

# Income Distribution among Arable Crop Farmers in Nigeria: Evidence from Ekiti State, Nigeria

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## Abstract

This study analysed the determinants of income distribution among arable crop farmers in Ekiti State, Nigeria. It was carried out using a structured questionnaire to collect data in six Local Government Areas of Ekiti State through a multi-stage sampling technique. Descriptive statistics, Line chart, Gini decomposition and regression analyses were used to analyze the data collected from the field survey. It was revealed in this study that mechanization, educational level, household size, number of crops grown and secondary occupation all have significant effect on the household income distribution among the arable crop farm households in Ekiti State, Nigeria. It was revealed that the average age was about 54 years and standard deviation of 9.9. Also, majority of the respondents are males and are married and having about 19 years as average years of farming experience. This study however recommended that agricultural activities should be promoted among rural households in Nigeria. Policy makers, therefore, must concentrate on measures to increase agricultural productivity through targeted efforts such as making mechanization facilities available to the rural arable crop farmers. Similarly, large scale farming and mixed cropping system should be encouraged to further help in increasing the income of the arable crop farm households in rural and urban of the study area.

**Keywords:** Income Distribution, Income Inequality, Arable Crop Farmers, Nigeria.

## INTRODUCTION

Agriculture is the most widely spread form of human activity and it is more basic than any other industry (World Bank, 2008). Even, in the machine age, agriculture of one kind or another provides a livelihood for more than three quarters of the human race and create employment for millions of people all over the world and over seventy percent (70%) of Nigeria population engage in one form of agriculture or another (Anyanwu, *et al*, 1999; Oladipo, 2005). In addition, agriculture produces raw materials for other industries on which a large portion of the remaining people depends. From the crops the farmer grows, he gets his food and also that of his family and the surplus is sold for cash, with which he buys other necessities of life. In other words, apart from the provision of food for the growing population of the world, agriculture serves as the major source of income for the local farmers and rural dwellers in the developing countries of the world including Nigeria (Anyanwu, *et al*, 1999).

The ultimate goal of agricultural production plans in national development is to raise the standard of living (Olayide and Olayemi, 1998). However, standard of living is related to many other factors and its measurement involves attention to a considerable number of variables. One of the important yardsticks for measuring standard of living is the average distribution of income (Olayide, *et al*, 1998). The World Bank has earlier reported (in year 2001 and 2003 respectively) that a high level of income inequality exists in many low income countries of sub-Saharan Africa (SSA) of which Nigeria is inclusive. The report further revealed that it is widely believed that majority of the people in sub-Saharan Africa live in the rural areas and these rural communities are majorly agrarian with majority of them owing just a small piece of land on which they grow arable crops that are hardly sufficient to feed themselves let alone to sell in other to generate income.

Evidence from literature and past studies have identified this region as one of the world's poorest, and the economies are heavily dependent on agriculture as the primary source of income and food (Apatha, *et al*, 2010). Past studies have also identified that most of the poorest households in SSA are found working in agriculture (Ikpi, 1989; Ayoola, *et al*, 2000; Okunmadewa, 2002; Spencer, 2002; Alayande and Alayande, 2004; Poulton *et al.*, 2005; Apatha, 2006). Therefore, understanding income inequality and its consequences on agricultural production especially on how to improve the status of the chronically poverty trapped individual farmers and farming households is the major concern and focus of this study. As a result, the following questions were raised:

What are the key socio-economic characteristics of the arable crop farmers in Ekiti State? What is the pattern of income distribution among the arable crop farming household in Ekiti State? What is the share of income contributed to total income by each identified arable crop mostly grown among arable crop farmers in Ekiti State, Nigeria? What are the factors affecting the distribution of income among arable crop farming households in Ekiti State, Nigeria? Providing answers to these questions will help in bringing about a more equitable distribution of income among arable crop farming households in Ekiti State and consequently improve the welfare status of the arable crop farmers and generally boosting agricultural production across Ekiti State, Nigeria.

