



Determinants of Participation in Non-farm Employment among Rural Farmers in Ebonyi State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors SCO and CAO designed the study. Authors SCO and IVE wrote the protocol, and wrote the first draft of the manuscript. Authors SCO and IVE managed the literature searches, and performed the analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

This study examined the determinants of participation in non-farm employment, and factors that influence income derived from non-farm employment among rural farmers in Ebonyi State, Nigeria. Primary data used in the study were obtained from 150 respondents' selected employing multistage sampling technique. Multinomial logit and Tobit regression were used for the analysis. Findings revealed that farm households derive more income from non-farm sources (N288,585.7) relative to farm activities (N118,900). Crop income contribute more to farm income while income derived from forest (lumbering, hunting, firewood) contributed the least to farm income. Furthermore, income derived from being self-employed contributed the highest to non-farm income of households. Accordingly, 29.18% of total household income was derived from farming, out of which cropping accounted for 18.18%, livestock 8.53%, fishing 1.44% and forest income accounting for 0.25% respectively; while non-farm income share of total income stood at 70.82% out of which 2.27% participated in agricultural wage employment, 30.81% participated in non-agricultural wage employment, 33.10% participated in self-employment activities. Result of the

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multinomial regression analysis showed that age, farm size, educational level, household size, distance to the market, distance to the nearest urban center, access to electricity and availability of good drinking water were the dominant factors that influenced the choice of participation in non-farm employment in Ebonyi State. Also sex, level of education, size of farm income, and value of household assets were the dominant factors which influenced non-farm income in the study area. The study recommends the promotion of non-farm employment as a good strategy for supplementing the income of farmers through training programmes directed towards training farmers in skills that can be used in non-farm employment and/or small and medium scale businesses (SME's); while also improving infrastructure, credit and financial markets.

Keywords: Determinants; participation; non-farm employment; non-farm income; rural farmers; Nigeria.

1. INTRODUCTION

The rural labour force in most developing countries is growing rapidly. Given the limited land frontier, and uncertainties, agriculture cannot absorb nor sustain these workers. This situation has forced peasants to look for alternative source of income. Either migration to urban areas or the development of non-farm employment in the rural areas must take up the slack [1]. In as much as agriculture remains the main source of income and employment in most rural areas in developing countries, the rural non-farm sector has gained prominence over the past decades. In recent times therefore, there has been an increasing recognition that the rural economy is not confined to the agricultural sector alone [2]. This is because the number of poor people in rural areas exceeds the capacity of agriculture to provide sustainable livelihood opportunities in many parts of the world [3]. For most rural people in developing and transitional economies therefore, non-farm employment is part of a diversified livelihood portfolio [3].

Finding part-time or part-year local non-farm employment is vital for people living on small farms in zones with single agricultural seasons and relatively low agricultural productivity. Such employment provides vital income diversification and access to cash at key moments especially in West Africa, where the risk of farming is high and rural savings, credit, and insurance mechanisms are poorly developed or not available [4].

Rural non-farm economic activities may among other things; absorb surplus labour in rural areas, help farm-based households spread risks, offer more remunerative activities to supplement or replace agricultural income, offer income potential during the agricultural off-season, and provide a means to cope or survive when

farming fails [5]. Declining farm incomes as a result of shrinking per-capita land availability and the desire to insure against agricultural production and market risks drive farmers to seek for rural non-farm employment so as to diversify their income.

The concomitant effects of rapid population growth, environmental degradation, slow spread of technology and low public investment in agriculture account for the increasing inability of the farm sector to sustain rural livelihoods [6]. Suffice to say that the traditional development approach of providing technology and infrastructure to increase agricultural production has not succeeded in curbing the trend of increasing poverty, and alternative source of productive employment must be sought in order to support the additional workforce created by population growth. As it is, most countries in Africa have not yet met the requirements for successful agricultural revolution, and factor productivity lag far behind the rest of the world. This has led to growth scepticism in the international development discourse about the relevance of agriculture to growth and poverty reduction Africa. As a result promotion of non-farm employment as a pathway out of poverty has gained widespread support among development agencies and non-governmental organisation [7]. For the poor, their agricultural resources are often too limited to allow efficient use of all household labour; and non-farm activities can offer an alternative remunerative allocation, especially during the off-season. In essence, income from agriculture is subject to high risk due to climatic factors, price fluctuations, pest and diseases. Earnings from non-farm employment may help to buffer the resulting income fluctuations and improving household security [8,9]. So far, relatively little policy efforts have been made to promote the

