



## EVALUATION OF FACTORS INFLUENCING EFFICIENCY OF COCOYAM PRODUCTION AMONG FARMERS IN EKITI STATE

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### ABSTRACT

The study analyses the factors influencing the efficiency of cocoyam production among farmers in Ekiti State. A multi-stage sampling procedure was employed to select 224 respondents for the study. Primary data were collected with the use of well-structured questionnaires comprised of open and close-ended questions. The collected data were analysed using both descriptive statistics and the stochastic production frontier function. The results show that 67.41% of the respondents in the study area were male, with a mean age of 37 years, and a higher proportion (76.43%) being above 30 years. The respondents were fairly literate, with 75.00% who had more than 5 years of experience in cocoyam production. The average farm size was 3.9 hectares. Technical efficiency analysis indicated that 26.3% of respondents had technical indexes between 0.91 and 1.00, with a mean technical efficiency of 0.79. The estimated coefficients of factors such as land area, herbicide, and fertilizer use had significant ( $p < 0.05$ ) effects on yield, suggesting their potential to increase cocoyam yield. However, increasing the number of suckers and pesticides did not enhance yield, leading to decreased efficiency. Additionally, factors like age, gender (more female), and cooperative membership were found to reduce efficiency as they increased. Conversely, farming experience and family size had negative relationship with inefficiency, indicating that higher levels of these factors improved overall efficiency. The study therefore recommends amongst others that more arable land should be provided in the study area to maximize the use of labour and further enhance the efficiency of cocoyam farmers.

**Keywords:** Cocoyam, Efficiency, Input, Production, Technical, Inefficiency.

### INTRODUCTION

Nigeria is recognized as the highest producer of cocoyam globally, with an annual production of approximately 3,216,116 metric tonnes, positioning the country among the top producers worldwide (Food and Agriculture Organization Corporate Statistical Database (FAOSTAT, 2021). Cocoyam is considered the third most important root and tuber crop cultivated and consumed in Nigeria, following cassava and yam (National Root Crops Research Institute (NRCRI). Efforts have been made to enhance productivity in Sub-Saharan Africa, including the promotion of improved crop varieties and fertilizer technologies (Abdoulaye *et al.*, 2018). To gauge productivity, the concept of efficiency comes into play, encompassing productive, allocative, and economic efficiencies. Productive efficiency refers to achieving output with the minimum cost input mix for a given good or service, going beyond technical efficiency, which focuses solely on input-output ratios (including input prices). It also includes technical efficiency, which examines the feasibility of reducing inputs without decreasing output or increasing other inputs. Productively efficient farmers aim to minimize input costs while maximizing output, enhancing productivity per unit of land through efficient resource utilization. This includes expanding farm plots, embracing innovations, and maintaining soil fertility affected by land use and forest cover changes.

Despite various programs and policies aimed at improving efficiency and productivity in cocoyam production, previous studies suggest that the desired results have not yet been achieved. Furthermore, the productivity level of resources utilized by farmers in the country remains relatively low (Ojo, 2004). In spite of Nigeria's status as the leading global producer of cocoyam, contributing to



more than a quarter of the world's production according to FAOSTAT (2021), various constraints hinder its production. Research conducted by Mukaila *et al.* (2023), Chemura *et al.* (2022), and Oluwafemi (2013), among others, highlighted key constraints affecting cocoyam production within the country. These include scarcity of quality planting materials, low multiplication ratio, lack of improved varieties, labor scarcity, poor shelf-life of corms and cormels, issues related to the land tenure system, inadequate storage facilities, poor access to markets with unpredictable prices, prevalence of pests, diseases, and weed infestations.