This paper therefore analyzes the distribution of income in Nigeria agricultural sector with particular

focus on arable crop farming households in Ekiti State, to ascertain the socio-economic characteristics of the arable crop farmers in Ekiti State, to figure out the pattern of income distribution among arable crop farmers in Ekiti State, to determine the share of total income contributed by each identified arable crop mostly grown among arable crop farmers in Ekiti State; and to determine the factors affecting the distribution of income among arable crop farming households in Ekiti State

## MATERIALS AND METHODS

### Study Area

The study was conducted in Ekiti State, Nigeria. The State is one of the six States constituting the south-western region of Nigeria. Ekiti State is made up of 16 local government areas with three geo-political zones. According to the 2006 population census, the State has a population of 2,384,212 (with 1,212,609 males and 1,171,603 females) and a land area of 5,435sq km (EKSG, 2006). The State is situated entirely within the tropics. It is located between longitude 4° 5' and 5° 45' east of the Greenwich meridian and latitude 7° 15' and 8° 5' north of the equator. The State is found to the south of Kwara and Kogi States, East of Osun State and bounded by Ondo State in the east and in the south (EKSG, 2006). The State is mainly an upland zone, rising about 250 meters above the sea level. It lies within the areas underlain by metamorphic rocks of the basement complex. It has a general undulating land surface with a characteristic landscape that consists of old plains broken by step-sided out dome racks that may occur singularly or in group of ridges. The State enjoys tropical climate with two distinct seasons. These are the raining season (April-October) and the dry season (November- March). Temperature ranges between 21°C and 28°C with high humidity. Tropical forest exists in the south, while savannah occupies the northern peripheries (EKSG, 2006).

However, this study area was chosen basically because Ekiti-State is one of the predominantly agrarian areas and that arable crops are mostly grown by the farmers across the state (Ibitoye, 2012). The men are predominantly farmers while the women engage majorly in trading activities and for the educated indigenes who are employed formally, farming remains the major secondary occupation (Oluwatayo, 2008).

### Sampling Technique and Method of Data Collection

This research work was conducted with a comprehensive survey of arable crop farming households in Ekiti State. A multi-stage sampling technique was used for data collection from the identified population of arable crop farming households in the State. In the first stage, three Local Government Areas (LGAs) were randomly selected from each of the ADP production zones of the State making a total of six LGAs. The LGAs are Ado, Ekiti East, Ekiti West, Gbonyin, Ikole and Oye LGAs. The second stage involved a purposive selection of two rural and two urban communities in each of the LGAs selected, making a total of four communities that were selected from each LGA and a sum total of twenty-four communities across the six LGAs earlier selected. In the last stage, a sampling frame of arable crop farmers in the twenty-four communities was constructed based on the information obtained from Ekiti-State ADP. From the sampling frame, a total of one-hundred and twenty farmers were sampled and interviewed. A well structured questionnaire that covers information on the socio-economic characteristics of the respondents, the level/scale of their production, numbers of crop produced, farm size, income earned from each arable crop grown, etc. was used for data collection.

### Analytical Technique

The analytical techniques that were employed include descriptive statistics and multiple regression analysis. The descriptive statistics such as frequency distribution tables and line chart were used to describe the socio-economic characteristics and to show the pattern of income distribution among the arable crop farming household in Ekiti State respectively. Gini-coefficient decomposition of income was used to determine the share of total income contributed by each identified arable crop mostly grown among arable crop farmers in Ekiti State. The multiple regression analysis was however used to determine the factors that affecting the distribution of income among arable crop farming households in Ekiti State, Nigeria.

### Model Specification

#### *The Decomposition of Income*

In order to determine to determine the share of total income contributed by each identified arable crop, decomposition analysis based on Gini-coefficient decomposition was used. The Gini-coefficient was decomposed as follows:

$$G_y = \frac{2 \text{Cov}(Y,r)}{n\mu}$$

Where: n = the number of observations

$\mu$  = mean income of the distribution

Y = the series of total income

r = series of corresponding ranks

$G_y$  = Gini-coefficient

Since total income is the sum of source incomes, the covariance between the total income and its rank can be

written as the sum of covariance between each income source and rank of total income. The total Gini income can then be expressed as a function of the Gini sources either rural or urban.

$$G_y = \sum \frac{\mu_i R_i I_G}{\mu}$$

Where:

$I_G$  = the total Gini income expressed as a function of its source (i.e. either rural or urban)

$R_i$  = the correlation ratio expressed as:

$$R_i = \frac{Cov(Y, r)}{Cov(Y_i, r_i)}$$

Where  $Cov(Y, r)$  is the covariance of total income and corresponding rank respectively and

$Cov(Y_i, r_i)$  the covariance of the *ith* source of income and corresponding rank.

