

POVERTY STATUS OF COOPERATIVE AND NON-COOPERATIVE YAM FARMERS HOUSEHOLDS IN EDO CENTRAL AGROECOLOGICAL ZONE OF EDO STATE, NIGERIA

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ABSTRACT

The alleviation and eradication of poverty have remained a critical issue among countries of the world. Cooperative societies have been touted as effective mechanisms for improving agricultural productivity and enhancing the socio-economic status of farmers. This study investigates the poverty status of cooperative and non-cooperative yam farming households in Edo Central Zone, Edo State, Nigeria. A multistage sampling procedure was used to select 120 yam farmers for this study. Data were analysed using descriptive statistics, Foster-Greer-Thorbecke (FGT) poverty measure, and logit regression analysis. The results showed that cooperative farmers have significantly lower poverty incidence (37.10%), depth (9.12%), and severity (3.58%) compared to non-cooperative farmers with incidence (63.35%), depth (27.37%) and severity (8.91%) for non-cooperative farmers. Key factors found to influence the poverty status of the yam farming household were age (-0.331), farming experience (0.268), farm size (4.291), income from yam production (0.661), and income from other sources (4.291). The study concludes that co-operative society membership alone does not significantly and statistically influence poverty status, suggesting a need to enhance cooperative effectiveness. It is therefore recommended that policymakers and agricultural development organisations in Edo State should consider promoting and strengthening agricultural cooperatives as a feasible tool for poverty reduction.

Keywords: Poverty, co-operatives members, cooperative societies, yam farmers, Foster-Greer-Thorbecke (FGT)

INTRODUCTION

Background of Study

Yam contributes to the wealth and food security of the peoples of sub-Saharan Africa and it is a highly valued crop in Nigeria (Verter and Becvarova, 2015). It is better in terms of nutrients to than other similar crops such as potato, cassava, plantain, etc. According to Vecter and Becvarova, (2015), in Nigeria, it employs a significant number of people.

Nigeria leads in yam production compared to other African countries, producing up to 17 million tonnes from a land area of 2,837,000 hectares (FAO, 2015). Nigeria has steadily grown its yam production all through time, yet, there is however decreasing yield and the production has been on the decline since 2012 (Amaefula, 2021). Yam production is labour-intensive and requires a huge capital outlay, with labour constituting approximately 40% of the total cost of its production. Yam cultivation is profitable and demand for the commodity is high and this has contributed to the increase in

its price, making it unaffordable for many (Amaefula, 2018 and Amaefula, 2021).

Production of yam in Nigeria is usually carried out by smallholder farmers whose output is more than 90% of the total production. The crop contributes significantly to the national economy and rural income by employing a significant percentage of rural folks. It is also a cheap source of carbohydrate staple for the majority of the population and reduces poverty levels (Onyenobi *et al*, 2013). Despite the abundance of yams, poverty remains a pressing issue for many Nigerians.

Agricultural co-operative societies are institutions specifically designed to cater to the Agricultural practitioners' needs (Onyima and Okoro, 2019), thus it can be found in areas of consumption, production, and marketing. Cooperative activities increase the members' income, ensure growth, increase market opportunities, and create jobs, especially among low-income households. According to Ezekiel (2014), it also increases sustainable development in rural areas and decreases poverty. Agricultural cooperative societies engage in a variety of programs to assist farmers in overcoming obstacles. Farmers cooperate by pooling their limited resources through cooperatives to maximize Agricultural output, which improves socioeconomic activity (Onyima and Okoro 2019).

Poverty refers to a state or condition of deprivation or lack, typically characterized by a lack of material resources or necessities needed to meet one's basic human needs. In a broad sense, it encompasses several dimensions, including income, education, health, access to resources, and overall well-being. Poverty is often measured in monetary terms, using income or consumption-based indicators, which examine the extent to which individuals or households fall below a defined poverty line.

This line is typically set at a level considered necessary to meet basic needs, such as food, health, shelter, protection, education, and clothing. Adeleke (2012) also defined poverty as being severely lacking in necessities for survival, such as food, sanitation facilities, education, information, lack of income, and productive resources.

According to Ravallion and Datt, (2019), increasing agricultural productivity can reduce poverty through some ways such as changes in real income and the creation of jobs, among others. These have multiplier effects on non-farming businesses, such as pricing effects on food. Its effects on poverty are both direct and indirect. Direct effects come from agricultural growth immediately raising the actual incomes of poor farm and non-farm households; indirect effects come from agricultural output growth causing more employment opportunities in non-farm sectors both upstream and downstream in response to higher domestic demand.

