ASSESSMENT OF POVERTY STATUS AMONG COCOA FARMERS IN OSUN STATE OF NIGERIA

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ABSTRACT

There has been an increase in the level of poverty in Nigeria over the past years and the people living in rural areas who are mostly engaged in agriculture are more affected. This study examined poverty status of cocoa farming households in Osun State, Southwest Nigeria as well as examined some of the farm and farmer characteristics that affect poverty among the farmers. Data were collected from 1200 cocoa farming households in four cocoa growing Local Government Areas of the state in 2009. The data were analysed using the FGT poverty indices and logistics regression. The international poverty line and double the national minimum wage in Nigeria were used as poverty thresholds for determining poverty status. FGT results show that 82% of the cocoa farmers were living below the international poverty line while 44% of them were earning less than the national minimum wage. Logistic regression results show that the number of complimentary crops cultivated by the farmers increased the log likelihood of being poor while literacy status and family size reduced it. With the current level of poverty in the cocoa economy, it may be difficult to attract young people with alternative sources of employment into cocoa farming. Increasing literacy level among cocoa farmers, specialisation in a few complimentary of crops and the introduction of labour saving technologies that will reduce the extent of dependence on family labour will help to reduce poverty among cocoa farmers.

Key words: Cocoa farmers, Socio-economics, Poverty status, Logistic regression, Nigeria

INTRODUCTION

Cocoa (Theobroma cacao) is the principal source of income for millions of farm workers in the cocoa producing states of Nigeria. It is a source of employment generation, a significant contributor to social infrastructural development, a source of raw materials for Agro-Industries (Salami, 2000), a foreign exchange earner and a source of revenue to cocoa producing states in particular and Nigeria in general (Folayan, 2005). Nigeria accounts for about 6 percent of the world cocoa production and it is the fifth largest cocoa producer (ICCO, 2008). The quantity of cocoa beans exported from Nigeria between 1976/77 and 2002/2003

was an average of 166,813 tonnes annually (Folayan, 2005). For the year 2007, cocoa beans export was 174,900 tonnes. At an average price of US$ 1,630 per tonne, the value of the cocoa export in 2008 was US$ 285.1 million (FAOSTAT, 2010).

Cocoa Farmers in Nigeria were considered more well-off in the 1960s than they did in the 1990s. The fortunes of cocoa farming and farmers have declined as a result of the general decline in the socio-economic conditions in the country (Onyeiwu et.al., 2009). There has been an increase in the level of poverty in Nigeria over the past 25 years; 28.1% in 1980 and 54.4% in 2008 (NPC, 2004; NBS, 2008).

The reduction in the proportion of people whose income is less than a US$ 1.00 day by halve between 1990 and 2015 is one of the targets set as the millennium development goals. To monitor the progress towards the achievement of this target, there is a need to measure the level of poverty in the nation as well as know the causes of poverty in the different segments of the society. This paper uses the Foster, Greer and Thorbecke (FGT) indices to assess the poverty status among cocoa farmers in Osun State, Nigeria. It also examines some of the farm and farmer characteristics that affect poverty among the farmers.

CONCEPTUAL FRAMEWORK

The Nigerian cocoa farmers are mostly small-scale farmers who grow cocoa as a cash crop and some arable crops for household consumption. The farmers sometimes offer the small excess of arable crops to the market for additional cash income. The cocoa farm is a long-term asset and over 60% of cocoa farmers' cash income is derived from cocoa. If the term of trade turns against cocoa farming, the farmer finds it difficult to cut down his cocoa trees and switch to another crop in the short run because of the hope that the price may improve in subsequent years (Olayemi and Oni, 1972).

In absolute Naira terms, producer price of cocoa has increased significantly since the abolition of the Cocoa Board and the devaluation of the Naira in 1986 (Folayan, 2005). In relative terms, the price of cocoa has fallen significantly since the collapse of the cocoa agreements and the decline in international cocoa prices (Konnig & Jongeneel, 2006). The devaluation of the Naira must have masked the decline in cocoa farmers' real incomes. Post devaluation, Nigerian cocoa farmers have experienced a deterioration in their welfare status (Onyeiwu et.al., 2009).