The decomposition of Gini-coefficient can be further expressed as:

$$\sum w_i g_i = 1$$

Where:  $w_i = \frac{\mu_i}{\mu}$

$$g_i = \frac{R_i I_{Gi}}{I_G}$$

Where  $w_i g_i$  is the factor income inequality weight of the *ith* source in overall income inequality,  $w_i$  is the source income weight and  $g_i$  is the relative concentration coefficient of the *ith* source in overall inequality. An income source increases overall income inequality when  $g_i$  is greater than 1 and decrease overall income inequality when  $g_i$  is less than 1.

#### Multiple Linear Regression

Regression has been defined as the amount of change in (the value of) one variable associated with a unit change in (the value of) another variable. The Multiple Regression Analysis therefore helps to determine the effect of changes in the independent variables (or explanatory variables) on the dependent variable. The regression model was implicitly specified as:  $Y = f(X_1, X_2, X_3, X_4, \dots, X_n, \epsilon)$ .

Where,

$Y$  = the household per capita income (Naira),

$X_i$  = the matrix of independent/explanatory variables,

$\beta$  = the regression coefficients,

$\epsilon$  = the error term.

More specifically, the variables specification were as follows:

$Y$  = Household per capital income.

$X_1$  = Mechanized farming (yes = 1, 0 otherwise).

$X_2$  = Age of household head.

$X_3$  = Gender of household head.

$X_4$  = Educational level of household head/number of years spent in school.

$X_5$  = Household size.

$X_6$  = Farm size.

$X_7$  = Number of crops planted.

$X_8$  = Full time farming (yes = 1, 0 otherwise).

$X_9$  = Cropping system

$X_{10}$  = Land ownership type

$X_{11}$  = labour source

$X_{12}$  = Secondary occupation (yes = 1, 0 otherwise).

$\epsilon$  = the error term.

## RESULTS AND DISSCUSSION

### Socio-Economic Characteristics of Arable Crop Farming Households in Ekiti State, Nigeria

The summary of the socioeconomic characteristics of the arable crop farmers in the study area is as presented in Table 1. It was revealed that the average age was about 54 years and standard deviation of 9.9. This indicates that greater percentage of arable crop farmers in the study area are still very agile and full of vigor and strength

to carry out the laborious activities involved in agricultural production. Majority of the respondents are males and are married in agreement with the study of Babatunde, (2008). Average number of years of formal education among the respondents was about 10 years; mean household size was about 7 persons. The mean household farm size was about 2.6ha. While the minimum and maximum farm sizes were 0.5ha and 4.7ha respectively, as shown by the measure of dispersion (standard deviation = 2.1). The average number of crops grown by the arable crop farmers in the study area was two, with the majority of the farmers practicing mixed cropping and having about 19 years as average years of farming experience indicating that larger proportions of respondents are well experienced in arable crop farming as shown in Table 1.

**Table 1: Socioeconomic Characteristics of Arable Crop Farming Households in Ekiti State, Nigeria (n = 120)**

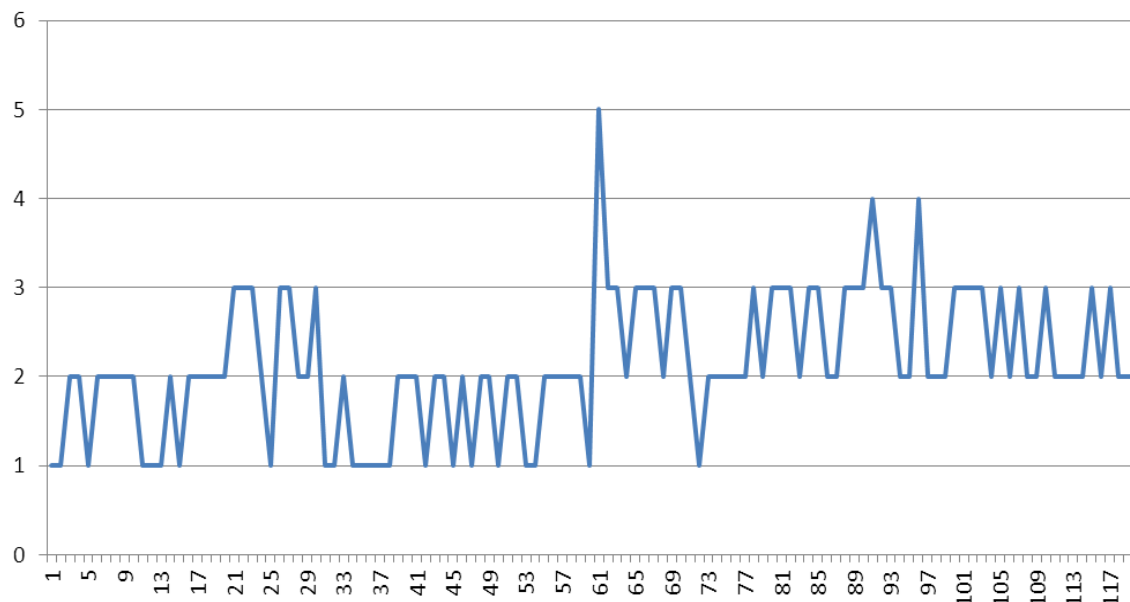
Variable	Mean	Mode	Standard Deviation
<b>Age (Years)</b>	54.1	63.0	9.9
<b>Gender</b>	-	Male	-
<b>Marital Status</b>	-	Married	-
<b>Educational Level (Years)</b>	9.8	11.0	6.3
<b>Household Size</b>	7.0	9.0	4.0
<b>Household Farm Size (Ha)</b>	2.6	1.0	2.1
<b>Number of Crops Grown</b>	2.0	3.0	1.0
<b>Farming Experience (Years)</b>	18.8	20.0	11.1
<b>Cropping System</b>	-	Mixed cropping	-

Source: Field Survey, 2013.

#### Pattern of Income Distribution among the Arable Crop Farming Household in Ekiti State

Figure 1 presents the total household income distribution among respondents which include income from arable crop production, government employment, personal businesses, pensions and salaries, and other sources that are not agricultural based. The Figure revealed that the average income earned by an average arable crop farming household was about N900, 000 per annum with the minimum and maximum household income of N204, 000.0 and N3, 109,000.0 respectively.

**Figure 1: Pattern of Income Distribution among the Arable Crop Farming Household in Ekiti State**



**Note:** Mean = 899,738.3, Standard Deviation = 469,082.3, Minimum = 204,000.0, Maximum = 310, 9000.0  
 1 = < N500, 000, 2 = N500, 000 – N999, 999, 3 = N1, 000,000 – N1, 999,999,  
 4 = N2, 000,000 – N2, 999,999, 5 = ≥N3, 000,000.

Source: Field Survey, 2013.

#### 4.4 Decomposition of Arable Crop Income by Income Source

Table 2 presents the result of income decomposition analysis. The table shows the relative contribution of each identified arable crop income to overall income inequality in rural and urban areas of Ekiti State, Nigeria. Five arable crops namely; maize, rice, yam, cassava and cocoyam were the crops majorly grown in the study area.

The table reveals that in the rural areas, income from rice production accounted for the largest share of total agricultural income with 32.2 percent and contributed 21 percent to total income inequality. This implies that income from rice production possess some potential for reducing income inequality in rural areas. Similarly, maize has the same potential of reducing income inequality in rural areas as it accounts for 30.1 percent of the total income from arable crop production and contributed 22.8 percent to total income inequality.

In the urban areas however, cassava accounted for the largest share of the total income by contributing 34.1 percent and accounting for 17.7 percent of the total income inequality. Similarly, incomes from maize and rice in the urban areas accounted for 23.3 percent and 18.8 percent of total income, respectively, and contributing 15.9 percent and 19.3 percent to the overall income inequality in arable crop production. This suggests that income from maize also has potential of reducing inequality in income distribution in the urban areas. However, general mechanization of arable crops will increase production, which will consequently increase income of the arable crops farm households since increasing incomes from agricultural sources will reduce income inequality in rural and urban areas of Ekiti State, Nigeria.

**Table 2: Decomposition of Arable Crop Income by Income Source**

Income Source	Income Share (%)		Relative inequality Contribution	
	Rural	Urban	Rural	Urban
Maize	0.301	0.233	0.228	0.159
Rice	0.322	0.188	0.210	0.193
Yam	0.213	0.224	0.369	0.397
Cassava	0.110	0.341	0.173	0.177
Cocoyam	0.054	0.014	0.020	0.074
Total	1.00	1.00	1.00	1.00

**Source: Author's Computation, 2013.**

**Factors Affecting the Distribution of Income among Arable Crop Farmers in Ekiti State, Nigeria**

Table 3 presents the result of the regression analysis carried out to determine to the factors affecting the distribution of income among arable crop farmers in Ekiti State, Nigeria. The multiple linear regression result revealed that mechanization, educational level, household size, number of crops grown and secondary occupation have significant effect on the distribution income among the rural arable crop farm households in the study area. The positive relationship that existed between mechanization and household income implies that increase in the level of mechanization will bring about an increase and a more equitable distribution of income among arable crop farmers in rural areas of Ekiti State. Similarly, as household size, number of crops planted and secondary occupation increases, total household income will also increase in the rural areas of the study area. This implies that as household size increases, there will be more labour availability which will enhance increased production and as the number of crops grown increases, household income also increases.

