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Economic Evaluation of Cocoa Production: A Case Study of the Price Boom of Year 2023-2024

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Abstract

Economic analysis of cocoa production during the price boom period (2023-2024) was carried out in Oluyole Local Government Area of Oyo State South-west Nigeria. Multi-staged sampling procedure was used to select respondents and data were collected from 40 cocoa farmers using structured questionnaire and scheduled interview. Data collected were analyzed using descriptive statistics, gross margin analysis, profitability and efficiency ratios as well as linear regression analysis. Results showed that the mean age of the respondents was 54 years. Some of the farmers had tertiary education (32.5%) and majority have 5-15 years farming experience (35.0%). The profitability and efficiency ratios were 5.22 and 6.22 respectively implying that cocoa production in the study area is profitable and efficient. The result revealed that the coefficient of determination (R^2) was 55.0% which shows that the variables could explain 55.0% of the variation in the dependent variable. Marital status, farm size and transport cost were positive and significant at 1.0%, 5.0% and 10.0% respectively. This implies that marital status, farm size and transport costs contribute positively and are the major factors contributing to the production and marketing of cocoa in the study area. Also the labour cost was negative but significant and therefore, has a negative relationship with the total revenue of the farmers.

It was however, recommended that cocoa farmers should sustain the momentum of rehabilitation of their old cocoa plantations and also establish new ones. Youth in the area should also be encouraged to venture into cocoa farming.

Introduction

Cocoa is a very important cash crop in Nigeria and some other African countries where it is produced in commercial quantities contributing substantially to these countries' economies and also serving as source of employment to millions of smallholder farmers (ICCO, 2022).

Globally, cocoa is reputed to be among the leading world export crop with global production of about 4,645 thousand tons for the year 2017/2018 (ICCO, 2018). According to Olufikayo (2019), the projected global cocoa market would be worth a value of USD 14.572 billion by year 2026 from USD 10.14 billion in 2015 as a result of higher inclination of younger consumers for chocolate consumption globally. According to Tothmihaly (2017), there is a strong and growing demand for cocoa globally most especially in Eastern Europe and Latin America. Even though the origin of cocoa beans is traceable to South America especially the Amazon zone, yet most cocoa beans production is attributed to African continent especially to West African countries such as Côte d'Ivoire, Ghana, Nigeria and Cameroon. According to Temkap and Balogun (2020), Africa accounts for 75.9% of the world cocoa production and remains the largest producing region globally. Nigeria which has a very good history in cocoa production over the years now ranks the third largest producer in West Africa due

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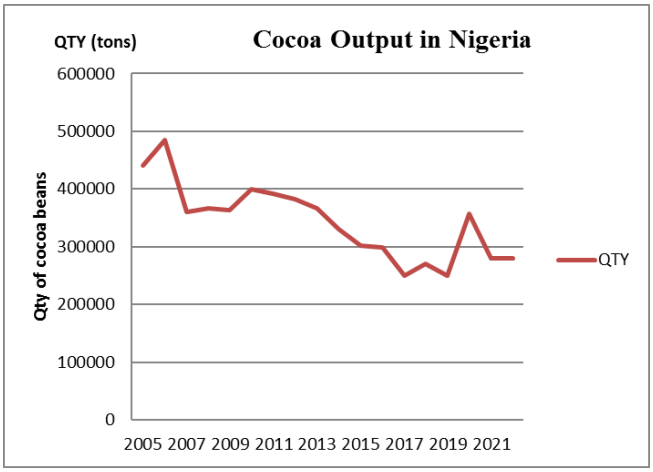
to a drastic reduction in cocoa production in the 1980s and 90s. This could be attributed to shift in focus from agriculture to oil sector by successive federal governments in the country over this period. According to FAOSTAT (2022), the current cocoa output in the country ranges between 250,000 and 280,000 metric tons yearly (Fig. 1).

