Determinants of Farmers' Participation in Off-Farm Activities in Iwo Local Government Area of Osun State

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Abstract

Income constraint has been the major problem faced by farmers in rural areas for many years. This has significantly reduced agricultural production and the standard of living of farmers. In this study, factors responsible for farmers' participation in off-farm employment activities, various off-farm activities engaged, the extent of participation and the share of off-farm income in the total income of farmers were examined. A stratified random sampling technique was used in the selection of 90 respondents from Iwo local government area of Osun state. Descriptive statistics such as frequencies and percentages were used to describe the socioeconomic characteristics of farmers while binary logistic regression was used to determine the factors that influence farmers' participation in off-farm activities. The study reveals that majority of farmers (63.3%) participated in one form of off-farm activities or the other. The average farm income was found to be ₦46,911.11±28,321.8 per annum and the average off-farm income was ₦80,935.56±36,007.9 per annum. The study provides evidence that, off-farm income contributed more than farm income to the total income of farmers accounting for 63.3 % of their total income. The off-farm activities in the study area included paid employments as well as self-employments. Results further show that the average farm size cultivated in the study area was approximately 1.77±1.3 hectares and the average number of years of formal education of farmers was 6.04±4.7 years. Age, household size, remittance and the local area characteristics were found to be significant as determinants of participation in off-farm income activities. In conclusion, despite farming being the major occupation of all the respondents, majority of them were involved in one form of off-farm activities or the other. Intervention programmes and incentives should be channelled to low income farmers to encourage sustainable engagement in farming.

Keywords: Off farm activities, Average farm income, Off-farm income, Remittances, Local area characteristics

INTRODUCTION

In recent decades, off-farm activities have become prevalent as important source of income for farming households in Nigeria, thus, an important component of livelihood strategies among rural households in most developing countries. Several studies have reported a substantial and increasing share of off-farm income in total household income (Babatunde *et al*, 2010). Reasons for this observed income diversification include declining farm incomes and the desire to insure against agricultural production and market risks (Lanjouw *et al,* 2001). That is, when farming becomes less profitable and more risky as a result of population growth and market failures, households are pushed into off-farm activities leading to "distress-push" diversification. In other cases, however, households are rather pulled into the off-farm sector, especially when returns to off-farm activities are higher or less risky than in agriculture, resulting in "demand-pull" diversification. The population of every economy is divided into two categories, the economically active and the economically inactive. The economically active population (labor force) or working population are the population that is willing and able to work, including those actively engaged in the production of goods and services (employed) and those who are unemployed. Whereas, unemployed refers to people who are willing and are capable of working but are unable to find suitable paid employment; the next category, the economically inactive population refers to people who are neither working nor

looking for jobs. These include full-time students, those below the legal age for work, old and retired persons.

The FAO (2008) defined off-farm activities as the participation of individuals in remunerative work away from a home plot of land. As a result of the continuous need to increase livelihood opportunities and generate additional income, rural farming households are involved in various off-farm income fetching activities. This is done in order to sustain their families and for further investment in farm plots such as purchase of input and farm equipment. In Australia, a study showed that the proportion of farm household with at least one member employed in the non-farm sector increased from 21 per cent in 1982-1983, to 29 percent in 1994-1995 (Lim Applegate, 2002). In North America, non-farm earnings assisted young couples in financing their farm investment requirements (Lim-Applegate *et al,* 2002). Other studies noted that risk-averse farmers resort to non-farm employment as a risk management strategy (Hisham *et al*, 2004). Off-farm income has been found to have a great potential in reducing poverty in rural areas. In most countries, poverty levels are higher in rural areas than in urban areas. Due to the fact that the extent and severity of poverty are greater in rural than in urban areas, providing opportunities for productive employment and decent work for rural workers is a major development challenge (World Bank, 2008).