The negative relationship that exists between the educational level and farmers' income in the rural areas implies that as the farmers become more educated, the household income decreases. This is against the a priori expectation. It may be an indication that the rural educated crop farmers may not be reaping the benefit of their education in terms of additional source of employment and income. At the same time, they have not been earning as much as agricultural income as their counterparts in the urban areas. However,  $R^2$  of 0.773 indicates that 77.3% of the factors that affects household income in the rural areas are accounted for by the explanatory variables. In the urban areas however, educational level, farm size, number of crops grown and secondary occupation has a positive and significant effect on household income distribution in the urban areas of Ekiti State, Nigeria. This indicates that as educational level, farm size, number of crops grown and secondary occupation increases in the urban areas, the level of household income and its even distribution also increases in the urban areas. Mechanization in the urban areas had no significant effect on the household income distribution in the urban areas. Reasons for this may be as a result of diverse income generating opportunities available in the urban areas.

**Table 3: Factors that Determine the Distribution of Income among Arable Crop Farming Households in Ekiti State, Nigeria**

Variable	Rural (n = 60)		Urban (n = 60)	
	Coef.	Std. Error	Coef.	Std. Error
(Constant)	-304194.945 (- 1.077)	282356.549	-554872.118 (- 0.740)	750127.380
Mechanization	255721.60** (2.530)	101056.601	214281.320 (0.808)	265246.126
Age	4333.650 (1.419)	3053.003	673.298 (0.101)	6689.951
Gender	-99174.589 (-1.102)	89985.986	5814.938 (0.045)	128723.695
Educational Level	-43529.329** (-2.051)	21268.901	47858.539** (2.091)	22892.371
Household Size	-263.022 (-0.032)	8143.077	18660.978 (1.254)	14880.305
Farm Size	123439.725** (5.399)	22865.435	167722.961** (7.451)	22509.201
No. Of Crops Grown	128039.112** (3.053)	41941.934	216024.509** (2.813)	76796.965
Full time Farming	43396.841 (0.441)	98516.526	6938.475 (0.043)	159646.670
Cropping System	47177.108 (0.555)	84954.044	-132350.839 (- 0.916)	144450.234
Land ownership Type	43677.883 (1.542)	28331.004	67440.296 (1.451)	46488.734
Labour Source	26389.990 (0.469)	56268.608	158385.300 (1.296)	122207.360
Secondary occupation	330164.894** (3.273)	100885.388	282432.497** (2.601)	108577.490
<b>R<sup>2</sup></b>	<b>0.773</b>		<b>0.695</b>	

Source: Field Survey, 2013.

Note: \*\* = Significant at 5%, t-values are the values in parenthesis.

### CONCLUSION AND RECOMMENDATIONS

It was concluded in this study that mechanization, educational level, household size, number of crops grown and secondary occupation all have significant effect on the income distribution among the rural arable crop farm households in Ekiti State, Nigeria. Also, income from rice and production possesses some potential for reducing income inequality in rural areas. In the urban areas however, cassava was revealed to be income inequality reducing.

Arising from the findings of this study, the following recommendations were made to improve income distribution among arable crop farm households, increase income generating ability of households and consequently boosting agricultural production in rural and urban Nigeria. The first policy implication of this study is that agricultural activities should be promoted among rural households in Nigeria. This is because, apart from being an inequality-decreasing income source i.e. having the potentials to bring about equitable distribution of income, it remains a major income source for the rural households. Policy makers, therefore, must concentrate on measures that will increase agricultural productivity through targeted efforts such as making mechanization facilities available to the rural arable crop farmers. Similarly, large scale farming and mixed cropping system should be encouraged to further help in increasing the income of the arable crop farm households in rural and urban areas as it was reported that number of crops grown as well as farm size have a positive and significant effect on household income in both rural and urban areas of Ekiti State, Nigeria. Lastly, education should be encouraged among arable crop farmers as this was observed to have a significant effect on even household income distribution.

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