

Income distribution pattern among cocoa farmers in Abia State, Nigeria: The Lorenze curve and mean per capita household expenditure approach

Ifeanyi Moses KANU^{1*}

Chukwukere Austin OKEZIE¹

¹Department of Agricultural Economics, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria

*Correspondence author e-mail: ifym.skolarz@gmail.com

Abstract

The project probed the pattern of income distribution and poverty status among Cocoa farmers in Abia State, Nigeria using Lorenze curve and the mean per capita household expenditure (MPCHE) approach. Graph of the Lorenze curve and calculation of the Gini coefficient from the MPCHE of the Cocoa farmers shows that income was unequally distributed among the Cocoa farmers in Abia State; hence, there was an increasing gap between the poor and the rich Cocoa farmers in the study area. The Pearson correlation analysis between income and poverty of the Cocoa farmers was positive, with a correlation coefficient of 0.676; implying that a one-unit decrease in income inequality will result in a 67.6% decrease in poverty level. Since there was a high level of income inequality among the Cocoa farmers, the bottom 20% of the poor farmers should be encouraged to form cooperatives in order to access credit facilities from the government and other institutions. The government should also provide subsidies and grants to the bottom poor farmers to boost their production causing decreased income inequality and poverty level.

Key words: Income distribution, Poverty status, Pearson correlation coefficient, Gini coefficient, Cocoa farmers

INTRODUCTION

Income distribution patterns over the years has been a major concern in the determination of the level of economic growth and development of any country; as high level of income inequality produces an unfavourable environment for economic growth and development (Agwu and Oteh, 2014). In order to reduce poverty, income inequality and food insecurity in developing nations; it is fundamental that economic policies should aim at promoting rapid agricultural growth (Bradshaw, 2006). For growth to have some meaningful impact on poverty, that growth must occur in sectors in which large proportion of the poor derive their livelihood. Growth in incomes of the poor is strongly positively correlated with overall growth of the economy especially growth in the agricultural sector (Hoekman *et al.*, 2001).

Agriculture is the most important sector in the Nigerian economy given its contributions, over the past several decades, to employment, foreign exchange, food supply, poverty reduction and its linkages with other sectors of the economy (Udah *et al.*, 2015). Agriculture is recognized as a fundamental instrument for stemming and reversing the worsening poverty, income inequality and food insecurity challenges in Nigeria. Increasing agricultural productivity can increase food availability and access; as well as rural incomes (Iheke and Nwaru, 2013). Despite years of commitments in agricultural research and development with evidence of achievements; income inequality, hunger and poverty continue to confront a greater percentage of the Nigeria population (Damisa *et al.*, 2011).

Cite this article as:

Kanu I.M. and Okezie C.A. 2021. Income distribution pattern among cocoa farmers in Abia State, Nigeria: The Lorenze curve and mean per capita household expenditure approach. *Int. J. Agric. For. Life Sci.*, 5(1): 21-28.

ORCID and Mail:

¹I.M. Kanu: 0000-0002-5766-193X (ifym.skolarz@gmail.com)

¹C.A. Okezie: 0000-0002-5625-8508 (ccaokezie@yahoo.com)

Received: 05.01.2021 **Accepted:** 12.02.2021 **Published:** 07.03.2021

Year: 2021 **Volume:** 5 **Issue:** 1 (June)

Available online at: <http://www.ijafls.org> - <http://dergipark.gov.tr/ijafls>

Copyright © 2020 International Journal of Agriculture Forestry and Life Sciences (Int. J. Agric. For. Life Sci.)



This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International (CC-by 4.0) License

Poverty has many causes, all of which reinforce one another. The sources include lack of assets, such as land, tools, credit and supportive networks of friends and family; lack of basic services, such as clean water, education and health care; and lack of employment income, to provide food, shelter, clothing and empowerment. Some of these factors directly cause poverty. Others contribute indirectly by producing inequality – by stifling the political power of certain sectors of the population for example, or denying them their human rights (Chukwuemeka, 2008). Since the sources of poverty are diverse, it should be seen as a multi-dimensional problem that calls for a solution with a multi-pronged approach, especially as it affects farming households who face multiple disadvantages.

Cocoa has been a leading agricultural export commodity and a major source of foreign exchange earnings and economic development in Nigeria over time (Nkang *et al.*, 2006). The Cocoa sub-sector has received increased attention as part of the Federal Government's Economic Reform Agenda of diversifying the nation's export base from petroleum. This has led to the creation of the Cocoa Transformation Agenda which aims at doubling the production of Cocoa in the next few years with the support of the International Institute of Tropical Agriculture (IITA) (Olajide and Olawoye, 2014). IITA is expected to deploy advanced micro-propagation techniques to develop clean, disease free Cocoa trees with high yields that will improve the income of Cocoa farmers and ensure the environmental and social sustainability of Cocoa-based production systems. One growth strategy in the policy is to increase the quantity of semi-processed Cocoa being exported in order to increase smallholder farmer income. This research is therefore justified based on the significant impact of Cocoa production as the most important export tree crops in Nigeria, which could improve foreign exchange earnings and reduce the levels of poverty, income inequalities and food insecurity challenges in the economy.

