(KEJAANS)

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES

September, 2025, Vol. 1, issue 2

CONTACT:
The Editor-in-Chief,
Kebbi Journal of Agriculture and Natural Sciences,
Faculty of Agriculture,
Abdullahi Fodio University of Science and Technology
Aliero,
PMB 1144, Birnin kebbi, Nigeria.
Email: kejaanseditor@ksusta.edu.ng,

ISSN: 1595-5776

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)

September, 2025; Volume 1, Issue 2

OFFICIAL JOURNAL OF THE

FACULTY OF AGRICULTURE

ABDULLAHI FODIO UNIVERSITY OF SCIENCE AND TECHNOLOGY, ALIERO

ISSN: 1595-5776

About the Journal

This official scientific publication of the Faculty of Agriculture, Abdullahi Fodio University of Science and Technology Aliero, is a non-profit, open access, double-blind peer-reviewed Journal publishing four issues (January, April, July and October) per annum. The Journal is a platform open to collaborations with researchers, authors, institutions, research agencies and private companies related to Agriculture. The Mission of the Journal is to disseminate scientific knowledge through the publication of original research articles, research notes, book reviews, letters to the editor and reviews of Literature, representing a contribution to scientific and technological knowledge in respective areas covered by the Journal. The Kebbi Journal of Agriculture and Natural Sciences seeks to validate and disseminate new knowledge, making it public in order to strengthen the human capacity, constitute a link in the scientific community to the society and encouraging the expansion of University and academic researches.

Scope of Kebbi Journal of Agriculture and Natural Sciences (KEJAANS)

The Kebbi Journal of Agriculture and Natural Sciences has the sole aim of providing an intellectual platform and ideas for scholars, by promoting interdisciplinary studies related to agriculture and natural science through publishing the latest scientific research findings that are of direct policy implications and beneficial to the research community. Consequently, the journal covers all aspects of Crop Science, Animal Science, Agricultural Economics, Agricultural Extension and Rural Development, Food Science, Fisheries and Aquaculture, Biotechnology, Soil Science and Agricultural Engineering, Forestry and Environment, Wildlife, Agricultural Education, Agro-allied Industries as well as all Natural Science researches related to Agriculture.

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)
September, 2025: Volume 1, Issue 2 : 271-278
p-ISSN: 1595-5776

COMPARATIVE ASSESSMENT OF THE COST AND RETURNS OF UTILIZING IMPROVED COCOA PRODUCTION TECHNOLOGIES BY FARMERS IN CROSS RIVER AND AKWA IBOM STATES, NIGERIA

***Ukoha, J. C. L., Eze, S. O. and Kalu, U.**

Department of Agricultural Extension and Rural Development, Michael Okpara University of Agriculture, Umudike, P.M.B 7267 Umuahia, Abia State, Nigeria

Corresponding Author: joyciroukoha@gmail.com, +234 703 380 6058

ABSTRACT

The study comparatively assessed the cost and returns of utilizing improved cocoa production technologies by farmers in Cross River and Akwa Ibom States, Nigeria. A multi-stage and purposive sampling technique were used to collect data for the study. A total of 240 cocoa farmers who have utilized improved cocoa production technologies were used as sample size. Data were collected from primary source using structured questionnaire and FGD and analyzed using descriptive statistics, such as frequency distribution, percentages and mean. The breakdown of the results of the cost and returns of utilizing improved cocoa production technologies by farmers showed that Total Revenue from Cross River State (₦2,022,900.84) was higher than that of the Akwa Ibom State (₦1,844, 517.13). Also, the Total Variable Cost from Cross River State (₦315, 107. 50) was higher than that of Akwa Ibom State (₦319,927.88). This therefore, brought the Total Fixed Cost (TFC) to ₦1,170,120.80 for Cross River State while that of Akwa Ibom State was ₦1,490,555.80 and was higher than that of the Cross River State. Therefore, the Net Farm Income (NI) generated from utilizing improved cocoa production technologies in Cross River State was ₦537,672.54 per annum and for Akwa Ibom State (NI) was ₦353,961.33 per annum. This brought the Gross Margin (GM) to ₦1,707,793.34 for Cross River State and ₦1,524,589.25 for Akwa Ibom State. The Return on Investment (RNI) was 1.4 for Cross River State and was 1.2 for Akwa Ibom State, indicating that rural households in both States were at breakeven though those from Cross River State was better off. The study concluded that Cocoa enterprise is viable and therefore, recommended that Government should encourage farmers to boost cocoa production with incentives and subsidies on farm inputs.

