

Gender Differentials in Income Diversification among Farm Households in Oyo State, Nigeria

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ABSTRACT

The study was carried out to assess gender differentials in income diversification among farm households in Oyo state, Nigeria. A three-stage sampling technique was adopted to select one hundred and twenty respondents (120). Descriptive statistics, Mean of Income Shares, Simpsons Index of Diversity and Tobit regression model was used to analyze the data. The results show that, the average age of the respondents was 47.49 years, average household size is 7 and majority (74.36%) of household members were within 18-60 years of age bracket. The average farm size of the farmers is 1.94 ha and 68.4% had a minimum of primary school education. The mean farming experience was 12.34 years while the average annual income of respondents is N113,170.83. Female respondents generated highest proportion of income (0.352) from Food Crop Production while male respondents generated highest proportion of income (0.383) from Cash Crop Production. Also, 90% of male respondents and 85% of female respondents embraced income diversification. The result of the probit model shows that age, number of households members >60 age bracket and education status all have negative coefficients which imply a negative probability relationship with the probability of income diversification. It does mean that any increase in any of these variables will leads to a decrease in probability of income diversification in among male farmers in the study area. However, household size, number of households members within 18- 60 age bracket and income has positive probability relationship with income diversification status of the male farmers. Again, household size, number of households members between 18-60 age bracket, farm size and income have positive probability relationship with income diversification status significantly influence the probability of income diversification among the female farmers.. The study concluded that the respondents' socio-economic characteristics influences the degree of income diversification in the study area. It was therefore recommended that relevant stakeholders should introduce more gender specific enterprises.

Key Words; Farm income, Enterprises, Income Shares, Farmers, Simpson Index.

INTRODUCTION

Income diversification within farm households is an increasingly important reality in coping with the changing economic framework of the agricultural based rural economy in Sub-Saharan Africa (SSA) (World Bank, 2007). The inherent risks associated with total dependency on rain fed agriculture that characterized agricultural activities in the region made diversification of income an important component of livelihood strategies among the farming households. In Nigeria like most developing countries in SSA, rural economy has been traditionally associated with the agricultural sector, with particular focus on farm activities as the primary driver of rural income (FAO, 2017). However, Enete and Achike (2008) stated that risks such as u weather changes, outbreak of pest and diseases, pollution in coastal waters, manifestation of negative externalities, and other uncertainties that often pose threats to farming activities and yields, do lead to erratic fluctuations of farm household incomes. The observed farm households' income fluctuations have been linked with the continuous trapping of most farm households in the vicious cycle of poverty. In order to escape the observed vicious cycle, studies (Taylor et al., 2003) have shown that farm families often diversified their sources of income from the core farm business operation to include off-farm employment and alternative enterprises in order to maintain farm household incomes, defend farm equity as well as provide greater opportunity for retirement and family succession. Diversification of the sources of income is therefore aimed at cushioning the effects of economic shocks, poverty

reduction, reduction in income inequality, consumption stability and overall improvement in the standard of living of the households (Soares 2005; Minot, et al, 2006). Hence, a farmer is likely to hold at least more than one income portfolios on his/her farm depending on socio-economic, business and biophysical characteristics in the environment. Income diversification can either be out of necessity in situations where the income from the household's farm production is not enough to sustain an acceptable standard of living or by choice which refers to voluntary reasons for diversification, this is often linked to the desire for higher returns from off-farm activities.

Income diversification in farm households can then be seen as a dynamic adaptation process in response to threats and opportunities, by which farm households can manage risk as well as gain extra income and resources to secure their livelihoods and improve their standard of living (Ellis et al., 2003). Therefore, income diversification may be considered as a deliberate household strategy to smooth incomes or to manage risks, or it may be an involuntary response to crisis to cope with shocks (Toulmin, et al., (2000), Barrett, et al., 2002). Comprehensively, Minot, et al., (2006) stated that income diversification has always been used to describe four distinct but related concepts. One definition refers to an increase in the number of sources of income or the balance among the different sources (Ijaiya, Ijaiya, Bello, Ajayi, and Adeyemi, 2010). A second definition concerns the switch from subsistence food production to commercial agriculture. This also implies an increasing mix of income activities on the farm.

