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Adoption of Cocoa Rehabilitation Techniques among Cocoa Farmers in Oyo State, