

Effect of Selected Food Crop Outputs on Poverty Level of Farm Households in Rivers State

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Abstract

This study examined the effect of selected food crop outputs on poverty level of farm households in Rivers State. The primary data of the study were collected from a sample of 820 respondents based on the copies of questionnaires completed and returned. The data collected were analyzed using binary logit regression involving the odd ratios and marginal effects. The estimated binary logit results showed that yam production decreases the probability of poverty reduction by 0.028%. The results showed that an increase in cassava production increases the probability of poverty reduction by 0.034%. This suggests that plantain production has the potential to improve the poverty levels of farm households in Rivers State. The pseudo-R-squared showed that the food crop outputs (yam, cassava, cocoyam and plantain outputs) jointly accounted for 34.89% of the total variations in poverty level. Based on the findings, this study recommends that the Rivers State Government through the Ministry of Agriculture should support the farmers to improve yam production by breeding varieties of yam seeds for distribution to farmers, developing alternative propagation materials through cutting, research into non-stake yam varieties and promoting extension services for rapid seed yam production to create more opportunities for improved Socio-economic livelihoods and reduction of poverty level in Rivers State.

Keywords: Food crops, Socio-economic Development, Farm households, Yam, Cocoyam, Plantain, poverty level.

1.0 Introduction

Nigeria is a third-world nation with a predominantly rural and agrarian population (World Bank, 2021). Crop production has frequently been cited as being essential to the majority of third-world countries' economic development. Nigeria is said to have a higher percentage of its population living in rural areas. Crops provide for the needs of the majority of Nigerians families. Palm kernel, soy beans, ginger, rubber, benign seed, and chili pepper are among Nigeria's main agricultural export commodities. Bananas, plantains, and cassava and its products were among the other important produced for exports and local consumption. Nigeria's economy is still reliant on primary goods, which include agriculture, to generate foreign exchange and contribute to the country's GDP as well for the development of the economy. As may be expected, the foundation of practically every economy in the world is agriculture. It supplies the fundamental components that humans require as well as the raw resources required for industrialization and economic growth and development (Uzonwanne et al. 2023). Small-scale farmers are the backbone of Nigeria's economy, despite the fact that they control the majority of the country's agricultural output and have no individual power. According to Oluwatayo et al. (2008), at least

60% of Nigeria's population makes their livelihood from small-scale farms that provide around 90% of the nation's food. These farms are typically smaller than two hectares. Regrettably, many small-scale farmers employ unrefined and conventional agricultural methods and are subsistence farmers. This has contributed to the sector's subpar performance. Therefore, encouraging productivity and production growth—especially among small-scale producers, who account for the majority of the country's agriculture—will be essential to a successful socio-economic development strategy. A variety of policies have been implemented to increase the nation's agricultural production base. In general, these include: (i) achieving food security and self-sufficiency in basic food supply; (ii) increasing production of agricultural raw materials for industries; (iii) increasing production and processing of export crops using improved production and processing technologies; (iv) creating gainful employment; (v) rational utilization of agricultural resources, improved protection of agricultural land resources from drought, desert encroachment, soil erosion, and floods, as well as the general preservation of the environment for the sustainability of agricultural production; (vi) encouraging the increased use of modern technology in agricultural production. Rural families find it difficult to seize economic opportunities due to their limited access to markets and financial services (Saif-Ur-Rahman et al., 2018). They find it challenging to get loans and make investments, which are crucial for economic growth and diversification (Bharat & Suresh, 2023). Because of this, poverty is a major obstacle to socioeconomic growth and is more common in rural households (Do, 2023; Elavarasi & Babybowna, 2022; Mahato, 2023). The Rivers state government's top priorities are economic growth and poverty reduction, particularly in rural areas. With continuous flaws on governments reforms in the agricultural sector, the issues of poverty remains a major problems to farm household in rivers state as majority farmers in Rivers state has remain a major governance failure in the state hence the need for this study. The specific objective of this study was to examine the effect of food crop output (yam, cassava, cocoyam, and plantain) on poverty reduction of farm households in Rivers State.