Thirdly, income diversification is often used to describe expansion in the importance of non-crop or non-farm income. Fourthly, income diversification can be defined as the process of switching from low-value crop production to higher-value crops, livestock and non-farm activities (Ibrahim and Onuk, 2009). The foregoing notwithstanding, various motives have been adduced as prompting rural households and individuals to diversify sources income. The first set of motives comprise what is traditionally termed "Push Factors". This includes risk reduction, response to diminishing factors returns in any given use (for example family labour supply in the presence of land constraints driven by population pressure and fragmented landholding), reaction to crises or liquidity or cash constraints, high transaction costs that induce household to self-provision in several goods and services. The second set of identified motives are classified as "Pull factor" which is the realization of strategic complementary between activities such as crop-livestock integration or milling and rig production specialization according to comparative advantage accorded by superior technologies, skills or endowments (Awoniyi and Salman, 2011).

The decision to choose a given enterprise is seen as a behavioral response arising from a set of alternatives and constraints facing the decision maker (Wanyama et al., 2010). However, various explanations for income diversification behaviours can be found in economics literature to explain both incentives and disincentives for rural households to combine traditional crops with new crops and agricultural crops with animal husbandry or forestry Gender relationships are very important in shaping diversification process. This is because women and men, depending on their cultural and social backgrounds, perform different roles and have varying responsibilities in agriculture; in crop production as well as crop management. A better understanding of these differences will help to address the prevailing gender issues in rural household income diversification. Studies have shown that households headed by women or with a larger proportion of female members seem to be more involved in agricultural production and often less diversified.

Even when devoted to off-farm activities, they focus more on self-employment rather than in the more remunerative activities, which are, in African contexts, non-agricultural wage employment (Davis, 2007). Therefore, incorporating gender dimension in the analysis of households' income diversification is part of the process of a change in thinking about, social relations, ways of working, and ways of looking at as well as behaving towards both men and women. Social structure and culture may significantly affect the relative access of various genders to economic assets in families, as well as limit or encourage their mobility (Ellis 2000; Gladwin et al., 2001). Due to this, participation in diversification initiatives may vary and/or the benefits of these initiatives may not be equally distributed across the sexes (Waren, 2002). Prior economic development plans and strategies seldom took gender into account, despite the fact that both men and women have varied goals and criteria for success in their various careers. However, it should be emphasized that many income diversification plans tend to be gender-specific. The literature confirms that women may undertake a similar wide range of diversification activities as men (Chen and Ravallion 2010) but in many contexts, men are able to avail

themselves of diversification opportunities that are not open to women due to cultural constraint. Haggblade et al., (2010) showed that in rural areas of Mali the participation rate of women in non-farm employment is 16% as opposed to 84% for men, an indication that men do have more opportunities to pursue this type of diversification. The need to evaluate gender differentials if any in income diversification in the study area is the fulcrum of this study. Therefore, the objectives of the study are to; determine the contributions of various income-generating activities to the farm households compare the level of income diversification among the genders and examine the determinants of income diversification among farm households in the study area.

METHODOLOGY

The Study Area

The study was carried out in Oyo State. Geographically, the state is located within latitude 8°00'N and longitude 4°00'E. The vegetation pattern is that of rain forest in the South and guinea savannah in the North. It has an area of 27,249 square kilometers (Fajuyigbe, Balogun and Obembe 2007). The state is bounded in the north by Kwara State, in the south by Ogun State, in the east by Osun State, in the west partly by Ogun State and partly by Republic of Benin. There are five geographical distributions of people of Oyo State namely; Ibadan, Ogbomoso, Oke-Ogun, Oyo and Ibarapa. Agriculture is the main occupation of the people of Oyo State. The climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc. (Hephzibah and Tasie, 2022) There are also vast cattle ranches at Saki, Fasola and Ibadan, a dairy farm at Monatan in Ibadan

