Full Length Research Paper

Analysis of poverty and its determinants among cassava farmers in Apa Local Government Area, Benue State, Nigeria

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This study assessed the degree of poverty as well as its determinants among cassava farmers in Apa Local Government Area (LGA) of Benue State, Nigeria, using a sample of 80 cassava farmers randomly selected. Descriptive statistics, the Foster-Greer-Thorbecke (FGT) poverty index and Tobit regression model were employed as instrument of data analysis. The result indicated that 57.4% of the respondents were poor, and 31.6% of poverty line is needed to take them out of poverty, and about 23% inequality exist among the poor cassava farmers. While increase in age of the household head was found to increase poverty, increase in cassava farming experience and farm size reduced the farmers' poverty status. There is still significant scope for income increases through direct increment of cassava farms.

Key words: Tobit regression, poverty status, determinants, cassava farmers.

INTRODUCTION

Nigeria is one of the most resource-endowed nations in the world. But socio economically, Nigerians are also among the poorest in the world (Etim et al., 2009). Hence, there is a persisting paradox of a rich country inhabited by poor people, which has been the subject of great concern for many years, but more especially in the last decade. In year 2002, the United Nations Development Programme (UNDP) ranked Nigeria as the 26th poorest nation in the world (The Guardian, July 26, 2002; Dike, 2002) in the midst of plenty, and till today the country has not found her ways back in successfully reducing poverty to the barest minimum. The human poverty index HPI-I value for Nigeria of 38.8% ranks the country 75th among 103 developing countries (UNDP, 2005, Etim et al., 2009).

Poverty in Nigeria is rising with almost 100 million people living on less than $1 a day. The percentage of Nigerians living in absolute poverty - those who can afford only the bare essentials of food, shelter and clothing - rose to 60.9% in 2010, compared with 54.7% in 2004 (Subair, 2012). Although Nigeria's economy is projected to continue growing, poverty is likely to get worse as the gap between the rich and the poor

continues to widen and employment generation intervention programmes are not taken into account.

Indeed, reliance on unproductive subsistence farming and export of a few agricultural commodities places Nigeria at a disadvantaged position in the world, and threatens food security and increases rural poverty. The livelihoods of the Nigerian poor, both in rural and urban areas, depend primarily on agriculture, as at least two-thirds of the total labor force is engaged directly or indirectly in agriculture-related enterprises. Hence, for the majority of poor Nigerian households, improving the productivity of the domestic food and agricultural systems is key to enhancing well-being and escape from poverty (ECA, 2004).

In the wake of a looming "global food crises" that Nigeria is not isolated from, more emphasis is now being placed on increased domestic production. It is not un-common to see rural poor households engage in cassava

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production and other income generating activities. As poverty systematically deepens in rural communities and people's meager income do not cover their basic food and dietary needs, interest in cassava production has increased as cassava is the most commonly cultivated root crop because of its superior market value and long shelf life when processed into various products.

Currently, Nigeria is the largest producer of cassava in the world (FAO, 2004) and it is believed that production of cassava is a way farmers could easily get out of poverty since it requires less input and could grow even under harsh environmental conditions. Benue State on the other hand is the largest producer of cassava in Nigeria with the production figure of 3,562950 million metric tons and 3,643660 million metric tons in 2008 and 2009 respectively (NFDP, 2009). Farmers produce cassava as a source of family food and income (IITA, 2004). Cassava production is being practiced by virtually all homes in Benue State.

Therefore, understanding the factors underlying their persistent deprivation is important, when designing policies to meet their needs and improve their welfare. This study was therefore designed to assess the degree of poverty and determine factors of cassava production that reduce poverty among cassava producers in the study area.

MATERIALS AND METHODS

The study area

The study was conducted in Apa Local Government Area of Benue State. Apa L.G.A is one of the twenty-three L.G.As in Benue state. It was carved out of Otukpo LGA on 27th August, 1991 by the Babangida regime with its headquarters at Ugbokpo. The present Apa Local Government comprises eleven wards, and is located in the western part of Benue State. It has a projected population of over 790,457 (NPC, 2006). It is situated on the plain Savannah grassland, which stretches across the LGA. The climatic condition of the area has an average annual rainfall of about 1524 - 1778 mm with an average daily temperature of 30°C. The vegetation favours the growth of both root and grain crops.