Cocoa farming is one of the means of solving this poverty problem. To reduce the level of poverty and income inequality among Cocoa farmers, policymakers first need to know the patterns of the income distribution, their poverty status/depth, and major constraints limiting optimization of Cocoa production. Therefore, understanding income inequality and its consequences in Cocoa production especially on how to improve the status of the chronically poverty trapped individual Cocoa farmers is the major concern and focus of this research.

Research has shown that the majority (> 70 %) of the Cocoa farmers are smallholders who live in the rural areas faced with extreme inequality and poverty coupled with the use of obsolete tools and technology; devoid of social amenities (such as electricity, pipe borne water, hospitals and schools); with their income very low (Agwu and Oteh, 2014). The International Bank for Reconstruction and Development (2008) also observes that a high level of income inequality and poverty exists in most subsistence farming households in Nigeria. Canagarajah *et al.*, (1997) posit that most of the Cocoa farmers are at the bottom of the income distribution chart, and are living in abject poverty. Since the source of livelihood and income generation of majority of the poor is agriculture, alleviating poverty entails boosting agricultural production. Poverty reduction and economic reform are the major challenges facing Nigeria today (Etim and Solomon, 2010).

Resulting from the foregoing is the fact that there is an interdependent relationship between income distribution and level of poverty which must be understood and exploited to improve the economic life of the Cocoa farmers. This is because adequate knowledge of income distribution patterns, consumption expenditure and total accruable income to Cocoa farming is capable of improving resource allocation, reducing poverty levels and promoting equitable distribution of income among Cocoa farmers. This research is therefore aimed at determining the pattern of income distribution among Cocoa farming in Abia State, Nigeria. The specific objectives of the project were to

- i. analyze the patterns of income distribution among Cocoa farmers in Abia state;
- ii. assess the poverty status of Cocoa farmers in the study area; and
- iii. investigate the relationship between income distribution and poverty among farmers.

METHODOLOGY

Description of the Study Area

This study was carried out in Abia State, Nigeria. Abia State is situated in the South-East geo-political zone of Nigeria. Abia State lies between longitudes 7° 23'E and 8° 2'E East of the equator and latitudes 4° 47'N and 6° 12'N North of the Greenwich Meridian. The State is located East of Imo State and shares common boundaries with Anambra, Enugu and Ebonyi States in the North West and North East respectively. On the East and South East, it is bounded by Cross River and Akwa Ibom States and by Rivers State on the South. Abia State is made up of 17 local government areas and most of the people especially the rural dwellers are engaged mainly in subsistence farming. They engage in arable crop production such as Cassava, Yam, Rice, Maize and sweet potatoes. Cocoa and Oil palm are among the major cash crops grown (Nwaobiala, 2013). Abia State is one of the Cocoa producing states in Nigeria. The State is divided into three agricultural zones namely; Umuahia, Ohafia and Aba Agricultural Zones. Umuahia and Ohafia Agricultural Zones are the two major zones of Cocoa production in the state. According to Abia State Government (2012) Cocoa is produced in Bende, Ikwuano, Umuahia North and some parts of Ukwa East and West.

Most families in Abia state are involved in one farming activity or the other as a primary or secondary occupation, over 70% of the population is involved in agriculture as an occupation. The state is blessed with favourable warm climate and sufficient moisture ideal for the growth of tree crops, root and tuber crops, cereals, vegetables, nuts and food crops including rice, while a good number of the people engage in trading on various agricultural produce, either on a retail or wholesale basis. Some of the people engage in non-farm economic activities, like craft making, carpentry, and bricklaying. Livestock is also kept especially on a smallholder basis (Nwaru, 2005). Apart from agriculture, commerce is another major occupation of the people of Abia State. The Ariaria International Market Aba, which is one of the largest markets in the West African sub-region, contributes greatly to commerce in Nigeria.

Sampling Technique and Size:

A Multi-stage Purposive Sampling Technique was adopted in selecting the respondents. Data were collected in stages. In

the first stage, Umuahia Agricultural zone and Ohafia Agricultural zone were purposively selected from the three agricultural zones in Abia state; because the zones are the major areas of Cocoa production coupled with the presence of a higher number of Cocoa farming households. In the second stage, three (3) Local Government Areas were purposively selected from the two agric. zones; which were Ikwuano, Umuahia North and Bende Local Government Areas respectively. In the third stage, (3) three Autonomous Communities were purposively selected from each of the Local Government Areas; making a total of (9) nine Autonomous Communities. In the fourth stage, 10 (ten) Cocoa farming households were purposively selected from the nine (9) Autonomous Communities. In all, a total of 90 Cocoa farming households were enlisted for the study.

Analytical Technique

Objective One: (Analysis of the pattern of income distribution) was analyzed with Lorenze curve and Gini coefficient.

The *Lorenz curve* is a tool used to represent income distributions as proposed by Lorenz (1905); it tells us which proportion of total income is in the hands of a given percentage of population. This method is conceptually very similar to the method by quantiles. However, instead of ending up with income shares, the Lorenz Curve relates the cumulative proportion of income to the cumulative proportion of individuals.

