

EFFECT OF LIVELIHOOD DIVERSIFICATION ON FOOD SECURITY STATUS OF RURAL FARM HOUSEHOLDS IN ABIA STATE NIGERIA

Raphael Ndubuisi ECHEBIRI, Chigozirim Ndubuisi ONWUSIRIBE,
Daniel Chinedu NWAOGU

Michael Okpara University of Agriculture Umudike, Abia state, Nigeria, Department of Agricultural Economics, Department of Agribusiness and Management, Phone: +2348063425721. Email: danielchinedu32@gmail.com

Corresponding author: danielchinedu32@gmail.com

Abstract

This paper examined livelihood diversification as a survival strategy and a means to escape food insecurity among rural farm households in Abia state. Although still of central importance, farming on its own is increasingly unable to provide a sufficient means of survival in rural areas thus necessitating the need for diversification. Food security condition was not much improved as about 67% of the households were unable to meet their daily food energy requirement with 8% of relative deficiency. The logit regression result showed that diversification was influenced by household size, amount of credit received, education of the household head, cooperative membership and monthly income while food security status was influenced by years of education of household head, credit access, monthly income, age of household head and household size. Rural farmers should be encourage to participate in varied income generating activities in both agriculture and nonagricultural ventures to enhance their income and break the vicious cycle of poverty and impoverishment. The provision of soft loans at reduced interest prices will catalyze involvement in non-farm income generating activities thereby creating a boost in household income and consequently, welfare.

Key words: diversification, food security, livelihood, income, welfare

INTRODUCTION

The prevalence of non-agricultural activities in rural Africa dates back in the literature as far as the 19th century [6] with studies over the past 15 years highlighting the increasing importance of non-agricultural sources of income to rural dwellers. The focus on livelihood diversification necessarily implies a process, a simple scope targeted at broadening of income and livelihood strategies away from purely crop and livestock production towards both farm and non-farm activities that are undertaken to generate additional income via the production of other agricultural and nonagricultural goods and services, the sale of waged labor or self-employment in small enterprises [14]. This clearly posits the economic grounds of livelihood diversification. Whilst much of the literature defines ‘diversification’ in terms of productive activities or income, the introduction of the concept of ‘livelihoods’ has broadened the debate to include “the

process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living” [11]. Aside from the wider concept beyond income that includes both cash and in-kind income, social institutions and access to social and public services, the stress on process and thus dynamic change reflects the fluid and multi-faceted domain in which farm and non-farm based activities combine and compete.

The way a household copes with and withstands economic shocks depends on the options available in terms of capabilities, assets (including both material and social resources) and activities, i.e., on the household livelihood strategy [8, 11]. This implies that households will behave in dissimilar ways with respect to income generation and livelihood standards in entirety. In fact, households belonging to different socio-economic groups have different strategies to earn their own living

which, in turn, may ensure different levels of resilience to food insecurity. As a result, households belonging to different socioeconomic groups (for example, a farmer's household vs. a household whose main income source is public sector employment) require different interventions. Policymakers should tailor their national food security strategies in order to account for the different needs of the population. Comprehending the driving factors of each livelihood strategy is therefore crucial for improving the response mechanisms related to food insecurity and poverty in developing countries. This link provides a strong basis for judgment in conceptualizing the issues of livelihood diversification and food security especially in rural areas.

Traditionally, most research in the field of food security has focused on the development and refining of the methods of analysis chosen to predict more accurately the likelihood of experiencing future loss of adequate food, i.e., vulnerability to food security [14], more recently, a new concept has been proposed, i.e., resilience to food insecurity [2], that is the ability of the household to maintain a certain level of well-being (for example, food security) withstanding shocks and stresses, depending on the options available to the household to make a living and its ability to handle risks. Many studies have also found diversification to be increasing rapidly in some regions of the world. The conventional picture of the small farmer sustaining themselves off of their crops is no longer in accord with reality. Peasants are also traders, craftsmen, entrepreneurs, migrant workers, animal raisers and wage laborers. Some people pursue diversification activities to cope with insecurity and spread risks, while others are motivated by income accumulation. Whatever be the case, it becomes of great necessity to quantitatively link these economic variables with a functionality view of generating more potent and environment specific measures whose adoption can settle the ravaging effect of food insecurity in the study area. This interest in diversification in Nigeria (especially in Abia state illustrates not only the current reality that many rural

households are engaged in a diverse set of livelihood activities, but also that despite the reliance on agriculture as the driving force of the rural economy, food security is yet to be achieved. In view of this dependency on agriculture and the concomitant level of rural poverty and food insecurity, investigations into the nature of livelihood diversification also clearly reflect the desire to understand better whether promoting diversification offers potentials for livelihood enhancement and poverty reduction or not.

