



Analysis of Profitability and Factors Determining Cocoyam Production in Enugu State, Nigeria.

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ABSTRACT

The study analyzed the profits and factors involved in cocoyam production in Enugu State. Three local governments were randomly selected for this research namely Awgu, Udi, and Aniri LGAs. From each of these local governments, four communities were randomly selected and in each of these communities, ten (10) cocoyam farmers were also randomly selected making a total of forty (40) farmers for each local government area and a total of one hundred and twenty respondents for the study. A well-structured questionnaire was employed to extract primary data from the farmers and a focused group discussion was also conducted to get information from the farmers. It was found that cocoyam production enterprise in the study area was male-dominated (67.5%) with the majority of the farmers interviewed within the age bracket of 31-50years (81.6%). Those with secondary school levels of education were the highest (29.2%) and most of the farmers were also married (52.5%). Those having farming experience of about 6-15 years (53.4%) were the majority in the study area. The budgetary analysis clearly showed that cocoyam production as an enterprise was profitable giving back ₦2.08 for every naira spent. The regression analysis revealed that credit access, farming experience, extension service, labour and land size explained about 74.4% of the variation in the quantity of cocoyam production. Credit access, farming experience, extension service and labor were all found to be positively significant, hence increase in all these variables increases cocoyam production. High cost of production, fluctuating prices of produce, sourcing for farm labour and weed problem were all major constraints facing the cocoyam farmers in the study area. It is recommended that loans and grants and all other production inputs needed for cocoyam production be provided at a very subsidized rate in every respect to help these farmers acquire these inputs as it will help increase their farm output in cocoyam production in the study area.

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1.0 Introduction

Cocoyam is a stem tuber that is widely cultivated in the tropical regions of the world and is a well-known food plant which has a long history of cultivation with Nigeria being the largest producer in the world and accounting for about 40% of the total world output (Ademiluyi, 2013). Cocoyam is an important carbohydrate staple food in the southern and middle belt areas of Nigeria (Asumugha and Mbanaso, 2002). Studies have argued the crop to be the third most important staple root/tuber crop after yam and

cassava in Nigeria, (Knipscher and Wilson, 2002 and Echebiri, 2004). It has relatively small-sized starch grains which are easily digestible and therefore acclaimed to be a very good source of carbohydrates for diabetic patients (Ademiluyi, 2013). According to Ugabajah and Uzuegbuna (2012) small-scale farmers who operate within the subsistence economy grow most of the cocoyam in Nigeria. The surplus of the product is supplied to the market in the rapidly growing urban centers. The bulk of the production of

cocoyam is in Southern Nigeria. Ugbajah and Uzuegbuna (2012) also observed that per capita production of the crop is on the decline and that its ecological restriction in the humid zones further compounds this. From a socio-cultural point of view, the crop has a low rating and as a result of this, cultivation and consumption are of secondary importance. Ezenwa, (2010) observed that there has been a decline in the yields of cocoyam in the past few years. As population pressure on land continues to increase, the importance of cocoyam in ensuring household food security should be given adequate recognition. Although present yields are still below expectation, which could be attributed to many factors such as climate variation, drought, poor cultural practices among cocoyam growers, pest and disease infestations. There is a need to increase yield to meet the objective of food security. Nigeria like some other developing countries is principally an agrarian nation and still faces an ever-increasing food crisis as the level of food production is yet to keep pace with demand (Amusa *et al*, 2011). Although cocoyam is regarded as a major food crop in Nigeria, especially in female-headed households, its' consumption in recent times has increased (Asadu *et al*, 2011). Nwabuzor (2001) noted that cocoyam is consumed in various forms when boiled, fried, pounded or roasted and processed into chips which has a long shelf life and provides food all year round, especially during lean planting season. Despite the various programs launched and established by the government of Nigeria, returns from the agricultural sector have been much below the potential (Izuchukwu, 2011). Cocoyam yields continue to decline and are substantially lower than potential yields also the ignorance of the nutritive value and diversities of food forms by a large percentage of the populace, thus this is a major limiting factor to the general acceptability and extensive production of the crop NRCRI (2003). Thus, it becomes imperative to carry out a study on the economic analysis of cocoyam production in Enugu State.

2.0 Methodology

2.1 Study Area

This research was carried out in Enugu State. The state covers a total of 7,161 square kilometers of land mass and it is bounded in the south by Abia State and in the north by Kogi State. To the west, it is bounded by Anambra State while on the east it is bounded partly by Benue State and Ebonyi State. The state consists of seventeen (17) local government areas and three senatorial districts. According to the 2006 census, Enugu State population stood at 5,590,513 people thus being among the most populous state in the country. There are two distinct seasons namely wet and dry seasons. The wet season occurs between April and October while the dry season occurs between November and March.

2.2 Sampling technique and Sample size

The multi-stage random sampling technique was adopted for this research. Three local governments that grow cocoyam very well out of the seventeen (17) local governments were randomly selected for this research, they are Awgu LGA, Udi LGA, and Aniri LGA. From each local government area selected, four communities were randomly selected and in each community ten (10) cocoyam farmers were also selected for the research making a total of forty (40) respondents in each local government and a total of one hundred and twenty (120) farmers for the study area.

Primary data was gotten by administering a well-structured questionnaire to the respondents and also through focused group discussions. Secondary data was sourced from published and unpublished projects, textbooks and the internet.

2.3 Analytical tools

2.3.1 Descriptive/inferential statistics.

Descriptive statistics was used to analyze the socio-economic characteristics and constraints to cocoyam production of the respondents in the study area, by the use of mean, frequency distribution, percentages.

Gross margin analysis/Benefit-cost ratio

Gross margin analysis was used to estimate the total cost incurred and the profits/returns accrued to cocoyam farmers in the study area. The cost and returns was estimated based on the previous production season and the variables were measured in naira. Gross margin analysis was specified as the following:

$$\begin{aligned} GM &= TR - TVC \\ GM &= \text{Gross margin} \\ TR &= \text{Total revenue} \\ TVC &= \text{Total variable cost} \\ NFI &= GM - TFC \\ TFC &= \text{Total fixed cost} \end{aligned}$$

Benefit cost ratio (BCR): Benefit-cost ratio was used to analyze the returns to investment.

$$BCR = \frac{\text{Total revenue}}{\text{Total cost}}$$

Ordinary least square regression

The OLS regression was used to determine factors affecting cocoyam production. This is specified as:

$$\begin{aligned} Y &= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 \\ &+ \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e \\ Y &= \text{Total farm output (Kg)} \\ X_1 &= \text{Age of farmer (years)} \\ X_2 &= \text{Credit access (1= yes, 0= no)} \\ X_3 &= \text{Cost of Chemical (Naira)} \\ X_4 &= \text{Cost of fertilizer (Naira)} \\ X_5 &= \text{Extension service (1= yes, 0= no)} \\ X_6 &= \text{Farming experience (years)} \\ X_7 &= \text{Labour (Man/day)} \\ X_8 &= \text{Level of education (years)} \\ X_9 &= \text{Land size (Ha)} \\ X_{10} &= \text{Input prices of seedlings (naira)} \\ e &= \text{error term} \end{aligned}$$

2.3.2 Inferential statistics

Frequency distributions and percentages were used in determining the constraints to cocoyam production in the study area. Those constraints which occurred almost all the time had very high-frequency distribution and also had high percentages, therefore the constraints were ranked using percentages from high to low.

3.0 Results and discussion

3.1 Socio-Economic Characteristics of Cocoyam Farmers

The following Socio-Economic Variables were sampled as presented in table 1.

Table 1: Socio-Economics Characteristic of Cocoyam Farmers.

Socio-Economic Variables	Frequency (N = 120)	Percentage (%)
Age Distribution		
20-30	27	18.4
31-40	31	25.8
41-50	43	35.8
>50	24	20.0
Sex		
Male	81	67.5
Female	39	32.5
Educational level		
None	23	19.2
Primary	31	25.8
Secondary	35	29.2
Tertiary	17	14.2
Adult Education	14	11.6
Farming Experience		
<5	12	10
6-10	32	26.7
11-15	32	26.7
16-20	24	20
>20	20	16.6
Marital Status		
Single	29	24.2
Married	63	52.5
Separated	9	7.5
Widowed	19	15.8
Cropping pattern		
Cocoyam only	33	27.5
Maize + Cocoyam	38	31.7
Cassava + Cocoyam	25	20.8
Groundnuts + Cocoyam	24	20.0
Total	120	100

Source: Field Survey, 2022

According to the Age distribution, as shown in table 1, the majority of the farmers who indulged in cocoyam cultivation fell into the age range of 41-50 with a percentage of (35.8%) followed by a close age range of 31-40 with (25.8%) indicating that the farmers are in their youthful age and will indulge in cocoyam production very well which will translate to positive yield. This enterprise is energy demanding and can only be indulged in by male farmers hence male farmers dominate with (67.5%) in cocoyam production. This probably explains why females generally are found to process and market cocoyam. It was also observed that the majority of the farmers (29.2%) had secondary school education followed by a close range of 25.8% who had primary school education. 14.2% of these cocoyam farmers in the study area have also had some form of tertiary education implying that they are open to the adoption of improved technologies and they are also well experienced in farming as about (83.4%)

of them have above five (5) years of farming experience. The majority of the sampled farmers were found to be married (52.5%) indicating that they may have enough access to family labour while those farmers single accounted for just (24.2%) in the study area. (87%) of the cocoyam farmers intercropped cocoyam seedlings with other crops while just (33%) of these cocoyam farmers in the study area have separate plots in which cocoyam was cultivated showing that in the study area, cocoyam farmers also cultivate these other crops to help with income when cocoyam isn't due to be harvested.

3.2 Cost and Return Analysis

Budgetary analysis of any farming enterprise is of utmost importance to determine the level of profit generated by the enterprise. In generating the profitability of cocoyam production cost/return analysis and benefit-cost analysis are employed to get the net farm income. Table 2 below shows the budgetary analysis of cocoyam in the study area.