Keywords**:** Total revenue, Variable Cost, Net Farm income, Return on Investment, Gross margin

Introduction

Cacao (*Theobroma cacao*) is largely produced in Nigeria and Nigeria is the fourth leading exporter of cocoa in the world, after Cote d'Ivoire, Indonesia and Ghana. Cocoa from the Amelonado type was taken from Brazil to Saotome in 1855 and later in the century to Ghana and Nigeria to form the basis of cocoa growing in West Africa (Verter and Becvafova (2014).

According to Olowolaju (2014), cocoa is an important source of raw materials, as well as source of revenue to governments of cocoa producing States. Cocoa as the largest non-foreign exchange earner for the country, provides sources or employment a significant

share of the household's income to millions of Nigerians as farmers, processors, licensed buying agents, marketers and exporters. Also, as a cash crop has played much role in the fight against poverty by increasing farmers' income in addition to promoting rural economic growth and contributing to the Country's GDP through its high foreign exchange (Fountain and Huetz-Adams, 2018, Agbota, 2013).

However, with the advent of the oil boom of the 1970s, the cocoa sub-sector experienced a decline. Olaiya (2016) attributed the cause of decline in cocoa production to the oil boom syndrome coupled with other socio-economic factors. Sequel to this development, some institutional efforts were put in place, such as cocoa rehabilitation programme, cocoa trade liberalization, distribution of improved cocoa varieties to farmers at subsidized rate and few new plantings were carried out from the mid-1980s to most part of the 1990s. This effort yielded slight increase in cocoa production (Adebiyi and Okunlola, 2013).

Akwa-Ibom, Cross River, Delta and Edo States are cocoa producing States in South-South, Nigeria. Cross River State is known as the second largest cocoa producer in Nigeria and this was closely followed by Akwa Ibom with four LGAs producing cocoa in large quantities (Afolayan, 2020; Simon, 2017).

The utilization of improved cocoa production technologies as developed by CRIN for farmers is expected to increase productivity significantly, increase income, reduce poverty, ensures satisfaction and improve the overall wellbeing of the cocoa farming households, although, farmers' income may affect technology utilization Arimi (2015). Studies have shown that conventional cocoa production is profitable and that the returns from cocoa production are high (Osarenren, Ejuetueyin, and Eweka, 2016; Oladoyin and Aturamu, 2022).

Hence, the study compared the cost and returns of utilizing improved cocoa production technologies by farmers in Cross River and Akwa Ibom States, Nigeria

Methodology

Study Area

The study was carried out in Cross River and Akwa Ibom States, Nigeria. Cross River State is a state in the South-South geopolitical zone of Nigeria. The average temperature of the state is between 15°C and 30°C. However, this climatic condition is different in locations within the Cross River state such as the high plateau of Obudu, which has a record of a fall in temperature between 4°C and 10°C, as a result of the high altitude of this area. The capital city of the State, Calabar, has a significant record of rainfall within the year, while the dry season has less significant effect in the state due to the depth of rainfall experienced. Based on the records presented by the Climate Data of the state, the annual rainfall of Cross River state is 3306mm (130.2 inches). Akwa Ibom is one of the 36 states in Nigeria, lying between latitudes 4°32′N and 5°33′N, and longitudes 7°25′E and 8°25′E.

Population of the Study

The study was made up of all cocoa farmers in Cross River and Akwa Ibom States of Nigeria.

