DETERMINANTS OF RURAL POVERTY IN AFRICA: THE CASE OF YAM FARM HOUSEHOLDS IN SOUTHEASTERN NIGERIA

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Abstract

This study empirically determined the factors that influence households' exit from poverty as a guide for policy intervention in the increase in yam production among yam producers. Cross sectional data collected from random samples of 300 yam producing households heads were used for the analysis. Data analysis comprised the use of statistical tools such as percentages, means, tables, poverty ratios and regression analysis. The poverty line for the poor yam household heads was established as ₦678.59 per person per day while the mean household size and amount spent per person was 6 persons and ₦113.10 respectively. The determinants of poverty were level of education which has negative sign and significant at 5%, membership of farmer's group was negative and significant at 10% while yam production experience was negative and significant at 1% and participation in agricultural workshop was negative and significant at 5%. These factors significantly decreased poverty which was in base with *apriori* expectations while that of household dependency ratio was positive and significant at 1% but increased poverty.

Keywords: Rural Poverty, Yam farmers, Southeastern Nigeria

Introduction

The significance of rural poverty is underscored by the fact that as much as 45 to 80% of national population reside in the rural areas and are dependent in agriculture in most developing countries (Onyenweaku, 1991; Sabir *et al.,* 2006; Olubanjo *et al.,* 2007; Nwachukwu, 2009). Poverty can be described as the level of deprivation that encompasses shortfalls or inadequacies in basic human needs, which prevent people from achieving internationally acceptable levels of well-being (Sengul and Tuncer, 2005). This situation, which has been ascribed in some quarters to production failure owing to a suppression of markets and in some other quarters to institutional and distributional failure (Olubanjo *et al*., 2007; Swastika *et al.,* 2007), is characterized by disease, low life expectancy and physical and mental retardation.

"Globally, about 1.2 billion people are in extreme poverty, living on less than a Dollar per day" (IFAD, 2001). Majority of these people are in developing countries, 44% in South Asia, 24% each in sub-Saharan Africa and East Asia and 6.5% in Latin America and the Caribbean (IFAD, 2001; Babatunde *et al.,* 2008). Within these regions, poverty is largely a rural phenomenon with an average of between 62 and 72% of the population living on less than a dollar a day (Owuor *et al*., 2007). In comparison, rural poverty also tends to be deeper than urban poverty in these regions (Bird *et al.,* 2002; Owuor *et al.,* 2007).

In Nigeria rural poverty levels are relatively high. For example, a national poverty survey carried out in 2003 and 2004 indicates that the urban areas have poverty levels estimated at 43.2% while the rural areas have poverty levels that are as high as 63.8% (Federal Republic of Nigeria, 2005; NBS, 2006). The mean national poverty incidence stands at 54.7 (NBS, 2006). However, evidence indicates that this situation has not improved in the last 15 to 17 years in a majority of sub-Saharan countries of Africa (World Bank, 2006; Owuor *et al.,* 2007).

In Southeastern Nigeria, about 70% of the populations live in the rural sector and are dependent on agriculture as in most developing countries of the world for their livelihood (Onyenweaku, 1991; Nwachukwu, 2009). Yam is a major food crop widely grown and massively consumed in Nigeria and is popularly regarded as the "King" of all arable crops in Nigeria because it earns more money per unit weight than other food crops (Orkwor, 1998; Orkwor *et al.,* 1998, National Root Crops Research Institute (NRCRI), 2008). Yam, cassava, cocoyam and sweetpotato are the

most common root and tuber crops grown by the yam farm households. Among these crops grown, yam has high social and cultural importance. It is an important source of carbohydrate in the diet of most Nigerians and contributes about 20 percent of the daily calorie in-take of Nigerians (Onyenweaku and Mbuba, 1991; Ugwu, 1999). Yam farmers are often regarded as wealthier than other class of farmers due to its prestigious cultural status and amount of yam tubers the farmers have in the storage yam barn, (Orkwor, 1998), but presently the cost of yam production is rising forcing many farmers out of production (NRCRI, 2008). This could be ascribed to multidimensional poverty. As a result, the gap between yam supply and demand has increased. Rural yam farm households have to cope with food supply shortages, price fluctuation and pressure to get "more" out of thinned out resources especially land (Akinsanmi and Doppler, 2005).