Statement of Problem

Poverty has continually been a threat to human survival anywhere it exists in the world. Poverty has become an unending trap, gradually engulfing entire households and continuously leading to death (Moshin Khan, 2019). The alleviation and eradication of poverty have remained a critical issue among countries of the world and have also become the central goal and top priority of the international development agenda (United Nations, 2015). The unending trap created by poverty is gradually consuming poor farming households thereby lessening their productivity, imposing the ultimate trap to economic development, siphoning and continuously draining the viable human resources to the developed world in search of greener pasture.

Co-operative society has been defined by the International Co-operative Alliance (ICA) as 'an autonomous association of persons united

voluntarily to meet their social, cultural and physical needs through a jointly owned and democratically controlled organisation". Cooperative societies have been touted as effective mechanisms for improving agricultural productivity and enhancing the socio-economic status of farmers. These societies provide various benefits such as having credit available to the co-operators, shared resources, and collective bargaining power, which can mitigate the challenges faced by individual farmers (Afolabi, 2010). In contrast, non-co-operative farmers often lack these advantages, which can exacerbate their poverty status due to limited financial resources accessibility, modern farming methods, and markets (Babatunde, 2013). According to Ovwigho and Ife (2009), cooperative societies can play a significant role in improving income levels and the overall well-being of farmers.

Despite these potential benefits, the effectiveness of cooperative societies in reducing poverty among yam farmers in Edo Central Zone has not been fully explored. This study aims to fill this gap by comparing the poverty status of cooperative and non-cooperative yam farmer households. Understanding these dynamics can inform policy decisions and interventions aimed at promoting agricultural cooperatives as a strategy for poverty reduction in rural Nigeria.

METHODOLOGY

Area and Scope of the Study

This study was carried out in the Edo Central Zone of Edo State, Nigeria. Edo Central agro-ecological zone comprises five Local Government Areas (LGAs), which are Esan West, Esan Central, Esan North-East, Igueben, and Esan South East LGAs. The population of this zone was 586,534 in the 2006 population census, however, with the 2022 projections, the population stands at about 873,900. This is a projected increase of about 49%.

The zone lies approximately on Latitude 6° 42' 34.88 'N, and Longitude 6° 11' 35.27'E. It is situated in the southern region of Nigeria, in the tropical rainforest zone.

This area is predominantly agrarian, with yam being one of the major agricultural crops cultivated.

Data Collection

Primary data used for this study was collected with the aid of structured questionnaire. Data collected includes socio-economic characteristics of the yam farmers, their level of production, farm size as well as inputs used such as labour, the quantity of fertilizer, and prices of inputs.

Sampling Procedure

A multistage sampling procedure was adopted in selecting the sample for this study. The first stage involved the selection of two LGAs from the zone, using simple random sampling technique. The selected LGAs are Esan North East and Esan South East LGAs. The second stage involved the selection of three communities from each selected LGA already selected. This also was done using simple random sampling technique. The following communities were selected: Uzea, Ubiaja, and Arue for Esan North East LGA and Ewatto, Ewohimi, and Emu for Esan South East LGA. The third stage involved the selection of two cooperative societies each from the six selected communities from the list of cooperative societies that were obtained from the Ministry of Commerce, Industry, and Cooperatives. The fourth stage involved the simple random selection of five (5) farmers from the selected cooperative societies; this gave a total of sixty (60) cooperative yam farmers. The same procedure was used in selecting 60 non-co-operative yam farmers from the communities. This amounted to one hundred and twenty yam farmers from the zone, however only a total of

115 questionnaires were returned and used for the analysis of this study.

Data Analysis

Descriptive Statistics such as means, frequency counts, and percentages were used to summarize the data on the socio-economic characteristics of the yam farmers. The Foster-Greer-Thorbecke (FGT) poverty index involving poverty incidence (P_0), depth (P_1), and severity (P_2) were used to analyse the poverty status of yam farmers in both categories in the study area.

Poverty Line

The poverty incidence shows the rate of poverty which is simply the number of poor farmers, whereas poverty depth and severity show the distance of the poor farmers from the poverty line and the impact of measured poverty if a gain

person from the line respectively. In calculating the poverty line, the relative poverty measure (where households, are in a disadvantaged position either financially or socially with regards to other people in their environment) or the absolute poverty line (where basic needs of the farming households are not covered) can be used. For this study, the absolute poverty line was used. As such, yam farmers with per capita income of less than \$2.15 (approximately ₦2,150.00 given the dollar rate of ₦1000 to the dollar) were classified as poor, while those farmers spending above \$2.15 per day were classified as non-poor (World Bank, 2022).