2.0 Literature Review

2.1 Theoretical Literature

Lewis Theory of Impacting Economic Growth

Lewis theory links economic growth with agricultural sector, he assumes that surplus labour transfer from the agricultural sector to another sector promote economic growth (Lewis, 1979). Todaro and Smith (2003), while looking at Lewis theory of development, assume that the underdeveloped economies consist of two sectors. These sectors are the traditional agricultural sector characterized by zero marginal labour productivity and the modern industrial sector. The primary focus of the model is agricultural production and its influence on economic growth. Todaro and Smith (2003) argued further that, if economic growth is to take place and become self-sustaining, it will have to include the rural area in general and the agricultural sector in particular. Development economists such as Smith in *The Wealth of Nations* (1776) and Ricardo in *The High Price of Bullion, a Proof of the Depreciation of Bank Notes*, (1810), have focused on how agriculture can best contribute to overall economic growth and modernization. The physiocrats such as Quesnay and Marx laid more emphasis on agriculture in the growth of an economy. In their views, the development of an economy depends on the growth of the agricultural sector. The source of national wealth is essentially agriculture. They believe that the fate of the economy is regulated by productivity in agriculture and its surplus is diffused throughout the system in a network of transactions. The agricultural sector, to the physiocrats, is

the only genuinely productive sector of the economy and the generator of surplus upon which all depends. Quesnay believed that the wealth of nations was derived solely from the value of agriculture. Quesnay's understanding of value-added was rather primitive—he could not see, for example, how manufacturing could create wealth. Farmers, on the other hand, could. As Karl Marx explains in "Das Kapital", "the Physiocrats insist that only agricultural labour is productive, since that alone, they say, yields a surplus-value". The physiocrats ideology on agriculture formed the basis for the research work

2.2 Empirical Review

Different studies have examined the relationship between agriculture and socio-economic development in the past. These works have important findings that shed more light on the relationship between the dependent and independent variables. For example, Dauda (2017) examined the contribution of food crops output to poverty reduction in Nigeria and found that an increase in food crops output had a significant impact on poverty reduction in Nigeria. Similarly, the findings from the study by Anyanwu (2014) revealed that agricultural productivity significantly influenced economic growth and had a positive impact on poverty reduction in rural areas. In addition, Aderemi et al. (2021) explored the relationship between crop output and poverty reduction in Nigeria from 1981 to 2016 using ARDL technique. It was discovered from the paper that employment in agriculture and poverty level have a significant relationship in the short run. In another light, Paudel (2016), in his study found a positive link between crop production and income growth. On the other hand, Onunze (2016) disclosed in his study that there exists a positive relationship between the agricultural sector and economic growth. In the same vein, Sunday et al. (2021) concluded that agricultural sub sector's production significantly influences the movement of per capita GDP of Nigeria in both the short and long-run periods. Ogbanga (2018) in his study, agricultural development and employment generation in Nigeria, found that agricultural production had a significant negative impact on unemployment. Nwankpa (2017) in his study on the economic impact of livestock production on the economy, with special interest in IkareAkoko of Ondo State Nigeria, identified employment and income generation as the major benefits of livestock production.

3.0 Methodology

3.1 Study Area

This study was conducted in Rivers State, Nigeria. The State is bounded to the South by the Atlantic Ocean, to the North by the Anambra, Imo and Abia States, to the East by Akwa Ibom State and to the West by the Bayelsa and Delta States. Rivers State is currently made up of 23 local government areas. These are Port Harcourt (capital), Ogba/Egbema/Ndoni, Ahoada East, Ikwerre, Etche, Andoni, Bonny, Okrika, Iyigbo, Khana, Gokana Tai, Obio/Akpor, Emohua, Degema, Aseri Toru, Akuku, Abua/Odial, Omuma, Opobo/Nkoro, Ogu/Bolo, Ahaoda West and Eleme. According to the National Population Commission (NPC, provisional 2016 census figures) the State has a total population of 7,303,900. Its coordinates are Latitude 4.75°N and longitude 6.50°E, and it encompasses an area of 11,077 km² (4,277m²) (Umechukwu et al., 2026) The study was carried out in Rivers State thus making every citizen of the State a potential respondent. As such, the results of the study were generalized about the whole of Rivers State. According to the NPC (2016) population records, Rivers State has a population of 7,303,900 people. However, for in-dept study, only a sample or subset of the population was used. A random selection of nine (9) LGAs of the State was done with three (3) LGAs selected from each

of Rivers East (i.e., Etche, Obio-Akpor, and Ikwerre), Rivers South East (i.e., Andoni, Gokana, and Khana), and Rivers West (i.e., Abua-Odual, Degema, and Ogbia-Egbema-Ndoni) was carried out. In the quest to ensure a representative sample, a multi-stage random sampling design was adopted in selecting the required sample for the study. The first step was the selection of three LGAs from each of the senatorial districts of the State, the simple random selection of 820 farm household heads across the LGAs. The summary of the sampling procedure is presented in Table 1.