Empirical evidence on the nature of poverty among rural farmers vis the extent of influence of the source of income on agriculture and inequality in income are necessary for policy choices. Although predicted poverty reduction scenarios vary greatly depending upon the rate and nature of poverty related policies, actual evidence suggests that the depth and severity is still at its worst in sub-Saharan Africa and South Asia (Owuor *et al.,* 2007). World Bank (1995) report on poverty status in Nigeria showed that poverty incidence was more in rural areas and was characterized by poor basic facilities, food insecurity, obsolete farming practices, poor nutritional values, little access to savings facilities, inability to educate children due to high cost, inadequate diet, poor latrines, bathrooms, kitchens, limited access to good drinking water, poor electric power supply and lack of clothing materials. These were based on direct access to basic needs of households.

Adewusi (2007) conducted a study on rural livelihood and poverty in Oyo State, Nigeria through a field survey of 259 rural households. The author employed logit model for the data analysis. The results of the logit model revealed that seven variables were significant among the variables estimated. These were gender, years of formal education, access to electricity, access to improved seed, access to veterinary services, distance to the nearest tarred road and access to formal credit facilities. A Recent study conducted in Pakistan using the logistic model among small farmers found that lower farm productivity, old age of the head, lower prices of the outputs, bigger household size, lack of infrastructure, and high dependency ratio were the major determinants of

poverty, while education of the head was the poverty-reducing factor (Sabir *et al.,* 2006). These variables according to Sabir *et al.* (2006) were divided into two general areas; the characteristics associated with the income generating potential of individual and the characteristics associated with the geographic context in which the individual lives. Variables found to have positive and significant association with farmers' poverty status included lower farm productivity, age of the head, lower prices of the outputs, bigger household size, lack of infrastructure and high dependency ratio while education of the head was negative and highly significantly associated with farmers' poverty status (Sabir *et al.,* 2006).

Studies conducted in Kenya using probit model among small farmers were of a different dimension. Empirical results was reported that access to micro-credit, education, participation in agricultural seminars, age of the head, livestock assets and location in high potential areas significantly influence the probability of households exiting chronic poverty. On the other hand, female gender, group membership and distance to the market increase the probability of persistence in chronic poverty. Results revealed that micro-credit access, male gender, age of head, education and market access are key determinants of exit from rural poverty (Owuor *et al*., 2007). These variables had the expected signs and were significantly associated with farmers' poverty status. Studies conducted in Nigeria showed different poverty trends in some variables selected based on aprior expectation. For instance, the work conducted by Nzenwa and Oboh (2005), Olubanjo *et al.,* (2007) and Babatunde *et al.,* (2008). Olubanjo *et al.* used ordinary least square regression and poverty index as it dependent variable, and found that farm fragmentation and farming experience showed significant but negative effect with farmers' poverty level while age, level of education, level of capital borrowing, size of farm lands operated and household size indicated positive effect.

Nzenwa and Oboh (2005) conducted a study on households' endowments on poverty among farmers in Benue State, Nigeria. They employed logit model to estimate proxy measures of household endowments. They used the ratio of individual income to the poverty line as dependent variable in the logit. The household endowment variables used in estimating the logit model were age of household head, educational level of household head, household size, and ownership of house. Others include farm income, off farm income, land

holding, dwelling type and sex. The results showed that six of the variables were significant in the logit model. These are age and household size which was positively related while education level, house ownership, farm income and off farm income, were negatively related to poverty status in Benue. Babatunde *et al.,* (2008) on the other hand, conducted a study on rural households' poverty in South Western Nigeria. They used exponential model and log of per capita expenditure as the dependent variable. They found that the male gender (dummy), level of education of head of household, farm size, land ownership and membership of farmers' group were positive and significantly related to household's per capita expenditure. According to Babatunde *et al.*, the prevalence of poverty is higher among older (age), small-scale farmers with large household size and household headed by uneducated female (i.e negative relationship leading to increase in poverty).