The Lorenz curve is obtained as follows:

The x-axis records the cumulative proportion of population ranked by income level. Its range is therefore (0, 1).

The y-axis records the cumulative proportion of income for a given proportion of population, i.e. the income share calculated by taking the cumulated income of a given share of the population, divided by the total income Y, as follows:

$$L\left(\frac{k}{p}\right) = \frac{\sum_{i=1}^k y_i}{Y}$$

Where:

k=1....n is the position of each individual in the income distribution;

i=1....k is the position of each individual in the income distribution;

P is the total number of individuals in the distribution;

y_i is the income of the i_{th} individual in the distribution

$\sum_{i=1}^k y_i$ is total the cumulated income up to the k_{th} individual.

It is apparent that $\sum_{i=1}^k y_i$ ranges between 0, for k=0, and Y, for k=n, therefore

$$L\left(\frac{k}{p}\right) = \frac{\sum_{i=1}^k y_i}{Y} \text{ ranges between 0 and 1}$$

In Plate 1, the diagonal AB is the line of perfect distribution of income. The further away the *Lorenze curve* is from the line of perfect distribution of income, the more unequal is the distribution of income. The ratio of the shaded area to the total area of triangle is the index of concentration. The Gini ratio goes to zero as the actual income distribution approaches perfect equality. If there were perfect inequality, the ratio of the concentration would be one.

The Gini Coefficients is: $G = 1 - \frac{\sum_{i=0}^{n-1} (X_{i+1} - X_i)(Y_{i+1} + Y_i)}{2}$

$G = 1 - \frac{\sum_{i=0}^{n-1} (X_{i+1} - X_i)(Y_{i+1} + Y_i)}{\sum XY}$, Which reduces to $G = 1 - \frac{\sum XY}{\sum XY}$

G = Gini coefficient, X_i = Share of Cocoa farmers in the i_{th} group of recipients, and Y_i = Share of Cocoa farmers in the i_{th} group of income

Figure 1 is a *Lorenze Curve* Showing Income Distribution. The horizontal section portrays the cumulative percentage of households while the vertical section portrays the cumulative percentage of income.

Scale of the Lorenz curve: On the Cumulative proportion of Households (x-axis), 0.1 units represents 10 Cocoa farming households. On the Cumulative proportion of Income (y-axis), 0.1 unit represents ₦10,000.00. Average exchange rate in the year 2016: ₦257.66 to \$1.00

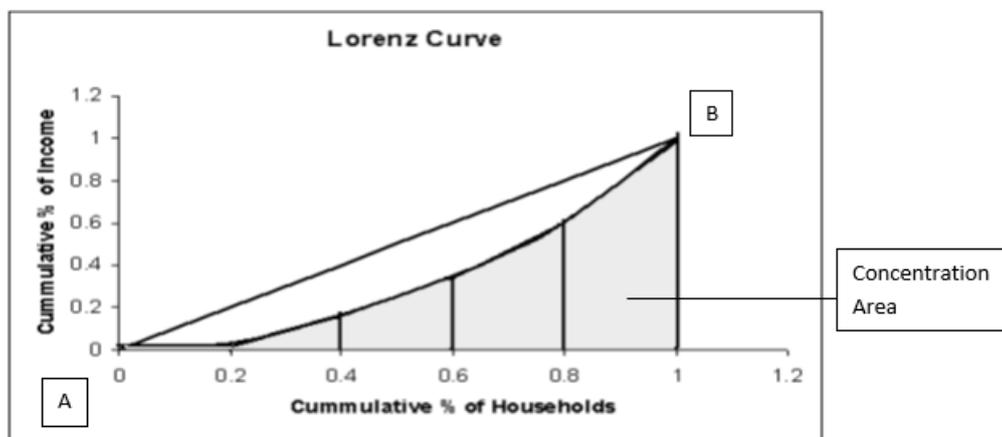


Figure 1: A Hypothetical Lorenze Curve Showing Income Distribution

The Gini Coefficient is found by taking the ratio of the area between the line of perfect equality and the Lorenz Curve to the area under the line of perfect equality. The value of Gini coefficient (from 0 to 1) reveals the degree of income inequality (from complete inequality to complete equality).

Objective Two: (Assessment of the poverty status of the Cocoa farming households). This was realized with Foster-Greer-Thorbeck (FGT) poverty measure. The major reason for this

$$\text{expressed as: } P_a = \frac{1}{n} \sum_{i=1}^q \left\{ \frac{z - Y_i}{z} \right\}^\alpha \quad - \quad - \quad - \quad - \quad 3$$

$$\text{When } a = 0, \text{ i.e. Poverty Incidence or Head count } P_0 = \frac{1}{n} \sum_{i=1}^q \left\{ \frac{z - Y_i}{z} \right\}^0 = \frac{q}{n} \quad 4$$

$$\text{When } a = 1, \text{ i.e. Poverty Incidence or Head count } P_1 = \frac{1}{n} \sum_{i=1}^q \left\{ \frac{z - Y_i}{z} \right\}^1 \quad - \quad - \quad - \quad - \quad 5$$

$$\text{When } a = 2, \text{ i.e. Poverty Incidence or Head count } P_2 = \frac{1}{n} \sum_{i=1}^q \left\{ \frac{z - Y_i}{z} \right\}^2 \quad - \quad - \quad - \quad - \quad 6$$

The FGT index of the Cocoa Farmers will be estimated as:

$$P_a = \frac{1}{N} \sum_{j=1}^q \left\{ \frac{z - Y_j}{z} \right\}^\alpha \quad - \quad 7$$

Where **Pa** = Weighted FGT Poverty Index

q = Number of Cocoa farmers below the Poverty line/number of poor Cocoa farmers

Yi = Per capita Expenditure of the Cocoa farmers

α = Degree of Concern for the depth of poverty, and takes the values 1, 2, 3...

Z = Poverty Line (two-third of Mean Per Capita Household Expenditure (MPCHE) of the farmers); and **n** = total number of Cocoa farmers in the study area

Po (Head Count) measures prevalence of Poverty

P1 (Poverty Gap Index) measures the depth of poverty, while

P2 (Squared Poverty Gap) measures Poverty severity

$$\text{Per Capita Household Expenditure} = \frac{\text{Total Household Monthly Expenditure}}{\text{Household size}} \quad - \quad - \quad - \quad - \quad 8$$

The poverty line that was used in the study was based on the Cocoa farmers' monthly consumption expenditure. The classification of household poverty status was based on Mean Per Capita Household Expenditure (MPCHE).

$$\text{MPCHE} = \frac{\text{Total Per Capita Household Expenditure}}{\text{Total Number of Cocoa Farming Households}} \quad - \quad - \quad - \quad - \quad - \quad 9$$

Two – thirds (2/3) of the Mean Per Capita Household Expenditure (MPCHE) was used as the moderate poverty line, while one – third (1/3) of MPCHE was used as the line for extreme poverty, i.e. extreme poverty was defined as 1/3 of the mean per capita total household expenditure. Cocoa farmers with MPCHE less than this would be considered extremely poor, (following Iheke and Nwaru, 2013) while those spending > 2/3 of MPCHE are considered to be non-poor Cocoa farmers.

Objective Three: (Relationship between Income inequality and Poverty among the Cocoa farmers)

The Pearson's Correlation coefficient was used to analyze this objective. The Pearson's 'r' otherwise known as the Product Moment correlation coefficient, is about the most widely used measure of association for interval (and ratio) scale data. It measures linear association between interval variables.

$$r = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2} \sqrt{\sum y_i^2}} \quad 10$$

Where: r = Correlation Coefficient between X and Y.

X = Income Inequality (Income distribution statistics of the Cocoa farmers)

Y = Poverty Levels (Fraction of Cocoa farmers with real income below a fixed income threshold i.e., below MPCHE)

x_i = Mean Deviation of X

y_i = Mean Deviation of Y

MPCHE = Mean per Capita Household Expenditure

choice is due to its decomposability and usage by World Bank and other agencies.

Poverty head count index, poverty gap index and squared poverty gap index were computed to measure the incidence, depth and severity of poverty of the Cocoa processors. A relative poverty line was constructed based on the Mean Per Capita Household Expenditure (MPCHE) of the farmers. The General Foster, Greer and Thorbecke (FGT) poverty index (Pai) is

The Product Moment correlation coefficient 'r', can take any value between -1 and +1. For example, a statistically significant correlation coefficient in the range $0 < r < 0.3$ was regarded as weak correlation; $0.3 < r < 0.6$ was regarded as moderate correlation; $0.6 < r < 1$ was also regarded as strong correlation, while a correlation coefficient of 1 was regarded as perfect correlation.

If the two variables are positively correlated, their values tend to rise or fall together. A negative correlation between two variables implies that the two variables tend to show co-movement in opposite direction. Zero correlation implies a completely absence of joint linear movement (in either direction between variables).

The Pearson Correlation is stated thus (following Koutsoyiannis, 1977):

RESULTS AND DISCUSSION

Evaluation of Income Distribution among Cocoa Farmers in Abia State, Nigeria

The pattern of income distribution among the Cocoa farmers in the study area was analyzed. Variables relating to income accruable from Cocoa farming were subjected to the Lorenz curve and the Gini Coefficient analysis.

Figure 2 is a Lorenze curve showing the distribution of income among Cocoa farmers in Abia State; with a Gini Coefficient of 0.4243. Gini Coefficient are aggregate

inequality measures and varies from 0 (perfect equality) to 1 (perfect inequality). The diagonal blue line in Figure 2 is a representative of 'perfect equality'. The more the Lorenze line curves away from the diagonal (line of perfect equality), the greater the degree of inequality represented.