Statement of the Problem

Poverty is one of the most serious challenges confronting rural households worldwide, especially those in developing countries and sub-Saharan Africa in particular. Off-farm activity is an alternative strategy and has the potential to improve the income and well-being of rural households. Development policies for the rural sector have always targeted improving farm productivity to combat rural poverty. Despite this bias, there is growing evidence in developing countries that there is more to the rural sector than farming (Reardon, 1997 cited in Omofare, 2011). Although global poverty has generally reduced in the last 40 years, progress in sub-Saharan Africa has been slow and uneven. The number of people reported as living on less than a dollar a day (the internationally agreed definition of absolute poverty) has doubled over the past 20 years (World Bank, 2005). This has left many questions as to the best strategies that should be used to deal with the problem, spurring numerous research interests and massive donor funds to be used. Poverty is often viewed as a predominantly rural phenomenon. About 75 percent of the world's poor are believed to work and live in rural areas (World Bank, 2008), and it is estimated that, by the year 2020, 60 percent of the world's poor will still be rural. A study on non-farm income diversification and poverty among farm households by Adewunmi *et al,* (2011) in Southwest Nigeria showed that the incidence of poverty was as high as 76.4% among rural farming households. This is probably due to small size of holding, tenancy, lack of irrigation facilities and low yield. The rural sector has the vast majority of the poor, accounting for more than 70% of the total population of 6,602,224,175 (World Bank, 2007). The rural households in sub-Saharan African countries usually have to cope with both poverty and income variability to shift from subsistence agriculture to a more pluriform society where farm and non-farm opportunities are available (Ahmed *et al*, 2012). Federal office of Statistics, FOS (2004) revealed that between 1980 and 2004 in Nigeria, rural poverty were higher than urban poverty and the majority of the rural poor derive their livelihood from subsistence agriculture. Diversification of income sources has been put forward as one of the strategies households employ to minimize household income variability and to ensure a minimum level of income (Ahmed *et al,* 2012). Owing to the fact that the major occupation of rural communities is farming and the rural community thus constitute the basis for agricultural production in any economy, the need for sourcing for alternative income source cannot be over emphasized as agricultural production is plagued by many uncertainties and agricultural produce consistently face price fluctuation which leads to serious reduction in farmer's income (Gani *et al*, 2011). In order to have a better understanding of this relationship, there is need to provide answers to the following questions: What are the various off-farm employment activities available in the study area? What is the extent of participation in off-farm activities? What is the contribution of off-farm activities to the total income of farmers in the study area? What are the factors that determine the participation of rural households in off-farm activities?

Literature review

In the face of continuous decline and stagnation in agricultural production, studies have shown that farmers engage in various off-farm

activities as a way of increasing total household income and reduce shocks, price and production risks in agriculture. Also, development in rural areas might have directly opened up opportunities for farmers to participate in off-farm employment and hence increasing their potential to raise household income from off-farm activities (Roslan *et al*, 2011).The term off-farm activities is not the same as non-farm employment. The FAO (2008) defined off-farm activities as the participation of individuals in remunerative work away from a home plot of land. Remunerative work here can include employment in the agricultural and non-agricultural sectors of the rural economy. Several studies (Norsida *et al*, 2000; Roslan *et al,* 2011) have shown that off-farm activities encompass activities both in the non-farm and farm sectors. Therefore in the real sense of it, all remunerative activities in the rural non-farm sector including manufacturing, services, trading, commerce, transportation, mining, tourism, vocational activities are in addition to agricultural related activities outside farmers' home plot are collectively referred to as off-farm activities.

Given the enormous diversity that characterizes the rural off-farm economy; different categories of households facing different sets of constraints and opportunities opt for different types of different rural non-farm activities. Reardon *et al* (1997), suggest that when relative return are higher in the rural non-farm than agriculture and return to agriculture are relatively more risky, pull factors are at work. Conversely, when farm output is inadequate and opportunity for consumption smoothing, such as credit and crop insurance are missing, or when input market are absent or fail and the households need cash to pay for farm inputs, push factors are at work. Under such conditions, wages or income are likely to be lower in the rural non-farm economy. There often exists a positive correlation of rural non-farm activities with higher income levels of rural families, higher potential for diversification of income sources and higher productivity in agricultural activities. Recent research has also shown a positive correlation between a higher diversification of non-farm activities and income and the level of education, quality of and access to infrastructure, objectives and organization of services, opportunities created by local, regional and national government policies and access to credit and financial services (Davis, 2003). Adewunmi *et al* (2011) found that income received from the non-farm livelihood sources contributed an average of 67.1% of the total income while farm activities contributed 32.9%.

RESEARCH METHODOLOGY

This study was carried-out in Iwo local government area of Osun state, Southwest of Nigeria. Iwo was purposively selected as the study area out of the thirty Local Government Areas (LGAs), because the area is predominantly agrarian. The headquarters of the Agricultural Development Programme (ADP) in Osun state and the state FADAMA coordination office is in Iwo local government and comprises Ayedire, Ola-oluwa, Isokan, Ayedaade and Irewole zones. One farm settlement was cited in the area at Patara. According to the 2006 population census in Nigeria, the population head count of Iwo local government area of Osun state stood at 120,919 and covers an area of 245sqkm with a derived savanna with low rainfall at the beginning of the year which determines the type of crops grown in the area. The people are primarily of the Yoruba descent and majority of them are Muslims. The town's primary economic activity is agriculture while the major crops grown are cocoyam, yam, maize, cassava, okra, tomatoes, sweet potatoes and pepper. The major tree crop grown is palm which is used for making palm oil. Some textile activities are also engaged in as income earning activities in the town. Iwo accounts for about 1.2 million tonnes of the total volume of maize produced in the state and as such, it's a very important agricultural zone considered for the food security of the state. 5555 ha of land is cultivated for maize, 7612 ha for cassava and about 1275 ha of land is cultivated for other crops