In recent years, because of the large prevalence of poverty, reducing it has been of great concern to many developing countries for the past few decades (Babatunde *et al.,* 2008). This situation has created the quest for poverty reduction strategies which have been at the center stage of development programmes and policies. The progress towards the global target of halving, between 1990 and 2015, the proportion of people living in extreme poverty, has been very slow. The main problem lies in the fact that despite the high poverty rates in Nigeria little is documented on policy related determinants of rural poverty among farmers especially yam farm households, making it very difficult to effectively set and implement sustainable anti-poverty programmes. Hence, the objective of this study was to empirically determine factors that influence households' exit from poverty as a guide for policy intervention in the increase in yam production among yam producers.

Methodology
The Study Area
The Southeastern Nigeria where this study was conducted lies between latitudes 4° and 7°N and longitudes 6° and 9°E and has a total of 109.52 million hectares of land (NPC, 2006). The Zone has a population of over 16 million people (NPC, 2006). It is made up of five states viz: Abia, Anambra, Ebonyi, Enugu and Imo States from which three States were randomly drawn and studied. About 60-70% of the inhabitants engage in agriculture, mainly crop farming and animal rearing (Nwachukwu, 2009). It is climatically characterized by two successive distinct seasons, the

dry season (November-February) and the rainy season (March-October). The study area is a rain fed agricultural area characterized by a bimodal rainfall pattern with peaks in July and September, respectively (Onyenweaku, 1994; Tanko and Oparah, 2006). The Zone is prone to gully erosion due to the soil structure (Ajero and Ibeawuchi, 2007).

Sampling Design
The study covered a total sample of 300 household heads randomly drawn from yam farm households using multi-stage random sampling technique. The data were collected in 2008 and 2009. Based on the annual yam production of 2.96 metric tonnes obtained in Enugu State, 0.97 metric tonnes in Ebonyi State, 0.94 metric tonnes in Anambra State, 0.77 metric tonnes in Imo State and 0.56 metric in Abia State, Abia State was dropped on the grounds of low yam production. This information was obtained from the report by (National Agricultural Extension, Research, Liaison Service (NAERLS) and National Food Reserve Agency (NFRA), 2009). Southeastern Nigeria was stratified into four major yam producing States namely Anambra, Ebonyi, Enugu and Imo based on the above annual yam production in each state. In the second stage, three States were selected by simple random sampling (SRS) procedure. The States chosen were Anambra, Ebonyi and Imo States. The third stage involved the stratification of the three States based on agricultural Zones delineation on each of the selected States namely; Anambra State (Anambra, Onitsha and Awka), Ebonyi State (Ebonyi Central, Ebonyi North and Ebonyi South) and Imo State (Okigwe, Orlu and Owerri). In the fourth stage, two Zones were selected from the agricultural Zones delineation in each State by SRS procedure namely; Anambra State (Anambra and Awka), Ebonyi State (Ebonyi Central and Ebonyi South) and Imo State (Okigwe and Owerri). In the fifth stage, the blocks in each selected Zone were delineated and the list formed the frame from which a sample of two blocks was selected per zone by SRS procedure. In all, a total of 12 blocks were selected, 4 blocks per State namely; Anambra State (Igbariam, Nteje and Urum, Mgbakwu), Ebonyi State (Ezza I, Ikwo II, Ohaozara II, Onicha I) and Imo State (Uboma II, Mbaa, Itu I and Afor Oru II). The Zonal Managers and Block Extension Officers of each selected states' Agricultural Development Programme (ADP) in charge of the selected Zones and blocks were contacted to provide the list of yam producing households. This formed the frame from which samples of 25 yam producing households were chosen per block by SRS

procedure. In the last stage, the sampling unit was yam producing household heads in the frames which was purposively chosen from each yam producing household. Thus, a total of three hundred (300) yam producing household heads were selected for detailed study.

