among farm households may be viewed from different angles. According to Minot et al. (2006), this may be defined as the balance among the different sources of income or an increase in the number of sources. This shows that, households with two income sources, each contributing half of the total, would be more diversified than households with two sources, one contributing more than half of the total. Also, households with three sources of income would be more diversified than those with two sources (Ersado, 2003). Diversification of income could occur when a farmer moves from the production of low-value crops to higher-value crops, livestock, and nonfarm activities. In addition, income is diversified when a farm household moves from subsistence farming to commercial agriculture.

In other words, diversification of income may include multiple farm locations where farm plots are sited in different geographical locations within the neighbourhood so that if bad weather conditions affect the farm in one location, it might not spread to the other locations particularly if such conditions are localized. Staggered planting is another form of diversification whereby planting of crops is done at different time intervals in a season in order to avoid the possibility of too early planting or too late planting.

However, Researchers over the years have identified reasons why farm households engaged in income diversification. According to Minot et al (2006), diversity in income sources allows rural farmers to reduce risk and meet consumption needs. Farm households with multiple sources of income will experience less variability in income than those with few sources. But Quiroz and Valdez (1995) opined that crop diversification is unlikely to reduce income risk because the yields of different crops are closely correlated. More also, there is need for diversification in a situation where income-generating activities exhibit diminishing marginal returns to labour input. It has been indicated that, the rich and poor farm households diversify differently. Richer households tend to be more diversified, suggesting that diversification is not only considered a risk management strategy but also a means of increasing overall income. The poor typically engage in labour intensive, low barrier to entry and low returns activities while the rich are found in activities that are capital intensive and of high returns (Barrett et al, 2005). Also, poor farm households diversify in order to minimize the risk involved in farming activities while diversification is seen by the rich as way of maximizing enterprise profit.

Demissie and Legesse (2013) examined the determinants of income diversification among rural households in Ethiopia. They found that diversification is influenced by human capital related variables (gender, household head age, number of household members that are active economically, and education), infrastructural related variable such as proximity to market, livelihood assets (farm size) and livelihood diversifying strategy. Also, in the study of income and crop diversification among farming households in the rural Nigeria, Ibrahim et al (2009) observed that diversification into a number of income sources and crops grown are very high among the farm households. The study found that the determinants of income diversification are availability of electricity in the household, children less than 12 year old, number of adults above 60 years and distance from local market while the determinants of crop diversification among the north central rural farmers are, age, number of extension visits, availability of tractor hiring services, returns from crop production and level of education of the household head. In western Kenya, Olale et al. (2010) study focused on the determinants of income diversification among fishing communities and he was able to conclude that educational level, access to credit and membership in associations are the key factors that explain income diversification behaviour among fish workers.

Furthermore, Babatunde (2009) observed that the determinants of rural income diversification have been analyzed in various developing countries but the results from such researches were somewhat ambiguous. Using econometric analysis, Babatunde and Qaim (2010) noticed that households with little productive assets and those who are disadvantaged in terms of infrastructure and education are inhibited in their ability to participate in more profitable off-farm activities. They concluded that off-farm income tends to increase income inequality.

Diversification in the context of this study is not concerned with profit maximization but mainly with income stabilization.

Despite the fact that South West region of Nigeria is known for agriculture, some farmers do engage in a variety of farm and off-farm activities to diversify their income and enable them cope with the risk involved in farming businesses. The main objective of the study is to examine the driving forces behind income diversification among farm household in South Western Nigeria. The specific objectives are to;

(1) Examine the socio–economic and demographic characteristics of farm households in the study area.

(2) Examine the farm households' different occupations or diverse activities engaged in as their livelihoods.

(3) Identify the factors responsible for farm households' income diversification.

2.0 Materials and Methods

2.1 Study Area

The study was carried out in South Western Nigeria. It comprises Ekiti, Lagos, Ondo, Oyo, Osun and Ondo States. It is also known as the southwest geographical zone of Nigeria. The area lies between longitude 2^0 3^1 and 6^0 00^1 East and latitude 6^0 2^1 and 8^0 37^1 N with a total land area of 77,818 km^2 and a population of 32.5 million (NPC,2014).The study area is bounded in the East by Edo and Delta States, in the North by Kwara and Kogi States, in the West by Republic of Benin and in the South by the Gulf of Guinea. The climate of southwestern Nigeria is tropical in nature, it is characterized by wet and dry seasons. The temperature ranges between 21^0C and 34^0C while the annual rainfall ranges between 1500mm and 3000mm. In the Southwest Nigeria, there is high temperature during the dry season with heavy rainfall during the rainy season (April to October) and dry wind during the dry season (November to March). There are good soils favourable to maize production in the study area. Naturally, farming is the major occupation of the people in the states under the study.