non-farm sector in a pro-poor way and overcome potential constraints [10,9]. One reason is probably the dearth of solid and up to-date information about the driving force of household diversification in specific contexts. Also, it is unclear how non-farm employment activities can contribute to equitable development. The study is therefore intended to highlight nonfarm sources and its contribution to household's income, determinants of participation in non-farm employment among rural farm households, and the factors which influence income derived from non-farm employment, because of its potential in absorbing a growing rural labour force in contributing to national income growth, and in promoting a more equitable distribution of income [1].

2. METHODOLOGY

2.1 Study Area

The study was carried out in Ebonyi State area of Nigeria. It is located in the South Eastern region of Nigeria, and lies within longitude 7.30' and 8.30'E and latitude 5.40' and 6.45'N. It covers an area of 6,421.2 square kilometers and population of 2,176,947 [11]; and accounts for 1.6% of total Nigeria population. The state is characterised by mean annual rainfall of between 2250 mm in the south and 1500 mm in the North with an average temperature of about 27°C and relative humidity of 85%. The people are predominantly farmers and grow crops such as rice, yam, maize, oil palm and vegetables; and also rear livestock. Non-farm employment activities common in the area ranges from hired farm labourers, petty trading to civil service.

2.2 Sampling Technique

Multi-stage sampling technique was adopted for the study. The state is divided into three agricultural zones. The first stage involved the purposive selection of one rural local government area from each agricultural zone where farming activities is predominant.

The second stage involved the random selection of five autonomous communities from each local government area, making a total of 15 autonomous communities. Third stage involved the random selection of two villages from each of the selected autonomous communities making a total of 30 villages. In the final stage, random selection of 5 farming household heads

from the 30 selected villages gave a sample size of 150 rural household heads used for the study.

2.3 Data Source and Collection

Primary was used for the study. Data was collected with the help of a structured questionnaire. For the purpose of selection of sample households as the units of analysis, a listing of all farm households in the sampled villages, whether they are involved or not in non-farm employment were sourced from the local authorities and key informants. Data were collected at the household level and it consists of individual characteristics, household characteristics and occupation of household, categories of farm and non-farm activities, composition of household income, farm size, household assets, location characteristics, infrastructural variables and constraint for participation in non-farm activities.

2.4 Analytical Technique

Multinomial logit model, tobit regression, and descriptive statistics were utilised.

2.4.1 Model specification

To identify the determinants of household's decision to participate in rural non-farm employment multinomial logit model was used. The choice of participation was disaggregated into; Agricultural wage employment, Non-Agricultural wage employment, and self-employment. Following [12] suppose the i^{th} household is faced with j choices, we specify the utility choice j as:

$$U_{ij} = Z_{ij}\beta + \sum ij \dots \dots \dots (1)$$

If the respondent makes choice j in particular, then we assumed that U_{ij} is the maximum among the j utilities. So the statistical model was derived by the probability that choice j was made given that:

$$\text{Prob}(U_{ij} > U_{ik}) \text{ for all other } k \neq j \dots \dots \dots (2)$$

Where, U_{ij} is the utility of the i^{th} respondent from the employment type j , U_{ik} the utility of the i^{th} respondent from the employment type k .

Thus, the i^{th} household decision was therefore modelled as maximizing the expected utility by choosing the j^{th} choice of participation in non-

farm employment among j discrete non-farm employment, that is;

$$\text{Max}_j = E(U_{ij}) = f_j(x_i) + \Sigma_{ij}; j = 0 \dots j \dots \dots \dots (3)$$

In general for an outcome variable with j categories let the jth employment choice that the ith household chooses to maximize its utility take the value 1 if ith household choose jth employment choice and 0 otherwise. The probability that a household with characteristics X chooses a choice of non-farm employment j is:

$$P_{ij} = \frac{\exp(X_i \beta_j)}{\sum_{j=0}^j \exp(X_i \beta_j)}; j = 0 \dots 3 \dots \dots \dots (4)$$

With the requirement that

$$\sum_{j=0}^j P_{ij} = 1, \text{ for any } i$$

Where:

- P_{ij} = probability representing the ith respondent's choice of choosing category j
- x_i = predictors of response probabilities, which include; age, sex, marital status, years spent in school, household size, farm size, value of asset, distance to the market, distance to the urban center, access to electricity, availability of good drinking water and distance to tarred road.
- β_j = covariate effects specific to jth response category.

With farming as the reference category, appropriate normalization that removes an indeterminacy in the model was assumed that β = 0 so that exp(X_iβ_j) = 1, implying that the generalised equation (4) above is equivalent to

$$P_r \left(y_i = \frac{j}{x_i} \right) = P_{ij} = \frac{\exp(X_i \beta_j)}{\sum_{j=0}^j 1 + \exp(X_i \beta_j)} \dots \dots \dots (5)$$

For j = 0, ..3

$$P_r \left(y_i = \frac{1}{x_i} \right) = P_{ij} = \frac{1}{\sum_{j=0}^j 1 + \exp(X_i \beta_j)} \dots \dots \dots (6)$$

Where: y is a polytomous outcome variable with categories coded from 0.....J

Similar to binary logit model, it implies that we can compute J log-odds ratios which are specified as;

$$\ln \left[\frac{P_{ij}}{P_{1j}} \right] = x'(\beta_j - \beta_0) = x' \beta_j \quad J = 0 \dots \dots \dots (7)$$

To examine the factors influencing income from non-farm employment Tobit model was used. The model assumes that income from the non-farm sector is a function of a vector of explanatory variables X_i and unknown parameter vector β.

The probability that Y derives income from non-farm employment is a function of independent variables given as:

$$Y_i = \beta X_i + \mu \dots \dots \dots (8)$$

$$Y_i = \beta_0 + \beta_x X_i + \dots + \beta_n X_n \dots \dots \dots (9)$$

Following the above equation, the functional form for the ith household specified with a Tobit model can be expressed as:

$$Y_i = \beta X_i, \text{ If } i^* = X_i \beta + u_i > T \dots \dots \dots (10)$$

$$Y_i = 0, \text{ If } i^* = X_i \beta + u \leq T \dots \dots \dots (11)$$

Where:

- Y_i = the probability that a household will derive its income from Non-farm employment.
- i = Non-observable latent variable representing the negative income of the household member.
- T = Non-observable threshold level (cut off) or critical value which translate into i* > T as a household member participate in non-farm employment.
- X_i = Vector of explanatory variables.
- β = Vector of parameters estimated.
- u = Stochastic error term.

The model for the Tobit regression implicitly expressed is given as:

$$Y_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, u) \dots \dots \dots (11)$$

Where:

- Y_i = the probability that a household will derive its income from Non-farm employment.
- X₁ = Age (years)
- X₂ = sex (1= male, 0=female)
- X₃ = marital status (1=married 0 otherwise)
- X₄ = educational level (years)
- X₅ = household size(number)
- X₆ = size of farm income (Naira)
- X₇ = farm size (ha)
- X₈ =value of asset (Naira)
- X₉ = distance to market (km)
- X₁₀ = distance to urban center (km)
- X₁₁ = access to electricity (1=access, 0 otherwise)

X_{12} = availability of portable water (1=available, 0 otherwise)
 X_{13} = distance to tarred road (km)
 u = Error terms.

3. RESULTS AND DISCUSSION

3.1 Profile of Households in Relation to Non-Farm Employment

The average household age is 44.5 years with a range of 21-72 years. The average household size is about 7 persons with some households having as many as 16 members while the average years of education accounted for 8.87 which can be explained by the density of secondary education in the study area. Average annual household income is N410,485.7 in the study area. The average distance to the market and to the urban center is 6.97 km and 10.65km respectively indicating a rather far distance from the village to the urban center than from the house to the market.

3.2 Composition of Household Income

From Table 2, mean farm income of farm household was N118, 900 while mean non-farm income stood at N288, 585.7 thus indicating that more income is derived from off-farm activities. The major source contributor to farm income was crop income which had over N77, 333 while the least contributor to farm income was income

derived from forest (lumbering, firewood, and hunting) which accounted for over N1,006. For the non-farm income category, income from been self-employed contributed the highest to total non-farm income (N134866.7), followed by non-agricultural wage employment which accounted for N125,549.5. The least contributor to non-farm income was remittance which accounted for about N7,453.33 of the respondent's income.

3.3 Share of Non-Farm Income in Household Income

Table 4 shows the contribution of different income sources to overall household income. According to the result, 29.18% of total household income was derived from farming, out of which cropping accounted for 18.18%, livestock 8.53%, fishing 1.44% and forest income accounting for 0.25% respectively.

Non-farm income share of total income was about 70.82% out of which 2.27% participated in agricultural wage employment, 30.81% participated in non-agricultural wage employment, 33.10% participated in self-employment activities, 1.83% received remittances and 2.81% received pensions respectively. From the result above, it can be deduced that a larger share (70.82%) of total rural household income is derived from off-farm activities.

Table 1. Profile of respondents households

Variable	Description	Mean	Std. deviation
Household size	Number of household members	7.02	3.05
Age	Age of household head (yrs)	44.5	11.9
Sex	64.67% male		
Marital status	77.33% married		
Education	Numbers of yrs in school of the household head (yrs)	8.87	5.64
Farm size	Area cultivated by household (ha)	0.72	0.86
Income	Total household income per year (Naira)	407,485.7	480,798.3
Electricity	Dummy for access to electricity (yes = 1, No=0)	0.75	0.43
Pipe-borne water	Dummy for access to pipe borne water (yes = 1, No = 0)	0.84	0.37
Tarred road	Dummy for tarred road in the village (yes = 1, No =0)	0.69	1.99
Distance to market	Distance from the house to the nearest market place (km)	6.98	6.89
Distance to urban center	Distance from the village to the nearest urban center (km)	10.65	9.78

Source: Field survey, 2015

Table 2. Distribution of the respondents based on average composition of household income

Income source	Mean annual income	Standard deviation
Crop income	77,333.33	88730.47
Livestock income	34,740	134984.80
Fish income	5,859.06	26784.18
Forest income	1,006.711	5965.55
Total farm income	118,900	
Agric wage income	9,260	23720.25
Non-agric wage income	125,549.5	345629.60
Self-employed income	134,866.7	386747.60
Remittance	7,453.33	18627.61
Pension	11,456.16	93593.66
Total non-farm income	288,585.7	
Grand total	407,524.791	

Field Survey, 2015. Note: Mean Income is in Naira

Table 3. Share of non-farm income in total household income

Income source	Number of participant's*	Percentage*	Share of total income (%)
Agric. income	150	100	29.19
Crop income	146	97.3	18.98
Livestock income	60	40.0	8.53
Fishing income	15	10.0	1.44
Forest income	10	6.67	0.25
Non-farm income			70.82
Agric. wage	25	16.67	2.27
Non agric. wage	40	26.67	30.81
Self employed	52	34.67	33.10
Remittance	37	24.67	1.83
Pension	3	2.0	2.81
Total			100

**Multiple Responses, Field Survey, 2015.*

3.4 Factors that Influenced the Choice of Participation in Non-farm Employment

Age, farm size, and availability of good drinking water significantly affected agricultural wage employment activities; while participation in non-agricultural wage employment is significantly affected by age, years spent in school, household size, farm size, access to electricity and availability of good drinking water. Participation in self-employment activities on the other hand is significantly influenced by age, household size, farm size, distance to the market, distance to the nearest urban center, and availability of good drinking water.