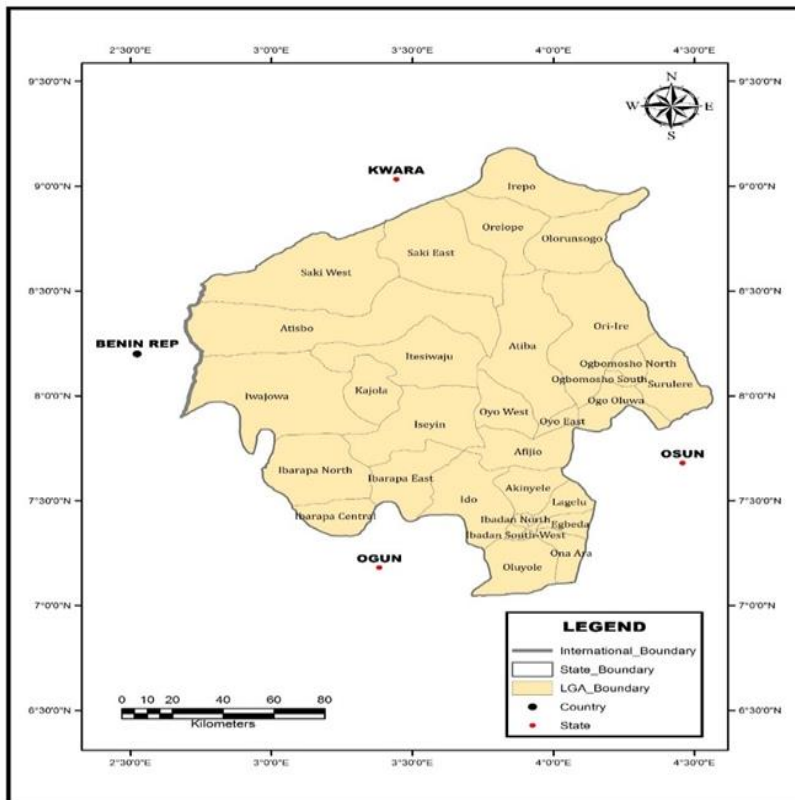


Fig 1: Map showing Oyo state Showing Local Government Areas

Sampling and Data Collection

The study uses a multi-stage sampling procedure to select the respondents. The first stage involves a purposive selection of Ogbomoso and Oyo Agricultural development Programme (ADP) zones because the two zones were regarded as the food basket of Oyo State (Oladele, 2001). The second stage involves the random selection of four Local Government Areas (LGAs) in each zone, making a total of eight LGAs. In the third stage, two villages were randomly selected from each of the selected LGAs, making a total of 16 villages. From each village, a list

of farmers was compiled and pooled together, the list was stratified into men (1380) and women (720) farmers. From each stratum, 10 percent of the population was randomly selected. In all, a total of 138 male farmers and 72 female farmers were selected, for a total of 210 respondents. A cross-sectional data was collected for the study using a pre-tested questionnaire with both close and open-ended questions. Data were collected on socio-economic characteristics of the respondent, farm production and institution characteristics, household participation in farm and nonfarm enterprises. Information on productive assets owned and household expenditure was also obtained. Personal observations were also made on the settings and activities of farm households in the study area to augment the information provided in the questionnaire.

Data Analysis

Descriptive statistics such as mean, standard deviation, minimum and maximum values was used to describe and categorize socio economic characteristics of the respondents. The mean income shares approach was used to estimate the income shares obtained by the farm households in the study area. This approach estimates the shares of incomes at the individual household level (Davis et al., 2007) by finding the share of each income source in Total Household Income (THI) for each household. The mean share for each income source for all households is then found. The general formula for Mean Shares (MS) of Income is given as:

$$MS = \frac{\sum_{h=1}^n y_{ih}}{Y_h}$$

Where i= the income source, Y=Total Income, y= income from particular activity, h=the household, n= the number of households. Equation (1) was applied in this study as:

The sum of Total Household Income (THI) is given as:

$$THI = \sum_{j=1}^n Y_j$$

Where: THI=Total Household Income, thus income coming from all sources j

j=1, 2, 3, 4....9, farm and non-farm income.

The Simpsons Index of Diversity (SID) was used to estimate the degree of income diversification among farm households in the study area. The SID takes into consideration both the number of income sources as well as how evenly the distributions of the income between the different sources are (Minot, Epp Recht, Anh and Trung, 2006; Joshi, Gulati, Birthal and Twari, 2003). The SID is preferred because its value ranges between Zero (0) and One (1). Thus, 0 denotes specialization and 1 the extremity of diversification. The more the SID value is closer to one, the more diversified the household is.