2.2 Method of data collection

A multi-stage random sampling technique was used for the selection of 250 respondents needed for the study. Two states were randomly selected out of the six states in the western part of Nigeria. The states are, Ondo and Ekiti States. From each state, five Local Government Areas (LGAs) were again selected randomly to make a total of ten LGAs. Lists of farmers that were into income diversified activities (that is those with multiple sources of income) were compiled from the lists of farmers provided by the LGAs Ministry of Agriculture. Twenty five farmers were selected randomly from each LGA. In all, a total of two hundred and fifty respondents were randomly selected and interviewed by trained enumerators. Due to the uncooperative attitudes of just ten respondents, two hundred and forty farm households were used for the analyses. A well structured and standardized questionnaire was used to collect information on households' socio-economic and demographic characteristics, income sources, number and types of crops grown, number and types of animal reared. For the purpose of this study, farmers that met one of the criteria listed below were included in the list generated before selecting respondents randomly: (1). Farmers that grow the same type of crop in different locations. (2). Farmers that grow more than one type of crops on a plot. (3). Farmers that are into livestock and crop production. (4). Farmers that rear same type of livestock in different locations. (5). Farmers that rear more than one type of animals in a particular location. (6). Farmers that engage in off farm activities. (7). Farmers that engage in wage earning activities.

2.3 Analytical techniques

Descriptive statistics, the Simpson index of diversity and Tobit regression model were used to analyse the data collected.

The Simpson index of diversity is one of the measures of income diversity. It takes care of both the number of sources of income and balance among them. The index could be specified as follows:

$$SID = 1 - \sum_i \aleph_i^2 \quad \text{.....(1)}$$

Where N_i^2 is the square of the proportion of income coming from source i while Σ means summation and SID is the Simpson index of diversity. The index lies between zero and one. As the number of sources of income to be measured increases, the sum of the squared shares decrease and the index approaches one.

However, in order to know the determinants of income diversification among respondents, Tobit regression model was applied to the data collected. The model is stated as:

$$Y_i^* = X_i' \beta' + \varepsilon_i' \quad \ldots\ldots(2)$$

Y_i^* is the dependent variable and is equal to the Simpson index of diversity of household i (SID_i). It takes the value between 1 and 0. X_i' is a matrix of independent variables.
Where,
X_1= age (years)
X_2= marital status (1 if married; 0 otherwise)
X_3=household size
X_4=household income (₦)
X_5=education of head(years)
X_6=access to credit (access; yes=1, no=0)
X_7=access to extension service (access; yes=1, no=0)
X_8=farming experience(year)
X_9= gender (male=1, female=0)
X_{10}=distance of farm to market
X_{11}= membership of association.
$\beta'$is a parameter vector in the equation to be estimated
ε_i' is a radom variable which is normally distributed with mean zero and constant variance.
The coefficients are estimated by maximum likelihood method. The maximum likelihood method is chosen among others, such as minimum X^2 method, etc, to determine the value of the unknown parameters of multivariate Tobit model because of resulting parameter estimators are consistent asymptotically normal and efficient. The log-likelihood function for the Tobit model is as follows:

$$\ln L = \sum_{Y_i>0} -\frac{1}{2}\left[\ln(2\pi) + \ln\sigma^2 + \frac{(Y_i - \beta' X)^2}{\sigma^2}\right] + \sum_{Y_i>0} \ln\left[1 - \Phi\left(\frac{\beta' X}{\sigma^2}\right)\right] \ldots\ldots\ldots\ldots (3)$$

Φ is the Cumulative Density Function and other variables are as earlier defined.