The age of household head significantly and negatively affect participation in agricultural wage employment, non-agricultural wage employment and self – employment activities at 10%, 5% and 1% level, respectively (Table 5). This implies that supply of labour to agricultural

wage employment; non-agricultural wage employment and self-employment activities were higher for younger households than older households. Hence, younger households in addition to participating in farming activities also rely on non-farm employment to support their livelihoods. This finding is in line with earlier work done by [13,14]. The coefficient of farm size was negative and significant for agricultural wage employment, non-agricultural wage employment and self-employment activities at 5%, 10% and 5% level respectively. This implies that farmers have little or no options rather than to consider non-farm employment due to land deficiency[15]. Number of years spent in school was positive but not significant for agricultural wage employment and self-employment activities but significant in non-agricultural wage employment activities at the 5% level. Therefore, the number of years spent in school is not necessarily a determining factor for agricultural wage employment and self-employment activities in the study area. However, years

spent in school was positively and significant at 5% level indicating a rather strong relationship with non-agricultural wage employment. This implies that more educated household heads opt for self-employment activity as they have better prospects in non-agricultural wage employment. This finding is consistent with the result reported by [15,16]. The co-efficient of household size was positive and statistically significant at the 10% level for non-agricultural wage employment and self-employed activities respectively, while the co-efficient of household size was positive but not significant for agricultural wage employment. This implies that the larger the household size, the higher the likelihood of the farmer indulging in non-agricultural wage employment and self-employed activities. More so, the presence of large number of economically active members in the household improves the capacity of the household to participate in different non-farm economic activities. This in line with the findings of [17,18] in which they separately reported that increase in household size increase the likelihood of adopting non-farm employment activities; and contrary to the finding of [9].

The co-efficient of distance to the market was negative and statistically significant at the 10% level for only self-employed activities and not

significant for both agricultural wage employment and non-agricultural wage employment. This is as expected, as the nearer a farmer is located to the market the more the opportunity of engaging in self-employment activities. Thus, the probability of taking up a self-employment activity is higher for farmers in proximity to the market.

The co-efficient of distance to the urban center was also negatively related to the decision to participate in non-farm employment and was statistically significant to the decision to participate in self-employed income generating activities at 10% level. This implies that the nearer a farmer is located to a city the more tendencies of engaging in self-employment activities as it is easier to venture into business in the city than in the rural area. This is in line with [14] who noted that as the city grows, agricultural labour is lost to non-agricultural activities.

Furthermore, the coefficient of availability of portable water was also positive and statistically significant at the 10% level for all categories of non-farm employment which indicate that pipe borne water availability encourages participation in non-farm employment activities in the study area.

Table 4. Multinomial logit estimate of the factors that influenced the choice of participation in non-farm employment

Variable	Agric. Wage employment		Non-Agric. employment		Self-employment	
	Co-efficient	t- ratio	Co-efficient	t- ratio	Co-efficient	t- ratio
Age	-0.1344	-2.11*	-0.2088	-3.44**	-0.2457	-3.67***
Sex	-1.1938	-0.98	0.5064	0.46	0.5692	0.48
Marital status	0.1731	0.24	0.1718	0.27	-0.0289	-0.04
Years of education	0.1562	1.13	0.4617	3.4**	0.1691	1.31
Household size	0.1225	0.62	0.3482	1.92*	0.4889	2.50*
Farm size	-7.2664	-2.71**	-2.8498	-1.95*	-6.9165	-2.94**
Value of asset	-9.92e-07	-1.23	-4.27e-07	-1.11	-2.62e-07	-0.62
Distance to market	-0.0716	-0.51	-0.1142	-0.94	-0.3072	-1.90*
Distance to urban center	-0.0046	-0.06	-0.1205	-1.48	-0.2248	-2.15*
Access to electricity	0.6794	0.45	2.3045	1.69*	1.6888	1.21
Availability of water	3.3824	1.90*	3.4031	2.02*	3.5032	1.83*
Distance to tarred road	0.1792	1.21	0.1901	1.36	0.0271	0.14
Constant	4.2732	1.07	3.8781	1.16	9.0472	2.47*
No of observation	150					
Log likelihood	-79.01					
LR Chi ² (36)	223.56					
Prob Chi ²	0.0000					
Pseudo R ²	0.5859					

Field Survey, 2015. Note ***, ** and * indicate statistical significance at 1, 5 and 10% Probability levels.

Table 5. Reasons for participating in non-farm employment activities

Reasons	Frequency*	Percentage
Surplus household labour	12	8.00
Spread risk	34	22.67
Supplement agric. income	81	54.00
Population pressure	21	14.00
Poor output	18	12.00
Pests and diseases	11	7.33
<u>Provide income during</u> off-season	51	34.00
Reduced available land	13	8.67
No land for farming	6	4.00
Poor land	15	10.00
Provide coping means when farming fails	26	17.33

*Multiple Responses, Field Survey, 2015.

Finally, access to electricity was positive for all categories of non-farm employment and statistically significant for only non-agricultural wage employment at 10% level. The result is consistent with the findings of [13,19].

3.5 Reasons for Participation in Non-farm Employment Activities

The reasons for participating in non-farm employment are shown in Table 5. Multiple responses were recorded as respondents had more than one reason for participating in non-farm employment. The table shows that majority of the households (54%) participate in non-farm employment activities to derive additional income to supplement agricultural income, so as to improve living standard. It is also observed that some households participate to provide income during off-season (34%), while some participate to spread risk (22.67%), which could come from disease outbreak, flood and crop failure which lead to reduced output, 17.33% participate to provide coping means when farming fails. When farming fails non-farm employment serve as a shock absorber to the farming household. This finding is in line with the work of [20] who found out that, households diversify income sources to improve standard of living, to invest in personal development of the household members and to reduce risk that may occur from agricultural production.

3.6 Factors that Influence Income Derived from Non-farm Employment

The tobit coefficients, standard error, t-ratios and the level of significance are presented in (Table 6). Four out of the twelve variables included in the model were significant including; sex, years

spent in school, size of farm income and value of assets. The coefficient of sex of household head was positive and significant at the 10% level. Therefore male headed household heads derived more income from non-farm employment activities as against their female counterparts. This is in line with the findings of [21,18]. The coefficient of years spent in school was positive and significant at the 10% level. This implied that the more educated household heads have more likelihood and better chances of deriving additional source of income from non-farm employment. This is in line with the work done by [14]. The situation is more likely as farming in Nigeria is still generally in the hands of small holder farmers with the little or no education.

The coefficient of size (ratio) of farm income (income from agricultural activities) to total income of the household was negatively and statistically significant at the 1% level. This is in line with a priori expectation as the probability to participate in non-farm income generating activities will be low if the proportion of income from agricultural sources in total income of the farmer is very high. Farmers whose main income is from agricultural sources are probably also those who spend most of their time in agricultural activity and hence have less inclination to participating in non-farm employment [14]. The coefficient of value of household assets was positive and statistically significant at 1% level. This implied that households with more assets do have the capacity to participate in non-farm income generating activities, putting them in a better position than those households with little assets. In other words, the higher your productive assets, the higher the tendency to participate in non-farm income generating activities. This is

Table 6. Tobit estimate of factors that influenced income from non-farm employment

Variable	Coef.	Std. err.	T
Age	4048.56	3257.73	1.24
Sex	138657.90	54755.57	2.53*
Marital status	38862.57	36089.92	1.08
Years of education	12498.25	6505.00	1.92*
Household size	1628.33	9857.06	0.17
Size of farm income	-595521.30	114163.30	-5.22***
Farm size	5966.79	46784.47	0.13
Value of Assets	0.24	0.02	10.40***
Distance to the market	253.77	6332.43	-0.04
Distance to urban center	2831.15	4479.73	0.63
Access to electricity	8233.55	73717.54	0.11
Availability of water	136607.90	87708.32	-1.56
Constant	113275.40	207193.90	-0.55
No of observation	150		
Log likelihood	-1924.38		
LR Chi ² (14)	164.01		
Prob Chi ²	0.0000		
Pseudo R ²	0.0409		
Sigma	285588.6	17340.73	