Scale of the Lorenz curve: On the Cumulative proportion of Households (x-axis), 0.1 units represents 10 Cocoa farming households. On the Cumulative proportion of Income (y-axis), 0.1 unit represents approximately ₦10,000.00 kobo. Exchange rate in 2016: ₦257.66 to \$1.00

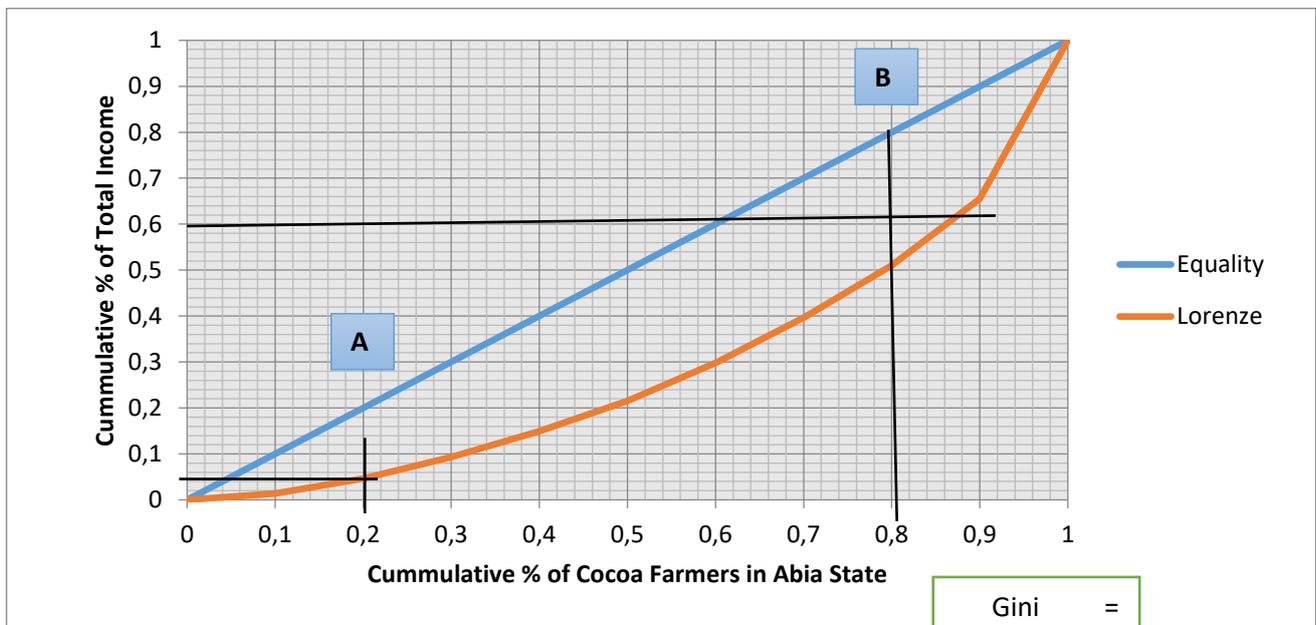


Figure 2: Lorenze Curve showing the Distribution of Income among Cocoa Farmers in (Ikwuano, Umuahia North and Bende LGA), Abia State. *Source: Field Survey Data, 2016.*

The Lorenze curve in Figure 2 shows the Cocoa farmers plotted on the horizontal axis and their income on the vertical axis; not in absolute terms but in cumulative values. The estimated Gini Coefficients indicated variability in the distribution of incomes among the Cocoa farming households. At point 'A' in Figure 2, the bottom 20% of Cocoa farmers in Abia State receives only 8% of the total income, while at point 'B' top 80% of the Cocoa farmers in the study area receives 60% of the total income. The results of the analysis showed that there was inequality in the distribution of income among the Cocoa farming households. The Gini coefficient of 0.4243 indicates that incomes of the Cocoa farmers in Abia State were relatively unequally distributed. Awoyemi (2007) observed that rising inequality threatens growth and poverty reduction targets. Correspondingly, Omonona (2009) detected that huge income inequality between the poor and the rich, bad governance, corruption, high unemployment rate, rapidly

growing population and poor infrastructural developments contributes to the rise in income inequality and poverty in Nigeria. This implied that income inequality and poverty were relatively high among Cocoa farmers in Abia State. UNDP – United Nations Development Programs (2013) observe that to achieve a reduction in poverty, income growth has to be equitably distributed.

Poverty Status of Cocoa Farmers in Abia State, Nigeria

The fundamental principle in the determination of poverty status is the estimation of Poverty Line. This involves the estimation of Mean Per Capita Household Expenditure (MPCHE) of Cocoa farmers based on their basic consumption expenditure. The MPCHE is derived for Cocoa farmers in Abia State, Nigeria. This results assisted in determining the poverty status of the farmers.