3.0 Results and Discussion
3.1 Respondents' socio-economic characteristics

3.1.1 Distribution by Age
Table 1 shows the age distribution of farmers that have diversity of income. The minimum age was 26 years while the maximum age was 84 years. The analysis shows the mean of the age distribution to be 41 years. Farmers that were less than 30 years were 8 constituting about 3 .3 percent while those between 30 and 39 years were about 25.8 percent. Also respondents that were between 40 and 49 years and 50 and 59 years were 23.3 and 20.8 percent respectively. 40 respondents constituting about 16.7 percent were between 60 and 69 years of age while just 10.1 percent of the sampled farmers were 70 years and above. The majority (52.4 percent) were below 50 years. This shows that the population of farmers in the study area with diverse source of income is very active and young. The implication of this is that young farmers prefer having more than one source of income than the old ones. This may be necessary in order to reduce income risks in the face of missing insurance markets (Barret et al., 2001). Also it has been argued by researchers that a household with more economically active people will be more likely to have more income sources.

3.1.2 Distribution by Marital Status
According to table 1, the majority (83.4%) were married while 14 respondents constituting 5.8 percent were single. 3.3 percent of the farmers had lost their spouses. Also, 7.5 percent were divorced. This implies that married farmers believe more in diversification of income sources. Also it is an indication that married farmers have additional household responsibility which will definitely encourage income diversification.

3.1.3 Distribution by Gender

Table 1 depicts that 190 households constituting about 79.2 percent were male headed while just 50 households constituting about 20.8 percents of households surveyed were female headed. This shows that the majority of the households were headed by male farmers. The implication of this is that male headed households prefer to have more than one source of income when compared with their female headed households.

3.1.4 Distribution by Households' Head Education

Table 1 indicates that 25.8 percent of the households head did not pass through any formal education while the majority of those household heads (74.2%) were educated. Only 0.8 percent of the head went through adult literacy education while 48 constituting 20 percent had primary education. Also, those with secondary education were 29.2 percent while 24.2 percent earned tertiary education. One could infer from this analysis that educated farmers love to diversify their income source. According to Pingali et al. (2005), education assists farmers in reducing the transaction costs for accessing and interpreting information regarding alternative income-generating activities.

3.1.5 Distribution by Household Size

According to table 1 the minimum household size in the study area was 1 while the maximum was 18. The mean household size was 9. Those households having between 1 and 5 were 50 respondents constituting 20.8 percent while the majority (66.7%) had between 6 and 10 household size. 8.3 percent of the households had between 11 and 15 people while just 10 households (4.2%) were above 15 in number. The result shows that households in the study area with more than one source of income have large household size. Having more than one source of income may be necessary in order to cater for the needs of members of households. Also, large household size may encourage income diversification due to the availability of labour.

3.1.6 Distribution by type of Income diversification

Table 1 shows the type of diversity in income sources found among the farmers in the study area. The majority (62.5 percent) of the respondents diversified into production of two or more crops as sources of income while 12.5 percent went into production of crops and livestock in order to have more than one sources of income. Also, 20.8 percent of the households diversified their sources of income by growing crops and engaging in off-farm activities. Just 10 respondents constituting 4.2 percent went into livestock production and engaged in off-farm activities in order to have diversity in income sources. The implication of this analysis is that respondents have very diverse income sources, relying on livestock, crops and off-farm activities with the majority earning their income from crop production.

3.1.7 Distribution of Household by Distance of Farm

Table 1 indicates the distribution of respondents by the distance of farms to their various homes. Distance a times dictates the number of income generating activities that farmers would engage in on their farms. According to table 1 the farms of 48 respondents constituting about 20 percent of the distribution had their farms less than one kilometer from their various homes. 46.7 percent had theirs located within the range of 1 and 5 kilometers while 31.3 percent of the respondents farm were sited between 6 and 10 kilometers. Just 5 farmers constituting about 2 percent had theirs above 10 kilometers. The minimum distance was 0.5 kilometer while the maximum was 13 kilometers. The average distance of farms from homes was 3 kilometers while the majority (66.7%) of the households had their farms located less than 6 kilometers. This implies that most of the farms could be trekked by farmers. The implication of this is that more income generating activities are likely to be engaged upon by farmers and this will increase income sources. Also, mobilization of farm inputs to farms in the study area will not be difficulty.

3.1.8 Distribution by farm size

Table 1, also shows the distribution of farmers by farm size. Most of the time, the farm size of any farmer dictates the expected output and income. About 20.8 percent of household had less than one hectare of land for farming activities while the majority, (42.5%) owned between 1 and 5 hectares of land. Also, 88 farmers constituting about 36.7 percent had 6 and above hectares of land. The mean farm size was 4 hectares while the minimum and maximum were 0.4 and 20 hectares respectively. This shows that the study area is inhabited by small scale farmers. The implication of this distribution is that most of the farmers are expected to engage in off-farm wage employment and/or off-farm self employment in order to cater for their household members. Hence diversification of income sources is enhanced by small scale production.