The SID general formula is given as:

$$SID = 1 - \sum_{i=1}^n P_i^2$$

SID=Simpsons Index of Diversity, n=number of income sources, Pi =Proportion of income coming from the source i, the value of SID ranges from Zero (0) to One (1), however, if there is only one Source of Income, Pi=1, then SID = 0. Following Aboaba, Adenle, Sowunmi and, Akinade (2019) The respondents were classified as follows: When SID is less than 0.01 (no diversification), SID is equal to 0.01–0.25 (Low diversification), SID is

equal to 0.26–0.50 (Average diversification), SID is greater than or equal to 0.51 (High diversification). Tobit regression model was used to evaluate the factors influencing income diversification in the study area. The Tobit model, also called a censored regression model, is design to estimate linear relationships between variables when there is either left- or right-censoring in the dependent variable. In Tobit model, the degree of income diversification among farm households is a continuous decision, the model expresses respondents’ the degree of income diversification among farm households as a function of linear combination of observable explanatory variables, some unknown parameters and an error term e_{it} . A linear specification of Tobit model can be represented as follows:

$$Y_{it} = \beta_i X_{it} + e_{it}$$

Algebraically, it can be expressed for a given farmer as

$$Y_{it} = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \dots + \beta_n X_{nt}$$

Such that

$$Y_{it} = \begin{cases} 0 & \text{if } Y_{it} \leq T \\ Y & \text{if } 0 < Y_{it} < 1 \\ 1 & \text{if } Y_{it} > T \end{cases}$$

Y= dependent variable

$$\text{Where } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_9 X_9 + U$$

Y= Simpsons Index of Diversity

Independent variables are:

X₁=Age of the respondent (Measured in years)

X₂=Marital Status (Dummy, Married =1, Single=0)

X₃=Household size (Measured as number of people in the household)

X₄=Level of education (Measured as highest level of school attended)

X₅= Total Household Income/month (Measured in Naira)

X₆ =Total farm size (ha)

X₇ = Extension visits (Number of visits received is a season)

X₈= Access to credit (1 = Yes, No =0)

β = vector of unknown coefficient

U = independently distributed error term assumed to have zero mean and constant variables

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1 presents the socioeconomic characteristics of respondents. From the table, age of the respondents fell between 26-73 years for male and 28 - 66 for female respondents. The prevailing age bracket was between 41 –

50 years (34.78%) and (37.5%) for male and female, respectively. A greater part of respondents 60.14% and 70.83% of male and female respondents respectively were married while 39.86 % and 29.17% were single respectively. The house hold age composition for male shows that 52.90% of male household head were between age of 18 – 60 years while for female household head it is 56.94%. those below 18 years were 31.88% for male household heads and 26.39% for female household heads. Educationally, majority (48.55%) and 41.67% of male and female respondents attended secondary school, 29.70% and 38.89 % attended primary school, 7.97% and 4.17 % attended tertiary institution while 13.77 and 15.28% of male and female respondents respectively did not have any formal education. The dominant household size for the two genders is 6 – 10 persons (55.07%) for male, 40.28% for female. A breakdown of the farming experience shows that 25.36% of male and 30.55 % of female respondents had less than 10 years’ farming experience, 35.51% male and 45.83% female had between 11- and 20-years farming experience, 23.91% male and 18.06% female had 21-30 years’ farming experience while 15.22% male and 5.56 % female had above 30 years of farming experience. 34.06% male and 33.33% female have average income of N5000 and below. 57.53% of male and 58.34% of female have average monthly income distributed between N51000 and N200000 while only 7.97% male and 8.33% female have average monthly of greater than N200000. Majority (68.84%) male and 61.11% have off farm income