Sampling technique and sources of data

A well-structured questionnaire was used to collect data. Iwo local government area of Osun state consists of more than 40 villages and there are registered and contact farmers in each village. The area was divided into five strata. These strata were not necessarily homogenous. Two villages were then randomly selected from each stratum making a total of 10 villages being sampled. Through simple random sampling data were collected from 100 respondents, 20 from each stratum. However, the data used in analysis was from 90 respondents, the rest were discarded due to incomplete responses. Data were collected on both quantitative and qualitative factors that determine their participation in off-farm employment. These factors include individual characteristics such as age, education, marital

status, sex. Household characteristics such as household size, remittance, farm size, farm income, off-farm income etc. and the local area characteristics-whether the area can be classified as agricultural or agricultural with some industrial activities.

Analytical techniques

Descriptive statistics was used to describe the socioeconomic characteristics of respondents and their status in off-farm activities. For the purpose of determining the effect of the various characteristics- individual, household, and the local area characteristics on the probability of participating in off-farm activities, the logit regression model was used. This approach has been used by various authors including Norsida *et al* (2000), Salimonu *et al* (2006) and Roslan *et al* (2011) to estimate the determinants of farmer's and rural household's participation in off-farm activities.

Logit Model

In order to estimate the decision of the farmer (head of the household) to participate in off-farm activities, a binary choice model based on maximum likelihood method was used. Dummy dependent variable of 0 and 1 was used with the value of 1 for the farmer (head of the agricultural household) who participated in off-farm activities and the value of 0 for those who did not participate. Given the value of the independent variables, the estimated value for the dependent variable could be interpreted as the probability to participate in off-farm activities, (Gillespie *et al*, 2011). The logit of a number p between 0 and 1 is given by the formula:

$$logit(p) = \log(p) - \log(1-p) \qquad (1)$$

The logistic function of any number β is given by the inverse logit:

$$Logit-1(\beta) = \frac{1}{1+\exp(-\beta)} = \frac{\exp(\beta)}{1+\exp(\beta)} \qquad (2)$$

If p is the probability, then 1/1-p is the corresponding odds and the logit of the probability is the logarithm of the odds; similarly the difference between the logit of two probabilities is the logarithm of the odds ratio.

The logit model used in this study is specified as follows:

The model stated implicitly as:

$$Y_i = f(X_1, X_2, X_3 \ldots\ldots\ldots X_n \qquad (3)$$

$$P(Y_i = 1 \text{ or } \frac{0}{x} = \frac{1}{(1+\exp-(\beta_0 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n} \qquad (4)$$

$$\ln\left[\frac{P}{(1-P)}\right] - \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots \beta_n X_n \qquad (5)$$

Where

Y = participation status (participate =1; not participate = 0). Participation in off-farm activities is expressed as probability function (P/1-P), with P as the probability of participating and 1-p as probability of not participating in off-farm activities. Equation 5 was estimated and used to examine the probability of the respondents to participate in off-farm activities or otherwise. It is worth mentioning here that the sign of estimated parameter is already sufficient to conclude whether the independent variable has a positive or negative impact on the dependent variable. In addition, the magnitude of the impact could be determined with the odds ratio. The following independent variables were hypothesized as determinants of participation in off-farm activities in the study area.

X_1 = Gender of the household head (Dummy =1 if male, 0 if female)

X_2 = Number of years of education (continuous)

X_3 = Age of respondents in years (continuous)

X_4 = Marital Status (Dummy=1 if married, 0 otherwise)

X_5 = Household size (Continuous)

X_6 = Remittance (Naira)

X_7 = Farm income (Naira)

X_8 = Belong to a local group or cooperative (Dummy = 1 if yes and 0 if otherwise)

X_9 = Farm size (hectares)

X_{10} = Local area characteristics (Dummy = 0 if area is predominantly agricultural and 1 if area is agricultural with some industrial activities)

X_{11} = Average time it takes to get to the nearest town (in hours)