*Field Survey, 2015, ***, ** and * indicate statistical significance at 1, 5 and 10% Probability levels.*

consistent with the findings of [13,19]. The tobit regression analysis also shows that age, marital status, household size, farm size, distance to the urban center, access to electricity were all positive in signs but statistically not significant. We must however be cautious not to insinuate that these variables have no significant influence on households' income from non-farm employment; as they could be vital ingredients for income determination from household non-farm employment.

3.7 Constraints that Households Face in Participating in Non-farm Employment Activities

Table 7 shows the constraints of decision to participate in non-farm employment activities. Multiple responses were recorded as households face more than one constraint. According to the result, lack of start-up capital (41.33%), lack of adequate education (37.33%), poor environment (34.67%), and poor road network (32.00%), were the major constraints that hindered households from participation in non-farm employment activities in the study area. [22,23,24,25] inferred that, there is a strong case for arguing that without capital, education, good road network, and favourable business environment; it will be difficult for households to participate in non-farm employment activities which will generate incomes for livelihood sustenance.

Table 7. Constraints of decision to participate in non-farm employment activities

Constraints	Frequency*	Percentage
Lack of start-up capital	62	41.33
Poor environment	52	34.67
Lack of access to credit	29	19.33
Poor market information	34	22.67
Lack of adequate education	56	37.33
Poor market information	21	14.00
Land procurement issues	23	15.33
Lack of basic amenities	25	16.67
Poor road network	48	32.00

**Multiple Responses, Field survey, 2015*

4. CONCLUSION

For communities and households facing reduced productivity due to uncertainties associated with agricultural production, participating in non-farm employment, and deriving of meaningful income from participating thereof will help increase income of rural farmers and the rural economy as a whole. Result from this study therefore revealed that majority (70.82%) of the respondents derived their income from non-farm

