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Socioeconomic Evaluation of Non-Farm and Farm Income of Smallholder Farmers in Kaduna State, Nigeria

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Abstract. Farmers' income from non-farm and farm activities plays a significant role in rural livelihood. It can address income inequality and contribute to economic growth among rural households. However, some specific factors appear to be push factors driving the income-generating sources. This study identified the drivers of income generated from farmers' activities aside farming and those derived from farm activities in Kaduna State of Nigeria. Survey data were derived from 249 farmers that were sampled using multi-stage sampling method. The information was derived using questionnaires. Descriptive statistics and an ordinary least square regression technique were employed to process the data. The estimated average age obtained for the farmers was 45 years. The respondents were small-scale farmers cultivating on 1.9 hectares of land on the average with 7 years of farming experience. An average household earns ₦1911038.15 and ₦197024.90 annually from farm and non-farm activities respectively Farmers specific factors driving farm income were age, assess to extension services, farming experience, marital status and education. Furthermore, the variation in non-farm income could be explained by changes in age, household size, contact with extension services, marital status and education. The study concludes that policies and programs targeting increasing rural household income must focus on both farm and nonfarm income sources with the inclusion of training and improved agricultural extension delivery.

Keywords: Farm income, non-farm income, smallholder farmers

1. Introduction

In many countries, smallholder farmers play a significant role in the agricultural sector. In Nigeria small scale farmers make up to 80% of the total farmers. They are found producing different food crops and livestock contributing to national food security and general economic growth (Mgbenka and Mbah, 2016). It has been established that most food consume in low-income countries are produced by smallholder farmers and they are backbone of food supply (Chiaka *et al*., 2022). It is therefore sufficed to say that Nigeria population relies on smallholder farmers for food production. The role of small-scale farmers to ensure food security and poverty alleviation are vital and cannot be over looked.

Considering the roles of smallholder farmers in economic growth of many developing countries, level of income is a major determinant and indicator of livelihood as well as a measure of poverty and hunger (Ryś-jurek, 2019). Income diversification is one of the major strategies to boost rural livelihood standard and to achieve growth and development among rural households (Mukaila *et al.*, (2021). The level of economic growth and welfare could be influenced by income level. Furthermore, incidence of poverty and food security could be determined by income level particularly where the majority of household relies on farm activities as their main source of sustenance.

There is a problem of low productivity among farmers in sub–Saharan African (Oluwasola *et al.,* 2012). This could be attributed to the fact that very little is available to invest to increase farm capital stock. The problem is caused by poor income among farmers. Capitalization of farmers' income will continue to be affected except there is increase in farmers' income. Investment is a function of saving and saving is the difference between income and expenditure. This shows the role income plays in farm business. Farm investment is essential and it promotes technology adoption and stimulates input use. Investment is the change in fixed inputs used in production process.

Investment in agricultural activities covers storage, processing and marketing of agricultural products. Sustained investment in technological innovations is capable of ensuring improvement in the quality of physical and human resources base to raise farm-level output is critical to transforming small holder farming system. Increased asset value can improve the equity position of farmers and decision of farmers with respect to investment could be attributed to agricultural development. This can be used to gauge sustainable agricultural production.

It is important to understand and study the factors contributing to the variations in farmers' income because it implications for the reduction of farmers challenges who constantly faced with incidence of poverty, food and nutrition insecurity (W/kidan and Tafesse, 2023). Evaluating farmers' non-farm income will provide useful information to gauge the livelihood status. Small holder farmers are faced with limited land availability. Most small holder farmers cultivate between one and two hectares of land (Lowder *et al*., 2016; W/kidan and Tafesse, 2023) and there is need to increase their farm income to meet up with their consumption level. This therefore exposes farmers to chronic poverty. Hence, diversifying income sources will enhance food security and alleviate poverty. This implied that farmers' income from different sources is important in any development action targeting at improving farmers level of living. This study therefore, considered the factors of farmers' income in the study area. This will assist in any policy formulation that is targeting at improving the level of living among the farmers.

1. Analyzing the factors that influence farm and non-farm income at the farmer level is essential.
2. Understanding the determinants of income for farmers, both on and off the farm, is crucial.
3. Examining the factors affecting farm and non-farm income among farmers is vital.