3.1.9 Distribution by membership of associations

Table 2 indicates the distribution of respondents based on membership of associations. The importance of belonging to associations by farmers can not be overemphasized. It has been emphasized by Minot et al(2006)

that one of the ways to address problems such as lack of access to credit, lack of information about production methods, insufficient land or labour and lack of social capital is through cooperatives or other farmer organizations. About 19.6 percent of the respondent belonged to just one association while 28.7 percent were members of 2 associations. The majority, 51.7 percent belonged to more than 2 associations. This implies that in the study area, through their associations, farmers would have access to information needed for income generating activities.

3.1.10 Respondents farming experience

Table 3 shows the distribution of farmers according to their farming experience. An adage says experience is the best teacher. Experience will definitely assist farmers to decide on the type and number of income generating activities to embark upon. Table 3 indicates that 8.8 percent had less than 5 years farming experience while those with 5 to 10 years were 14.2 percent. Respondents that had over 10 years but less than16 years experience were 29.1 percent while the majority (47.9%) had over 15 years farming experience. The minimum and maximum farming experience were 2 and 30 years respectively while the mean was 12 years. This shows that farmers in the study area are well experienced. It implies that farmers would not have problem on how to go about their income diversification activities.

3.1.11 Distribution of respondents by sources of credit

According to table 4, about 5.4 percent of the respondents used for this analysis sourced for credit from non-governmental organization (NGO) while 20.8 percent got theirs from their personal savings. Also, those who relied on cooperative societies for credit were 23.3 percent. Those that chose thrift societies and friends & relatives were 20.5 percent and 30 percent respectively. Most of the farmers had access to low interest rate credit and hence multiple sources of income would definitely be promoted in the study area.

3.1.12 Distribution by number of extension workers visitation

Information on new technologies and innovations on farming activities are made available to farmers by the extension agents. These workers a times help in providing information on input and output prices in various markets. Table 5 shows that about 16.7 percent of the respondents were never visited by extension workers while 26.7 percent and 5 percent were visited once and twice respectively. The majority (51.6%) were paid visitation more than twice. In all, over 83 percent of the farmers were visited by extension agents. This implies that most of the farmers would have access to relevant information on farming businesses and hence be able to diversify into many income generating activities.

3.1.13 Distribution by number of income sources

Income generating activities include, crop and livestock production, off-farm wage employment and off-farm self employment. Table 6 shows the number of income generating activities of respondents. 46 respondents constituting 19.2 percent had between 2 and 3 sources of income. Those that engaged in 4 or 5 activities were about 65.8 percent while just 15 percent were into 6 or more income generating activities. The minimum and maximum were 2 and 8 respectively while the mean was 5. This shows that diversity in income sources is very high in the study area.

3.1.14 Household income distribution

According to table 7 about 8.3 percent of the households earned less than ₦200,000 per annum while 19.2 percent received between ₦200,000 and ₦399,999 as income per annum. Also 147(61.3%) respondents constituting the majority were in the income range of ₦400,000 and ₦599,999 per annum. Just 15 percent earned above ₦599,999 in a year. The minimum and maximum households income per year were ₦116,000 and ₦1million respectively while the average income was ₦467,252. This implies that most of the farmers in the study area are small scale farmers.

3.2 Determinants of farm household income diversity

The Simpson index for the study area was 0.80. This indicates the existence of high level of income diversity in terms of the number of sources of income and the balance of income among sources in the study area. According to table 8 the variables, marital status(X_2), household size(X_3), household income(X_4), education(X_5), access to credit(X_6), access to extension services(X_7), gender(X_9) and membership of association(X_{11}) were positively related to diversity in income sources as measured by Simpson index of diversity(SID). This implies that an increase in the variables leads to a more diversity in sources of income and vice versa. In this regard, the number of sources of income and the balance of income among sources are expected to be higher among married respondents than single. This may be so because married people are expected to have more responsibilities in terms of meeting the consumption needs of the household members when compared with those that are not married. Also the positive sign on the coefficient of household size(X_3) shows that the presence of large number

of economically active members in the household would encourage diversity in income sources. This is so because of the availability of labour for income-generating activities. In addition, large household size implies more mouths to feed and hence more income to generate.

The household income(X_4) had positive and significant relationship with diversity in income sources. This implies that as the household income increases (decreases), diversity in sources of income increases (decreases). According to table 8, education of the household head had positive relationship with income diversity. This implies that the more the number of years the household head spent in school the more the income sources. Educated heads would definitely have access to off-farm employment opportunities and hence more diversity in income sources. Most of the time, education opens the door to a number of different income-generating activities. Access to credit(X_6) related positively to diversity in sources of income. This is an indication that access to credit in kind or in cash allows households to increase their sources of income and vice versa. More economic activities are expected to be financed by respondents that have access to credit facilities.

Moreover, variable access to extension services(X_7) was positively and significantly related to diversity in income sources. Extension services are expected to provide useful information on how best to carry out farming activities. Most of the time new innovations and technologies on farming businesses are made available to the farm households. The sign implies that access to extension services encourages diversification of income sources. Also gender(X_9) had positive relationship with diversity in income sources. This is an indication that male headed households are into more income generating activities than their female counterparts. Membership of association(X_{11}) positively and significantly influenced diversity in income sources. This result implies that respondents that belonged to associations especially the cooperative societies had higher probability of diversifying into multiple sources of income than those that did not belong to any association. Such a result reflects the fact that cooperative societies do assist in passing useful information on farming and other off-farm activities to farm households. A times associations do provide financial assistance to their members thereby encouraging investment in multiple sources of income

Also, variables, age(X_1), farming experience(X_8) and distance of farm to market(X_{10}) had negative relationship to the number of sources of income and the balance of income among sources. An indication that an increase in the variables discourages farmers from having multiple sources of income and vice versa. Age of the household head(X_1) negatively and significantly affected diversity in income sources. This shows that the more the age the less the number of income-generating economic activities a respondent is expected to embarked upon. This may be so because most of the time age is associated with the accumulation of skills in one economic activity, leading to specialization and fewer income sources. Additionally, farming experience(X_8) influenced diversity in income sources negatively and significantly. This implies that experienced respondents will have fewer numbers of economic activities than those that are inexperienced. This is consistent with the view that highly experienced farmers are not very active economically to seek multiple sources of income. Also, distance of farm to market(X_{10}) was significant but had a negative effect on the number of sources of income and the balance of income among sources. This could be explained by the fact that farmers whose farms are far from the inputs and output markets are faced with higher transaction costs which reduce returns from market sales and lead to fewer income generating activities.

In addition, two variables (age and household income) were significantly different from zero at 1 percent level of significance while five variables (household size, access to extension services, farming experience, distance to market and membership of an association) and one variable (marital status) were significant at 5 percent and 10 percent levels of significance respectively. This shows that the main determinants of income diversification among farmers in the study area were, age, household income, household size, access to extension services, farming experience, distance of farm to market, membership of association and marital status.

4.0 Summary and Conclusions

This article examined the farm households' income sources diversification behaviour in South Western Nigeria. A multi-stage sampling technique was used to select 250 respondents randomly from the study area. Only data collected from 240 respondents were subjected to descriptive, Simpson index of diversity and Tobit regression analyses. The results show that the minimum, maximum and mean age of respondents were 26 years, 84 years and 41 years respectively. Also, majority (83.4%) of the sampled farmers were married. 79.2 percent of the households were headed by men while women headed just 20.8 percent. Distribution by households' head education showed that 74.2 percent were educated while 25.8 percent were illiterates. The minimum household size was 1 while the maximum was 18. The mean household size was 9. It was revealed that farm households had very diverse income sources with the majority (62.5%) earning their income from production of two or more crops. Distribution of farm households by the distance of farm to their various homes indicated that the majority

(66.7%) had their farms located less than 6 kilometers while the average distance of farms from homes was 3 kilometers.

In addition, 0.4 and 20 hectares were the minimum and maximum farm size respectively while the average was 4 hectares. In the study area, 51.7 percent belonged to more than 2 cooperative societies. The average farming experience of the household heads was 12 years while the minimum and maximum were 2 and 30 years respectively. The majority of the households had access to low interest rate credit. 83 percent of the households were visited by extension agents. Also, distribution of farm households by number of income sources revealed that the minimum and maximum were 2 and 8 sources respectively while the mean was 5 sources. The average income per annum for households in the study area was ₦467,252. The Simpson index of diversity was 0.8. This revealed a high level of income diversity in terms of the number of sources of income and the balance of income among sources. Age, household income, household size, access to extension services, farming experience, distance to market, membership of association and marital status were the main determinants of diversity of income sources among respondents in the study area. Based on the findings, the followings are recommended.