Poverty Incidence, Depth and Severity

The Foster-Greer-Thorbecke (FGT) poverty index was used to analyze the poverty status of the yam farmers in the study area.

The FGT poverty index is calculated using the following formula:

$$P_{\alpha} = \frac{1}{n} E_{i=1}^q \left[\frac{Z - Y_i}{z} \right]^{\alpha} \dots\dots\dots (1)$$

Where:

P_{α} = p-alpha (poverty index) that measures the level of poverty.

n = Total number of households (sample size).

(Z - Y_i) = the gap between the poverty line and the income for each poor individual.

Z = the poverty line for household.

q = number of households below the poverty line.

Y_i = household income of the i^{th} household

α = poverty aversion parameter that takes the values 0, 1, or 2 for incidence, depth, and severity of poverty respectively.

Determining the poverty index

When $\alpha = 0$, the expression becomes:

$$P_0 = \frac{1}{n} E_{i=1}^q \left[\frac{Z - Y_i}{z} \right]^0 \dots\dots\dots (2)$$

P_0 = measure of poverty incidence, is synonymous with both the head count ratio and the prevalence of poverty. It signifies the percentage of the population residing below the poverty line. A higher value of this index signifies a larger proportion of individuals or households living in poverty.

Where $\alpha = 1$ the expression becomes

$$P_1 = \frac{1}{n} E_{i=1}^q \left[\frac{Z - Y_i}{z} \right]^1 \dots\dots\dots (3)$$

P_1 = Poverty depth or poverty gap index which measures the extent to which individuals fall below the poverty line as proportion of the poverty line.

Where $\alpha = 2$, the expression becomes:

$$P_2 = \frac{1}{n} E_{i=1}^q \left[\frac{Z - Y_i}{z} \right]^2 \dots\dots\dots (4)$$

P_2 = poverty severity index, which increases as a person's distance from the poverty line grows. It quantifies the squared poverty gap in relation to the poverty line. Consequently, a higher value of this index indicates more severe poverty.

To assess poverty, a decomposition was conducted, taking into account the socio-economic characteristics of the respondents. Additionally, an analysis of the impact of cooperative activities, as employed by Oladimeji (2015), was undertaken to further understand its influence on poverty.

The logistic binary model also known as Logit was employed to determine the factors influencing the poverty status among yam farmers. The logit regression model by Gujarati (2004) as applied by Omonona *et al.*, (2006) was used. The model in its implicit form is given as;

Log (Y) = natural log (odd ratio)

$$Y_1 = \ln \left(\frac{p}{1-p} \right) = \beta + \beta_1 X_1$$

Where

Y = dependent variable (poverty level non-poor = 1 and poor = 0)

α = intercept

β = regression coefficients

X = independent variables

The model in its explicit form is given as;

$$Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e_i$$

Where;

Y = dependent variable (poverty level non-poor = 1 and poor = 0)

B_0 = Intercept

B_{1-8} = parameters to be estimated

$X_1 - X_8$ = independent variables

X_1 = Age of respondent (years)

X_2 = Household size

X_3 = Educational level (years)

X_4 = Farming experience (years)

X_5 = Farm size of yam (Hectares)

X_6 = Income from yam production (₦)

X_7 = Income from other productive activities (₦)

X_8 = Membership of cooperative (Member = 1 Non member = 0)

e_i = Error term

RESULTS AND DISCUSSION

Table 1 shows the socio-economic characteristics of the yam farmers regarding their farm sizes, annual income, as well as earnings from other sources. The average farmland the farmers in the study area owned was 1.5 hectares. Some non-cooperative farmers (57.1%) have farm sizes between 0.51 and 1.50 hectares, compared to 64.4% of cooperative farmers in the same category. Additionally, a larger proportion of Cooperative farmers (27.1%) have farm sizes between 1.51 and 2.5 hectares, compared to only 14.3% of non-cooperative farmers. This suggests that co-operative farmers had larger farm sizes, which can be linked to the assistance and resources provided by cooperative societies (Afolabi, 2010). Cooperative members with larger farm sizes may experience increased production and economies of scale; they are both needed to lower poverty. Research has shown that cooperative membership often leads to

increased access to land and other inputs, which is critical for agricultural development (Ovwigho & Ifie, 2009).