Sample and Sampling Procedure

A multistage sampling procedure was employed to select the sample for the study. It employed purposive sampling in both States of Cross River and Akwa Ibom States in selecting three (3) Local Government Areas (LGAs) depending on the level of cocoa farming in the area. For Cross River State namely; Boki, Etung and Ikom, LGAs were purposively selected while in Akwa Ibom; Ini, Ikono and Ibiono LGAs were selected. This means a total of six (6) LGAs. In the third stage, four (4)

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)
September, 2025: Volume 1, Issue 2 : 271-278
p-ISSN: 1595-5776

communities were equally purposively selected from each LGA, bringing the total number to twenty-four (24) communities. These communities were: for Cross river State – Boki LGA (Bashua, Abonorok, Oriemekpung and kanyang), Etung LGA (Benedeghe, Abia, Benedeghe farm and Agbokim) and Ikom LGA (Ekparabong, Ikom, Nde,and Okuni). Furthermore, the communities from Akwa Ibom State were: Ini LGA (Odoro Ikpe, Mbiabet Ikpe, Mbiabong Ikot Udofia and Itu mbonuso); Ikono LGA (Ibiaku Ntok Okpo, Iton Odoro, Nung Ukim and Mbiabong Ikom) and Ibiono LGA (Edem Urua, Okoita, Use and Ikot Ikpang). Continuing, ten (10) cocoa farmers were purposively selected from each of the communities to give rise to a total of two hundred and forty (240) cocoa farmers that were used for the study.

Method of Data Collection

Data for the study were generated from primary source using a structured questionnaire to elicit information from Cocoa farmers. Similarly, Focused Group Discussion was also carried out in the study area to further strengthen the findings. This is in addition to secondary information gotten from journals, quarterly reports, text books, the internet etc

Method of Data Analysis

To determine cost and return of utilizing improved cocoa production technologies, the gross margin analysis was used; where GM = TR – TVC, where GM = Gross Margin, TR = Total Revenue, TVC = Total Variable Cost; Net Farm Income (NI) = Total Revenue (GI) - Total Cost (TC); Return on Investment (RNI) = GI/TC. The Decision Rule was: If RNI = 1, then farmers are at breakeven; If RNI < 1, then farmers are at loss

Results and Discussion

The results on the Gross Margin, Net Income and Return on Investment from Cocoa Production are presented using chats as well as in the Summary Table 1.

Revenue from Cocoa production in both Cross River and Akwa Ibom States

In Cross River State, it showed that **average revenue** accruing from sale of cocoa bean was one million, six hundred and forty-five thousand, five hundred and sixteen naira, sixty-seven kobo only (₦1,645,516.67), sale of cocoa wine was twenty-three thousand, six hundred and twenty-nine naira, seventeen kobo (₦23,629.17), sale of cocoa pods after processing was sixty-two thousand, two hundred naira (₦62, 200.00), wage from supplying labour in cocoa farm was sixty-nine thousand, nine hundred and sixty-seven naira, fifty kobo (₦69, 967.50), renting out of cocoa farm was one hundred and sixty thousand, eight hundred and seventy-five naira only (₦160, 875.00) while renting out of farm equipment was sixty thousand, seven hundred and twelve naira, fifty kobo (₦60. 712.50). **Total Revenue (TR)** therefore, equaled Two million, twenty-two thousand- and nine-hundred-naira, eighty-four kobo (**₦2,022,900.84**). This indicated that apart from the cocoa beans that gave the highest revenue from cocoa, there are other aspects of cocoa produce that can yield income to the rural households in Cross River State.

Entries from Akwa Ibom State, showed that **average revenue** accruing from sale of cocoa bean was one million, five hundred and thirty-three thousand, f our hundred and seventy-five naira, eighty-five kobo only (₦1,533,475.85), sale of cocoa wine was twelve thousand, seven hundred and five naira (₦12, 705.00), sale of cocoa pods after processing was sixty-nine thousand, seven hundred and seven naira, fifty kobo (₦69,707.50), wage from supplying labour in cocoa farm was one hundred and nine

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)
September, 2025: Volume 1, Issue 2 : 271-278
p-ISSN: 1595-5776

thousand, six hundred and seventy-six naira, seventy kobo (₦109,676.70), renting out of cocoa farm was seventy -four thousand, three hundred hundred and nine naira, fifty-eight kobo only (₦74,309.58)

Total Revenue (TR) therefore, equaled one million, eighty hundred and forty-forty thousand, five hundred- and seventeen-naira, thirteen kobo (**₦1,844, 517.13**). This came from the sale of cocoa beans, cocoa wine, cocoa pods, wage from labour, rent from cocoa farm and farm equipment that gave the total revenue from cocoa for the rural households in Akwa Ibom State.