2. Research Methodology

2.1 Study area

Kaduna State of Nigeria was the study area. The State is geographically located between Latitude 8º59ˆN and 11º 30ˆN of the Equator and Longitude 6º05ˆE and 8º43'E of the Greenwich Meridian. The State has boundaries with five States. These are Katsina, Kano, Plateau, Zamfara, and Nasarawa. The estimated area is 68,000 square kilometers. This could be translated to 7% of Nigeria total land mass. The total land area is about 4.5 million hectares which consist of about 2.2 million hectares. This is made of 1.94 million hectares of upland and 0.08 million hectares of lowland. In terms of climatic condition, the area usually experience between 1524mm and 635 average yearly rainfall with two different seasons (rainy and dry season). The relative humidity is usually below 40 degrees. The dry season often start from October and last between 5-7 months. Agriculture is the main livelihood option among the people because of the suitable arable land that support the production of crops such as maize, millet, cowpea, sorghum and yam. The people of the State live mostly in organized towns and cities (Ike and Idoge, 2006). A large variety of non-farm occupations also exist in the area.

2.1 Sampling procedure and sample size

The study adopted multi - stage sampling techniques in the selection of the respondents. The first stage involves random selection of five (5) Local Government Areas (LGAs). The second involves selection of 15 villages. These were selected across the selected five Government Areas. The population of farmers were obtained from Kaduna State Agricultural Development Agency (KADA) to form the sampling frame out of which 36% of the farmers were selected after the sample size was determined following Yamane, (1967) sample size determination as indicated below:

$n== \frac{N}{1}+N(\alpha)^2$

Where n= is a sample size, N= is a sample frame (population sample), α^2= expected margin $(0.05)^2$. A total of 249 respondents were used for the study.

2.2. Data collection and analysis

The use of primary data was involved. Data were collected with the use of structured questionnaire which was administered to the respondents. The collected data were analysed using descriptive statistics and multiple regression analysis. The model was specified as follows:

$$Y = \alpha + \beta X_i + e$$

Where,
Y is the dependent variable (farm and non-farm income), α is the constant term, β is the coefficient, X_i arindependent variables and e is the error term.

3. Results and Discussion

3.1 Socio-demographic status of the respondents

The result in Table 1 showed the socioeconomic profile of the respondents. It was revealed that more than half (57 percent) are below 51 years of age. Only 10.4 percent were greater than 60 years. The estimated

average age was 45 years. This also indicates that the respondents interviewed are still young and are within the active age. This has a good implication in the study area because agriculture is one of the major occupations in most rural community, though older people are always found engaging in agriculture as an income generating activity despite their physical nature they are always found in growing crops and rearing of livestock (Nzabona *et al*., 2013). Majority (89.2) of the respondents were males while only 10.8 were females. This is contrary to the report of Nzabona *et al*. (2013) where majority of their respondents were females because of higher female life expectancy in their study on what influences older persons' engagement in income-generating activities in Uganda. Low participation of women in income generating activities could be linked to inadequate productive resources available to them (Fawhinmi and Adeniyi, 2014). Those that are married among the respondents constitute 97.9 percent. Only 2.1 percent are still single. The implication of marital status is that it will invariable contributed to increase in household size (Torimiro, 2005). Marital status is very important among rural household because it is associated and could be one of the drivers of farm business and livelihood activities because of its role in terms of agriculture labour supply. Household head who is married would have more access to family labour (Amaza *et al*., 2009). Majority (53 percent) of the respondents had household size ranged between 6-10 members per household. The average size of household was 7 members. This indicates that the household size was relatively large. Large household size has been reported to be a proxy to labour availability for income generating activities (Onubuogu *et al*., 2013; Esiobu *et al*., 2014). The respondents had one form of education or the other with majority (96 percent) belonging to social organization. Access to agricultural extension services was poor. Only 10.8 percent had contact with extension agent. This is not a good indication for agricultural production as this will affect adoption and diffusion of innovation. The average farming experience was 6 years. Farming experience is an important factor in farm business as this could influence the level of farm output and productivity. Farming experience could have both negative and positive effect on farm activities. It may be that for a certain period there would be positive effect on production after which the effect may become negative as a result of advancement in farmer's age or in ability to change from old method of farm techniques and practices (Amaza *et al.,* 2009).