sources. The study also revealed that age, household size, farm size, number of years spent in school, distance to the market, distance to the nearest urban center, access to electricity and availability of good drinking water significantly influenced choice of participation in non-farm employment activities. The results also showed that the co-efficient of sex, education, size of farm income and value of assets significantly influenced income derived from non-farm activities at 10%, 10%, 1% and 1% respectively. It was also found that the major reasons for participating in non-farm employment activities were to supplement agricultural income and provide income during off-season. Lack of start-up capital to go into self-employment activities, poor environment, lack of adequate education, and poor road network hindered participation in non-farm employment. This study therefore highlights the importance non-farm employment in augmenting household income as over three-quarter of the household heads income were derived from non-farm income generating activities. Therefore, promoting non-farm employment could be a valuable strategy for supplementing the income of farmers, transforming the rural economy, and sustaining equitable rural growth. This could be achieved through training programmes directed towards training farmers in skills that can be used in non-farm employment or small and medium scale businesses (SME;s); as well as through improvements in infrastructure, education and credit/financial markets. Specifically, engagement in non-farm activities, apart from increasing income, could increase agricultural productivity as it provides the resources necessary for investment in advanced agricultural technologies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Lanjouw P. Non-farm employment and poverty in rural El-Salvador. *World Development*. 2001;29(3):529-547.
2. Csaki C, Lerman Z. *Agricultural transition revisited: Issues of land reform and farm restructuring in East Central Europe and the former USSR*. Washington DC: World Bank; 2000.
3. Davis JR, Bezemer D. *The development of the rural non-farm economy in developing countries and transition economies: Key emerging and conceptual issues*. Chatham, UK: Natural Resources Institute; 2004.
4. Reardon T. Using evidence of household income diversification to inform study of the rural non-farm labour market in Africa. *World Development*. 1997;25(5):735-747.
5. Gordon A, Craig C. *Rural non-farm activities and poverty alleviation in Sub-Saharan Africa*. Policy Series 14. Chatham, UK: Natural Resources Institute; 2001.
6. Ghana Government. *Ghana Vision 2020: the First Term Medium-Term Development Plan (1997-2000)*. Accra, Ghana: National Development Planning Commission; 1997.
7. Babatunde RO, Qaim M. The role of off-farm income diversification in rural Nigeria: driving forces and household access. Conference paper presented on 23 Mar 2009 at the Centre for the Study of African Economies (CSAE), Economics Department, Oxford; 2009.
8. Lanjouw J, Lanjouw P. *Rural non-farm employment: A survey*. Policy Research Working Paper No. 1463, the World Bank; 1995.
9. Ibekwe et al. Determinants of non-farm income among farm households in South East Nigeria. *Acad. Ari*. 2010;2(8):29-33.
10. Lanjouw J, Lanjouw P. The rural non-farm sector: Issues and evidence from developing countries. *Agricultural Economics*. 2001;26:1-23.
11. NBS. *National bureau of statistics, Socio-economic Survey in Nigeria*, Abuja, Nigeria; 2006.
12. Greene W. *Econometric analysis*, London, Prentice-Hall International; 2000.
13. Matshe I, Young T. Off-farm labour allocation decisions in small-scale rural households in Zimbabwe. *Agricultural Economics*. 2004;30(3):175-186.
14. Ike PC. Determinants of participation in non-farm economic activities in South East Nigeria: A Tobit analysis approach. *Journal of Biology, Agriculture and Healthcare*. 2015;5(2).
15. Ibekwe UC. *Income distribution among farm households in Orlu agricultural zone of Imo State: Unpublished Ph.D thesis*, Department of Agricultural Economics, University of Nigeria Nsukka; 2001.
16. Parasada RM. The determinants of rural off farm employment in two villages of Andra Pradesh (India). *Poverty Research*

- Unit, University of Sussex. Provinces in China. World Bank Policy Research Working Paper 91; 2002.
17. Harjes T. Globalization and income inequality: An European perspective. IMF Working Paper 07/169 (Washington: International Monetary Fund); 2007.
 18. Demissie, Legesse. Determinants of income diversification among rural households: The case of smallholder farmers in Fedis district, Eastern hararghe zone, Ethiopia, Journal of Development and Agricultural Economics. 2013;5(3): 120-128.
 19. Babatunde et al. Determinants of participation in off-farm employment among small-holder farming households in Kwara State, Nigeria, Publication of Nasarawa State University, KeffiPAT December. 2010;6(2):1-14.
 20. Ibrahim HI, Onuk GE. Analysis of rural non-farm diversification among farming households InDoma area of Nasarawa State, Nigeria. Publication of Faculty of Agriculture, Nasarawa State University, Keffi, PAT. 2009;5(1):49-54.
 21. Tijani et al. Analysis of factors influencing labour supplied to non-farm sub-sector by households in Mubi North Local Government Area of Adamawa State, Nigeria, Nigerian Journal of Basic and Applied Science. 2010;18(1):35-43.
 22. Osondu CK, Obike KC, Ogbonna S. Determinants of decision to non-farm entrepreneurship by women farmers in Ikwuano LGA of Abia State. European Journal of Agriculture and Forestry Research. 2014;2(4):41-52.
 23. Durno J, Stuart R. Gender issues in sustainable agriculture. p.24-37. In Overholt C. (ed.). Gender roles in development projects. New Delhi Fox Publisher, New Delhi, India; 2005.
 24. Anyiro CO, Oriaku BN. Access to and investment of formal micro credit by small holder farmers in Abia State, Nigeria. A case study of ABSU Micro Finance Bank, Uturu. Journal of Agric. Sci. 2011;6(2):69-76.
 25. Ezeh et al. Technical efficiency in poultry broiler production in Umuahia Capital Territory of Abia State, Nigeria. Greener Journal of Agric. Sci. 2012;2(1):001-007.

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