The mean annual income of the yam farmers was N 889,545.40 and N 494,339.30 respectively for the non-members and members of cooperatives. The result shows that 62.5% of non-co-operative societies members earn less than ₦360,000.00 from yam production, whereas only 33.9% of co-operative members fall into this income bracket. Furthermore, a significant portion of co-operative farmers (54.2%) earn more than ₦560,001.00. The mean yam income for cooperative farmers (₦889,545.4) is considerably higher than the amount the non-co-operative farmers earn (₦494,339.3). This income disparity suggests that cooperative membership has an advantage on yam farmers' earnings. The support from cooperatives, such as better access to high-quality seeds, credit, and training, likely contributed to the higher income of cooperative members (Oladejo & Olawuyi,

2011). Higher incomes can also lead to improved standards of living and alleviate poverty levels among co-operative farmers.

The results show that 49.2% of cooperative farmers and 62.5% of non-cooperative farmers earn less than ₦360,000. In the higher income bracket (₦460,001 - ₦560,000), cooperative farmers account for 50.8%, while non-cooperative farmers make for only 8.9%. The average revenue from other businesses the co-operative farmers (₦219,942.9) engage in, is slightly higher than that of non-cooperative farmers (₦193,214.3). The increased revenue from additional sources among cooperative farmers could possibly result from the diversification opportunities and additional financial support provided by cooperatives. Diversification of income sources is crucial for risk management and economic stability, reducing the vulnerability of farmers to adverse conditions (Babatunde, 2013).

Table 1: Socio-Economic Characteristics of Yam Farmers in Edo Central Zone

Characteristic	Categories	Non-co-operators	%	Co-operators	%
Farm size (Ha)	<= .50	16	28.6	5	8.5
	0.51 - 1.50	32	57.1	38	64.4
	1.51-2.5	8	14.3	16	27.1
	Mean	1.5		1.5	
	SD	0.77		0.85	
Yam income	<= 360000.00	27	62.5	20	33.9
	360001.00 - 460000.00	1	28.6	7	11.9
	460001.00 - 560000.00	5	8.9		
	560001.00+	23		32	54.2
	Mean	494,339.3		889,545.4	
other Income	SD	91,488.6		78,412.0	
	<= 360000.00	35	62.5	29	49.2
	360001.00 - 460000.00	16	28.6		
	460001.00 - 560000.00	5	8.9	30	50.8
	560001.00+				
	Mean	193214.3		219942.9	
	S.D	58221.14		65246.1	

Poverty Profile of Cooperative and Non-Cooperative Yam Farmers in the Study Area

The poverty incidence, or headcount ratio, shown in Table 2, represents the percentage of households living below the threshold of poverty. The findings show a poverty incidence index of 0.3710 (37.10%) for cooperative yam farmers and 0.6335 (63.35%) for non-cooperative yam farmers. This shows that co-operative farmers have a poverty rate that is considerably lower than their non-cooperative counterparts. The decreased prevalence of poverty among cooperative farmers is most likely associated with the benefits of cooperative membership, such as improved access to resources, training, and markets, which increase revenue to reduce poverty (Afolabi, 2010; Oladejo & Olawuyi, 2011).

The poverty gap index measures the average shortfall of the poor's earnings relative to the poverty line. The values are 0.0912 (9.12%) for co-operative farmers and 0.2737 (27.37%) for non-cooperative farmers. This suggests that the income gap of the co-operative farmers is substantially smaller. Cooperative members benefit from shared resources, collective

bargaining, and financial support, which help to close the income gap (Ovwigho and Ifie, 2009).

The poverty severity index considers the disparity between the poor by giving more weight to those further down the poverty line. The severity indices are 0.0358 (3.58%) for cooperative farmers and 0.0891 (8.91%) for non-cooperative farmers. The fact that co-operative farmers have a lower severity index implies that not only are there fewer impoverished households, but even the poorest of the poor are doing better than those in the non-cooperative category. This can be tied to the support structures within the cooperatives that provides a fairer distribution of resources and income among co-operative members (Babatunde, 2013).

The lower poverty incidence, depth, and severity among cooperative farmers indicate that being in a co-operative society improves the socioeconomic status of rural households. These findings are consistent with those of Afolabi, (2010); Oladejo and Olawuyi (2011) who highlighted the positive impact of cooperatives on agricultural productivity and the decrease of poverty.

Table 2 FGT Model of Poverty Index

	Cooperative		Non-Cooperative	
	Index	%	Index	%
Poverty level Incidence (P_0)	0.3710	37.10	0.6335	63.35
Depth (P_1)	0.0912	9.12	0.2737	27.37
Severity (P_2)	0.0358	3.58	0.0891	8.91

Factors Influencing the Poverty Status of Yam Farmers

In Table 3 the factors influencing the poverty status among yam farmers are presented. At the 10% significance level, the age of the head of the household has a positive and significant effect on the risk of being poor. This implies that older yam farmers are more likely to be impoverished

as their decreased physical stamina may result in decreased output. This finding is in line with the study of Ukoha *et al*, (2010) where a significant positive relationship was found between the age of the household heads and poverty status. Another key finding from this study shows, farming experience significantly reduces the likelihood of poverty at the 5% level of

significance, this implies that experienced farmers will likely have better farming skills and knowledge of best practices leading to higher productivity and income. This finding is at variance with the finding of the study of Adanna (2017), where farming experience, interest on borrowed capital, and farm size were not statistically significant. At 1% level of significance, farm size positively affected the farmer's poverty status. This implies that compared to their contemporaries, farmers who own smaller farms are more likely to be poor. This may be because farmers with larger farms enjoy economies of scale and more efficient use of resources.

Therefore, larger farm sizes are linked to greater agricultural output and income, which may help in reducing poverty (Oladejo & Olawuyi, 2011). Income from yam production had a positive significant effect on poverty status at the 1% level of significance. The result indicates that lower income from yam production significantly increases the likelihood of being poor. Furthermore, revenue derived from

additional business ventures was shown to likely reduce poverty and this was significant at the 5% level. Diversification of sources of income helps buffer against the risks associated with reliance on a single agricultural product and contributes to overall economic stability (Babatunde, 2013).

Membership of a co-operative society as a variable was found to be not significant on poverty status in this model. According to Ovwigho & Ifie (2009). This finding may be due to the variability in the effectiveness of co-operatives societies or some unknown variables affecting how cooperative benefits translate into poverty reduction. While cooperative membership did not significantly impact the yam farmers' poverty status, it suggests there is need to assess and enhance the effectiveness of cooperatives to ensure that they provide obvious benefits to their members. These results suggest that age, farming experience, farm size, income sources, and cooperative membership are significant factors in influencing the poverty status of yam farmers in Nigeria.

Table 3 Logit Estimates of Factors Influencing Poverty Status of Yam Farmers

Variables	Maximum Likelihood estimates (β)
Age (years)	-0.331* (0.0819)
Household size	0.022 (0.949)
Educational level	-0.034 (0.4621)
Farming experience(years)	0.268** (0.0475)
Farm size of yam	4.935*** (0.0013)
Income from yam production (₦)	0.661*** (0.000)
Income from other business activities (₦)	4.291** (0.0037)
Membership of cooperative	0.129 (0.3910)
Error term	-4.747*** (0.0024)

Source: Field Survey, 2023. Sigma = 27.613, Chi² = 212.381; Prob> Chi2 0.0000, Pseudo R² = 0.5060, Loglikelihood -135.191

***Significant at 1%, ** Significant at 5%, *Significant at 10%. Figures in parentheses represent standard error



CONCLUSION AND RECOMMENDATION

According to the study, yam farmers in the Edo Central zone who belonged to cooperative organizations experienced less poverty than farmers who did not. The identified factors influencing poverty include age, farming experience, farm size, and income from yam production. Older farmers were found to be more likely poor, while those who were more experienced with larger farm sizes had the likelihood of reduced poverty levels. Income from yam production and other sources were found to significantly reduce the likelihood of poverty. Although, cooperative members had higher income and lower poverty indices, the variable of co-operative membership alone does

not significantly and statistically influence poverty status, suggesting a need to enhance cooperative effectiveness. Policymakers and Agricultural development organisations in Edo State should be encouraged to consider promoting and strengthening the idea of agricultural co-operatives membership as a feasible tool for poverty reduction. Yam farmers should also consider diversifying their income sources, by cultivating additional alternative crops, including livestock enterprise, agro-processing ventures, and/or non-farm activities to supplement their yam production income. Further research should be done to investigate the effectiveness of co-operatives societies in rendering their benefits to farmers.

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