RESULT AND DISCUSSION

Respondents' socioeconomic characteristics

Table 1 shows that majority (41.1%) of the farmers were between ages 38-47 and the average age of farmers in the study area was estimated to be 45.4 years which is similar to that obtained by Apata *et al* (2010) who found the mean age of farmers in Ondo and Ekiti to be 43.55 and 46.97 years respectively. Majority of the respondents (67.8%) were married with an average household size of 5 which contradicts results from several studies such as Salimonu (2012) and Apata (2010). The study further shows that majority (48.8%) of the farmers had only primary education. The average number of years of formal education for the study area was estimated to be 6.04 years. Also, most of them (98.9%) cultivated between 1 ha to 5 ha of land and the mean farm size was estimated to be 1.77 ha which is in consonance with results from many studies (Babatunde *et al*, (2010) and Salimonu 2006) which found that farmers in most parts of Nigeria on the average cultivate less than 2 ha of land.

Table 1: Distribution of respondents based on their socioeconomic characteristics

Characteristics	Frequency	Percentage
Gender		
Male	55	61.1
Female	35	38.9
Age		
28-37	19	21.1
38-47	37	41.1
48-57	23	25.6
58-70	11	12.2
Marital status		
Single	8	8.9
Married	61	67.8
Divorced	9	10
Widowed	7	7.8
Separated	5	5.6
Household size		
1-3	18	20
4-6	56	62.2
7 and above.	7	7.8
Educational level		
No education	23	25.6
Primary	44	48.8
Secondary	16	17.8
Tertiary	7	7.8
Farm size		
1-5	89	98.9
5.1-10	1	1.1

Income sources of farmers

Table 2 shows the various activities and the contribution of off-farm income to the total income of farmers in the study area. Results reveal that apart from farming as primary occupation, 63.3 percent of the farmers participated in one form of off-farm income generating activities or the other. This constitute income from remittances, construction works, civil service, security, charcoal production/sales, sawmill and sales of firewood, buying and selling of food/non-food items, tailoring, cloths/basket weaving, grinding and grating, bicycles and motorcycle repairs, commercial motorcyclists, private companies, weaving of hair and barbing hair. Table 2 shows that off-farm income contributed a total of 63.3 percent to the overall income of the farmer on the average. This figure agrees with though somewhat lower than Adewunmi et al (2011) who found that off-farm income contributes about 67.1 percent to the total income of farmers in southwest Nigeria but is in contrast with Salimonu (2012) who found that farmers earn 45.9 percent of their income off-farm. The farm income on the other hand accounted for 36.7 percent of the total income. The result in table 2 on the average also shows that remittances contributed a share of 16.8 percent, civil service 10.9 percent, commercial motorcyclist 8.7 percent, construction works 5.3 percent and others 21.6 percent to the total income. Results further indicate that the average farm income for farmers was ₦46, 911.11 per annum and the average off-farm income was ₦80, 935.56. This result suggests that there is a steady decline in the contribution of farm income to the total income of farmers. This may be as a result of the higher remuneration associated with off-farm activities and the relatively lesser drudgery in most off-farm activities. The implication of this is that farmers allocates more time to off-farm activities and earn more stable income. This may be to the detriment of agricultural production if production and price uncertainties remain major bottlenecks to farm income generation.

Determinants of participation in off-farm activities

The regression result presented in table 3 shows that the LR (Likelihood-Ratio) of 56.98 is statistically significant at ($P<0.01$), which implies that the model has a good fit for the data. The constant or intercept 6.696 of the regression line is significant at ($P<0.01$) and this represents the autonomous participation index for all the farmers in the study area. Four out of the eleven explanatory variables used in the analysis were significant at different level. These variables included age (-0.198), household size (0.573),

remittance (-2.43E-05) and the local area characteristics (2.458). All the significant variables had the expected sign in line with a priori expectation. This sign shows the effect of the various variables on the participation in off-farm activities. Age had a negative sign; this implies that as the age of the farmer increases, the probability of participating in off-farm activities decreases.