MATERIALS AND METHODS

This research work was carried out in Abia State, Nigeria. The state lies between the latitude 50 03°N to 50 07° and longitude 70 17°E to 70 24°E and it is located in the tropical rainforest zone of Nigeria. Being close to the equator, the zone experiences almost no variation in temperature across the year. The climate is consistently hot with maxima typically being about 31°C and minima around 24°C with evenly distributed rainfall in moderate manner ranging from 2000mm to 2500mm annually [7]. The state covers a land area of 5,243.7 square kilometers. It has a total population of 2,845,380 comprising 1,430,298 males and 1,415,082 females [17]. The people are land resource dependent and produce crops like oil palm, melon, cocoa, maize, yam, cassava, okro, banana, plantain, etc. as well as livestock. Other livelihood option includes carpentry, gardening, wage services etc.

Data collection and analysis

Primary data were used for this work, generated with the use of questionnaires from 120 households. Simple descriptive tools like tables, means and frequencies as well as inferential tools like logit regression and FGT models were employed in the data analyses.

Model Specification

The logit model for factors affecting the choice of various livelihood strategies is given as:

$$Li = \ln(Pi / 1 - Pi) = Zi = b_0 + b_1X_1 + b_nX_n + e$$

where:

Z = log of odds

Pi = Involvement in livelihood options other

than farming (1)
 1-Pi = otherwise (0)
 X₁ = Age of household head (Years)
 X₂ = Household size
 X₃ = Credit volume accessed (₦)
 X₄ = Years of education
 X₅ = Cooperative membership
 X₆ = Income (₦)
 b₁-b₆ = coefficients of parameters
 e = error term

The data collected were subjected to descriptive statistics and econometric analyses such as Foster, Greer and Thorbeck index of food insecurity and binary logit regression. A separate food insecurity line was developed for the area. To achieve this, the cost of basic need method as proposed by Revalion and Bidani was used. This is mostly done through identifying the food insecure 50% of the sample population as a reference group with the assumption that in study area, the food insecure part of society is above 50%. The food consumption behaviour of the reference group is accessed to determine the average quantities in per adult equivalent of basic food items that makeup the reference food basket. In this case, the basket makes up of the mean consumption levels (purchase, remittance and food aid) of basic food items. The calorie value of each food items is constructed from the World Health Organization food nutrition table. The total calorie obtained from consumption of this basket of average quantity per adult by an individual is:

$$\sum_i q_i K_i = T^* \dots\dots\dots(1)$$

$T \approx T^*$, but $T \neq T^*$. Here T^* is total calorie obtained by individual adult from consuming the average quantities, q_i is average quantity per adult of food item i consumed by individual, K_i the caloric value of the respective food item i consumed by individual adult and T is recommended consumed calorie per day per adult for Nigeria, i.e. 9,210 kJ = 2,200 kcal.

The average quantity per adult of each food item scales up and down by a constant value T/T^*

so as to provide total of 9,210 kJ = 2,200 kcal per adult per day before doing any activities.

Then, multiply each food items after scaling up and down by the median price and sum up to get a food insecurity line.

A household was then considered food secure or insecure if the daily recommended calorie was equal or above and below the food insecurity line respectively. The degree of food insecurity was estimated using the Foster, Greer and Thorbeck (FGT) equation shown as:

$$P \alpha = \frac{1}{N} \sum_{i=1}^q \left(\frac{z-y_i}{z} \right)^\alpha \dots\dots\dots(2)$$

where:
 α is the degree of food insecurity with values of 0, 1 and 2 for headcount, short-fall and severity of food insecurity, respectively. Furthermore, N is total number of sample households, q the number of food insecure households, Z is the cutoff between food security and insecurity and y_i is the measure of per adult equivalent food calorie intake of the i th household.