However, the contributions of cocoa to the Nigeria's economic development are vast and have been reported by many authors. In terms of employment, Nigeria cocoa industry still provides employment for quite a number of people especially farmers and farm household who are engaged in direct cocoa production. Other individuals who are engaged along cocoa value chains such as processors, transporters, and license buying agents and so on also make their living from cocoa indirectly. Also, cocoa is an important source of raw materials for many companies that use cocoa or cocoa by-products for their products.

Cocoa in Nigeria also serves as source of revenue to the governments of cocoa producing states especially in the Western part of the country where cocoa is produced in abundance. In addition, in terms of foreign exchange earnings, no single agricultural export commodity has earned more than cocoa in Nigeria. In addition, Nigeria's cocoa is noted for its first-rate bean count, low slatey, low mold, and smooth flavour. In terms of climate, Nigeria has a favorable climate that supports cocoa production from October to June every year with 1.4 million hectares of farmland for cocoa cultivation throughout the country (NBS, 2010).

However, in the year 2024, a major event occurred which disrupted global supply of cocoa. This event led to the worst supply deficit in decades from Ivory Coast and Ghana who are the two major cocoa beans suppliers. This major disruption led to notable increase in the prices of cocoa globally. However, for the first time ever in Nigeria, cocoa beans produced in the country sold above ₦ 12 million per metric ton in year 2024 as compared with ₦4,000 in 2021, ₦3,948 in 2022, and ₦5,413 in 2023 ((ICCO, 2024). Based on available data from the National Bureau of Statistics (NBS), Nigeria's cocoa exports rose by 304 percent in the first quarter of year 2024 due to higher demand for Nigeria cocoa beans and also due to naira depreciation in the country which made export more profitable. The country's cocoa exports, which accounted for 42.4 percent of the ₦1.04 trillion agricultural exports for the period, surged to ₦438.7 billion in the first quarter of 2024 from ₦108.6 billion in the corresponding period of 2023. According to data from (ICCO, 2024), Nigeria's cocoa price hit a significant high of $12,000 per tons in April 2024.



Source: FAOSTAT, 2023

Figure 1: Cocoa Output in Nigeria (2005-2021)

Source: United Nations COMTRADE database on international trade

Figure 2: Nigeria's Exports in Millions USD

Similarly, there was a spike in the local prices of cocoa beans the same year (Fig. 2). This was a windfall for many of cocoa farmers in the country who were able to produce and offer for sales sizeable quantities of cocoa beans in that particular year.

However, this price increase or surge has caused many Nigeria cocoa farmers especially those who had formerly abandoned their cocoa farms to begin the rehabilitation of their old cocoa plantations. Some started planting seedlings of high-yielding varieties to replace the over-aged and unproductive cocoa trees while some engaged in the expansion of their cocoa plantations.

In spite of all these positive developments about cocoa production in the country, Nigeria's cocoa production and exports are still facing a lot of challenges such as incidence of pests and diseases, problems associated with climate change, high transport costs, poor rural infrastructures and other issues relating to marketing. These challenges have become clog in the wheel of progress of cocoa industry in the country. In addition to these bottlenecks, it is pretty difficult to integrate Nigeria cocoa markets and participate optimally in international trade.

However, considering the importance of cocoa to the Nigeria economy, the Federal Government's concerns and efforts to diversify the export base of the country has placed cocoa in the centre-stage as the most important export tree crop (Ihedioha *et al*., 2018).

Also, given continual and acute poverty rates among cocoa producers worldwide (Fountain and Hutz-Adams, 2019), which has been a thing of concern since 2015, many actors in the cocoa sector have been making effort to make sure that cocoa farmers are given opportunities to earn at least a living income which is the amount they require to be able to afford a decent standard of living. Based on the foregoing, leaders from across the cocoa and global chocolate industry came together in Abidjan, Côte d'Ivoire, to provide feedback on the draft 'Living Income Benchmark Study for the Main Cocoa Growing Regions (Anker *et al*, 2017). Since then, many more independent studies on living income have been conducted around the world (De los Rios and Tyszler, 2020).