Table 1: Population of Selected LGAs

Selected LGAs	Population
Rivers East Senatorial District	
Etche	351,200
Obio-Akpor	649,600
Ikwerre	756,600
Rivers South-East Senatorial District	
Andoni	306,200
Gokana	328,500
Khana	411,500
Rivers West Senatorial District	
Abua-Odual	396,800
Degema	350,500
Ogbia-Egbema-Ndoni	398,000
Total Population Size	3,948,900

Source: Extracted National Population Commission (2016).

From this, the sample size was determined using the sample size formula given by Naig et al. (2006) as:

$$n = \frac{Nz^2p(1-p)}{e^2(N-1) + z^2p(1-p)} * Deff$$

Where N = Population of selected LGAs = 3,948,900, p = Expected value of the indicator = 50%, e = Margin of error = 5%, Deff = Design effect = 1.5, and Z-score = 2.33 at standard of 99% confidence interval.

The determined sample of 814.17 was further adjusted by rounding-up to 820 as the higher the sample the closer it is to the population. This was also cover for poor or non-response. Further, the study used questionnaire as the main instrument for data collection. These data were analysed using Binary Logistic Regression analysis

3.2 Model specification

The model is specified as follows

$$Py(YA, CAS, COC, PLT) \quad (3.1)$$

Where:

YA = Yam output

CAS = Cassava output

COC = Cocoyam output

PLT = Plantains output

Also, measuring socio-economic development of farm household in terms of poverty level and employment level (3) can further give:

$$PY = f(YA, CAS, COC, PLT) \quad (3.2)$$

Where PY = Poverty level

That is:

$$ECD = D_i = \begin{cases} 1: \text{Presence of ECD} \\ 0: \text{Absent of ECD} \end{cases}$$

The relationship between the variable becomes binary in nature and can be expressed in a Binary Logistic Regression model, which in its simplest form can be stated thus:

$$P(Y) = P_i = 1 / 1 + e^{-(\beta_0 + \beta_i X_i + U_i)} \quad (3.4)$$

This can also be written as:

$$P_i [1 + e^{-(\beta_0 + \beta_i X_i + U_i)}] = 1 \quad (3.5)$$

Or

$$\text{Log}(P_i / 1 - P_i) = \beta_0 + \beta_i X_i + U_i \quad (i = 1, 2, 3, \dots, n), \quad (3.6)$$

where $P(Y) = P_i$ is the probability of Y occurring, Y is the categorical variable which in this case is socio economic development, e is the base of natural logarithms, X_i is the predictor variables, and U_i the estimates of the error terms. The β_0 is the Y intercept and β_i the coefficients of the predictor variables. The ratio $(P_i / 1 - P_i)$ is called the log odd or Logit, which acts as the dependent variable.

Therefore, the model to estimate the relationship between socio economic development of farm household and its determinants is of the form:

$$\begin{aligned} \text{Log(odds)} &= PY \\ &= a_0 + a_1 YA_i + a_2 CAS + a_3 COC + a_4 PLT + \varepsilon_i \end{aligned} \quad (3.7)$$

4.0 Results and Discussion

Three binary logit models were estimated to capture how the underlying food crop outputs affect the poverty level of farm households in Rivers State. The odds ratio and marginal effects results are reported in Table 2 through Table 5.

Table 2: Summary of Logistic Regression Results for Model 1

Dependent variable: Poverty reduction (PY)					
Variable	Coefficient	Std. err.	z	P> z	[95% conf. interval]
YA	-.0011356	.0015894	-0.71	0.475	-.0042507 .0019795
CAS	.00138	.0009446	1.46	0.144	-.0004714 .0032314
COC	-.0022786	.0010651	-2.14	0.032	-.0043662 -.0001909
PLT	-.0040969	.0024456	-1.68	0.094	-.0088902 .0006965
cons	.9692061	.5357876	1.81	0.070	-.0809183 2.01933
Pseudo R-square		0.3489		Prob(Chi-square)	0.0393