The **total revenue** from Cross River State (**₦2,022,900.84**) was higher than that of the Akwa Ibom State (**₦1,844, 517.13**). This could be as a result of more market linkages and exposure to ready buyers in Cross River State.

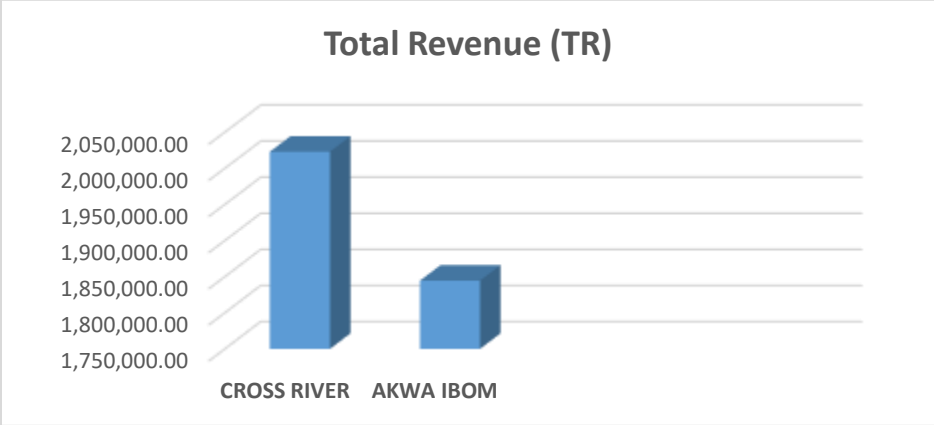

Fig 1: A chart showing Total Revenue (TR) from cocoa production, 2024

Variable Cost (VC) incurred in cocoa production from the study area

Furthermore, **Variable Cost** expended on the average in Cross River State included: Labour one hundred and thirty-five thousand, seven hundred and five naira (₦135,705.00); Transportation was one hundred and five thousand, four hundred and eighty-five naira (₦105,485.00) and Agrochemicals was seventy-three thousand, nine hundred- and seventeen-naira, fifty kobo (₦73,917.50). Therefore, **Total Variable Cost (TVC**) under Cross River State as was incurred by the rural households in cocoa production was three hundred and fifteen thousand, one hundred- and seven-naira, fifty kobo (**₦315, 107.50**). The result showed that more of the cost incurred was on transportation of farm inputs, farm produce, farm visits etc, closely followed by amounts expended on hiring labour and finally on the purchase of agrochemicals.

In Akwa Ibom State, the Variable Cost expended on the average included: Labour – seventy-three thousand, five hundred- and sixty-eight-naira, seventy-five kobo (₦73, 568.75); Transportation was one hundred and fifty-nine thousand, one hundred-naira, eighty kobo (₦159,100.80) and Agrochemicals was eighty-seven thousand, two hundred- and fifty-eight-naira, thirty-three kobo (₦87,258.33). Therefore, **Total Variable Cost (TVC)** incurred by the rural households in Akwa Ibom State in cocoa production was three hundred and nineteen thousand, nine hundred- and twenty-seven-naira, eighty-eight kobo (**₦319,927.88**). The result showed that more of the cost incurred was on transportation of farm inputs, laborers, farm produce, farm visits etc,

closely followed by purchase of agrochemicals and finally, the amounts expended on hiring labour.