The combination of these challenges alongside the decline in commercialization within the agricultural sector emphasizes the urgent need for comprehensive interventions. Enhancing the production efficiency of cocoyam farmers especially in Nigeria is crucial to addressing these challenges and ensures the sector's economic viability. Previous studies primarily focused on Technical Efficiency (TE) as a metric for productivity, particularly in single-crop analysis, either through a single equation or a two-step approach (Ajayi *et al.*, 2018; Oluwatayo *et al.*, 2019). However, a clear understanding of the factors influencing cocoyam production's technical efficiency is lacking. In addition, there are few studies specifically analyzing the factors influencing productivity using efficiency as a metric in cocoyam production. Therefore, this study investigates the factors influencing efficiency in cocoyam production, focusing on a case study of Ekiti State.

## **METHODOLOGY**

### **The study Area**

The research was conducted in Ekiti State, Nigeria, which is situated in the Western part of the country. Geographically, it lies between longitudes 40°51' and 50°451' East of the Greenwich meridian and latitudes 70°151' and 80°51' north of the Equator. It lies south of Kwara and Kogi State, East of Osun State and bounded by Ondo State in the East and in the south. with a total land Area of 5887.890sq km. Ekiti State has 16 Local. The state consists of 16 Local Government Areas (LGAs) and spans a land area of 5887.890 km<sup>2</sup>. As of the 2006 National Population Census (NPC), Ekiti State had a population of 2,737,186 people, but it is projected to increase to 4,063,457 people by the year 2023, with an annual growth rate of 3.1% as estimated by the NPC and National Bureau of Statistics. Ekiti State is a hilly, inland upland region in southwestern Nigeria with a tropical climate characterized by a distinct wet and dry season. The average annual temperature ranges from 21°C to 28°C, and average annual rainfall is between 1,200 mm and 1,800 mm. The settlement patterns in Ekiti State predominantly revolve around nucleus urban areas, efficiently connected by a network of roads. The people of Ekiti are known for their industrious nature, integrity, pursuit of knowledge, and articulate communication. In terms of occupations, Ekiti men are primarily engaged in farming activities, while a significant proportion of the women are involved in trade, specifically trading in manufactured goods. The religious landscape in the state comprises of majority being Christians followed by Muslims, with some individuals adhering to traditional beliefs.

### **Sampling Procedure and Sample Size**

A multi-stage sampling procedure was employed to select the respondents for the study. In the first stage of sampling, 2 Local Government Areas (LGAs) were purposively selected from each of the 3 Agricultural Development Project (ADP) zones based on their levels of cocoyam production, resulting in a total of 6 LGAs. Then, in the second stage, 2 communities were purposively selected from each of the previously selected LGAs, making a total of 12 selected communities. The third stage involved the application of simple random selection techniques to choose respondents. With reference to the state's ADP statistics, which identified a total of 2208 cocoyam farmers in the selected communities, and following Tewodros (2017) recommendation that a sample size ranging from 10% to 30% is good enough to represent the targeted population adequately, this study chose the 10% sampling target size. The sampling strategy was justified using probability proportional to size (PPS), resulting in the utilization of 224 individuals (approximating 10% of the total population) for the study.

### **Method of Data Collection**

Primary data was used for this study. The data were collected with the use of well-structured questionnaires comprised of open and close-ended questions, which were administered to 224 cocoyam



farmers in the study areas. The instrument captured information on farmers' socio-economic characteristics, production practices, input use, output levels, institutional factors, and constraints affecting cocoyam production

**Method of Data Analysis**

The collected data were analyzed using both descriptive statistics and the stochastic production frontier function.

Descriptive statistics

**Econometric Specifications**

The Stochastic production frontiers was used for this research as it has been a valuable and widely utilized tool in various fields to estimate technical efficiencies, providing crucial insights into the performance of producers or entities under study. The maximum likelihood estimation (MLE) was used to estimate the parameters of the stochastic production frontier (Ajibefun and Damola 2003).