Table 1: Socio-Economic Characteristics of Respondents

Variable	Male (n=138)	%	Female (n=72)	%
Age				
≤30	8	5.8	4	5.56
31-40	26	18.84	12	16.67
41-50	48	34.78	27	37.5
51-60	41	29.71	21	29.17
>60	15	10.87	8	11.1
Marital Status				
Married	83	60.14	51	70.83
Single	55	39.86	21	29.17
Household Age Composition				
<18	120	31.88	62	26.39
18-60	352	52.9	180	56.94
>60	72	15.22	37	16.67
Educational Level				
No formal education	19	13.77	11	15.28
Primary school	41	29.7	28	38.89
Secondary school	67	48.55	30	41.67

Tertiary Institution	11	7.97	3	4.17
Household Size				
≤5	34	24.64	30	41.67
10-Jun	76	55.07	29	40.28
15-Nov	19	13.77	8	11.11
>15	9	6.52	5	6.94
Farming Experience				
≤10	35	25.36	22	30.55
20-Oct	49	35.51	33	45.83
21-30	33	23.91	13	18.06
>30	21	15.22	4	5.56
Average Monthly Income				
<50,000	47	34.06	24	33.33
51,000-100,000	34	24.64	18	25
110,000-150,000	26	18.84	13	18.06
151,000-200,000	20	14.49	11	15.28
>200,000	11	7.97	6	8.33
Off-Farm Participation				
Yes	95	68.84	44	61.11
No	43	31.16	28	38.89

