

ANALYSIS OF FARM HOUSEHOLD INCOME DISTRIBUTION AMONG YAM FARMERS IN NIGER STATE, NIGERIA

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Abstract

The study examines the income distribution among yam farmers in selected Local Government Areas of Niger State. The study also determines the source and level of income, ascertain the extent of income inequality among the yam farmers household. The study adopted the multi-stage random sampling technique in the selection of respondents. In the first stage, three Local Government Areas were selected randomly from agro ecological zone II of the State based on the preponderance of yam production in these Local Government Areas which are located in the zone. The second stage involved a random selection of three villages from each of the Local Government Areas summing up to nine villages. The third stage involved a random selection of yam farmers from each of the villages using simplified formula to calculate sample size (n) from N population of the yam farmers in the study areas. The gross farm income techniques was used to determine the total farm income and Gini coefficient was used for the estimation of income distribution. The results reveal that 90% of the respondents were male, 45% were within the age range of 40 – 49 years and mean of 43.1%. 91% of them were married, 44% of them had average household size of 8 members. 42% of household had no education and 58% of them source their fund from personal savings. The result also showed that annual farm income was higher (₦45, 692,034) as to annual off-farm income (₦13, 895,670). Income distribution showed minimal level of inequality in farm income (0.572), high level in off-farm income (0.612) and low level in total income (Gini coefficient = 0.329). The study concluded by recommending among others that yam farmers should be encouraged to undergo literacy education which in turn help in boosting their yam activities and income growth; government at all level should provide credit facilities and other incentives such as fertilizer, seed among others to the yam farmers as this will enhance their yam productivity; and farm household should not depend only on farm income as this may reduce their income generation.

Key Words: Farm Household, Income Distribution, Yam farmers

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INTRODUCTION

The significance of equal access to opportunities, assets, and income plays important role in reducing income inequality and encouraging economic growth (Oluwatayo 2008). Income disparities are all about the dispersion of a distribution either in terms of consumption, income or any other quality or attribute, that shows the welfare status of a population (Autor 2012). The accentuated socio- economic problem of income inequality has led to unequal access to food, shelter, education, health and other essentials of life (Oguniyi, Adepoju and Olapade 2011). A high level of income inequality exists in many low-income countries including Nigeria. It is also widely believed that majority of Nigerians live in rural areas (Babatunde 2009). These rural communities are majorly agrarian with majority of them owning just small pieces of land on which they grow crops hardly sufficient to feed themselves, let alone to sell in order to generate income. They therefore, live on small and meager income as compared to urban dwellers who earn more due to their higher literacy level among others (Oguniyi *et al.*). Usually, people in the urban areas invest their time and money to acquire skills and hence, earn higher income

(Oluwatayo, 2008). The poverty situation in Niger State, according to prior national research, portrayed a scenario of low dependency ratio, undesirable household economic welfare and pathetic self-classified poverty assessment (Saidu, Ahmed and Sani, 2013).

Poverty and income inequality are closely related and several literatures have shown that income disparity is a manifestation as well as a strong cause of poverty. Disparities in the income level of the people in rural economy are on the increase which could be due to poverty. Using the 2004 national living standard survey (NLSS) data, Oyekale, Adeoti and Ogunnupe (2006), found out that the overall Gini index for Nigeria was 0.580. In sectoral sense, the study found income inequality to be higher in rural areas compared to urban areas and that employment income increases income inequality while agricultural income decreases it (Oyinde *et al.*). The people living in the rural areas are in one way or the other more prone to poverty. Income inequality has social, security and economic implications which engender rural people to think of themselves as being marginalized in terms of income distribution and provision of social amenities, which may lead to increased grievances and situational unrest (Saidu, Ahmed and Sani 2012). The introduction of various poverty and income redistribution policies by the government was to reduce high cost of living among its populace which will in turn improve their standard of living. Despite all these programs introduced, the living standard among the populace has not improved tremendously (Agbaeze and Onwuka 2011). Base on the foregoing, the specific objectives of this study are to determine the source and level of income distribution among the yam farmers in the study area and ascertain the extent of income inequality among yam farmers in the study area.

METHODOLOGY

The Study Area

Niger State is located in the north central zone of the country. The State has a population of 3,950,249 (population census 2006) and the projected value of 4,702,376 at the end of 2013 (CBN 2.38 percent annual projection). The State is ranked 8th out of 36 in terms of population density. The State lies between latitudes 8^o.11' N and 11^o.20' N and longitudes 4^o.30'E and 7^o.20'E occupying a land mass of about 74,244km² (Niger State Geographic Information System, 2007) . The State is bordered to the north by Zamfara State, West by Kebbi State, south by Kogi State, south west by Kwara State, north-east by Kaduna State and south-east by the Federal Capital Territory. It also has an international boundary with the Republic of Benin along Agwara and Borgu Local Government Areas to the North West (Niger State Geographic Information System). The Maximum temperature, usually not more than 32^oC, is recorded in March and June, while the minimum is usually between December and January. The fertile soil and hydrology of the State permits the cultivation of most of Nigeria's crops and still allows sufficient opportunities for grazing, fresh water fishing and forestry development. The soil types in the State are of two types, Ku and Ya soils. The Ku soil has little erosion hazards, while the Ya soil has better water holding capacity which makes it more suitable for agricultural activities.

Sampling Technique and Sample Size.

The study adopted the multi-stage random sampling technique in the selection of respondents. In the first stage, three Local Government Areas were selected randomly from agro ecological zone II of the State based on the preponderance of yam production in these Local Government Areas which are located in the zone. The second stage involved a random selection of three villages from each of the Local Government Areas summing up to nine villages. The third stage involved a random selection of yam farmers from each of the villages using simplified formula to calculate sample size (n) from N population of the yam farmers in the study areas as adopted by Tanko and Kpange (2014).

$$nh = \frac{n.NH}{N} \quad (1)$$

Where n_h is the sample size determined, N_H is the population size (sampling frame), n is the number of the targeted respondents and N is the total population of yam farmers in the study area. The sampling frames of villages and farmers were obtained through the National Farmers Census (2011), National Farmers Database, Niger State Agricultural Mechanization and Development Authority, village heads and farmers' association, through a reconnaissance survey.

Method of Data Collection

Primary data were used in this study and were collected through the aid of pre-tested questionnaire. Information gathered included the following:

- (a) Socio-economic data: This included information on age of household head, sex of the household head, years of education, marital status, household size, source of fund among others.
- (b) Household income data; This included information on crop income, livestock income, agricultural wage income, agricultural wage labour to other farms, non-agricultural wage income from both formal and informal employment, self-employed income from own businesses, remittance income received from relatives and friends not presently living with the household, other incomes, mostly comprising capital earnings and pension.

Method of Data Analysis

Descriptive statistics

These tools were used to analyze the socio-economic characteristics of the respondents (objective 1). These include frequencies, means, percentages, tables and chart.

Farm budget technique:

This was used to determine the level of income of the yam farmers. Gross Farm Income (GFI) = price x quantity
Miscellaneous, Man-hour/ Man-day: This was used to analyze the off-farm income of the yam farmers.

Measurement of Income Distribution of Respondents

1. The Gini coefficient and the Lorenz curve:

This was used to ascertain the extent of income inequality among the respondents (objective 4). The Gini coefficient is a measure of statistical dispersion most prominently used as measure of inequality among value of a frequency distribution. For example, level of income, wealth among others (Dixon, Weiner, Mitchell and Woodley 1988). It has value from 0 to 1. Therefore a low Gini coefficient indicates a more equal distribution of income or wealth with zero corresponding to complete equality while higher Gini Coefficient indicates more unequal distribution with one corresponding to complete inequality (Bakare 2012). Lorenz curve plots the proportion of the total income of the population (y-axis) that is cumulatively earned by the bottom X% of the population (Bakare 2012).