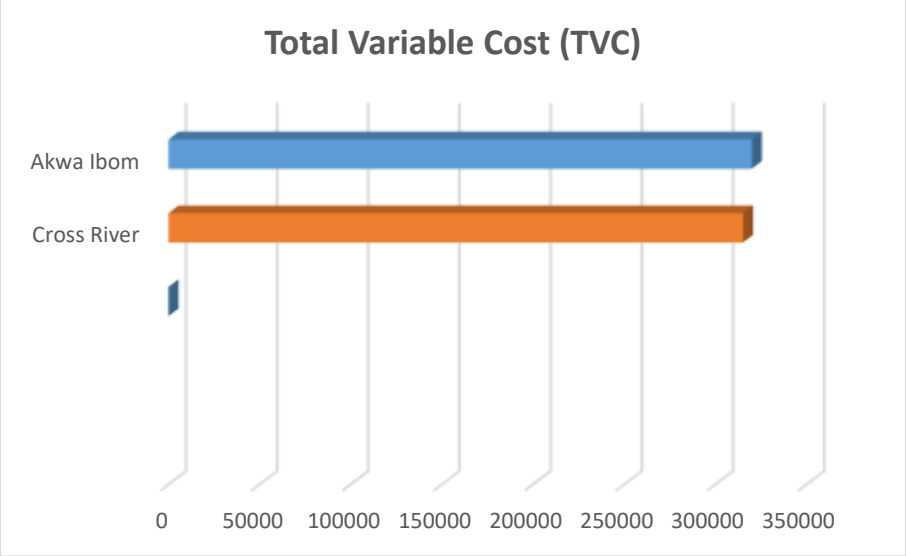

Fig 2: A chart showing Total Variable Cost (TVC) in Cocoa Production, 2024

Fixed Cost incurred in cocoa production from the study area

Continuing, the **Fixed Cost** incurred in Cross River State included rent on land which was one million, one hundred and thirty-eight thousand, seven hundred- and eight-naira, thirty kobo (₦1,138,708.30) while the Depreciation calculated was thirty-one thousand, four hundred- and twelve-naira, fifty kobo (₦31,412.50). Rent paid on cocoa farm land constituted the bigger proportion on the cost of production. This therefore, brought the **Total Fixed Cost (TFC)** to One million, one hundred and seventy thousand, one hundred- and twenty-naira, eighty kobo (**₦1,170,120.80**) while the **Total Cost (TC**) was One million, four hundred and eighty-five thousand, two hundred- and twenty-eight-naira, three kobo (**₦1,485,228.03**).

Also, the **Fixed Cost** incurred in Akwa Ibom State included rent on land which was one million, one hundred and forty-nine thousand, nine hundred- and thirty-three-naira, seventy-five kobo (₦1,149,933.75) while the **Depreciation** calculated was twenty thousand, six hundred- and ninety-four-naira, seventeen kobo (₦20,694.17). Rent paid on cocoa farm land equally constituted the bigger proportion on the cost of production as in Cross River State, thereby, bringing the **Total Fixed Cost (TFC)** to One million, one hundred and seventy thousand, six hundred and twenty-seven naira, ninety-two kobo (**₦1,170,627.92**) while the **Total Cost (TC**) was One million, four hundred and ninety thousand, five hundred and fifty-five naira, eighty kobo (**₦1,490,555.80**), higher than that of the Cross River State.

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)
September, 2025: Volume 1, Issue 2 : 271-278
p-ISSN: 1595-5776

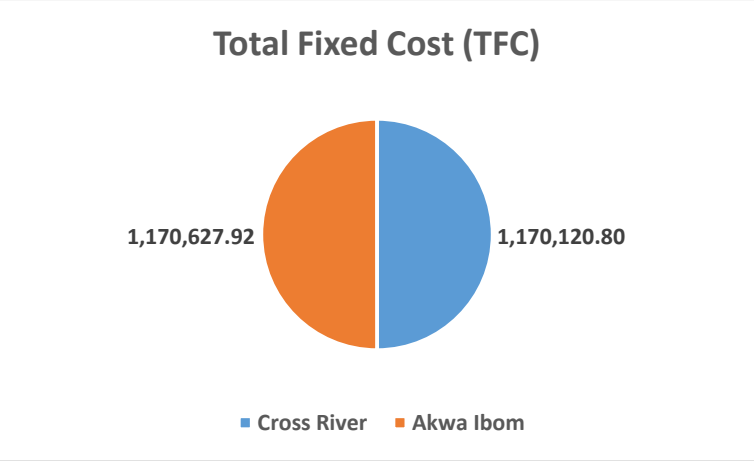

Fig 3: A chart showing Total Fixed Cost in cocoa production, 2024

Net Farm Income (NFI)