As earlier stated, the world cocoa market experienced a price boom between year 2023 and 2024, occasioned by increase in demand for cocoa beans as well as cocoa supply chain disruptions (FAO, 2024), this presents an opportunity to carry out the economic evaluation of income and expenditure of cocoa farmers in Oyo State. Therefore, this study carried out economic evaluation of cocoa production during the price boom period (2023-2024) in Oyo state, Nigeria. The study seeks to identify the socio-economic characteristics of cocoa farmers in the study area; determine the average income of cocoa farmers in the study area during the cocoa price boom; and analyze the income, expenditure and profitability of cocoa in the study area.

Materials and Methods

Study area

The study was carried out in Oyo State, located in South Western Nigeria. The State has a land area of approximately 28,584 square kilometers and a population of 5,591,589 (Wikipedia, 2008). The State lies in the equatorial rainforest belt between Latitude 2°38´ and longitude 4°35´ east of the Greenwich meridian. The annual rainfall varies from 155mm to 1800mm per annum. There is distinct wet season from April to late October, and dry season from November to March with mean annual temperature of 26.2 degree Celsius. However, the relative humidity is high between July and December and low between December and February. The forest zone in this State with high humidity favours the cultivation of arable crops like maize, yam, cassava, and rice. Tree crops such as kola, cocoa, mango, citrus and oil palm are also cultivated in abundance in the State. Farming is however, the major source of income for majority of the people in the State.

Sampling Procedure and Data Collection

Multi-staged sampling procedure was used to select the cocoa farmers for the research work. The first stage involved purposive selection of Oluyole Local Government Area of Oyo State. This was based on the fact that the Local Government Area has a lot of cocoa plantations. In other words, many farmers in the area engage in cocoa production. The second stage involved purposive selection of four villages under the Local

Government Area. These villages are Abanla, Aba-agbo, Alaho, Ikija where majority of the farmers are cocoa farmers. The third stage involved random selection of 10 cocoa farmers in each of the four villages making a total sample size of 40 cocoa farmers. Data were collected with the aid of well-structured questionnaire and scheduled interview. Data collected included: age of cocoa farmers, sex, marital status, educational status, and household size, variety of cocoa grown, years of experience in cocoa farming, farm size, and quantities of cocoa produced in year 2023/24, quantities of cocoa sold, income from cocoa sales and so on.

Analytical Techniques

The analytical techniques used were descriptive statistics, gross margin analysis, profitability and efficiency ratios as well as ordinary least square regression analysis (OLS). Descriptive statistics was used to profile the socio-economic characteristics of the respondents. Gross margin analysis was used to determine the profitability of the enterprise while profitability and efficiency ratios were used to measure the production performance of the cocoa farmers. Also OLS regression analysis was used to capture the factors that contributed to the revenue of the cocoa farmers in year 2023/24 while Gross margin analysis was also used to calculate the cost incurred from cocoa production as well as the revenue generated from the sales of cocoa beans by the cocoa farmers.

The model is given as follows:

$TC = TFC + TVC$……(i)

Where,

TC = Total Cost

TFC = Total Fixed Cost

TVC = Total Variable Cost

Total revenue generated from the sales of cocoa was calculated thus;

Net Income (NI) = GR – TC……(ii)

Gross margin (GM) = GR – TVC……(iii)

Where,

GR = Gross Revenue

TC = Total Cost

GM = Gross margin

Net Income per farmer = Net Income/ Total number of farmers.

The model for the OLS is given as follows:

$Q = \beta_o + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + e_i$

Where:

Q = Quantity of cocoa traded (Kg),

Bs = Parameters estimated

β_0 = the constant term

Xs = the independent variables

The explanatory variables are;

X_1 = age (Years)

X_2 = marital status (single =1, married = 2, widowed = 3, separated = 4)

X_3 = educational level (Primary School = 1, Secondary = 2, tertiary = 3)

X_4 = Household size

X_5 = years of experience (years)

X_6 = Membership of Association (Non member = 0, member = 1)

X_7 = Farm size (Ha)

X_8 = Cost of pesticide (₦)

X_9 = labor cost (₦)

X_{10} = Transportation cost (₦)

e_i = error terms

Results and Discussion

The result in table 1 shows the socioeconomic characteristics of the sampled cocoa farmers. Socioeconomic characteristic such as ages of farmers, sex, marital status, household size, level of education, cocoa farm size are important factors to consider in determining the profitability of the farming business as well as their performances. The table shows that majority of the sampled cocoa farmers were male (87.5%). This is in consonance with the general belief that more male farmers are into cocoa production in Nigeria when compared with their female counterparts. The main reason behind this is that cocoa farming is tedious and men are able to cope better than women folks. This is also consistent with the findings of Oduntan and Adegbuyi (2018) who reported that men dominate both the certified and conventional cocoa production in their study area.

Also, from the table, most of the cocoa farmers are between the ages of 57-67 years with average age of 54 years. This shows that majority of the cocoa farmers in the study area are gradually aging. Hence, the need for able bodied youth, men and women especially young

school leavers and graduates who are still energetic and enterprising to be encouraged in cocoa farming in the study area. Majority of them 35% have between 5-15 years and 22.5% have 26-35years experience in cocoa farming (mean = 25.46 years (SD 15.64)) which presupposes that these farmers must have been in cocoa farming for a long period of time and must have gathered a lot of skills and experiences in cocoa farming. The experiences they have acquired over the years must have increased their managerial ability and as well come to bear on their activities. This result corroborates study by Nwaru (2004) who ascertained that an increased farm productivity, farmers' education counts less than farming experience.

Most of the farmers are married (92.5%) with average family size of 2. The implication of this is that family labor may not be available for cocoa production in the study area. The reason given by some of these farmers is that most of their children are students in higher institutions of learning while those around them are no longer interested in farming and have ventured into other trades. A high percentage of the sampled cocoa farmers (32.5%) had tertiary education. This means that the farmers are well lettered and would be able to accept and utilize modern farming technologies as well as agricultural and marketing information through extension services. Also, the average cocoa farm size in the study area is 2.12 hectares. This implies that majority of the farmers own small farms, which shows that cocoa production is still at low scale in this region. This could probably be as a result of small farm holdings in the country. This is in line with Ogunlade *et al*, 2009 which posited that 75.5% of the cocoa farmers in Nigeria are either small or medium scale farmers.

The result in table 2 shows the total cost of producing cocoa beans by the 40 farmers in the study area. The result shows that the total variable cost was ₦6,441,000. The total fixed cost and the total cost were ₦1,136,000 and ₦7,877,000 respectively. The total revenue from the sales of cocoa beans for the 40 farmers was ₦49,030,000.

Table 1: Socio-economic Characteristics of Cocoa Farmers in Oluyole LGA (no = 40)

Variable	Frequency	Percentage
Sex		
Male	35.0	87.5
Female	5.0	12.5
Age		
35-45	6.0	15.0
46-56	9.0	22.5
57-67	12.0	30.0
68-78	10.0	25.0
79-89	3.0	7.5
Mean Age = 54.28		
SD = 13.32		
Marital status		
Single	1.0	2.5
Married	37.0	92.5
Widowed	2.0	5.0
Educational stat		
No Formal Edu	2.0	5.0
Primary	15.0	37.5
Secondary	10.0	25.0
Tertiary	13.0	32.5
Household size		
1-5	25.0	62.5
6-10	12.0	30.0
Above 10	3.0	7.5
Farm size (Ha)		
Below 1	6.0	15.0
1-2	22.0	55.0
3-4	6.0	15.0
5-6	3.0	7.5
Above 6	3.0	7.5
Mean = 2.12		
SD = 1.84		
Farming Experience		
5-15	14.0	35.0
16-25	10.0	25.0
26-35	9.0	22.0
36-45	5.0	12.0
Above 45	2.0	5.0
Mean = 25.46		
SD = 15.64		

Source: Field Survey, 2025

The net income from the sales of cocoa beans by all the 40 farmers and the net income per farmer are ₦41,153,000 and ₦1,028,825 respectively. The gross margin was ₦42,589,000. However, considering the gross income, the gross margin and the net income per farmer of ₦1,028,825, it could be safely deduced that cocoa business has been a profitable venture in year 2023/2024. This could also be attributed to the spike in cocoa prices in the international market in that particular year. The profit level can be increased through the expansion or rehabilitation of their cocoa farms, *ceteris paribus.*

Table 2: Cost and Return Analysis

S/no	Items	Amounts (₦)
1.	Total Variable Cost	6,441,000
2.	Total Fixed Cost	1,136,000
3.	Total Cost	7,877,000
4.	Total Income from cocoa	49,030,000
5.	Net Income	41,153,000
6.	Net Income per farmer	1,028,825
7.	Gross Margin	42,589,000

Field Survey, 2025

Table 3 shows the measure of cocoa production performance. The condition for the above measure is that profitability ratio and efficiency ratio must be greater than one (1). However, from the result, the profitability ratio (PR) is 5.22 while efficiency ratio (ER) is 6.22. These imply that cocoa production is profitable and efficient in the study area. This is in line with the findings of Fadipe *et al.* (2012) in the study titled economic analysis of cocoa production in Oyo State where they obtained profitability ratio of 2.33 and efficient ratio of 3.22.

Table 3: Measure of Cocoa Production Performance

S/no	Items	Amount (₦)
1	Net Income	41,153,000
2	Total Cost	7,877,000
3	Net Income/Total Cost	5.22
4	Profitability ratio	5.22:1
5	Gross Income from sales of cocoa	49,030,000
6	Total Cost	7,877,000
7	Gross Income/Total Cost	6.22
8	Efficiency ratio	6.22:1

Field Survey, 2025

Table 4 shows the result of the ordinary least square regression analysis. The result reveals that the regressors could explain 55.0% of the variation in the dependent variable, that is, the coefficient of determination was 55.0%. Marital status, farm size and transport cost were positive and significant at 1.0%, 5.0% and 10.0% respectively. The implication of this is that marital status, farm size and transport costs contribute positively and are the significant factors contributing to the production and marketing of cocoa in the study area. On the other hand, the labour cost was negative and significant and therefore, has a negative relationship with the total revenue of the farmers in the study areas.

Table 4: Result of OLS Regression Analysis Showing the Determinants of Quantity of Cocoa Produced and Marketed

Variables	Coefficient	t-value
Constant	13.27	18.92
Age	-0.01	-1.14
Marital status	0.20***	1.93
Education	0.04	0.34
Household size	-0.06	-0.38
Farm experience	0.01	0.78
Association	0.36	1.73
Farm size	0.17**	2.09
Pesticide used	0.03	1.18
Labor cost	-0.03*	-2.51
Transport	0.05*	2.86
R^2	55.28	
Adjusted R	0.3986	

Source: Field Survey, 2025***Sig @ 1%, **Sig @ 5%, *Sig @10%

Conclusion and Recommendations

The world cocoa market experienced a price boom between year 2023 and 2024 as result of disruptions in global supply chain which led to an increase in demand for Nigeria cocoa beans. This invariably made cocoa business not only profitable for cocoa farmers in the country but was an unprecedented windfall for as many of these farmers that were able to offer enough quantities for sale. Cocoa business in the study area was profitable as shown by the net income per farmer of ₦1,028,825. This shows that each cocoa farmer in the study area was able to sell at the high prevailing prices,

cover costs and make huge profits. According to some of these cocoa farmers, they were able to expand their cocoa plantations, engage in rehabilitations of cocoa farms while many were also able to diversify or venture into new business enterprises.

Therefore, based on the findings, it is recommended that cocoa farmers sustain the momentum of rehabilitation of their old cocoa plantations, also establish new ones and increase their farm sizes for cocoa production. This would lead to increased cocoa production in the country. Feeder roads should also be constructed to connect some of these villages to ease and reduce the cost of transportation of cocoa beans to urban centers where they are sold. Lastly, most of the youths in the area which are into commercial motorcycling (Okada) or other unsustainable businesses should be encouraged by government to venture into cocoa production which has a glorious future for them.

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