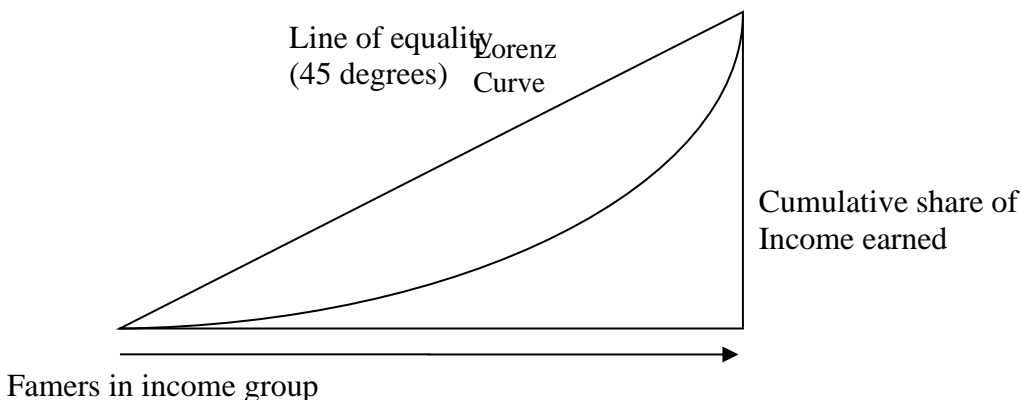


Fig 1: The Lorenz curve

The Gini index is the ratio of area between the curve and the line of perfect equality to the total area under the diagonal line of perfect equality. It varies from 0 (perfect equality) to 1 (complete inequality, where one individual hold 100% of the income). And is also defined as;

$$G=1-\sum x y$$

Where: G= Gini coefficient

X= cumulative percent of farmers in income group

Y= cumulative percent of income

RESULTS AND DISCUSSION

Socio-economic Characteristics of Yam farmers

The distribution of respondents according to their socio-economic profiles is presented in Table 1. The results revealed that 90% of the yam farmers were male while 10% were female. This is an indication that most of the yam farmers were male. The reason for this is as a result of exertion of physical energy required in the business. This result aligns with the findings of Oguniyi *et al.* (2011) in their study on comparative analysis of poverty and income inequality among food crop and livestock farmers in Ilesa metropolis, Osun State which revealed that 86 percent of food crop farmers were males, that the reason behind this, was because agricultural production is tedious in nature especially food crop production compared to other agricultural enterprises. The result also revealed that the average age of the respondents was 43 years. About 45% of the respondents were between the ages of 40 and 49 years. This implies that high percentage of these farmers was in their productive age and therefore they can participate actively in various agricultural production activities. In line with this, Mbanasor *et al.* (2010) found that about fifty percent of their respondents were within the age range of 40 and 59 years. By implication, they had high likelihood to earn high incomes as they were at the peak of their active years. Majority of the respondents (91%) were married. This indicates that married people were more involved in agricultural production in the study area.

The higher percentage of married respondent agrees with Agbaeze and Onwuka (2014) who reported that higher percentage of yam farmers (74.3%) were married. The Table also reveals that 44% of the yam farmers had about 6 to 10 household member households with an average household size of 8. This implies that high percentage of the farming households in the study area do not have large household sizes, hence income earned from farming activities will be expended on these members only which will consequently improve their welfare. In line with this, Baba and Wando (1998) had earlier reported that large family size tends to draw more on income which could have been used for future investment.

The table further reveals that only about 42% of the yam farmers had no education. Literacy level among the respondents was high which may affect their productivity positively. The distribution of respondents based on source of funding for their agricultural activities shows that personal saving (55%) was the predominant source of funding for the yam farmers. Funding from formal source accounted for lowest percentage i.e 20%. The result revealed that formal sources were less patronized for financial support for yam farming in the study area. This may be due to high interest rate on loans. This finding also agrees with Ndanitsa (2014) who stated that farmers sourced their funding from their personal savings. And that it may due to avoidance of high interest rate on loan as well as banks insistence on the provision of collateral facilities. In the same vein Oguniyi *et al.* (2011) found out that the distribution of respondents based on source of funding for their agricultural activities showed that personal saving (76.0%, 55.0%, and 73%) and cooperative (46.0%, 32.5% and 42.7%) were the predominant sources of funding for food crop and livestock farmers.

Table 1: Distribution of respondents based on their socio-economic profiles.

Variables	Frequency	Percentage
Sex:	Male	108
	Female	12
Age:	< 40	44
	40 – 49	54
	50 – 59	20
	60 and above	2
Marital Status:	Single	11
	Married	109
Household Size:	≤ 5	16
	6 – 10	53
	Above 10	51
Education Level:	No Education	50
	Qur'anic Education	13
	Primary Education	23
	Secondary Education	20
	Tertiary Education	14
Source of Funding:	Personal Saving	70
	Informal Source	26
	Formal Source	24
Ownership of House:	Rented apartment	4
	Personal	56
	Extended family	60
Type of residential building:	Mud and Unplastered	34
	Mud and Plastered	79
	Block and Plastered	6
	Block and Unplastered	1
Toilet Type:	Water Closet	2
	Pit Latrine	70
	Stream/Bush disposal	48
Source of Drinking Water:	Tap	3
	Borehole	75
	Well	14
	Stream	28
Accessibility of Roads:	Tarred	28
	Not tarred	86
	Not motorable	6
Means of Transportation:	Trekking	10
	Bicycle	15
	Private Motorbike	50
	Public Transport	38
	Private Vehicle	7

Source: Field Survey (2014)

Income Sources and Income Level of Yam Farmers

Table 2 shows the sources of income and the annual income of the sampled households in the study area. By decomposing the overall income between farm and off-farm income, revealed that the farm income as a whole accounted for 76.68% while off-farm income accounted for 23.32% of total income. This result corroborates the findings of Vanden Berg and Kumbi (2006), who reported that farm income contributed more than off-farm income to inequality in rural Ethiopia.

Table 2: Income sources and income levels of yam farmers in the study area.

Income source	Per capita income share	Percentage
Total household income	496,384.2	76.68
Total farm income	380,766.96	
Crop income	349,036.41	
Yam	107,038.76	
Maize	34,379.35	
Guinea corn	38,379.55	
Millet	36,962.88	
Mellon	37,594.92	
Cowpea	35,296.22	
Inter cropping	36,046.22	
Others	18,332.5	
Livestock income	31,730.54	
Cow	12,099.30	
Goat	10,031.94	
Sheep	5,833.33	
Poultry	3,765.97	23.32
Total off-farm income	115,797.25	
Agric wage income	28,949.31	
Non-agric wage income	16,082.95	
Self-employed income	57,898.63	
Remittance	9,649.77	
Other income	3,216.59	100

Source: Field survey (2014)

Estimation of Inequality in Income Distribution: Farm Income Distribution

The analysis of yam farmers' farm income distribution in Table 3 shows that 17.5% of the households earned annual farm income between of ₦200, 001 to ₦300, 000 brackets on annually. This was followed by 16.7% of the total sampled household which received ≤₦100, 000. This result is in agreement with Adewunmi *et al.* (2011) who found that farm households rely strongly on farm income source but still, 28 percent of their total income is from non-farm source. Waqar *et al.* (2011) also observed higher proportion of lower income households were found among households depending only on farm income. Also, that, the proportion of lower income households was lower in the households that adopted both farm and non-farm occupation as compared to households with dependence on only one occupation.

Table 3. Distribution of farm income and estimation of Gini coefficient of yam farmers

Income (₦)	Number of farmers (Freq)	% of farmers in income group	Cum % of farmers in income group (X)	Total income	% of their income	Cum % of income (Y)	XY
≤ 100,100	20	16.7	16.7	2,980,000	6.4	6.4	0.0010688
100,001-200,000	13	10.8	27.5	1,610,000	3.5	9.9	0.0027225
200,001-300,000	21	17.5	45	4,899,000	10.7	20.4	0.00918
300,001-400,000	15	12.5	57.5	4,991,000	10.7	31.1	0.0178208
400,001-500,000	19	15.8	73.3	7,722,000	16.6	47.7	0.0349641
500,001-600,000	09	7.5	80.8	5,307,000	11.4	59.1	0.0477528
600,001-700,000	07	5.8	86.6	4,352,000	9.3	68.4	0.0592344
700,001-800,000	06	5	91.6	4,400,000	9.4	77.8	0.0712648
800,001-900-000	05	4.2	95.8	4,752,000	10.2	88	0.084304
> 900,000	05	4.2	100	5,579,034	12	100	0.1
Total	120	100		46,592,034	100		0.4283122

Gini Coefficient = 1- 0.4283122 = 0.5716878

Source: Field Survey (2014)

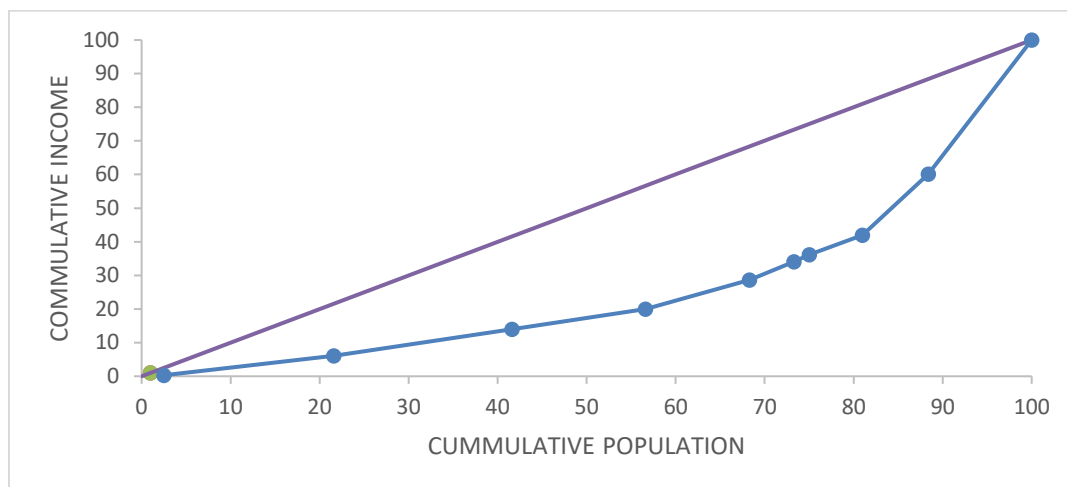


Figure 2: Lorenz curve for farm income distribution of yam farmers.

Table 4 shows that the farm income was unequally distributed among the sampled households. The lowest 45% of the population owned just 20% of the total farm income whereas highest 14% households owned 32% of the total farm income. These findings corroborated the findings of Naeemur- Rehman and Anwar (2008) that the bottom 20% of sampled farmers had got only 1.4% of total money income followed by top 20% receiving 60.80% of the total income. Similarly, the bottom 50% of the sampled farmer received only 9.40% of the total income representing higher degree of severity existing rural rice farmers of district Swat.

Table 4: Farm income distribution among sampled households

Household	Number)	Population%	Cum.%	Income	Income %	Cum.%
Lowest10		16.6	16.7	2980000	6.4	6.4
Next 10		10.8	27.5	1610000	3.5	9.9
Next 10		17.5	45	4899000	10.5	20.4
Next 10		12.5	57.5	4991000	10.7	31.1
Next 10		15.8	73.3	7722000	16.6	47.7
Next 10		7.5	80.8	5307000	11.5	59.1
Next 10		5.8	86.6	4352000	9.3	68.4
Next 10		5	91.6	4400000	9.4	77.8
Next 10		4.2	95.8	4752000	10.2	88
Next 10		4.2	100	5579034	12	100
				46592034	100	

Source: Field Survey, 2014

Gini coefficient for farm income

When Gini coefficient is zero, it implies that there is perfect equality in income distribution i.e income is evenly distributed and when it is one, it is perfect inequality. Table 5 shows that the income was distributed unequally among sampled households with Gini coefficient of 0.572, the result agrees with the findings of Aigbokhan (2008) who found a Gini coefficient of 0.488 in his studies on growth, inequality and poverty in Nigeria.

Off-farm Income Distribution among Yam Farmers

Table 6 shows the distribution of income that composes the overall off-farm income among the yam farmers. The result reveals that those yam farmers that fell within the range of \leq ₦100,000 had 23.3% of the total income, then followed by 15.0% which was recorded by the income earners that fell within the income range of ₦300,001 to ₦400,000, while ₦800,000 to ₦900,000 recorded the least percentage of 1.3%. In vein with the findings of Waqar *et al.* (2011) showed that highest proportion of lower income households were found among households depending on non-farm income.

Table 5: Distribution of Off-farm income and estimation of Gini Coefficient of yam farmers

Income (₦)	Number of farmers (Freq)	% of farmers in income group	Cum % of farmers in income group (X)	Total income	% of their income	Cum % of income (Y)
≤ 100,100	87	72.5	72.5	650,000	4.7	4.7
100,001-200,000	10	8.3	80.8	1,000,500	7.2	11.9
200,001-300,000	5	4.1	84.9	1,000,200	7.2	19.1
300,001-400,000	3	2.5	87.4	900,400	6.5	25.6
400,001-500,000	2	1.7	89.1	800,600	5.8	31.4
500,001-600,000	2	1.7	90.8	1,000,100	7.2	38.6
600,001-700,000	2	1.7	92.5	1,200,000	8.7	47.3
700,001-800,000	3	2.5	95	2,100,300	15.2	62.5
800,001-900-000	2	1.7	96.7	1,600,200	11.6	74.1
> 900,000	4	3.3	100	3,600,079	25.6	100
Total	120	100		13,852,379	100	

Gini Coefficient = $1 - 0.38942117 = 0.6105786$

Source: Field Survey (2014)

Lorenz curve for off-farm income

Table 3.6 shows that the off-farm income was distributed on unequally among the sampled households. The lowest 85% of the total respondents owned just 19% of the total off-farm income while the lowest 7% of the respondents owned 53% of the total off-farm income. These findings corroborated the findings of Babatunde (2009) who stated in his work that the richest quintile of respondents earned 12.3 times the total income earned by the poorest quintile. These fold-values are 12.6 and 17.6 when we consider farm incomes from irrigated agriculture and rain fed agriculture, respectively. As far as non-farm income is concerned, the richest quintile earned 99 times the amount of non-farm income earned by the poorest quintile. This Indicated that non-farm income is distributed more unequally than the other two types in rural Nigeria.

Table 6 Off-farm income distribution among yam farmers

Households (Number)	Population %	Cum Pop. %	Total Income	Income %	Cum. Income%
Lowest 10	72.5	72.5	650000	4.7	4.7
Next 10	8.3	80.8	1000500	7.2	11.9
Next 10	4.1	84.9	1000200	7.2	19.1
Next 10	2.5	87.4	900400	6.5	25.6
Next 10	1.7	89.1	800600	5.8	31.4
Next 10	1.7	90.8	1000100	7.2	38.6
Next 10	1.7	92.5	1200000	8.7	47.3

Next 10	2.5	95	2100300	15.2	62.5
Next 10	1.7	96.7	1600200	11.6	74.1
Next 10	3.3	100	3600079	25.9	100
Total	100		13852379	100	

Source: Field Survey 2014

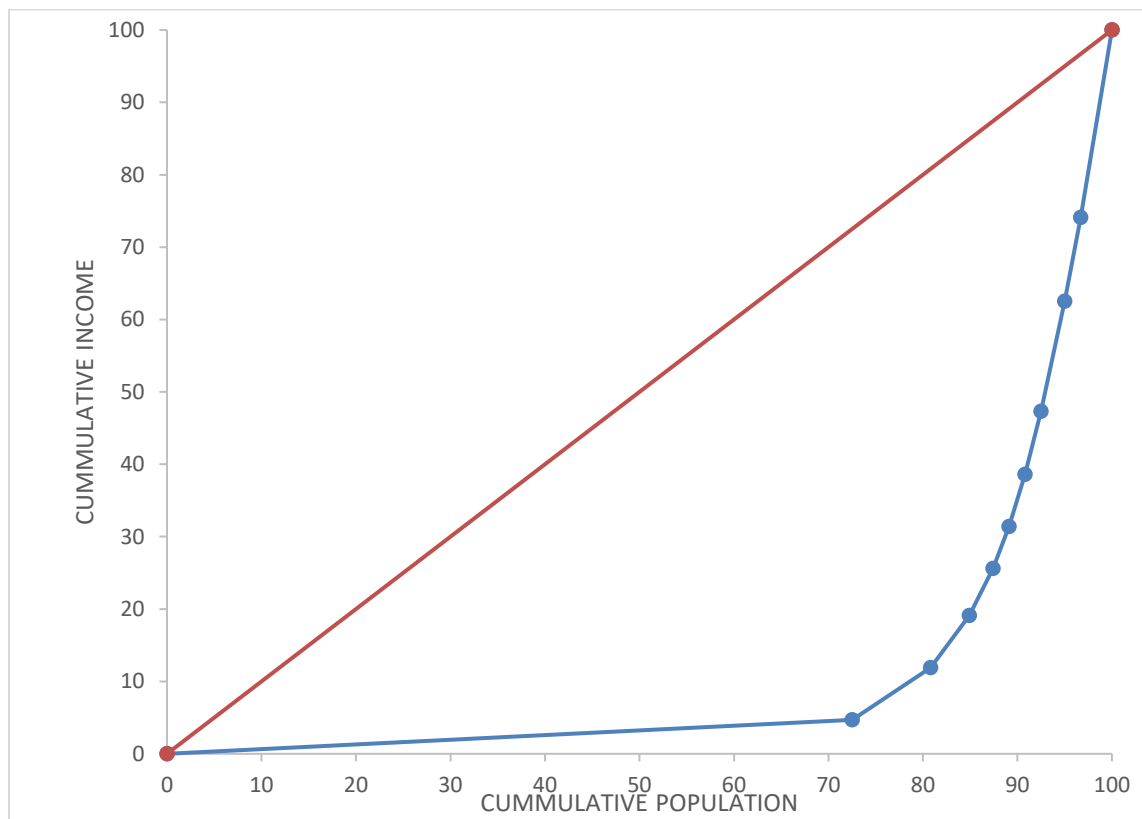


Figure 3: Lorenz curve for off-farm income distribution of yam farmers.

Table 5 shows that the distribution of off-farm income was unequally distributed among the respondents with a Gini coefficient of 0.611. This indicates that there is a high level of inequality in off-farm income distribution among the yam farmers. This result corroborates the findings of Jude *et al.* (2013) who found a very high Gini coefficient of 0.987 in their study area.

Total income distribution

In estimating the total income distribution of the households Table .7 presented the result. It could be observed that 20% of the households earned annual income that fell within ₦200, 001 to ₦300, 000 brackets on annual income basis. This was followed closely by 19.1% of the total sampled households which received between ₦600, 001 and ₦700, 000 on annual basis. This result is in agreement with Waqar *et al.* (2011) who found that 33% of the respondents in their study area earned annual income of ₦ 200,001- ₦ 300, 000. This finding is in agreement with Waqar *et al.* (2011) who found that 53% of respondents in their study area earned annual income of 200,001-300,000.