To examine the effect of demographic and socio economic characteristics on food insecurity and the probability of household being food insecure, the logit model will be adopted and specified as:

$$Li = \ln \frac{P(Y_i = 1)}{1 - P(Y_i = 1)} = Zi \dots\dots\dots(3)$$

$$Zi = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + u \dots\dots\dots(4)$$

where:
 X₁ = Age of household head (Years)
 X₂ = Household size
 X₃ = Food aid (Kg)
 X₄ = Years of education of household head
 X₅ = Credit access (1=Yes, 0=No)
 X₆ = Assets' ownership (₦)
 X₇ = Total number of earners in the household
 X₈ = Monthly income (₦)
 b₁ = b₈ = Coefficient of parameters
 u = Error term

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents are presented in Table 1 on such variables as age, sex, marital status, household size, level of education. The result in Table 1 indicates that majority of the respondents (68%) were between ages 45 and 64 comprising of middle and the aged. They may be limited to one livelihood means (farming) due to declining age. The study reveals that a greater proportion of the respondents (68%) in the study area were males while 32% were females. The married dominated involvement in income generating activities in the study area.

Table 1. Frequency Distribution of Respondents by socio-economic features

Age Range (Years)	Frequency	Percentage
25-34	10	8
35-44	22	18
45-54	30	25
55-64	38	32
65-74	17	14
75-84	3	3
Total	120	100
Gender		
Male	81	68
Female	39	32
Total	120	100
Marital Status		
Single	8	7
Married	94	78
Widow	18	15
Total	120	100
Level of Education		
No form. edu.	7	6
Pri. education	28	23
Sec. educ.	56	47
Tertiary educ.	29	24
Total	120	100
Experience (Years)		
1-5	47	39
6-10	56	47
11-15	8	7
16-20	7	6
21-25	2	1
Total	120	100

Source: Field Survey, 2017.

Such households are bound to enjoy the benefits of increased labour supply and supplementing the family's means of livelihood. Over 70% of the respondents in

the study area were literate with diverse levels of formal education; from primary to tertiary. This implies a very high level of literacy (ability to read and write) abides in the study area which would enable the entrepreneurs to better utilize effectively and efficiently available resources as well as diversify livelihood.

Livelihood Diversification Strategies of the Rural Households

The different livelihood strategies engaged in by the rural households are presented in Table 2.

Table 2. Livelihood Diversification Strategies of the Rural Households

Livelihood Activities	Frequency	Percentage (%)
Crop Farming	50	42
Livestock raising	29	24
Agro-processing/marketing	15	13
Service sector	10	8
Commerce/trading	16	13
Total	120	100

Source: Field Survey, 2017.

The result of the various livelihood strategies adopted by the households shows that crop farming, livestock farming, agro-processing/marketing, service sector and commerce/trading were identified and accounted for 42%, 24%, 13%, 8% and 13%. Crop farming (42%) was the most prevalent livelihood strategy among the respondents. This was followed by livestock rearing. The result therefore indicates that the respondents are majorly agrarian rural dwellers. They depend mostly on the proceeds from their farms to survive and meet their daily food and other necessary requirements. The study also reveals that diversification is yet to be developed as the respondents still depend majorly on agriculture. This confirms previous finding that Agriculture is the bedrock of sustenance in the Nigerian society.

Analysis of factors affecting the choice of livelihood diversification

The effect of explanatory variables on the influence of rural households' decision to diversify their livelihood sources is analyzed using a binomial logistic regression.

The 2 log likelihood ratio test (-199.62) shows that the estimated model including a constant and the set of explanatory variables fit the data better compared with the model containing the constant only. The R² value, model Chi-Square and overall percentage of correct prediction also suggested that the estimated model has an excellent explanatory power. The result is presented in Table 3.

Table 3. Logit Regression Result for Determinants of Livelihood Diversification of Rural households in Abia State

Variables	Coeff.	S.E	Wald
Age of Household head	-.007	.632	-3.60***
Household size	.141	1401.26	3.122***
Amount of credit received	.047	411.12	2.132**
Education of household head	4.307	5048.35	2.453**
Cooperative membership	1.735	3220.87	-3.42***
Monthly income (₦)	.251	1106.89	1.984**
Constant	227.098	25566.7	.000***

*p<0.10; **p<0.05; ***p<0.01 Nagelkerke R² = .664; -2 log likelihood = 199.62

Source: Field Survey, 2017.