▪ **Production Function:**

The production function relates the inputs (X) to the observed output (Y) and is specified as follows:

$$Y = f(\beta, X) + u - v \quad \dots(1)$$

$$Y = f(\beta, X_1, X_2, X_3, X_4, X_5, X_6, \dots X_n) + u - v \quad \dots (2)$$

where:

- **Y** represents the observed output, which is the level of cocoyam production.
- The function **f()** denotes the deterministic production frontier that depends on these input variables and the parameter vector **β**.
- **β** = Vector of parameters (which was estimated)
- **X** = Vector of inputs used in production
- **u** represents the random noise component or the random error in the production function. It is assumed to follow a symmetric and independent distribution, such as the normal distribution.
- **v** represents the technical inefficiency term, accounting for factors leading to deviations from the production frontier.

**Stochastic Frontier Analysis Model**

The empirical model of the stochastic production frontier which was built on the cocoyam growers' way of production in the study area is specified as follows:

$$\ln Y_i = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + \beta_5 \ln X_{5i} + \beta_6 \ln X_{6i} + \beta_7 \ln X_{7i} + (v_i - u_i) \dots (3)$$

**Where:**

- $Y_i$  = Total value of output of cocoyam per farm in Kg  
Expected sign +
- $X_1$  = Quantity of cocoyam sucker planted in kg  
Expected sign +
- $X_2$  = Land size of cocoyam in hectare (s)  
Expected sign +
- $X_3$  = Quantity of labour (hired and family) in man-days  
Expected sign +
- $X_4$  = Quantity of Pesticide in litres  
Expected sign +
- $X_5$  = Quantity of Fertilizer in kg  
Expected sign +
- $X_6$  = Herbicide in litres  
Expected sign +
- $B_0$  = Constant
- $\beta$ 's = Parameters to be estimated
- $v_i$  = Random error which covers random effects on production outside the control of the farmers' decision unit
- $\mu_i$  = Technical inefficiency



### Technical Inefficiency

The impact of technical inefficiency is caused by behavior-based problems that may be resolved by competent management (Xu and Jeffrey, 1998). The incorrect term ('s) is assumed to not affect them. The inefficiency model was used to identify and compare the factors affecting the production efficiency of cocoyam producers in the research location. Below is the explicit presentation of the calculated technical inefficiency:

$$\mu_i = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \delta_3 X_3 + \delta_4 X_4 + \delta_5 X_5 + \delta_6 X_6 + \delta_7 X_7 + \delta_8 X_8 \quad \dots (4)$$

Where:

$\mu_i$  = Inefficiency effect

$X_1$  = Age of farmer (years)

$X_2$  = Gender (dummy variables: 1 female and 0 male)

$X_3$  = Marital status (dummy variables: 1 married and 0 single)

$X_4$  = Family Size (number of persons in the household)

$X_5$  = Education (level of education)

$X_6$  = Primary Occupation (major occupation)

$X_7$  = Experience of farmer (years)

$X_8$  = Membership of Cooperative (dummy variables: 1 if a member of a cooperative association, 0 otherwise)

$\delta_0$  = Constant

$\delta$ 's = Parameters to be estimated

## RESULTS AND DISCUSSION

### Socioeconomics Characteristics of Respondents in the Study Area

The result presented in Table 1 illustrates the distribution of respondents based on their socioeconomic characteristics. The study revealed a notable gender disparity, with 67.41% of respondents being male and 32.59% female. This aligns with the findings of Amusa *et al.* (2011), supporting the notion that the majority of cocoyam farmers are male. An interesting facet emerged regarding the age distribution, with the mean age of respondents being 37 years. The highest age range was 31-40 years (38.84%), indicating that the surveyed individuals were predominantly in their productive age. This demographic composition goes well for cocoyam production in the study area, as individuals within this age range are expected to contribute significantly to enhanced productivity. This contrasts with the findings of Apata *et al.* (2021), who reported an average age of 45 for cocoyam growers in their study. In terms of education, 50.90% of respondents had completed secondary education, while 24.10% had pursued post-secondary education. The relatively high level of education suggests a fair degree of literacy among respondents, likely contributing to their understanding of agricultural practices and technology adoption. Furthermore, a substantial portion (73.21%) of the respondents was married, potentially resulting in larger household sizes, with implications for increased cocoyam production. The average household size was found to be 7 people, indicative of a large household that can positively influence productivity, aligning with the findings of Apata *et al.* (2021).

Examining primary occupations, 51.79% of respondents identified as traders who incorporated cocoyam farming into their livelihoods, while 48.21% considered farming as their primary occupation. Notably, a significant percentage (67.79%) engaged in farming as a secondary occupation, while 30.36% combined trading with farming activities. Only a marginal percentage (1.79%) cited artisan work as their secondary means of livelihood. This diverse occupational profile shows the multifaceted nature of respondents' economic engagements. Additionally, the results shed light on the production experience of cocoyam farmers in the study area. The mean production experience was found to be 9 years, with a significant majority (75.00%) boasting more than 5 years of experience, while a smaller percentage (25.00%) had less than 5 years. This contrasts with Omotesho *et al.* (2020) findings, which reported an average farming experience of 22 years among cocoyam farmers.

Regarding land acquisition, 50.89% of respondents inherited their land, while 49.11% obtained it through leasing for cocoyam production. The average farm size was determined to be 3.9 hectares, with 51.79% of respondents managing more than 5 hectares and 48.21% cultivating 5 hectares or less.



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These figures differ from Omotesho *et al.*'s (2020) findings, indicating a farm size of 4.3 acres in their study. Examining the financial aspect, 51.79% of respondents borrowed from local lenders, while 48.21% utilized personal savings for cocoyam production. Additionally, a substantial majority (75.00%) belonged to a cooperative society, with 44.20% having a membership exceeding 2 years. Cooperative membership is expected to enhance productivity by facilitating input acquisition, sales of output, and financial support. They also facilitate production training for their members. Notably, 41.07% of farmers sourced inputs from open markets, 32.14% received them from family and friends, and 26.79% benefited from cooperative societies. Concerning cropping systems, 50.89% of respondents practiced mono-cropping, while 49.11% engaged in mixed cropping. Among the latter, 25.00% inter-cropped maize, and 24.11% included vegetables as additional crops. The study also explored the motivations behind cocoyam cultivation. Findings indicated that 75.00% of respondents cultivated cocoyam for household use and sold surplus produced, while 24.11% cultivated solely for household consumption. This aligns with Omotesho *et al.* (2020) observation that the majority (97.3%) of cocoyam farmers cultivated for family sustenance.



**Table 1: Distribution of Respondents based on Socio-economics Characteristics**

Description	Frequency	Relative Frequency (%)	Mean
<b>Sex:</b>			
Male	151	67.41	
Female	73	32.59	
<b>Age (years):</b>			
21-30	53	23.66	
31-40	87	38.84	
41-50	50	22.32	<b>36.98 years</b>
51-60	21	9.38	
>60	13	5.80	
<b>Education:</b>			
No formal education	56	25.00	
Secondary education	114	50.90	
Post-secondary education	54	24.10	
<b>Marital status</b>			
Single	60	26.79	
Married	164	73.21	
<b>Family size</b>			
≤5	35	15.62	
>5	189	84.38	<b>7 persons</b>
<b>Primary occupation</b>			
Farming	108	48.21	
Trading	116	51.79	
<b>Secondary occupation</b>			
Artisan	4	1.79	
Farming	152	67.79	
Trading	68	30.36	
<b>Production experience (years)</b>			
≤ 5	56	25.00	<b>9 years</b>
>5	168	75.00	
<b>Mode of land acquisition</b>			
Inheritance	114	50.89	
Lease	110	49.11	
<b>Farm size</b>			
≤	108	48.21	
>5	116	51.79	<b>3.9</b>
<b>Source of finance</b>			
Personal income	108	48.21	
Local lenders	116	51.79	
<b>Cooperative societies</b>			
Yes	168	75.00	
No	56	25.00	
<b>No of years in cooperative</b>			
< 2	69	30.80	<b>3.36 years</b>
> 2	99	44.20	
<b>Source of input</b>			
Cooperative	60	26.79	
Open markets	92	41.07	
Family and friends	72	32.14	
<b>Cropping system</b>			
Mono cropping	114	50.89	
Mixed cropping	110	49.11	
<b>Other crops</b>			
Vegetables	54	24.11	
Maize	56	25.00	