The coefficient of age was estimated to be -0.198 and the marginal effect shows that one percent increase in age leads to a 3.692 percent decrease in the odds of participation in off-farm activities. This is in line with Norsida *et al* (2000) and Gillespie *et al* (2011) who found age to have a significant negative effect on rural households' participation in off-farm activities. The household size had a positive sign with a coefficient of 0.573 which implies that as the household size increases, the tendency of the farmer to participate in off-farm activities increases. The result of the marginal analysis implies that if the household size is increased by one more person, the odds of participation in off-farm activities will increase by 0.948 percent. This corresponds with the finding of Roslan *et al* (2011) that household size is a significant factor positively influencing engagement in off-farm income activities. Remittance as expected had a negative sign with a coefficient of -2.43E-05. The marginal analysis also shows that if the remittances received by farmers increase by one percent, the odds of participating in off-farm activities will decrease by 0.272 percent. This result is in consonance with Roslan *et al* (2011) who also found that income from remittance has a significant negative effect on the participation of off-farm income generating activities but in contrast with Salimonu (2012) who found that income from remittances had a significant positive effect on the participation in off-farm activities. This result is probably because farmers with high remittances coupled with their farm incomes can meet most household expenditures and face less pressure to seek extra means of generating income. The local area characteristics (area being agricultural with some industrial activities) with a coefficient of 2.458 had a significant positive effect on participation as a percentage increase in industrial activities in the study area increased the odds of participation by 0.273 percent. This underscores the importance of development of rural infrastructures and industry to encourage active rural participation in economic activities which has a great potential to improve their household income and standard of living.

Table 2 Sources of income and the percentage share of the households' total Income

Description	Total income per year (₦)	Mean income (year)	Standard deviation	Percentage contribution to total income
Total income	11,506,200	127,846.67	35527.6	
Total farm income	4,222,000	46,911.11	28321.8	36.7
Total off-farm income	7,284,200	80,935.56	36007.9	63.3
Remittance	1,934,600	21,495.56	31,302.0	16.8
Construction	612,000	6,800.00	68,433.0	5.3
Civil service	1,260,000	14,000.00	126,885.3	10.9
Security	312,000	3,466.66	27,372.8	2.7
Charcoal production/sales	474,000	5,266.67	42,170.5	4.1
Sawmill and sales of firewood	132,000	1,466.67	26,330.3	1.2
Buying and selling of food/non-food items	528,000	5,866.67	34,118.1	4.6
Tailoring	318,000	3,533.33	15,578.7	2.8
Cloths/basket weaving	84,000	933.33	7,679.2	0.7
Grinding and grating	234,000	2,600	18,337.2	2.0
Bicycles and motorcycle repairs	156,000	1,733.33	33,713.9	1.4
Commercial motorcyclists	996,000	11,066.67	68,986.2	8.7
Private company	144,000	1,600	25,298.2	1.3
Hair making	36,000	400	3,794.7	0.3
Barbing of hair	96,000	1,066.67	10,119.3	0.8

Table 3 Determinants of Participation in Off-farm Income Activities

Variables	Coefficients	t-values.	P(/z/)	Marginal effects
Constant	6.696	3.01*	0.003	
Age	-0.198	-3.41*	0.001	-3.692
Gender	-0.386	-0.54	0.588	-0.099
Marital status	0.494	0.61	0.543	0.115
Household size	0.573	2.05**	0.041	0.948
Level of education	-0.033	0.41	0.682	-0.072
Membership of cooperative	0.839	1.14	0.256	0.214
Farm size	-0.316	-0.36	0.720	-0.269
Farm income	-7.62E-06	-0.22	0.829	-0168
Remittances	-2.43E-05	-1.92***	0.055	-0.272
Average time to the nearest town(mins)	-4.34E-04	-0.02	0.986	-0.005
Local area characteristics	2.458	3.20*	0.001	0.273

LR (Likelihood-Ratio)= 56.98*
Log likelihood function = -30.652
Degree of freedom = 11
Pseudo $R^2 = 0.482$
***** Significant at P<0.01**, **** Significant at P<0.05**, ***** Significant at P< 0.1.

CONCLUSION AND RECOMMENDATIONS

The share of off-farm income in the total income of farmers was higher than farm income. This implies that farmers could consider participation in off-farm activities a necessary tool for improving their living standards, stabilizing their household income and spreading of income risk. This therefore calls for an integrated policy approach that takes care of farmers' quest for income diversification through engagement in off-farm participation. This indeed would have a multiplier effects on farmers' growth potentials in the primary occupation hence their sustainability. Enabling policy environment that improves farmers' income through farming activities is therefore advocated for. This could be inform of training on improved methods of production where farmers can re-invest the income from off-farm activities.

It is also found in the study that participation decreases with age. This implies that the youths participated more than the older farmers. The energetic youths are therefore disappearing gradually from the farming activities. Motivating youth programmes that would retain the young in the farming business are also therefore called for. This could be achieved through regenerating the collapsed farm settlement scheme, mechanized farming and market access. The current Agricultural Transformation Agenda of the Federal Government should also devise a feed-back mechanism through which the farmers' voice would be heard as an evaluation technique.

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