Sampling technique and data collection method

A two-stage sampling technique was used in selecting 80 contact farmers from the list provided by Benue Agricultural and Rural Development Authority (BNARDA). This consist of purposive selection of 8 wards from the total of 11 council wards in the LGA based on intensity of cassava production in the wards, and a random sample of 10 contact farmers were made from each of these wards. The data for the study were collected between January and March 2011, through the use of a well-structured questionnaire.

Analytical technique

Both descriptive and parametric tools of analysis were used. The simple descriptive statistics used were means and percentages, while the parametric analysis involved were the Foster-Greer-Thorbecke (FGT) poverty index and Tobit regression analysis.

Foster-Greer-Thorbecke (FGT) poverty model

In developing poverty profile, this study adopted the Foster, Greer and Thorbecke (FGT), (1984) class of poverty measure, which represents the level of income below which households are considered to be poor. The FGT class of poverty measure is defined as:

$$P_\alpha = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Yi}{Z} \right)^\alpha$$

Where, N = total number of respondents; Yi = household income; Z = poverty line ($1 per day = N155); q = number of households with income less than Z; α = Poverty Aversion Parameter Index which takes on the values of 0, 1 and 2 representing incidence of poverty, poverty gap and severity of poverty respectively (Foster et al., 1984). The measure relates to different dimensions of the incidence of poverty:

If α = 0, FGT is reduced to $P_\alpha = \frac{H}{N}$

Which is the proportion of the population that falls below the poverty line. This is called the head count or incidence of poverty. If α = 1, FGT becomes:

$$P_1 = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Yi}{Z} \right)^1$$

Which is the depth of poverty. It is the percentage of income required to bring each individual below the poverty line up to the poverty line. If α = 2, FGT becomes:

$$P_2 = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Yi}{Z} \right)^2$$

Which is the severity of poverty. It is indicated by giving longer weight to the extremely (core) poor. It is achieved by squaring the gap between their income and the poverty line to increase its weight in the overall poverty measure.

Tobit regression model

The Tobit regression model, a hybrid of the discrete and

Table 1. Farm and farmer-specific characteristics.

Variable	Mean	Standard deviation
Age in years	50.7	14.0
Years of schooling	8.8	5.1
Farming experience in years	16.5	10.8
Household size	10.2	7.6
Farm size in ha	4.1	2.6
Investment in inputs in Naira	66000	56754.6
Sex	85% male	
Marital status	87.6% married	
Land ownership	83% owned land	

Source: Field survey (2011).

continuous dependent variable was used to estimate the determinants of poverty among cassava farming households in Apa LGA of Benue State, Nigeria. The Tobit model originates from the work of Tobin (1958) and has been extensively used by economists to measure the effect of changes in the explanatory variables (xi) on the probability of being poor and the depth or intensity of poverty (McDonald and Moffit, 1980). The Tobit model can be used to determine the impact of the explanatory variables on the probability of being poor. The model assumes that many variables have a lower (or upper) limit and take on this limiting value for a substantial number of respondents. For the remaining respondents, the variables take on a wide range of values above (below) the limit. The model measures not only probability that a farmer is poor but also the intensity of poverty (Tobin, 1958). The model is expressed based on Tobin (1958):

$$q_i = P_i = X_i\beta + e_i \text{ if } P_i > P_i^*$$
$$O = X_i\beta + e_i \text{ if } P_i \leq P_i^*$$
$$i = 1, 2 \ldots\ldots 80$$

Where, q_i is the dependent variable. It is discrete, when the households are not poor and continuous, when they are poor. P_i is the poverty depth/intensity defined as $(Z-Y_i)/Z$ and P_i^* is the poverty depth, when poverty line (Z) equals the income per adult equivalent. X_i is a vector of explanatory variable, β is a vector of un-known co-efficient and it is an independently distributed error term. The explanatory variables specified as determinants of poverty are:

X_1= Age of the household head in years;
X_2 = Sex of the household head (Dummy=1 if male, 0 if female);
X_3= Marital status of the household head (Dummy = 1 if married, 0 otherwise);
X_4 = Years of schooling;
X_5 = Cassava farming experience in years;
X_6 = Size of household;

X_7 = Farm size in hectares;
X_8 = Ownership of land (Dummy = 1 if owned cassava farmland, 0 otherwise);
X_9 = Investment in inputs in Naira.

The P-alpha values were obtained using computer software, DAD 4.5, while the maximum likelihood estimates in the Tobit regression model were obtained using Stata version 9.