Table 7: Computation of Gini coefficient for the households’ total income of yam farmers

Income(₦)	Numbers of farmers (freq)	% of farmers in income group (X)	Cum frequency	Cum % of farmers in income group	Total income	% of their income	Cum % of income (Y)	XY
≤ 100000	3	2.5	3	2.5	182400	0.31	0.31	0.0000775
100001 – 200000	23	19.1	26	21.6	3428800	5.75	6.06	0.0116
200001 – 300000	24	20	50	41.6	6230017	10.46	16.51	0.0330
300001 – 400000	28	15	68	56.6	6655850	11.17	27.69	0.0415
400001 – 500000	14	11.5	82	68.3	575800	0.97	28.66	0.0335
500001 – 600000	6	5	88	73.3	3219581	5.40	34.06	0.0170
600001 – 700000	2	1.7	90	75	1277401	12.14	36.2	0.0062
700001 – 800000	8	6.7	98	81.7	7479711	12.55	48.75	0.0326
800001 – 900000	8	6.7	106	88.4	6769830	11.36	60.11	0.0402
> 900000	14	11.6	120	100	23768314	39.88	100	0.1049
Total	120	100			59587704	100		0.320575

Gini Coefficient = $1 - 0.320575 = 0.679425$

Source: Field Survey (2014)

Lorenz curve for total income

Table 8 shows that the income was distributed unequally among sampled households with Gini Coefficient of 0.321. The lowest 42 percent of population owned just 17 percent of the total income whereas highest 25 percent households owned 64 percent of total income. These findings corroborated the findings of Waqar *et al.* (2011), who found a Gini coefficient value of 0.69 and 0.75 for the asset of household in their study on the empirical analysis of household income in rural Pakistan, evidences from Tehsil Samundri Pakistan. The result also further revealed that the lowest 25percent population owned just 5 percent of the total income whereas highest 26 percent household owned 65 percent of total income.

Table 8: Total Income distribution among sampled households

Households (Numbers)	Population (%)	Cumulated population (%)	Income (%)	Cumulated income (%)
Lowest 10	2.5	2.5	0.31	0.31
Next 10	19.1	21.6	5.75	6.06
Next 10	20	41.6	10.46	16.52
Next 10	15	56.6	11.17	27.69
Next 10	11.5	68.3	0.97	28.66
Next 10	5	73.3	5.40	34.06
Next 10	1.7	75	12.14	36.2
Next 10	6.7	81.7	12.55	48.75
Next 10	6.7	88.4	11.36	60.11
Next 10	11.6	100	39.88	100

Gini Coefficient = 0.320575

Source: Field Survey (2014)

Gini coefficient of total income

The Gini coefficient is 0.320575 and it reflects the level of inequality in income distribution. This is in concord to Gini coefficient of income distribution of 0.33 for food crop farmers 0.40 for livestock farmers and 0.39 for crop livestock farmers found by Ogunniyi *et al.* (2011). The result can also be compared with the findings of Ayinde *et al.* (2012) who found the Gini coefficient of 0.43 and 0.33 as against 0.69 and 0.67 for agricultural and non-agricultural incomes in rural and urban areas respectively.

Conclusion

It is discovered from the findings that over 42% of the yam farmers in the study area were not educated. This in turn reduces the farm productivity of the farmers. The study also revealed that the yam farmers do not have access to credit facilities and other incentives such as fertilizer, seeds among others that would enhance their productivity. It is also discovered that farm household who only depend on farm income suffer low-income generation.

Recommendations

1. Yam farmers should be encouraged to undergo literacy education which in turn will help in boosting their yam activities and income growth.
2. Government at all level should provide credit facilities and other incentives such as fertilizer, seeds among others to the yam farmers as this will enhance their yam productivity.
3. Farm households should not depend only on farm income as this may reduce their income generation.

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