Determination of poverty line

The International Poverty Line (IPL) set by the World Bank has been used as the standard for assessing poverty. The IPL combined with household survey of income or consumption has been used in determining and comparing the level of poverty across countries. Measures of poverty based on the IPL and a number of others are used to give a picture of the extent of poverty at national level and are often aggregated internationally (Maxwell, 1999). Over the last few years, there have been some critics of the use of the World Bank standard of one US Dollar per day for absolute poverty and two US Dollar per day for moderate poverty. It has been argued that an appropriate measure of poverty should reflect the most basic requirements of human beings and have the same meaning everywhere and at every point in time; and that the use of the IPL as done by the World Bank does not meet these criteria (Pogge & Sanjay, 2003). In some instances, arbitrary cut-off point such as one half of the median income is used as the poverty line (Lanjouw, 2001; Chen & Ravallion, 2004). It has also been argued that considerations should be given to other measures of poverty such as deprivations in health, educational attainment and enjoyment of citizenship rights, life expectancy at birth but that these measures cannot easily be meaningfully combined with income to derive a single indicator (Srinivasan, 2001). Kakwani (2007) demonstrated that it is also possible to

construct international poverty threshold based on the food requirements to ensure adequate calorie intake for the world's poorest using the caloric norms developed by the Food and Agriculture Organization (FAO).

Overall, it could be said that poverty is a complex issue that defiles a specific definition. Various studies (Rozelle et al., 1997; Okunmadewa, 1999; Aigbokhan, 2000) have shown that the common practice is to view poverty either in absolute or in relative term depending on how it is being measured. Poverty is more easily recognized than defined (Aboyade, 1975). Poverty is viewed in absolute terms when there is low calorie intake, or poor housing condition, or inadequate health facilities, and poor quality of educational facilities, low life expectancy, high infant mortality, low income, unemployment and under-employment (Ravallion, 1998; Oladunni, 1999). Also absolute poverty can be related to condition of life degraded by diseases, illiteracy, malnutrition, deprivation and squalor (Ravallion and Datt, 2002). Relative poverty exists when the household has a per capita income of less than one-third of the average per capita income that exists in that domain or country (Oladunni, 1999). For this study, two poverty thresholds were set, namely; the World Bank IPL and double the current national minimum wage of N7,500 per month for the purpose of comparative analysis. The assumption here is that a couple have the opportunity to either work on the farm or seek paid employment and earn, at least, the minimum wage. This is the justification for using twice the minimum wage as the poverty line.

The assessment of poverty can proceed through the use of incomes or consumption expenditure surveys. Generally, it is believed that respondents in income surveys tend to under-estimate incomes, hence the preference for the use of consumption expenditure (Meyer & Sullivan, 2003). In a society with low literacy

level, the information provided on either incomes or expenditures will be through memory recall and is largely unreliable. Thus whenever it is possible to verify information on incomes, the use of incomes, which largely determines expenditure, should be preferable. The cocoa farmers covered in this study dispose off their cocoa through their cooperative societies hence there is fairly reliable source of information on income from cocoa which account for the bulk of their incomes. For this study therefore, the assessment of poverty was carried out via incomes estimated from farm output and farm gate price data.

METHODOLOGY

Area of study
This study was carried out in Osun State, Nigeria. Osun State is located approximately between longitude 3o 56'and 5o 47' East and between latitude 7o 11' and 8o 21' North. The State has 15 Local Government Areas (LGAs) and is one of the major cocoa producing states in Nigeria. The study covered four of the LGAs in the state. These are Atakumosa West, Ife East, Ife North and Ife South which are the major cocoa growing LGAs in the state. Osun State is the second highest producer of cocoa in Southwest Nigeria. The livelihood of most of the tree crop farmers in the cocoa growing areas of the state is dependent on cocoa revenues which accounts for about 68% of total revenues (Gockwoski and Oduwole, 2001).

Sampling procedure and method of data collection
The study used multistage sampling technique. In the first stage, the four LGAs that are major producers of cocoa were purposively selected. A total of 47 primary cocoa cooperative marketing societies were selected randomly across the local government areas from a list of cooperative societies obtained from Osun State Department of Cooperatives and all cocoa farmer members of the selected primary societies were targeted for questionnaire

administration. A total 1202 cocoa farmers were covered by the survey. The information requested in the questionnaire include name of village, local government area, name of farmer, sex, family size, age of farmer, cocoa and other crops production data, literacy, among others. The data collected were for 2008 production season. The questionnaire was administered in 2009.