- Since crop production is the most important source of income among the farmers, stakeholders should gear efforts towards improving its production by diversifying to high-value crops. This will lead to improvement in income and standards of living of rural households.
- If production of new crops are to be promoted by stakeholders, there is need to pay attention to marketing issues.
- Also, programmes to help rural farm households increase income through diversification should focus on yield improvement.
- Governments should pay more attention to rural roads and electricity in order to boost farming activities.
- Finally, since extension agents visitation is one of the determinants of diversification of income, government and NGO should invest more on the agents' capacity building.

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Table 1: **Distribution of farm households by socio-economic characteristics.**

Variable	Frequency	Percentage
Age in years		
< 30	8	3.3
30 – 39	62	25.8
40 – 49	56	23.3
50 – 59	50	20.8
60 – 69	40	16.7
70 – 79	20	8.3
80 and above	4	1.8
Marital Status		
Single	14	5.8
Married	200	83.4
Divorced	18	7.5
Widow/Widower	8	3.3
Gender		
Male	190	79.2
Female	50	20.8
Educational Background		
No Education	62	25.8
Adult Literacy	2	0.8
Primary Education	48	20
Secondary Education	70	29.2
Tertiary Education	58	24.2
Household Size		
1-5	50	20.8
6-10	160	66.7
11-15	20	8.3
Above 15	10	4.2
Types of Diversification		
Two or more crops	150	62.5
Crops and Livestock	30	12.5
Crops & Off-farm Activity	50	20.8
Livestock & Off-farm Activity	10	4.2
Distance of Farm(Km)		
Less than 1	48	20
1-5	112	46.7
6-10	75	31.3
Above 10	5	2
Farm Size(Ha)		
Less than 1	50	20.8
1-5	102	42.5
6-10	60	25
Above 10	28	11.7

Table 2: Distribution of respondents by membership of associations

Group	Frequency	Percentage
1	47	19.6
2	69	28.7
More than 2	124	51.7
Total	240	100

Table 3: Respondents farming experience

Year	Frequency	Percentage
Less than 5	21	8.8
5-10	34	14.2
11-15	70	29.1
Above 15	115	47.9
Total	240	100

Table 4: Distribution of respondent by sources of credit

Source	Frequency	Percentage
Non governmental organization	13	5.4
Personal savings	50	20.8
Cooperative society	56	23.3
Thrift society	49	20.5
Friends & relatives	72	30
Total	240	100

Table 5: Number of Extension workers visitation

Number	Frequency	Percentage
No visitation	40	16.7
Once	64	26.7
Twice	12	5
More than twice	124	51.6
Total	240	100

Table 6: Number of income sources

Source	Frequency	Percentage
2-3	46	19.2
4-5	158	65.8
Above 5	36	15
Total	240	100

Table 7: Respondents income distribution

	Frequency	Percentage
Less than 200,000	20	8.3
200,000 – 399,999	46	19.2
400,000 – 599,999	147	61.3
Above 599,999	27	11.2
Total	240	100

Table 8: Determinants of farm households' income diversification (Tobit Maximum Likelihood Estimates)

Variable	Coefficient	Standard error	t-ratio
Age(X_1)	-0.0373*	0.00876	4.26
Marital status(X_2)	0.3410***	0.1891	1.80
Household size(X_3)	0.0247**	0.0087	2.84
Household income(X_4)	0.3670*	0.0574	6.39
Education of head(Year)(X_5)	0.0019	0.0071	0.27
Access to credit(X_6)	0.0806	0.0931	0.87
Access to Extension services(X_7)	0.0381**	0.0178	2.14
Farming Experience(X_8)	-0.3406**	0.1627	2.09
Gender(X_9)	0.0120	0.0536	0.22
Distance of farm to market(X_{10})	-0.1109**	0.0530	2.09
Membership of an association(X_{11})	0.2224**	0.0875	2.54
Constant	0.8134***	0.1872	4.35

*, ** and *** denote statistical significance at the 1%, 5% and 10% levels, respectively.