Variables and Hypothesized Effects
Personal interviews were conducted on each of the yam producing households using a semi-structured questionnaire with questions ranging from household specific characteristics such as age, gender, education, household size, income levels and asset endowments. Farm specific questions addressed issues such as livestock ownership, farm size and related production activities, while market factors included access to credit market. The dependent variable was a poverty index which was the ratio of the household's income or expenditure short falls to the poverty line where poverty index is defined as the proportion of the short falls of individual expenditure from poverty line required to maintain a healthy living. Thus, factors that negatively influence the dependent variable are those that reduce poverty, while those with positive effects increase prevalence of poverty. The explanatory variables with their hypothesized effects on poverty were presented as follows;

Educational level of head and participation in agricultural workshops was theoretically expected to have negative relationships with poverty. Access to education as well as exposure to agricultural workshops was hypothesized to reduce poverty, implying that the more educated the decision maker the better skilled and productive he or she is and consequently the less poor the household, and also the more he participate in yam production.

Membership of farmers' group is also expected to have negative relationship with poverty. Farmers who belong to cooperative group are better-off than their colleagues who are not members in attracting benefits such as credit to increase yam production. Years in yam farming experience is expected to have negative relationships with poverty. Years of farming experience will lead to a reduction in the likelihood of being poor and increase yam production as well as income.

Livestock asset is expected to have negative relationship with poverty. Livestock asset provide additional income to the farmers. There is the likelihood to lead to reduce poverty. Farm size is expected to have negative relationship with poverty. Large farm size tends to improve income

leading to reduction in household poverty and also lead to increase in yam production.

Household dependency ratio (i.e number of children below the age of 15 years and those above 59) is expected to have positive relationship with poverty. High dependency ratio is expected to lead to increase poverty which may lead to decrease in yam production as a result large mouth to care for.

Access to credit is expected to have negative relationship with poverty. This variable is also theoretically expected to reduce poverty through cash investment in productive activities and also in smoothing consumption and enhance increase in yam production.

Analytical Method
The statistical tools used to realized the objective of this study were tables percentage, mean poverty ratios and linear multiple regression analysis. Descriptive statistical tools such as tables, means and percentages were used to analyse the poverty line. However, the analysis used household expenditure as a proxy to income as income was very difficult to obtain. This measure was specified as:

$$Z = 2/3 \, Y^* \qquad \ldots \qquad \mathbf{1}$$

Where,
Z = Poverty line measured in Naira. This was defined as the minimum level of consumption required and individuals or households falling below the threshold were considered poor. This was used to establish the poor and non-poor yam farm households relative to derivation of the poverty index used in equation 2. Y^* = Mean of per capita household expenditure, measured in Naira and derived as the average of per capita household expenditure following Osinubi (2003), Sengul and Tuncer (2005), NBS (2006) and Amao and Awoyemi (2009). Linear multiple regression analysis was used to estimate the determinants of rural poverty following Olubanjo *et al.,* (2007). The implicit functional form was specified as:

$$PI = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, ei) \ldots \quad \mathbf{2}$$

Where,
PI = Poverty index measured by the ratio of the household's income or expenditure to the poverty line where poverty index is defined as the proportion of the short falls of individual expenditure from food poverty line required to maintain a healthy living (Olubanjo *et al.,* 2007).

X_1 = Education of head, indicating the formal education received by head and measured as years of schooling.

X_2 = Membership of farmer's group (years). This is defined as the number of years the farm household head has been in the group.

X_3= Experience in yam production, measured by the number of years the yam producer has been in the business of yam production.

X_4 = Livestock assets (₦). This described the total monetary value of all the livestock owned by yam farm household (Owuor *et al.*, 2007).

X_5=Farm size (ha). This is measured by the total area of land the yam farm household has brought under yam and other arable crop production.

X_6 = Participation in agricultural workshop. This is defined as the number of times the yam farm household has participated in agricultural workshop (Sabir *et al.*, 2006).

X_7 = Household dependency ratio. The dependency ratio relates to the number of children (1-14 years old) and older persons (60 years and above) to the working-age population (15-59 years old) (United Nation, 2006).