Analytical Framework
Measures of poverty

There are a number of poverty measures. These include the headcount index, the Sen-Shorrocks-Thon index and FGT index. The FGT index has the advantage of measuring Headcount, Poverty Gap, Squared Poverty Gap or Severity indices within the same analytical framework. These poverty measures are discussed as follows:

Headcount Index

The index measures the incidence of poverty. It is the proportion of the population whose standard of living is less than the poverty line to the total number of individuals or households (World Bank, 1990). This could be represented as:

$$\dots\dots\dots\dots (equation\ 1)$$

Where N = total population
$I(.)$ = an indicator function that takes on a value of 1 (poor); if ($y_i < z$) is true, and otherwise, 0 (non-poor)
y_i = income or expenditure
z = poverty line.
N_p = number of individuals living below the poverty line
P_o = headcount index

It is however important to note that the headcount cannot account for the intensity of poverty. In other words, it cannot capture the extent to which individual income (or expenditure) falls below the poverty line.

The Sen-Shorrocks-Thon index

This is a modification of the Sen index and it takes into account the distribution of income among the poor. It is the product of the headcount index, the poverty gap index (applied to the poor only), and a term with the Gini coefficient of the poverty gap ratios (i.e. of the Gn's) (Haugton and Khandker, 2009). This index can be expressed as:

$$\dots\dots\dots\dots (equation\ 2)$$

Where Po = headcount index; $P1P$ = poverty gap index; and GP is the Gini coefficient of the poverty gap ratios.

The Foster, Greer and Thorbecke (FGT) indices

According to (Aigbokhan, 2000, Haugton and Khandker, 2009) the FGT can be expressed as

$$P_\alpha = \sum \left(\frac{z - Y_i}{z} \right)^\alpha \quad\dots\dots\dots\dots (equation\ 3)$$

Where: n = the sample size, q = number of households with income below poverty line, z = poverty line (to be determined based on pre-specified criteria), Y_i = the income of the ith poor household, and α = parameters of the FGT index; which can take three values namely; 0, 1 or 2. This implies that poverty measures can be calculated based on the three values of α. When α is equal to 0, the FGT yields the incidence of poverty or the Head Count Index as.

$$P_0 = \frac{q}{N} \quad\dots\dots\dots\dots (equation\ 4)$$

When α is equal to 1, the FGT yields the poverty gap in the sampled households as:

$$P_1 = \sum \left(\frac{z - Y_i}{z} \right) \quad\dots\dots\dots\dots (equation\ 5)$$

The poverty gap reflects the intensity of poverty since it measures the total amount of income required to remove the poverty. It however does not take cognizance of the number of people who are below the poverty line.

When α is equal to 2, the FGT measures the severity of poverty gap. It gives more weights to the poorest of the households. It is calculated as:

$$P_2 = -\sum \frac{z \quad \overline{Yi}}{z} \quad \text{.................(equation 6)}$$

In this study, the FGT is calculated for each of the three states of α. This index has been widely used to explore the levels of poverty (Aigbokhan, 2000, Haugton and Khandker, 2009)

Determinants of Poverty
Generally it is understood that some of the factors that can cause poverty could also be the result of poverty; meaning that the causality in the relationship could be in either direction.(Sabir, et.al., 2006, World Bank Institute, 2005) The peculiar characteristic of a geographic location may contribute to poverty among the people living there while the poverty of the people living in a location may contribute to the peculiar characteristic of the location. One of such characteristics is the available socio-economic infrastructure. Similarly, poverty can be the cause of a large household while a large household can cause poverty.

To determine the correlates of poverty in this study, the binary logistic model was used. This is in line with Sabir, et.al., (2006) and Yusuf et.al. (2008). Mathematically, the model is specified as:

$$Pi = P(Yi = 1) = F(x, \beta) \quad \text{.................(equation 7)}$$

Where: P = probability estimate; F = distribution function; x = vector of explanatory variable and β = set of parameters to be estimated which reflect the effect of the changes in x on the probability.

The response variable in this model is binary. It takes values of one if the household is poor and zero otherwise. Following Greene (2003) and assuming that the cumulative distribution was logistic, a logistic model was employed. The

probability of being poor was estimated by using the logistic probability model given as:
$$\text{Prob}(Yi = 1) = \frac{\exp(X'i\beta)}{1 + \exp(X'i\beta)} \quad \text{........(equation 8)}$$

Where: Prob (Yi = 1) = the probability that farming household falls below the poverty line; X'i = vector of explanatory variable and β = set of parameters to be estimated which reflect the effect of the changes in X'i on the probability.

For this study, the definition and description of the variables included in the model are:

Poverty status: This is the dependent variable and is defined as a binary variable which takes the value of one if household income is below the poverty line and zero if otherwise. The values of this variable are determined by those of the independent variables.