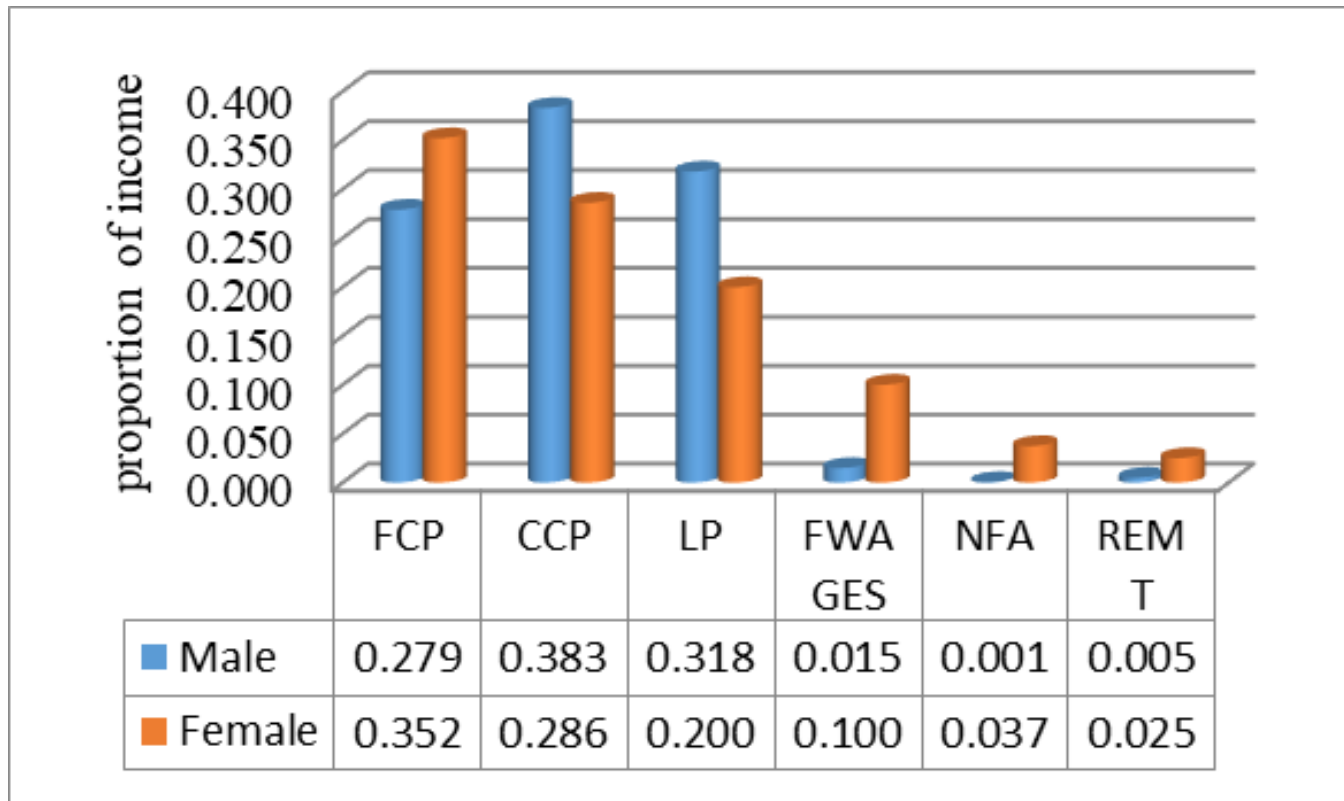
Source: Field Survey, 2023

Gender Decomposition of Shares of Incomes from Income Generating Activities

The gender decomposition of income diversification represented by proportion of income generated from various income generating activities by each gender is as presented in figure 2. From the figure, Food Crop Production (FCP) accounted for 0.279 proportion of male respondents' total income, while FCP accounted for 0.352 proportion of female total income. This shows that female respondents generated more income from FCP than male. This may be connected to the predominant traditional practice in which women were traditionally not entitled to own land through inheritance thus restricting them to food crop production only. Cash Crop Production (CCP) accounted for 0.383 proportion of male respondents' total income while CCP accounted for 0.286 proportion of female total income.

This shows that male respondents are more into CCP than female gender. Livestock Production (LP) accounted

for 0.318 proportion of male respondents’ total income, while LP accounted for 0.200 proportion of the total female income, this shows that male generated more income from LP than female respondents. Farm wage (FW) accounted for 0.015 proportion of male respondents’ total income while FW accounted for 0.100 proportion of the total female income. This shows that female generated more income from FW than male respondents, perhaps because women were often hired for labor-intensive tasks of planting, weeding, and harvesting. In addition, non-farming activities (NFA) accounted for 0.001 proportion of male respondents’ total income, while NFA accounted for 0.037 proportion of the female respondents’ total income. This shows that females’ respondents are into NFA more than men in the study area. Remittance accounted for 0.005 proportion of the male respondents’ total income while the female proportion of remittance accounted for 0.25. This also shows that the females also generated more income than the male.



Source: Data Analysis, 2023

Fig 1: proportion of income generated from various income generating activities.

LP = Livestock Production CCP= Cash Crop Production NFA= Nonfarm Activities

FCP= Food Crop Production FWAGE= Farm Wage REMT= Remittance

Gender Distribution of Income Diversification of the Respondent

The result of Simpson Index of Diversification used to categorize the respondents according to gender into different level of income diversification is presented in table 2. A total of 48.33% male and 40.00% female has diversification index between 0.26–0.50 and are therefore classified into to average diversification of sources of income category. The table further revealed that 10.00% of male respondents and 15% of female respondents does not diversify their source of income as their diversification falls below 0.01, while 12.00% of male and 26.67% female respondents have low diversified income source. Also 21.67% of male and 18.33% of female respondents highly diversified their income source.

The findings imply that 90% of male respondents and 85% of female respondents diversified their source of income. The result is in line with the findings of Amurtiya, et al., (2016) and Aboaba, et al., (2019) which state that majority of farm household have adopted income diversification as a means of coping with seasonal income variations.

Table 2: Gender Distribution of Income Diversification of the Respondent

Level of Diversification	SID	Male (n=60)	%	Female (n=60)	%
No Diversification	< 0.01	6	10	9	15
Low Diversification	0.01–0.25	12	20	16	26.67
Average Diversification	0.26–0.50	29	48.33	24	40
High Diversification	≥ 0.51	13	21.67	11	18.33
Total		60	100	60	100

Source: Data Analysis, 2023

Factors Influencing Male Farmers Income Diversification

The result of the Tobit regression analysis used in determining the probability relationship between income diversification status among the male farmers and the selected socio economics characteristics of the male farmers is as presented in Table 3. From the table, it shows that age, number of households members >60 age bracket and education status all have negative coefficients which imply a negative probability relationship with the probability of income diversification. It does mean that any increase in any of these variables will leads to a decrease in probability of income diversification in among male farmers in the study area. However, household size, number of households members within 18- 60 age bracket and income has positive probability relationship with income diversification status of the male farmers. This is an indication that any increment in any of these variables will lead to an increase in the probability of income diversification among the male farmers in the study area.