Therefore, in Cross River State, the **Net Farm Income (NI)** (Total Revenue (GI) – Total Cost (TC)) generated from utilizing improved cocoa production technologies was five hundred and thirty-seven thousand, six hundred- and seventy-two-naira, fifty-four kobo (**₦537,672.54**) per annum. This brought the **Gross Margin** (GM) (Gross Income (GI) – Total Variable Cost (TVC)) to one million, seven hundred and seven thousand, seven hundred- and ninety-three-naira, thirty-four kobo (**₦1,707,793.34**), the **Return on Investment** (RNI) (Gross Income /Total Cost) was **1.4**. Going by the Decision Rule, this finding means that the rural households in Cross River State was at breakeven in their cocoa farming enterprise.

For Akwa Ibom State, the **Net Farm Income** realized by rural households in utilizing improved cocoa production technologies was three hundred and fifty-three thousand, nine hundred- and sixty-one-naira, thirty-three kobo (**₦353,961.33**) per annum. This brought the **Gross Margin** (GM) (Gross Income (GI) – Total Variable Cost (TVC)) to one million, five hundred- and twenty-four-naira, twenty-five kobo (**₦1,524,589.25**), the **Return on Investment** (RNI) (Gross Income /Total Cost) was **1.2.** Going by the Decision Rule, this finding means that the rural households in Akwa Ibom State was equally at breakeven. However, Cross River State have higher Return on Investment in their cocoa farming enterprise than those cocoa farmers from Akwa Ibom State.

Akwa Ibom State was better off than Cross River State probably due to reduced cost emanating from interventions from government in terms of subsidy, which could have lowered production cost. This also explains why farmers in Akwa Ibom State are better off in terms of wellbeing status.

However, the entire findings in this section, showed that cocoa farming is a profitable venture especially when improved cocoa technologies are utilized in the course of production. This result is in line with that of Akinkpelu, Lawal, Ibiremo and Ogunwolu, (2021) that Productivity among farmers has been greatly enhanced and income increased through the efforts of Cocoa Research Institute of Nigeria (CRIN) that has developed and disseminated different improved production packages on cocoa to farmers in Nigeria in line with its objectives. It equally agreed with the findings of Akintelu, Mele, Sobanke and Adewunmi

(2019) that production technologies have led to quality of output and improved farm practices

.

Table 1. Summary Table on the Distribution of Cocoa Farmers Based on Gross Margin, Net Income and Return on Investment from Cocoa Production

Variables	Cross River Amount (₦)	Akwa Ibom Amount (₦)
Revenue from cocoa		
Average Selling price of Cocoa bean	1,645,516.67	1,533,475.85
Average Selling Price of cocoa wine	23,629.17	12,705.00
Average Selling price of cocoa pods after processing	62,200.00	69,707.50
Wage from supplying Labour in cocoa farm	69,967.50	109,676.70
Renting out of cocoa farm	160,875.00	74,309.58
Renting out of farm equipment	60,712.50	44,642.50
Total Revenue (TR)	2,022,900.84	1,844,517.13
Variable Cost		
Labour	135,705.00	73,568.75
Transportation	105,485.00	159,100.80
Agrochemicals	73,917.50	87,258.33
Total Variable Cost (TVC)	315,107.50	319,927.88
Fixed Cost		
Rent on Land	1,138,708.30	1,149,933.75
Depreciation	31,412.50	20,694.17
Total Fixed Cost (TFC)	1,170,120.80	1,170,627.92
Total Cost (TVC+TFC)	1,485,228.3	1,490,555.80