The independent variables are:
LGA: This variable identifies the geo-political location of the farming household. There are four different LGAs covered by the study.
Sex: This variable identifies the gender of the household head. There are female and male-headed households in the sample, measured as a dummy (male, 1; female 0).
Family size: This variable captures the number of people in the household.
Age: The variable captures the age of the household head in years.
Literacy: This is a binary variable which takes the value of 1 if household head is literate and 0 if otherwise.
Number of complementary crops: This variable captures the number of other crops cultivated by the household.

The geo-political location of the farming household is expected to impact on income and hence poverty level via variations in the productivity of the soil and other climatic factors which affect cocoa yield (Agboola, 1979) as well as through infrastructure which affects farmgate prices (Cook, 2005, Sabir et.

al., 2006). Generally, locations that have poor road connection and are far from the cities, the farmgate prices are usually lower while inputs costs are higher. For this study, the expectation is that the soil and climatic conditions will be fairly the same across the LGAs but the status of the road network to the farm locations may be different. Thus a positive relationship is hypothesized.

Some of the cultural operations in cocoa production such as pruning of chupons, spraying and slashing are better performed by men because they are strenuous. Women cocoa farmers may therefore be less capable of performing these operations Also, past studies have shown that poverty is more prevalent in female-headed households (Vecchio and Roy, 1998). A positive relationship is therefore hypothesized for the variable sex in this study.

Literacy and level of education aids adoption of improved farming techniques (Afolabi, 1987; Okunade, 2006) which in turn leads to better yields and higher farm income. Also, literacy and the level of education have been shown to be negatively correlated with poverty (Oxaal, 1997). The a priori expectation therefore is that there will be a negative relationship between the literacy variable and poverty in this study.

Members of the family serve as labour in cocoa production thus facilitating timely execution of cultural operations that will ensure good yield and increased income (Amos, 2007; Oluyole and Sanusi, 2009). To this extent, one expects negative relationship between family size and the log livelihood of being poor. On the other, some studies (Yusuf et. al., 2008; Virola and Martinez, 2007; Akande et.al. 2009; Aigbokhan, 2008) have found positive relationship between family size and poverty. For this study, there is no compelling justification to expect either a positive or negative justification a priori.

Some studies (Ali et. al. 2002; Yusuf et. al.,

2008) have found positive relationship between farmers' age and poverty. For this study, a positive relationship between age and poverty is also expected a priori because some of the critical cultural operations of cocoa farming such as pruning, slashing and spraying cannot be easily carried out by old farmers.

The cultivation of complementary crops along with cocoa could be regarded as a risk mitigating strategy by cocoa farmers such that if cocoa fails the farmer can obtain income from other sources and this is more important to the poorer farmers (Hussein and Nelson, 1998; Schreckenberg et. al., 2006). For this study, it is expected that poorer farmers will diversify into several other crops, thus a positive relationship is hypothesized between the number of complementary crops and poverty.

RESULTS AND DISCUSSION
Socio-economic characteristics of the cocoa farming households in Osun state, Nigeria
The socio-economic characteristics of the sampled cocoa producing households are presented in Table 1. About 93% of the household heads were male with a mean age of 58 years, while mean family size was 9. One of the major problems being faced by the cocoa economy in Southwest Nigeria is that of ageing cocoa farmers. For instance, over 65% of the cocoa farmers in two of the cocoa producing states of Ekiti and Ondo were found to be above 50 years old (Folayan, 2005). However, there is a growing need to make cocoa farming attractive to the younger labour force for the economy to be renewed; hence, cocoa production must be able to offer incomes comparable to what is obtainable in other sectors of the economy. The mean annual cocoa produced per household was 729 kg. At a producer price of about N350.000 per tonne obtainable at the time of the survey, this translates into a mean annual gross revenue of N255,150. This revenue figure gives an indication of the level of income the farmers were deriving from cocoa annually. The households also cultivated other tree and food crops such as oil palm, orange, kolanut, plantain/banana, cassava, maize and yam (Table 1).

Table 1: Socio-economic characteristics of respondents

Item	Value
Mean family size	9
Percentage of female headed households (%)	7.6
Mean age of household heads (years)	58
Literacy level of household heads (%)	67.1
Mean annual cocoa produced per household (kg)	729
Percentage cultivating other crops	
Oil palm	47.2
Orange	13.7
Kolanut	38.3
Plantain/banana	8.7
Cassava	46.7
Maize	32.6
Yam	8.0
Other crops	6.9

Source: Author's calculations, 2010

Poverty Status of the cocoa farmers

The indices of poverty of cocoa producing households in Osun State Nigeria are presented in Table 2.