Table 1. Mean per capita household expenditure (MPCHE) of Cocoa Farmers in Abia State; based on their Basic Needs

Basic Needs (Consumption Expenditure)	Amount/Month (₦) MPCHE	Amount/Annum (₦) MPCHE	Percentage (%) of Total Expenditure
3 square meal (food)/drinks	12,365.56	148,386.72	28.30
Clothing	6,911.11	82,933.32	15.81
Health/Medication	2,937.78	35,253.36	6.72
Education	1,894.00	22,728.00	4.34
Rental Value of Residence/shelter	10,371.11	124,453.32	23.73
Transportation Cost	5,881.11	70,573.32	13.45
Miscellaneous	3,345.44	40,145.28	7.65
TOTAL MPCHE	43,706.11	524,473.32	100
2/3 of MPCHE	29,137.41	349,648.88	
1/3 of MPCHE	14,568.70	174,824.44	

Exchange rate: ₦257.66 to \$1.00

Source: Field Survey Data, 2016

Table 1 represents the cumulative mean per capita household expenditure of Cocoa farmers in Abia State. This comprises the Cocoa farmers located in the three local government areas of the state, where Cocoa is mainly produced. From Table 1, it was observed that food items accounted for 28.3% of the MPCHE of the farmers in the State. The highest percentage of food items could be as a result of the necessity food have for individuals, firms and organization. Etim and Solomon (2010) posits that food constitute the highest Mean Per Capita Expenditure of farm households in Nigeria.

Rental value of land, clothing, transportation, miscellaneous expenses, health and education constituted

23.73%, 15.81%, 13.45%, 7.65%, 6.72% and 4.34% respectively. Greater percentage of MPCHE was spent on accommodation or rental value of residence. Also fewer amounts were spent on transportation, health care and education expenses respectively. In regards to low amount of MPCHE on education, Okpachu *et al.*, (2014) posits that the major problems facing Agricultural productivity in Nigeria is illiteracy. This has over the years posed great challenges to Agricultural development as well as productivity. In this regards, farm firms should inculcate the habits of acquiring formal and informal knowledge; especially formal knowledge backed up with scientific approach on agricultural production, sustainability and development.

Table 2. Distribution of Cocoa Farmers in Abia State, According to their Poverty Status

Poverty Status	MPCHE Amount (₦)	Frequency	Percentage (%)
Extremely/Core Poverty (1/3 of MPCHE)	< 14,568.70	5	5.56
Moderately Poor (2/3 of MPCHE)	14,568.70 ≤ Z < 29,137.41	32	35.56
Non Poor (> 2/3 of MPCHE)	> 29,137.41	53	58.88
	Total	90	100

Exchange rate: ₦257.66 to \$1.00

Source: Field Survey Data, 2016

Two – thirds (2/3) of the Mean Per Capita Household Expenditure was taken for the moderate poverty line for Cocoa farmers in Abia State, while one – third (1/3) was taken as the core/extreme poverty threshold. The value of the moderate poverty line was defined as ₦29,137.41 while the extreme poverty line was put at ₦14,568.70. Based on these estimated poverty thresholds, Cocoa farmers in Abia State were classified into mutually exclusive groups as presented in Table 2. The non-poor Cocoa farmers in Abia State were classified as those farmers whose per capita expenditure was above or was equal to two-third (2/3) of the mean per capita household expenditure (MPCHE) of all the farmers, while those whose per capita expenditure was below two-third of the mean per capita expenditure were classified as poor. Based on this status quo, the poverty line constructed as two-third of the mean per capita expenditure of all the Cocoa farmers found in Abia State was ₦29,137.41. This implies that all the Cocoa farmers in Abia State whose monthly per capita expenditure fell below ₦29,137.41 were classified as poor while the Cocoa farmers

whose per capita expenditure equaled or was above the poverty line were classified as non- poor.

Table 2 shows that only 41.12% of Cocoa farmers in Abia State fell below the estimated poverty line while the other 58.89% were classified as non-poor. The implication of this result is that majority of the Cocoa farmers in Abia State were non-poor. Osayande and Osabuohien (2016) stated that the number of poor Nigerians is put as 58 million; this represents an improvement from previous study which put the poverty level at 61% of Nigeria's population.

The ultimate goal of agricultural production plans in national development is to raise the standard of living and one of the important yardsticks for measuring standard of living is the average distribution income. Iheke and Nwaru (2013) suggested that to reduce poverty and hunger, improve the standard of living and increase farm income there is an urgent need for global, national, and local actors to pursue innovative approaches to improve agricultural productivity.

Relationship between Income and Poverty among Cocoa Farmers in Abia State, Nigeria

This sub-section analyses the relationship between poverty and income distribution. Poverty is the economic condition in which people lack sufficient income to obtain certain minimal levels of health services, food, housing, clothing and education which are necessities for a standard of living. Ogbeide and Agu (2015) and Kanu (2020) affirm that poverty is a major limitation of economic development and the dearth of economic opportunity is seen to increase the poverty level of an individual or household. This scarcity of opportunities is strengthened by inequality.

The Pearson Correlation coefficient was used in the evaluation of the relationship between income

distribution/inequality and poverty levels. Income distribution statistics derived from sub-section two coupled with the poverty status derived from sub-section three were subjected to the Pearson Correlation Analysis. The poverty levels/status is simply the fraction of Cocoa farmers with real incomes below a fixed income threshold. The fundamental principle in the determination of the income threshold is the estimation of the poverty line. This involves the calculation of the Mean Per Capita Household Expenditure (MPCHE) of Cocoa farmers based on their basic consumption expenditure. Two – thirds (2/3) of the Mean Per Capita Household Expenditure was taken for the moderate poverty line for Cocoa farmers in Abia State, while one – third (1/3) was taken as the core/extreme poverty threshold.