The result shows that the decision to diversify from agriculture to other livelihood means was positively influenced by household size, amount of credit received, education of the household head, cooperative membership and monthly income at 1%, 5%, 5%, 5% and 10% respectively and negatively influenced by age. The coefficient of age is significant and negatively related to involvement in numerous livelihood activities implying that with advancement in age of household heads, their involvement in non-agricultural activities reduces. This finding agrees with *a priori* expectations though deviates from [9] firstly because experience increases with age and consequently, experienced persons have more prospects of getting jobs in the non-farm sector.

The coefficient of household size been positively signed implies that with an increase

in the number of household members, households will seek for other livelihood means. An additional income source is expected to make available more money to meet the various demand of the increasing household membership.

The coefficient of credit use was found to be positively related to livelihood diversification. This implies that farmers with access to credit are likely to engage in other income generating activities. Since resource-base is very poor for most of the rural households, providing credit to households will improve their livelihood. Farmers engage in livelihood diversification to raise households' income portfolio. This is an indication that farmers who obtain credit are more likely to be livelihood means diversified. [9] agreed to this finding.

The coefficient of years of education of the household heads correlated positively with the probability event of involving in other source of livelihoods. The highly educated persons diversify their livelihood options through opting for salaried jobs, self-employment activities, etc., whereas low-educated and illiterate persons engage themselves in wage earning.

The finding also suggest that belonging to farmers organization would significantly influence farmers into livelihood diversification activities besides farming, because the experience of working and sharing ideas and common problems in groups would educate the farmers and also enable them to learn more about other opportunities which may exists outside his immediate engagement and environment.

The coefficient of monthly income correlated positively with livelihood activity. This could imply that rural dwellers who earn higher monthly income indulge in other livelihood activities (port- folio diversification) other than farming. This may be as results of having more money which can enable them invest in other livelihood activity other than farming.

Food security status

The food security status of the rural households is presented in Table 4.

Table 4. Households' Food Security status

Food Security	Frequency	Percentage (%)
Food secure	40	33
Food insecure	80	67
Total	120	100

Source: Field Survey, 2017.

The result shows that a greater proportion (67%) of the rural households were food insecure while 33% were food secured. This implies that 67% of the households were not able to meet their daily dietary requirements. The extent of the food insecurity is determined by the FGT results.

Table 5. FGT result

Variable	Index
Head count ratio	0.67
Short fall	0.32
Food insecurity severity	0.08

Source: Field Survey, 2017.

Table 5 shows that the headcount ratio, short-fall and severity of food insecurity were 67%, 32% and 8% respectively. This implies 67% of the sampled households could not meet the energy requirement recommended for subsistence. Each food insecure household needs 32% of the daily caloric requirement to bring them up to the recommended daily caloric requirement level. Besides, their per capita income and the relative deficiency among food insecure households is 8%.

Factors affecting food security status of the rural households

The results of the binary logistic regression are presented in Table 6.

According to the results, 5 variables are statistically significant. On the other hand, the values of Cox & Snell and Nagelkerke R² show that the model explains 40% and 50% variations in the data, respectively.

The result shows that food security status of the rural households was positively influenced by years of education of household head, credit access, farm size and monthly income respectively and negatively affected by age of household head and household size respectively. The coefficient of age of the household head had a negative relationship with food security. This implies that an increase in the age of household head reduces

the chances of the family being food security. Younger heads are active, innovative and can efficiently cater for their households unlike older heads who are faced with the challenge of declining age, productivity and efficiency. However, [18] disagrees with this finding and states that a positive relationship is possible because as households acquire more experience in farming operations, non-farm businesses, accumulate wealth and use better planning, they have better chances to become food secure.

Table 6. Logit regression result for factors affecting food security status of rural households in Abia state

Variables	B	S.E.	Wald	Exp. (B)
Age	.809	0.83	2.92***	.445
Household size	-1.15	0.98	2.472**	.316
Farm size	.089	0.11	3.26***	1.141
Education	.013	0.10	3.01***	1.013
Credit access	2.549	1.30	3.81***	12.799
Diversification	1.477	0.96	2.362**	4.379
Monthly income	1.477	0.96	2.362**	4.379
Food aid	1.089	0.96	1.269	2.970
Constant	3.632	0.88	3.86***	

*p<0.10; **p<0.05; ***p<0.01 Nagelkerke R² = 0.50; Cox and Snell R² = 0.40; -2 log likelihood = 47.043

Source: Field Survey, 2017

Household size was statistically significant and exhibited a negative relationship with household food security similar to the hypothesized effect implying that the chances for being food secure decreases with an increasing household size. According to [15], large family size creates more pressure on household food security because more food and non-food expenditure is spent for them increases. This study is congruent with the previous studies of [16] and [19].