Table 2: Poverty Indices of Cocoa Producing Households in Osun State, Nigeria

Poverty Indices	Poverty Line	
	International Poverty Line (US$1.00)	National Poverty Line (Twice Minimum Wage)
Head Count	0.82	0.44
Poverty gap	0.52	0.17
Severity of poverty	0.37	0.09

Source: Author's calculations, 2010

There are variations in the poverty indices depending on the setting of the poverty line. The headcount was 0.82 for the international poverty line and 0.44 for twice the national minimum wage. The headcount based on the international poverty line indicates that 82% of the cocoa farming households were living below the poverty line given the World Bank Standard of US$1.00 per capita. On the other hand, the headcount based on the minimum wage shows that 44% of the cocoa farming households were earning less than what a couple would have earned if they both had taken up paid employment. This shows that poverty is more prevalent among the cocoa farmers based on the international standard compared with the use of the national minimum wage.

Determinants of Poverty among the cocoa farmers

The results of the logistic regression of the poverty status based on the international poverty line are presented in Table 3. The result shows that, all the regressors jointly have significant impact on the poverty status of the cocoa farmers as indicated by the likelihood ratio statistic of about 212.

Table 3: Logistic Estimates of Poverty Determinants among Cocoa Producing Households in Osun State, Nigeria

Variable	Coefficient (B)	Standard Error	Z statistic	(Exp(B)-1)*100
Local Government Area	-0.109	0.082	1.329	-10.3
Sex	-0.127	0.309	0.411	-11.9
Family size	-0.38	0.036	10.556*	-31.6
Age	0.011	0.007	1.571	1.1
Literacy status	-0.37	0.185	2.000**	-31
Number of crops	0.697	0.082	8.500*	100.8
Constant	0.372	0.617	0.603	

* = Significant at 1%, **= Significant at 5%, Likelihood Ratio = 211.976,
Source: Author's calculations, 2010

Only family size, literacy status and the number of crops have significant influence on the log likelihood of beir poor. Other variables have no significant influence on the log likelihood of being poor as indicated by the Z tests. While number of complimentary crops increases the log likelihood of being poor, literacy status and family size reduce the likelihood of being poor. The negative coefficient of the literacy status is in line with a priori expectation. Generally it is expected that literacy will facilitate the comprehension of research results through extension messages and hence promote better management of the farms.

Available literatures have shown that family size could either reduce or increase the log likelihood of being poor. The outcome of this study which indicates that family size reduces the log likelihood of being poor is agreement with Amos (2007) and Oluyole and Sanusi (2009). The positive relationship between the number of complementary crops and poverty status may be a reflection of the poverty mitigating strategy of the poor small scale cocoa farmers who grow a number of other crops as a means of ensuring household food security. This is line with the findings of Hussein and Nelson (1998). The non-significance of age and sex in this study is contrary to a priori expectation. Ali et. al. (2002) and Yusuf et. al. (2008) found significant positive relationship

between age and poverty while Vecchio and Roy (1998) also support a positive relationship is between sex and poverty.

The log likelihood of becoming poor due to one unit change in the value of the regressors is presented in the last column of Table 3. A unit increase in family size will lead to about 31.6 percent reduction in the log likelihood of being poor while the acquisition of literacy capability by farmers will lead to about 31 percent reduction in their log likelihood of being poor. On the other hand, a unit increase in the number of complementary crops being cultivated by farmers will lead to about 100.8 percent increase in their log likelihood of being poor.

CONCLUSION

This study assessed the poverty status among cocoa farmers in Osun State, Nigeria as well as examined some of the farm and farmer characteristics that affect poverty among the farmers. The paper established that there is a significant level of poverty among cocoa farmers. At the present level of poverty in the cocoa economy, cocoa may find it difficult to attract young people who could secure alternative employments that can at least pay the national minimum wage.

Illiteracy may aggravate poverty among cocoa farmers. While large family size may reduce poverty among them by serving as a source of labour. Over time, however, research should develop labour-saving and cheaper technologies for handling operations such as slashing, pruning, spraying and harvesting that will reduce the labour requirements for various operations on the cocoa farm. This will enable farmers to operate larger cocoa farms without having to maintain large families or be dependent on hired labour. Farmers will hence be able to specialise on cocoa and a few complimentary crops rather than cultivate several other crops which seems to increase the log likelihood of poverty among cocoa farmers in the state.

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