X_8 = Access to micro-credit (₦), measured by the total amount the yam farm household obtained from the lender for the year. e_i = independently distributed error term. The variables were estimated using the computer software program- Stata 8.2.

Results and Discussion
Estimated Poverty Line
Table 1 depicts the estimated poverty lines based on per day among the yam farm households. Results showed that the mean annual household food expenditure among the yam farm households was ₦342, 011.76 while the poverty line was ₦678.59 ($4.52) per person per day.

Table 1: Estimated Poverty Line

Food Poverty lines		Per Day
Poverty line (Poor Yam farm households)	_	₦678.59 ($4.52)
Mean Household Food Expenditures	₦342,011.76 ($2,280.08)	-
Mean Household size	6 persons	₦113.10 ($0.75)

Source: Computed from Field Survey Data, 2009.
Note. The Dollars equivalents are given in the parenthesis. The exchange rate was ₦150 per US Dollar in 2009.

This implies that the poor yam farm household heads were living on $4.52 (₦678.59) person per day. This could be too low to meet the daily needs of the entire yam farm household heads. Considering the mean household size of 6 persons per household, this amount ₦113.10 ($0.75) was lower than the international poverty threshold of $1.25 per person per day for people living in sub-Saharan Africa and Asian countries as viewed by Ravallion *et al.,* (2009). The results tend to suggest problems of food insecurity among poor yam farm households. In other words this amount may not be able to meet the minimum daily calorie in-take of 2250 Kcal required per person per day.

Estimated Determinants of Poverty
These variables were divided into two general areas; the characteristics associated with the income generating potential of yam farm households and the characteristics associated with the geographic nature in which they live (Sabir *et al.,* 2006). The results of linear multiple regression analysis on the determinants of yam farm households' poverty level are presented in Table 2. The goodness of fit (R^2 value) indicates that only 35% of the variation in the poverty index was explained by the independent variables. The low R^2

value obtained is comparable to the R^2 value of about 0.24 reported by Olubanjo *et al.*, (2007).

The coefficients of level of education of the household head (X_1), membership of farmers' group (X_2), yam production experience (X_3), participation in agricultural workshop (X_5) and household dependency ratio (X_7) were all significantly different from zero. This implies that these variables were the important factors influencing yam farm households' poverty level. In contrast, the coefficients for livestock assets, farm size and credit were all not significantly different from zero, implying absence of any relationship between rural poverty and these variables.

A significant negative relationship was detected between level of education of the household head (X_1) and poverty level. This lends credence to the *apriori* expectation and some author's finding such as Nwaru (2004), Sengul and Tuncer (2005), Elijah and Ogunlade (2006) and Owuor *et al.*, (2007) that as the level of education of the household head increases, poverty level decreases. Education enhances the ability to derive, decode and evaluate useful information as well as improves the quality of labour as viewed by Onyenweaku (1991). This

was also to be expected because household heads with higher education tended to have the capability of profitably combining various enterprises to improve on their income as viewed by Owuor *et al.,* (2007) and Olubanjo *et al.,* (2007).

Table 2: Determinants of Poverty in South Eastern Nigeria

Variables	Coefficients	t-value
Education of Head (X_1)	-7.69e-03	-2.34**
Membership of Farmers' group (X_2)	-0.0483	-1.76*
Yam production experience (X_3)	-3.92e-03	-3.33***
Livestock assets (X_4)	-1.19e-07	-0.01
Farm size (X_5)	-1.71e-06	-0.79
Participation in agricultural workshop (X_6)	-0.0564	-2.07**
Household dependency ratio (X_7)	0.0218	3.33***
Credit (X_8)	-6.17e-06	-0.73
Intercept	1.0487	16.73***
Number of observation (N)	300	
R^2	0.347	
F- value	4.75***	

Source: Computed from Field Survey Data, 2009.

Note. * = Significant at 10 percent ** = Significant at 5 percent *** = Significant at 1percent

The coefficient of membership of farmers' group (X_2) is negative and significant at 10 percent. This also lends credence to the *apriori* expectation because membership of farmer's groups has many advantages in terms of reduction of risk and uncertainty because of improved access to information and to cheaper sources of credit and other important inputs needed in the production process as viewed by Onyenweaku (1991). Therefore, it could be said that the prevalence of poverty is higher among farm household heads who do not belong to any farmers' group as viewed by Babatunde *et al.,* (2008).