The coefficient of farm size cultivated by the household was found to have significant and positive relationship with food security status of households suggesting the larger the land size, the better food the security state of the household. The possible explanation is that the major source of food in the study area comes from own production, thus, household who have large size of cultivated land has better production which gives a better chance for the household to be food secure. This result is in agreement with the findings of [19, 1 and 15]. The study found that household

heads' level of education had a positive impact on household food security implying that at least, intermediate level of education is a necessary condition to assure household food security. Educational status of the household head is an important determinant of household food security because an educated household head is more sensitive to adopt technology to maximize the output he/she generated from farm activities. This study is in line with the previous studies of [3, 18].

The result of the logit model also showed that credit access had a significant and positive influence on food security in the study area suggesting that the use of credit increases the households' likelihood of being food secure in line with the hypothesized effect. Appropriate utilization of credit would build their capacity to produce more through purchase and use of agricultural inputs. [18] agrees with this posit and states that it would also be possible for the households to spend the credit on some other income generating activities so that the income from these could activities position households on a better status to escape vulnerability to food insecurity.

Income diversification was found to have a significant and positive relation with the food security status of the household indicating that farmers who engaged in other income generating activities other than farming have better chance to be food secure. It is certain that such households will be endowed with additional income and more likely to escape food insecurity. Household's monthly income is the total monthly income of the household from all sources. The positive coefficient of monthly income implies a positive relationship between food security and monthly income. An increase in monthly income of a household increases the chances of food security as agreed by [1].

Effect of livelihood diversification on the income and food security status of the households

A Pearson correlation analysis was carried out to examine how livelihood diversification affects households' income and food security as presented in Table 7.

Table 7. Correlations result: effect of livelihood diversification on income and food security (FS)

		(LD)	Income	FS (Z)
LD	Pearson Correlation	1	1.000**	.988**
	Sig. (2-tailed)		.000	.000
	N	120	120	120
Income (₦)	Pearson Correlation	1.000**	1	.988**
	Sig. (2-tailed)	.000		.000
	N	120	120	120
Food Security (Z)	Pearson Correlation	.988**	.988**	1
	Sig. (2-tailed)	.000	.000	
	N	120	120	120

** . Correlation is sig. at the 0.01 level (2-tailed).

Source: Field survey, 2017.

A positive correlation at 1% was found to exist between livelihood diversification and income as well as food security. This implies that increasing the number of livelihood means engaged in by a household, her income level will increase with a consequent tendency towards food security. It is therefore worthy to note that livelihood diversified households are more income stable and food secured than the reverse households.

CONCLUSIONS

The result of this study has revealed that farmers' involvement in livelihood diversification activities is as a result of overwhelming need to increase households' income portfolio and to maintain livelihood. The quest for improved standard of living which has been sought after by rural dwellers and their sympathizers would be met with higher successes when rural people realize the potentiality and effectiveness of livelihood diversification in the overall scheme of rural poverty reduction especially in rural communities of low income countries. It is therefore, the general conclusion of this study that livelihood diversification is a positive undertaken and an antidote to the chronic menace of poverty and food insecurity ravaging rural areas. This is because it enables rural people increase their income portfolio and insures households from insufficiency of

food, thereby improving their food security status, while equally lessening their vulnerability to hunger, diseases and mortalities. Rural farmers should be given opportunity to participate in varied income generating activities in both agriculture and nonagricultural ventures and rural development programmes which would enhance their livelihood diversification activities and living standard be initiated and encouraged; the effect of education on household food insecurity cannot be over-emphasized therefore strengthening both formal and informal education and vocational or skill training should be promoted to reduce food insecurity in the study area. Access to credit can create an opportunity to be involved in economic activity that generates revenue to households. Development partners operating in the study area should implement provision of credit to eligible households using targeting criterion that reflects actual characteristics of food insecure households.

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