Table 2: Cost and Return Analysis

Items	Naira
Total Revenue.	
Sales of Cocoyam	379,570
Variable Costs	
Fertilizer	29,650
Chemicals	54,672
labour	21,881
Planting Materials	32,200
Total Variable Cost	128,403
Fixed Cost	
Land Cost (Rentals)	39,500
Depreciation on Tools	14,870
Total Fixed Cost	54,370
GM= TR-TVC	251,167
Total Cost= TVC+TFC	182,773
Net Farm Income	196,797
Benefit-Cost Ratio	2.08

Source: Field Survey, 2022

Table 2 shows the cost and returns analysis of cocoyam farmers in the study area. Cocoyam production as an enterprise can be seen as profitable giving back about ₦2.08 for every naira invested. The cost of fertilizer is low because not all farmers utilize fertilizer and even if they do, it is always

at the early stage of cultivation. The result revealed that the total variable cost was estimated at ₦128,403 and the total cost of ₦182,773. The gross margin was calculated at ₦251,167 and the net farm income was ₦196,797.

3.3 Regression Analysis

Table 3: Factors affecting cocoyam production.

Variables	Coefficient	Std. Dev.	T-stat
Constant	-13.233	14.212	0.83
Age	2.024	0.077	-0.780
Credit Access	0.7481***	0.268	0.064
Cost of Chemical	-0.123	0.001	-0.500
Cost of Fertilizer	3.300	1.584	0.353
Extension Service	2.552**	1.4472	0.712
Farming Experience	0.3303***	0.088	0.102
Labour	14.316**	3.3833	0.77
Level of Education	0.0000501	0.00005	0.04
Land Size	11.543*	1.570	1.50
Input prices	-0.00074	0.00133	-0.650
R2	0.744		

Source: Field Survey, 2022

*** = significant at 1%

** = significant at 5%

* = significant at 10%

The coefficient of multiple determination (R^2) obtained and its statistical test at 1%, 5% and 10% indicates that credit access, farming experience, extension service, labour, and land size explain about 74.4% of the variation in the quantity of cocoyam production. Credit access and farming experience were found to be positively significant at 1%, this means that a unit increase in these variables will lead to a unit increase in the quantity of cocoyam produced. Credit access and farming experience lead to expansion and firm

decisions on the judicious use of resources for cocoyam farming. Extension services and labour were all positive and significant at 5%. This also implies that an increase in these variables will lead to an increase in the quantity of cocoyam produced, as this allows the farmers to make informed decisions which makes them carry out best cultural practices in cocoyam production. The cost of chemical and input prices were negative implying that an increase in these resources will lead to a reduction in cocoyam production in the study area.

Cocoyam Production Constraints

Table 4: Constraints to cocoyam production

Constraints	Frequency	Percentages(&)
High Cost of Production	23	19.17
Fluctuating Prices of Produce	20	16.67
Weed Problem	15	12.50
Inadequate Storage Facilities	13	10.83
Lack of Improved Cocoyam Varieties	17	14.16
Theft Problem	7	5.83
Lack of Access to Mechanical Equipments	9	7.50
Sourcing for farm labour	16	13.34
Total	120	100

Source: Field survey, 2022

Cocoyam production constraints as presented in table 4 above show that the high cost of production (19.17%) and fluctuating prices of produce (16.67%) were the highest problems encountered by cocoyam farmers in the study area followed by lack of improved cocoyam varieties with (14.16%). The least problems encountered in the study area were lack of access to mechanical equipment (7.50%) and theft problems with (5.83%). Showing that if the high cost of production and fluctuating prices of produce were all taken care of, the production of cocoyam will be greatly enhanced in the study area. Theft problem was the lowest problem encountered in the study area.

4.0 Conclusion and recommendations

In the study area, the major age range that indulged in cocoyam production was the age range of 41-50years (35.8%) and majorly male dominated (67.5%) indicating that the farmers were still young and active and can indulge in cocoyam production very well. The majority of the farmers have

had one form of education or the other with those with a secondary school level of education (29.2%) showing that when new ideas and innovations are introduced to these farmers they will be easily adopted. (53.4%) of the farmers in the study area have had farming experience of 6-15years showing that they have good knowledge of cocoyam production and were also mostly married (52.5%) thereby having access to enough helping hands on the farm. Budgetary analysis shows that cocoyam production in the study area is profitable, while the benefit-cost ratio indicated that for every naira spent on cocoyam production it gave back N2 for every naira invested. Credit accessibility, extension services, farming experience, and access to labour were all significant and enhanced cocoyam production in the study area while the cost of chemical and input prices were all negative and not significant and affected cocoyam production. Instead of the following, it's recommended that government, non-governmental organizations, research institutes and other financial agencies should make available cash in form of

(loans, grants etc.) and kind (subsidized inputs and other incentives) to these farmers to ameliorate the effect of the high cost of production to make the production of cocoyam much easier and cheaper to these farmers in the study area. The government should also put in place and help implement policies which will help curb inflation and high/fluctuating prices of farm produce to help these farmers forecast how much should be made as profit. Storage barns and cribs should also be procured for these farmers to store their goods in times of excess till times of scarcity when they will make more profits by the farmer.

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