Table 3. Pearson Correlation Coefficient between Income Distribution and Poverty among Cocoa Farmers in Abia State

	Income Distribution	Poverty rate
Income Distribution	1	0.676***
Poverty	0.676***	1
	Sig. (2-tailed)	0.000
	Number of observations	90

***. Correlation is significant at the 0.001 level (2-tailed).

Source: Field Survey Data, 2016

Table 3 represents the correlation coefficient between income distribution and poverty among Cocoa Farmers in Abia State. Where the two variables – income distribution and poverty – are positively correlated ($r = 0.676^{***}$). It is shown that there is a significant relationship between income distribution/inequality and poverty levels. The correlation is highly significant since the probability level (P) is less than 0.001. The result of this analysis implies that the higher the income inequality, the higher the levels of poverty. By implication, it can be deduced that a 1% shift/increase in income inequality will result in 67.6% shift/increase in poverty levels. Poverty and inequality were found to be positively linked thus reducing one entail the reduction of the other. Hence, it could be inferred that income distribution influences the level of poverty.

This result corroborated with that of Son (2007) who observed in his study entitled 'Interrelationship between Growth, Inequality, and Poverty' that the elasticity of inequality is positive since a decrease in income inequality decreased the level of poverty. He also noted that changes in income distribution exact larger effects on measures of depth and severity of poverty. White and Anderson (2001) observed that small changes in income distribution can have a large effect on poverty headcount. He also established that the poverty level increases as the gap between income-group become larger. Cheema and Sial (2012) reported a positive link between the variables such that poverty and inequality move in the same direction especially in urban areas. It was, therefore, established that the correlation between growth and inequality was much higher in urban than in rural areas. Chirwa (2005), therefore, argued that macroeconomic policies that promote growth in income are likely to lead to poverty reduction.

The implication of this result is that an improvement in Cocoa farmers' productivity and output would lead to income growth, decreased income inequality (*Ceteris paribus*) and consequently poverty reduction. Asogwa *et al.*, (2012) observed that progress on poverty reduction has become a major measure of success of development policy. Reducing the degree of inequality would speed up the process of poverty

reduction dramatically. Ogbeide and Agu (2015) supports that policy measures toward the reduction of poverty in Nigeria should not only concentrate on poverty but also incorporate policies of equitable distribution of income to reduce inequality. Correspondingly, greater equality of income will be achieved by improving the productivity of the poor, especially through improving basic education, health and other skills.

CONCLUSION AND RECOMMENDATION

Income distribution and poverty rate were positively correlated. A one-unit decrease in income inequality will result in 67.6% decrease in poverty levels. Furthermore, income was unequally distributed among the Cocoa farmers resulting in an increasing gap between the poor and the rich Cocoa farmers in the study area. Based on the high level of income inequality among Cocoa farmers, the poor Cocoa farmers should be encouraged to form cooperatives in order to access credit facilities from the government and other institutions. The government should likewise provide subsidies and grants to the bottom poor Cocoa farmers to boost their production.

CONFLICT OF INTEREST

The author sees no conflict of interest.

AUTHOR CONTRIBUTION

The project was carried out by author IMK. Guided by the expert advice of author CAO; IMK designed the study and wrote the first draft of the manuscript. IMK made contributions to the first draft and supervised the data collection, sorting and coding aspect of the project. Author CAO and IMK managed the analyses of the study as well as the literature search. However, all authors made contributions to the project.

ACKNOWLEDGMENT

I sincerely appreciate the authors whose research writings and publications helped to make this work a success, thank you all. No amount of words/thank you will be enough to express my gratitude to

my project supervisor; Professor C. A. Okezie for his selfless effort, guidance and direction throughout the research activities.