Table 1: Socioeconomic profile of the respondents

Variables	Frequency	Percentage
Age (years)		
>31	8	3.2
31-40	60	20.1
41-50	84	33.7
51-60	71	28.5
>60	26	10.4
Average	45	
Gender		
Male	222	89.2
Female	27	10.8
Marital Status		
Married	244	97.9
Single	5	2.1
Household size		
1-5	110	44.1
6-10	132	53.0
>10	7	2.8
Average	7	
Education		
No formal education	76	30.5
Primary	99	39.8
Secondary	58	23.3
Tertiary	16	16.4
Membership of Association		
Yes	239	96.0
No	10	4.0
Extension Contact		
Yes	27	10.8

No	222	89.2
Farming experience (years)		
>11 years	229	92.0
11-20	13	5.2
21-30	5	1.0
>30	7	2.8
Average	6	
Total	249	100.0

3.2 Estimated farm and non-farm income among the respondents

As shown in Table 2, the structure of income among the respondents. The estimated average farm and non-farm incomes per annum by a household are ₦1911038.15 and ₦197024.90 respectively. This implied that an average household earn ₦159,253.20 from farm activities in a month with additional income of ₦16.42. This is a good indication of better level of living among the household in the area. The value of what household earn is greater that minimum monthly living wage of ₦30,000. This could be due to the fact that most farmers are land owners. The implication of this is that smallholder farmers who cultivate their land with access to non-farm income could earn more that wage workers. Also achieving agricultural growth through the adoption of new technologies will enhance rural household living standard.

Table 2: Descriptive statistics of household annual farm and non farm income

Estimates	FI (₦)	NFI (₦)
Mean	1911038.15	197024.90
Standard deviation	254954.28	62660.48
Minimum	1086000.00	116400.00
Maximum	2616000.00	648000.00

FI= Farm Income; NFI =Non Farm Income

3.3 Factors influencing farm and non-farm income

The result of factors influencing farm and non-farm income is presented in Table 3. The coefficient estimated for age was significant and positively related to both farm and non-farm income. This implied that as the age increase, the farm income increases. The implication is that the older respondents earn more from farm activities compared to the young respondents. The estimate obtained for household size was negative and significant at 1 percent level of probability for non-farm income. This implied that as household size income, the income derived from non-farm activities also decreases. This is not surprising because household size is associated with availability of labour. A large household will have access to family labour and participate more in farming than non-farm activities. Contact with extension was positive and significant for both farm and non-farm income. This significant of this variable indicates that it is important in income generating activities among the farmers. This result is in agreement with the report of Mukaila *et al.* (2021) in their study. They found contact with extension as one the drivers of income generation among farm household. They attributed the reason to the dissemination of useful information on best farming practices by the fact that extension agents and the introduction of new techniques to the farmers. Farmers' productivity and income from agricultural activities can be significantly enhanced through access to useful information and the adoption of innovative technologies. Marital status exert positive and significant influence on farm and non-farm income generation among the farmers. This indicates that there is possibility of the married household head to have more income from farm and non-farm activities. This could be linked to the size of the household as married household head tends to have large household size compared to non-married household ahead. The estimated coefficient for education was significant at 5 percent and 1 percent level of probability for farm and non-farm income respectively. This variable exerts positive relationship with farm and non-farm income. This showed that the more educated the respondent is the more the level of farm and non-farm income. Tran et al (2023) stated that education is positively related to agricultural income which could be obtained from crops and livestock. Idowu *et al* (2018) reported that education has significant role on farm household engaging in non-farm activities compared with household who has no formal education.

Table 3: Determinants of farm income

Variables	FI			NFI		
Variables	Coefficient	St. Error	t-value	Coefficient	St. Error	t-value
Age	10123.85 ***	2827.809	3.58	2733.8***	507.5	5.39
Household size	-13397.62	13421.35	-1.00	-8856.6***	2408.8	-3.68
Extension contact	100997.2**	41435.36	2.44	56866.1***	7436.7	7.65
Farming experience	-9217.73**	3763.36	-2.45	-811.1	675.4	-1.20
Gender	119877.1	91011.24	1.32	-7353.2	16334.4	-0.45
Marital status	329382.5**	139891.6	2.35	81206.7***	25107.4	3.23
Education	10055.96**	3889.672	2.59	2080.3***	698.1	2.98
Farm size	29045.79	34919.61	0.83	907.4	6267.2	0.14
Diagnostic statistics						
R-square	0.97			0.93		
F-value	1125.33***			384.5***		

**P<0.05 ***P<0.01 FI=Farm Income NFI=Non-Farm Income

4. Conclusion

The findings of this study revealed that the respondents are within the active age group. More than three quarter are males and married with relatively large household size. The value of what household earn is greater that minimum monthly living wage which could be translated to improved level of living. Some socioeconomic profile such as age, household size, extension contact and education were found associated with farm and non-farm income. This study recommended that all policies targeting at improving the rural people must capture both farm and non-farm activities with attention on farm specific socioeconomic characteristics.

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