RESULTS AND DISCUSSION

Farm and farmer specific characteristics

The farm and farmer specific characteristics in the study area are presented in Table 1. The result showed that majority (78.8%) of the respondents fell within the age group of 21-60 years. On the average, the respondents were 50.7 years old implying that cassava farmers in Apa LGA are still in their active productive age. The result on the sex of the respondents indicated that married (87.5%) male (85%) farmers dominated cassava production in the study area. This is likely due to the cultural background of most Afrcan communities where root and tuber crops such as cassava and yam farms are left to men as their jobs. The reason for this is the vigorous labour that accompany their production.

The years of experience of respondents show that on the average, the farmers had experience of 16.5 years in cassava production. This implies that the stretch in the number of years of experience in cassava farming will make better the output through the appropriate combination of factors of production. The result of education (years of school training) shows that farmers were moderately educated as their average years of educational attainment were 8.8. This is likely to influence their efficiency in agricultural production as low education limits the quality and quantity as well as the speed at which farmers adopt new technologies and usage to enhance improved output and reduce their poverty level.

Furthermore, the result showed an average farm size of

Table 2. FGT poverty measure.

Poverty incidence $\alpha = 0$	Poverty gap $\alpha = 1$	Poverty severity $\alpha = 2$
0.574	0.316	0.229

Source: Data analysis (2011). Poverty line = $1 per day ($1 = 155 Naira, Nigerian currency, as at the time of writing this article).

Table 3. Maximum likelihood estimates of the Tobit regression model.

Variable	Coefficient	t-value
Age	0.017	2.34**
Sex	0.166	1.00
Marital status	-0.263	-1.40
Years of schooling	-0.008	-0.57
Farming experience	-0.018	-2.51**
Household size	0.010	1.00
Farm size	-0.156	-3.87*
Ownership of land	-0.172	-1.09
Investment in inputs (N)	6.760E-07	0.46
Sigma	0.453	8.88*
Log likelihood	-48.86	
Pseudo R^2	0.256	

Source: Data analysis (2011).

the respondents to be 4.1 ha, while analysis of the size of cassava farmers' household in the study area had a mean value of 10.2. This implies that family labour would be ready when needed in cassava production in the study area.

Poverty situation among cassava farming households in Apa LGA of Benue State

The poverty situation among the respondents is presented in Table 2. According to the results of FGT poverty measures, 57.4% of cassava farmers in the study area were extremely poor, while the poverty gap was 0.316. This implies that about 31.6% of the poverty line is required by the poor farmers to escape poverty. Furthermore, the result revealed severity of poverty at 0.229. This means that about 23% inequality exists among the poor cassava farmers in the study area.

Determinants of poverty

The result of the maximum likelihood estimates of the Tobit regression is presented in Table 3. The result showed that sigma (0.453) with a t-value of 8.88 was significant (P < 0.05). This means that the model has a good fit to the data and that the model as specified explained significant non-zero variations in factors influencing poverty. The result further revealed that only

the coefficients of age (0.017), cassava farming experience (-0.018) and cassava farm size (-0.156) were statistically significant (p≤0.05). The co-efficient of age was however positive to poverty implying that the older a farmer becomes, the more his poverty level increases by 1.7%. This result agrees with that of Etim and Patrick (2010) that poverty incidence is highest (69%) and lowest (31%) when households are headed by persons within the age of 61-80 years and 20-40 years respectively. The regression co-efficient of cassava farming experience of the household head was -0.018, meaning that a year's increase in cassava farming experience of the household head would lead to 1.8% reduction in poverty. This is attributable to the fact that as farming experience increases, the farmers make better output through the appropriate combination of factors of production. This subsequently leads to increase income and welfare for the farmers. This was contrary to the findings of Etim and Patrick (2010). Similarly, the coefficient of cassava farm size was -0.156 implying that a unit increase in cassava farm size will lead to 15.6% reduction in poverty.

Conclusion

Overall, the findings in this study indicate that young and energetic farmers, higher experience in cassava farming and larger cassava farm size helped raise farmers' income, thereby increasing their probability of escaping

poverty. This confirms the fact that cassava production can contribute to raising incomes of farm households, poverty alleviation, and food security in developing countries. A related policy implication for this and similar situations is that there is still significant scope for income increases through direct increment of cassava farms. Therefore, provision of inputs at subsidized rate and credit facilities can go a long way to help the farmers improve and increase production of cassava and hence, an escape from poverty. Also, improved opportunities in rural areas could also help reduce the massive rural-urban migration by the youths with its concomitant development problems.

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