Source: Field Survey Data, 2024

For Cross River State

*Net Farm Income (NFI) = Total Revenue (GI) - Total Cost (TC)
= 2,022,900.84 - 1,485,228.3 = *₦537,672.54*

Gross Margin (GM) = Gross Income (GI) – TVC
= 2,022,900.84 – 315,107.50 = *1,707,793.34*

Return on Investment (RNI) = GI/TC
= 2,022,900.84/1,485,228.3 = *1.4*

For Akwa Ibom State

*Net Farm Income (NFI) = Total Revenue (GI) - Total Cost (TC)
= 1,844,517.13 - 1,490,555.80 = *₦353,961.33*

Gross Margin (GM) = Gross Income (GI) – TVC
=1,844,517.13 – 319,927.88 = *1,524,589.25*

Return on Investment (RNI) = GI/TC
= 1,844,517.13/ 1,490,555.80 = *1.2*

Decision Rule: if RNI = 1, then farmers are at breakeven; If RNI < 1, then farmers are at loss.

Conclusion and Recommendation

The study concluded that Cocoa enterprise is viable as cocoa farmers in both States were at breakeven though those from Cross River State were better off and therefore recommended that Government should encourage farmers to boost cocoa production with incentives and subsidies on farm inputs such as improved seedlings, agrochemicals; trainings; favorable policies; farm insurance; access to loans and grants etc

References

Adebiyi, S. and Okunlola, J. O. (2013). Factors Affecting Adoption of Cocoa Farm Rehabilitation Techniques in Oyo State of Nigeria. *World Journal of Agricultural Sciences*, 9 (3): 258-265, 2013 ISSN 1817-3047

Afolayan, O. S. (2020). Cocoa Production Pattern in Nigeria: The Missing Link in RegionalAgro-Economic Development. *Analele Universităţii din Oradea, Seria Geografie*. 30(1), pp.88-96.

Agbota, S. (2013): "Cocoa contributes $900m to Nigeria's economy in 2012 – BMI". The SUN Newspaper, July 15, 2013. www.sunnewsonline.com

Akinpelu, A. O., Lawal, J. O., Ibiremo, O. S. and Ogunwolu, Q. A. (2021). Socioeconomic Factors and Cocoa Rehabilitation Techniques among Farmers in Boki, Cross River State, Nigeria. *Asian Journal of Research in Crop Science*, 6 (4), 1 – 6

Akintelu, S. O., Mele, L., Sobanke, V. O. and Adewunmi, M. (2019). Adoption of some cocoa production technologies by cocoa farmers in Kogi State, Nigeria. *International Journal of Agriculture Innovation, Technology and Globalization*, 1(1), 31 - 43

Fountain, A., and F. Huetz-Adams. (2018). "Cocoa Barometer 2018." http://www.cocoabarometer.org/Cocoa_Barometer/Download_files/2018 %20Cocoa%20Barometer%20180420.pdf.

Oladoyin, O. P. and Aturamu, O. A. (2022). Cost-benefit Analysis of Cocoa Production in ldanre Local Government Area of Ondo State, Nigeria. *Asian Journal of Advanced Research and Reports*,1 6 (2),1-10.

Olowolaju, P. S. (2014). An Assessment of Investment in Technology in Cocoa Processing Industry in Nigeria. *Journal of Economics and Sustainable Development*, 5(10), 182 - 188

Osarenren, C. O., Ejuetueyin, J. O. and Eweka, K. I. (2016). Socio-Economic Characteristics of Registered Cocoa Farmers in Edo State, Nigeria. *Journal of Applied Scienced and Environmental Management*

Simon, E. (2017). Cocoa Production: Can Akwa Ibom State Spring a Surprise? http://sitippe.com/cocoa-production-can-akwa-ibom-state-spring-surprise/

Verter, N. and Becvafova, V. (2014), analysis of some Drivers of Cocoa Export in Nigeria in the Era of Trade Liberalization. *Agris On-Line Papers in Economics and Information.* 6 (4). 208 – 218.