Source: Author's computation (2024) using STATA 17.0

Table 3: Marginal effect results for model 1

variable	dy/dx	Std. err.	Z	P> z	[95% C.I.]	X
YA	-.0002838	.0004	-0.71	0.475	-.001062 .000495	173.988
CAS	.0003449	.00024	2.46	0.014	-.000518 .000808	244.84
COC	-.0005695	.00027	-2.14	0.032	-.001091 -.000048	292
PLT	-.001024	.00021	-4.87	0.000	-.002222 .000174	101.182

Source: Author's computation (2026) using STATA 17.0

The odd ratio and the corresponding probability values of the z-statistics for the estimated logistic model are presented in Table 2. The results showed that an increase in yam output decreases the possibility of poverty reduction. Although this finding is not significant at the 5% level, it suggests that the growth of yam output has not translated to poverty reduction in the study area. At the same time, the results showed that an increase in cocoyam and plantain production decreases the possibility of poverty reduction in the study. It is also evident from the results that cocoyam output significantly intensifies the poverty incidence. However, the results showed that cassava production increases the possibility of poverty reduction in the study area. The pseudo-R-squared of 0.3489 indicates that the explanatory variables account for 34.89% of the total variations in poverty reduction. The estimated logistic model was also found to be statistically significant at the 5% level given that the probability values (0.0393) of the likelihood ratio (LR) is less than 0.05. This finding provides the basis for the statistical reliability of the estimated binary logit model for poverty reduction. More importantly, the marginal effects results presented in Table 3 showed an increase in yam production decreases the probability of poverty reduction by 0.028% in the study. Similarly, it was found from the results that an increase in cocoyam and plantain production decreases the probability of poverty reduction. Therefore, it followed from the estimated slope parameters that the probability of poverty reduction decreases by 0.056% due to an increase in cocoyam output. The results also showed that an increase in plantain production leads to a decrease in the probability of poverty reduction by 0.102% in the study. In addition, the results revealed that cassava production increases the probability of poverty reduction by 0.034% in the study area. This finding highlights the significant contribution of cassava production in mitigating the incidence of poverty in the study.

4.1 Discussion of Findings

The findings showed that cassava output increased the probability of poverty reduction among the selected farm households in the study area. This finding explains that the growth of cassava output offers an opportunity for poverty reduction. It equally highlights the important position of cassava in the process of socio-economic prosperity in the study area. The significant positive contribution of cassava output to poverty reduction is consistent with the findings of Dauda (2017) who reported that an increase in food crops output had a significant impact on poverty reduction in Nigeria. The results further showed that yam and cocoyam output decreased the probability of poverty reduction among the sampled farm households. This finding indicates that yam and cocoyam production has not translated to pro-poor growth which could be attributed to their relatively low growth. Similarly, evidence of a negative contribution of plantain output to poverty reduction was established from the results. The finding implies that the growth of plantain production is associated with the growing level of poverty among farm households. The negative contribution of yam, cocoyam and plantain outputs to poverty reduction is synonymous with the findings of Anyanwu (2014), who revealed that agricultural productivity significantly worsened the problem of poverty. However, the findings deviated from the previous results by

Jones (2015), who maintained that agricultural productivity played a substantial role in reducing poverty.

5.0 Conclusion and Recommendations

This suggests that the growth of yam output offers some opportunities for improved livelihood outcomes through job creation and better living conditions. This also led to a positive contribution of cassava to poverty reduction through employment growth. This suggests that plantain production has the potential to improve the socioeconomic well-being of farm households in Rivers State. Owing to the findings, this study concludes that food crop production, especially plantain and cassava production is critical for ensuring sustainable improvements in the poverty level of farm households in Rivers State.

5.1 Recommendations

The recommendations proffered for this study following the findings are outlined below:

- i. The Rivers State Government through the Ministry of Agriculture should support the farmers to improve yam production by breeding varieties of yam seeds for distribution to farmers, developing alternative propagation materials through cutting, research into non-stake yam varieties and promoting extension services for rapid seed yam production. These would create more opportunities for improved socioeconomic livelihoods in Rivers State.
- ii. The Rivers State Ministry of Agriculture in collaboration with the Agriculture Development Programme (ADP) should strengthen its support to cassava farmers by promoting intensive planting of high-yield cassava stems and expanding cropped areas to output and foster socioeconomic development.
- iii. The Rivers State Government should encourage farmers to increase their investments in cocoyam production and ensure adequate provision of farm inputs including fertilizer to increase the cocoyam output. This would help to reduce poverty, increase job opportunities, and income.

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