REFERENCES

- Abia State Government (2012): Abia State of Nigeria, An Investment Haven: Guide to Investment in Abia State. Retrieved online on 25th July, 2016 at www.abia.state.gov.ng.
- Agwu N M and Oteh O U: (2014) "Analysis of Income Inequalities and Food Security among Farmers in Abia State, South Eastern Nigeria" Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development*. Vol. 14, Issue 3, 2014.
- Awoyemi, B.T. (2007). Explaining Income Inequality in Nigeria: A Regression Based Approach. *Journal of Economics and Rural Development*, 4(6), 45-59.
- Bradshaw, T.K., (2006). Theories of poverty and anti-poverty programs in community development. Rural Poverty Research Center, RPRC Working Paper No. 06-05, February. RUPRI Rural Poverty Research Center 214 Middlebush Hall University of Missouri Columbia MO 65211-6200 PH 573. Available from <http://www.rprconline.org/>.
- Canagarajah, S. Ngwafon, J., and Thomas, S. (1997). The Evolution of Poverty and Welfare in Nigeria, 1985-92. Policy Research Working Paper 1715. World Bank, 1818 H Street NW, Washington, pp 88.
- Cheema, A. R., and Sial, M. H. (2012). Poverty, Income Inequality, and Growth in Pakistan: A Pooled Regression Analysis. *The Lahore Journal of Economics*, 17(2), 137–157.
- Chirwa, E.W., (2005). Macroeconomic Policies and Poverty in Malawi: Can We Infer from Panel Data Research Report. Global Development Network (GDD), Suite 1112, 2600 Virginia Avenue, NW Washington D.C., 20037, USA, pp: 33.
- Chukwuemeka, E (2008). The substance of public administration in Nigeria: A compendium of public policy and Local Government, Enugu: Computer Edge.
- Damisa, M.A., S.A. Sanni, T. Abdoulaye, A.Y. Kamara and A. Ayanwale, (2011). Household typology based analysis of livelihood strategies and poverty status in the Sudan Savannah of Nigeria: Baseline conditions. Learning Publishers *Journal of Agric. Environ. Stud.*, 2(1): 146-160.
- Etim, N. A. and Solomon V. A. (2010). Determinant of Rural Poverty among Broiler Farmers in Uyo, Nigeria: Implications for Rural Household Food Security. *Journal of Agriculture and Social Sciences*, 6: 24–28.
- Hoekman, B., C. Michalopoulos, M. Schiff and D. Tarr, (2001). Trade Policy and Poverty Alleviation, World Bank Working Paper No. 2733, Washinton DC: World Bank, pp 57.
- Iheke, O. R and Nwaru, J. C. (2013) "Innovation Adoption, Farm Productivity and Poverty Status of Rural Smallholder Farm Households in South-East, Nigeria" Invited paper presented at the 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia.
- Kanu, I. M. (2020). Analysis of cocoa farmer's poverty status in Abia State, Nigeria: The Foster, Greer and Thorbeck (FGT) decomposable poverty measure. *International Journal of Agriculture, Environment and Food Sciences*, Int. J. Agric. Environ. Food Sci., Vol. 4 (2), Page 188-199.
- Koutsoyiannis, A. (1977). "Theory of Econometrics". Second Edition *Published by Palgrave Macmillan* pp 67.
- Lorenz, M.O. (1905). Methods of Measuring the Concentration of Wealth. *Quarterly Publications of the American Statistical Association*, 9 (New Series, No. 70):209–219.
- Nkang, N. M., Abang, S. O., Akpan, O. E. and Offem, K. J. (2006) Cointegration and error correction modelling of agricultural export trade in Nigeria: The case of Cocoa., *Journal of Agriculture and Social Sciences*. (3): 214–215.
- Nwaobiala, C. U., (2013). Appraisal of Farmers' Participation in IFAD/FGN/NDDC/Community Based Natural Resource Management Programme in Abia and Cross River States, Nigeria. A Ph.D Thesis Department of Agricultural Economics and Extension Abia State University Uturu.
- Nwaru, J. C. (2005). Determinants of Farm and Off-Farm Incomes and Savings of Food Crop Farms in Imo State, Nigeria: Implications for Poverty Alleviation. *The Nigerian Agricultural Journal*, 36, 26 – 42.
- Ogbeide, E. N. O. and Agu, D. O. (2015) "Poverty and Income Inequality in Nigeria: any Causality?" *Asian Journal of Economic and Financial Review*. 2015, 5(3):439-452.
- Okpachu, A. S, Okpachu, O. G, and Obijesi, I. K. (2014): The Impact of Education on Agricultural Productivity of Small Scale Rural Female Maize Farmers in Potiskum Local Government, Yobe State: A Panacea for Rural Economic Development in Nigeria. *International Journal of Research In Agriculture and Food Sciences*. ISSN 2311 -2476. Aug. 2014. Vol. 2, No.4 pp 54-57.
- Olajide O. A. and Olawoye J. E. (2014). "Market Access for Smallholder Cocoa Farmers in Nigeria: What Options?" W. Doppler and S. Bauer (Eds) Volume 115 Margraf Verlag Weikersheim; page 175.
- Omonona B. T. (2009). Quantitative analysis of rural poverty in Nigeria. Nigeria Strategy Support Program (NSSP) Background Paper No. NSSP 009.
- Osayande, I. and Osabuohien, J. I. (2016) Effect of Yam-Based Production on Poverty Status of Farmers In Kabba/Bunu Local Government Area of Kogi State, Nigeria. *International Journal of Environmental & Agriculture Research (IJOEAR)*. ISSN:2454-1850. Vol-2, Issue-6.
- Son, H. (2007). Interrelationship between Growth, Inequality, and Poverty: The Asian Experience. *Asian Development Review*, 24(2), 37–63.
- Udah, S. C and Nwachukwu, I N (2015) "Determinants of Agricultural GDP Growth in Nigerian" *International Journal of Agricultural Research and Review*: ISSN-2360-7971, Vol. 3(3): pp 184-190.
- UNDP – United Nations Development Programs (2013). Human Development Report 2013.
- White, H., and Anderson, E. (2001). Growth versus Distribution: Does the Pattern of Growth Matter? *Development Policy Review*, 19, 267–289.