Table 3: Factors Influencing Male Farmers Income Diversification

Variable	Coefficient	Std. Err.	t	P> t
Constant	-0.397	0.292	-1.36	0.177
Age	-0.004	0.004	-1.86	0.094
Marital Status	0.153	0.118	1.3	0.195
Household Size	0.101	0.118	1.85	0.097
Number of Household Members <18	-0.122	0.119	-1.02	0.309
Number of Household Members 18–60	0.12	0.119	2.71	0.015
Number of Household Members >60	-0.244	0.145	-1.68	0.096
Education Status	-0.087	0.041	-2.1	0.038
Farm Size	0.004	0.012	0.34	0.735
Farm Experience	-0.006	0.005	-1.21	0.228
Income	0.017	0	2.64	0.01
Sigma	0.342	0.036	0.27	0.414

Sources: Data Analysis, 2023

***, **and * indicate statistical significance at 1, 5 and 10% significant levels, respectively

Summary: LR $\chi^2(13) = 25.48$, Prob > $\chi^2 = 0.0199$; Pseudo $R^2 = 0.1885$

Factors Influencing Female Farmers Income Diversification

The result of the Tobit regression analysis used in analyzing the probability relationship between income diversification status among the female farmers and the selected socio economics characteristics of the female farmers is as presented in Table 4. From the table, it shows that household size, number of households members between 18-60 age bracket, farm size and income have positive probability relationship with income diversification status. This is an indication that any increment in any of these variables will lead to an increase in the probability of income diversification among the respondents. However, household size 10% and income 5% significantly influence the probability of income diversification

Table 4: Factors Influencing Female Farmers Income Diversification

Variable	Coefficient	Std. Err.	t-value	P> t
Constant	0.397	0.292	1.36	0.177
Age	- 0.052	0.125	-0.42	0.677
Marital Status	0.800	0.600	1.33	0.183
Household size	0.700*	0.250	2.80	0.006
Number of Household member <18	-0.002	0.005	-0.40	0.690
Number of Household member 18-60	0.300**	0.150	2.00	0.045
Number of Household member >60	- 0.750	0.700	-1.07	0.287
Education status	0.700	0.400	1.75	0.080
Farm size	0.010**	0.005	2.00	0.045
Farm experience	-0.010	0.020	-0.50	0.617
Income	0.005**	0.002	2.50	0.014
Sigma	0.242	0.076	0.27	0.512

Sources: Data Analysis, 2023

***, **and * indicate statistical significance at 1, 5 and 10% significant levels, respectively

Summary: Number of obs = 120 LR $\chi^2(10) = 40.83$ Prob > $\chi^2 = 0.0001$

Log likelihood = - 62.642786 Pseudo $R^2 = 0.2447$

CONCLUSION

This study examined gender differentials in income diversification among farm households in Oyo State, Nigeria. The results show that female gender generated the largest proportion (0.352) of their income from food crop cultivation while the male gender generated the largest proportion (0.383) of their income from cash crop

production. Non-farm activities (NFA) accounted for least proportion (0.001) of male respondents' total income, while remittance accounted for least proportion (0.025) of female gender income. The result of Simpson Index indicates that majority of the respondents both male (48.33%) and female (40.00%) have averagely and above diversified their sources of income. While only 10.00% of male respondents and 15% of female respondents do not diversify their source of income at all.

The result of the probit model shows that age, number of households members >60 age bracket and education status all have negative coefficients which imply a negative probability relationship with the probability of income diversification. It does mean that any increase in any of these variables will leads to a decrease in probability of income diversification in among male farmers in the study area. However, household size, number of households members within 18- 60 age bracket and income has positive probability relationship with income diversification status of the male farmers. Again, household size, number of households members between 18-60 age bracket, farm size and income have positive probability relationship with income diversification status significantly influence the probability of income diversification among the female farmers. The study therefore recommend that rural households should be encouraged and assisted where and when necessary to engage more in enterprise diversification with the aim of increasing their sources of income to cushioning the effects of seasonal variation in income generation that often-characterized rain fed agriculture. In addition, relevant stakeholders should introduce gender specific enterprises. This will further help in adoption of gender specific enterprises diversification.

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