The coefficient of yam production experience of the household head (X_3) showed negative relationship with poverty level. The result also lends credence to the *apriori* expectation. This means that as the farming experience in yam production increases, poverty level decreases. This tends to be true because many years in farming are associated with better management and higher expected output. Olubanjo *et al.,* (2007), Owuor *et al.,* (2007) and Yusuf *et al.,* (2008) viewed farmers with long years of experience in crop farming to have acquired better understanding on how to handle changing climatic, pest and disease variations with consequential high productivity. In other words, farmers with long years of experience could be better crop and livestock managers. Although, this result is contrary to Onyenweaku (1991) and Etim and Edet's (2007) finding that as farming experiences increase, the age of the household head also increases. Thus, because of drudgery in farm operation, the energy available for work decreases with increase in experience.

This could lead to reduction in cultivable lands with reduction in income and increase in poverty as viewed by Etim and Edet (2007).

The coefficient of participation in agricultural workshop by the household head (X_6) showed negative relationship with poverty level and this result agrees with our *apriori* expectation. Regular participation in agricultural workshop tends to provide farmers with reliable information on a wide range of agricultural technologies. The frequency of participation in agricultural workshop is very crucial as it leads and guides the farmers on new farm practices and their uses. Owuor *et al.,* (2007) reported that frequent participation in agricultural workshop enhances farmer's ability to produce more and diversify into new enterprises. In other words, poor funding to State Agricultural Development Programme (ADP) can lead to lack of agricultural workshops as viewed by NAERLS and NFRA (2009). Organised agricultural workshops enables farm households to be better informed with improved agricultural techniques so as to improve on their income level. Thus, regular participation in agricultural workshops tends to enhance income level.

The coefficient of household dependency ratio (X_7) showed positive relationship with poverty level. This result also lends credence to the *apriori* expectation. This means that an increase in the number of dependents will raise the poverty level. In other words, it is an indication that the larger the household dependency ratio of yam producers, the more likely that the household would be poor. Sabir *et al.,* (2006) viewed farm households with

large dependents as gate way to poverty due to high costs of maintenance. Findings are also synonymous with Etim and Edet (2007) that most dependents particularly children, contribute less to family income. Though, large household sizes could be an incentive to those households above the poverty line in terms of farm labour supply as viewed by (White and Killick, 2001). However, poor farm households with large family members will likely have poor welfare due to limited resources as viewed by Babatunde *et al.,* (2008).

Conclusion

The poverty line of ₦678.59 obtained was a reflection of limited resources among the poor yam farm households. The results tend to suggest problems of food insecurity among poor yam farm households. If yam farm households are to improve on yam production, then there is the need to provide them with adequate compensation scheme. This can be done through provision of credit facilities. This will encourage them to produce more irrespective of the cost of production and increase in income. Finally, the determinants of rural poverty among yam farm households were level of education of the head, membership of farmers' group, yam production experience of the head, participation in agricultural workshop and household dependency ratio. The result of the determinants of poverty serves as pointers for policy interventions. Therefore**,** the rural yam producers need to be targeted with periodic training on improved yam technologies such would enhance increase in yam production and related products especially for the less educated ones. There is need for regular sensitization and increased mobilisation of the rural yam farmers to form farmers' cooperative group especially for those who do not belong to any group because of it immense benefits. Agricultural Development Programmes (ADPs) should be supported financially for intensive participation of rural poor yam farmers in agricultural technologies training to improve on their welfare status. New technologies can be accepted through persuasion. One way to achieve that could be through well organized workshops. There is also need to control large households in Nigeria as it leads to increase in poor welfare by way of introduction of birth control measures. This action had been successfully used in some countries especially China to reduce large households with some attracting incentives. Hence, birth control programmes could ensure that yam farmers have manageable family sizes so as enhance their welfare.

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