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**Reason for growing cocoyam**

Household consumption only	54	24.11
Household. Then sell the surplus	170	75.89

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**Source:** Field Survey, 2023

### **The Estimates of the Production Efficiency for Cocoyam Farmers**

The estimates of the Stochastic Frontier Production Function (SFPF) for cocoyam farmers are shown in Table 2. The sigma-square ( $\delta^2$ ) of 0.217 was significantly different from zero at a 1% level of significance. This indicates a good fit of the model and the correctness of the specified distribution assumption of the composite error term ( $U_i$ ), as shown by a gamma ( $\gamma$ ) value of 0.797, which was significant at the 1% level. This implies that about 80 percent of the variation in the value of cocoyam output was due mainly to the difference in their technical efficiencies or inefficiencies, while the remaining 21 percent can be attributed to random errors. The table indicates the Maximum Likelihood Estimates (MLE) for each of the variables that contributed to the efficiency and inefficiency of the households in cocoyam production in the study area. The estimated coefficients of the planting material (suckers), area of land cultivated, fertilizer, and pesticide costs were significant at the 1% level, while herbicide was significant at a 10% level of significance. This shows that these five inputs were significantly different from zero and important in the production of cocoyam in the study area.

Land, fertilizer, and herbicide were positively significant. This indicates that a 1% unit increase in the use of these variables by the farmer will lead to more than 1% unit increase in output. The coefficients of quantity of sucker, pesticide, and labour use were negatively significant. This shows that an increase in these variables by the farmer will lead to a decrease in output ( $y$ ). This finding is in line with the findings of Mukaila *et al.* (2023) in their research titled "The Evaluation of Farmers' Technical Efficiency of Cocoyam Production in Cross River State, Nigeria." To improve the efficiency of production, there is a need to examine the factors that cause inefficiency. Explanations are provided for the relative inefficiency levels among farmers through the estimated coefficient of the inefficiency model. From Table 2, it can be deduced that age and farming experience were significant at the 1% level, gender at the 5% level, while family size and cooperative membership were significant at the 10% level. This indicates that these five variables were the major socio-economic factors that affected the technical inefficiency of cocoyam farmers in the study area. Other variables such as marital status, education, and primary occupation were not significantly different from zero at the 1%, 5%, or 10% levels of significance.

Family size and farming experience were negatively significant to technical inefficiency. This implies that an increase in these two variables will lead to a reduction in their inefficiencies leading to a rise in the technical efficiency of these farmers. It should be noted that the age of the farmer may not necessarily correlate with farming experience. This finding is in agreement with the results of Falola *et al.*, (2014) in their work assessing the technical efficiency of Osun State's cocoyam producers. This shows that an increase in these variables could lead to an increase in output for the cocoyam farmers in the study area. While age, cooperative membership, and gender were positive in technical inefficiency, it implies that an increase in age will lead to more inefficiency which may be due to a decline in physical strength (Omotesho, 2020) thereby leading to reduced efficiency of the farmers, same also applies to being female (i.e., involvement of more females and fewer males in production) which led to inefficiency and may be due to women having less physical strength to work on the farm (Yisa *et al.*, 2020). Lastly, the participation of farmers in cooperative group activities for longer periods has led to a decrease in the efficiency of the farmers which might be due to the older cooperative members not accepting the new ideas and innovations again.

**Table 2:** Maximum Likelihood Estimates of Cocoyam Producers in Ekiti State

<b>Efficiency Variables</b>	<b>Coefficient</b>	<b>Standard-Error</b>	<b>T-Ratio</b>
beta 0	0.56161930	0.20261668E+00	1.2771
beta 1(land/ha)	0.281102050***	0.47643365E-01	4.5900
beta 2 (sucker)	-0.281102050***	0.45251553E-01	-5.1185
beta 3 (fertilizer)	0.002603115***	0.00253430	3.6821
beta 4 (herbicide)	0.001229815*	0.00181832	1.6802
beta 5 (pesticide)	-0.059924865***	0.05424037	-2.9201
beta 6 (labour)	-0.014800485	0.00628474	-1.0611
<b>sigma –square</b>	0.217000469***	0.6390910E-01	3.33954
<b>Gamma</b>	0.797207308***	0.13642399E+00	4.58436
<b>Inefficiency variables</b>			
Constant	1.732844	1.007505	1.72
Age (X1)	.0106049***	0.002507	4.2309
Gender (X2)	.0534186**	0.025009	2.1360
Marital Status (X3)	.0798501	0.395493	0.2019
Family size (X4)	-.0951855*	0.053197	-1.7893
Education (X5)	-.0778912	0.075777	-1.0279
Primary Occupation (X6)	-.0820331	0.249341	-0.3290
Farming Experience (X7)	-.0608953***	0.024168	-2.5197
Cooperative membership(X9)	.0823982*	0.041340	1.9932

\*\*\* t-values significant at 1%; \*\* t-values significant at 5%; \* t-values significant at 10%

**Source:** Field survey, 2023 Output from the program FRONTIER (Version 4.1c)

### Distribution of Cocoyam Farmers based on Technical Efficiency in the Study Area

The results in Table 3 show the distribution of technical efficiency of cocoyam in the study area. The frequency distribution of technical efficiency indexes shows high technical efficiency variations among the respondents. It can be observed, that 26.3% has technical indexes between 0.91 and 1.00. The technical efficiencies (TE) of the cocoyam farmers range between 0.334 and 0.972 with a mean of 0.790. The number of cocoyam producers in the study area considered to be technically efficient was about 56.7 percent. The mean value of 0.790 indicates that if the technical efficiency of input usage is increased by 0.210 (1-0.790), the farmers will be operating on the production frontier. This shows that on average, farmers were able to obtain about 80 percent of potential output from a given mix of inputs used in the production process. These findings were in agreement with Okoye *et al.*, (2008) who found out that the average technical efficiency of cocoyam farmers was almost 95% in their study area. Meanwhile, these findings also reveal the presence of technical inefficiencies whose elimination could lead to the improvement of the technical efficiency of cocoyam producers in the study area. This finding aligns with that of Okoye *et al.*, (2008) who established that that there is space for improvement in the production process and that policies geared at advancing technical knowledge and skills through agricultural extension services might greatly raise agricultural output.

**Table 3:** Distribution of Cocoyam Farmers' Technical Efficiency in the Study Area

<b>Efficiency index</b>	<b>Frequency</b>	<b>Percentage</b>
0.31-0.40	8	3.57
0.41-0.50	16	7.14
0.51-0.60	31	13.84
0.61-0.70	42	18.75
0.71-0.80	36	16.07
0.81-0.90	32	14.29
0.91-1.00	59	26.34
<b>TOTAL</b>	<b>224</b>	<b>100</b>
Mean	0.790	
Minimum	0.334	
Maximum	0.972	

**Source:** Field survey, 2023. Output from the program FRONTIER (Version 4.1c)



**Factors Influencing the Efficiency of Cocoyam Production in the Study Area**

The results of the regression analysis in Table 4 show the factors that influence the efficiency of cocoyam production in the study area. It can be inferred from the results that several factors play a significant role:

The age of the respondents showed a negative significance at the 5% level. This suggests that as farmers grow older, their efficiency in cocoyam production tends to decrease. This is expected, as older farmers most like have reduced in physical strength, which will affect productivity. This result is also in line with the findings of other researchers like Osahon *et al.* (2020), Okoye (2007), and Okoye (2008). It was found that gender was negatively significant at the 5% level. This indicates that gender also influences efficiency, with more female and fewer male farmers leading to decreased efficiency in cocoyam production, which might be due to the female gender not having enough strength to work longer on the farm compared to their male counterparts. These results align with the findings of Yisa *et al.* (2020) who opined that the male gender is more efficient than the female which might be due to physical strength associated with the gender. It was found to be significant at the 10% level. An increase in family size was associated with a notable increase in farmer efficiency. This is likely due to the availability of more family labour for cocoyam production. This result is backed by the findings of Osahon (2020) and Amusa *et al.*, in their various related research. This showed significance at the 5% level marriage tends to increase household size, which in turn increases available family labour. This has a positive impact on the efficiency of cocoyam production. Osahon (2020) also stated marital status increased the usage of technology which in turn led to an increase in the efficiency of farmers.

It showed significance at the 5% level. Farmers with more education tended to be more efficient in cocoyam production. This implies that education has played a role in enhancing efficiency; this can be a result of improved knowledge and skills. Authors such as Osahon (2020), Okoye (2008) and Falola (2014) and got similar result in their results. The Farming experience was highly significant at the 1% level. Farmers with more experience demonstrated better efficiency. This shows the importance of practical knowledge gained through years of farming. Anyiam (2023), Okoye (2008), and Falola (2014) also discovered in their studies that higher farming experience tends to help in better efficiency of the farmers. Membership in a cooperative society showed significance at the 10% level. Being part of a cooperative influences farmer efficiency, likely due to the cooperative's impact on the cocoyam farmer's education, information dissemination of information, inputs acquisition, sales, and experience in the study area which also aligns with the results of Okoye (2008) and Mukaila (2023) but in contrast with that of Osahon (2020) who saw Membership to cooperative to have a negative impact on the farmer's efficiency which might be due to distractions and other factors. These findings provided valuable insights into how various aspects of farmers' lives and practices contribute to their productivity.

**Table 4:** Factors Influencing Technical Efficiency of Cocoyam Production in the Study Area

<b>Variables</b>	<b>Coefficients</b>	<b>Standard error</b>	<b>t-value</b>
Constant	1.674387	1.106423	1.3251
Age (X1)	-724.715**	429.202	-1.689
Gender (X2)	-4859.806**	11016.073	-0.441
Marital Status (X3)	1665.641**	13330.337	6.495
Family size (X4)	1390.491*	2254.884	0.617
Education (X5)	83892.651**	7705.694	1.201
Primary Occupation (X6)	-832.876	54.67341	-0.229
Farming Experience (X7)	29097.818***	5547.260	-3.533
Cooperative membership(X9)	2243.517*	26.25240	1.134

\*\*\* t-values significant at 1%; \*\* t-values significant at 5% and \* t-values significant at 10%

**Source:** Field survey, 2023.

**CONCLUSION AND RECOMMENDATIONS**

The study concludes that on average, farmers were able to obtain about high percentage of potential output from a given mix of inputs used in the production process, thus, the farmers are efficient



technically in their cocoyam production. The arable land available for cocoyam production in the study area was limited and this put pressure on the available land. Labour (man-day) was under-utilized as a result of the large family size which increased the family labour; thus, resulting to excess labour force. Factors like age, gender, family size, marital status, education, family experience, and membership to cooperative society influenced the efficiency of cocoyam farmers in the study area. The study therefore recommends amongst others that more arable land should be provided in the study area to maximize the use of labour and further enhance the efficiency of cocoyam farmers. In addition, the agricultural extension agent should provide more technical support service to help the farmers improve on their technical efficiency.

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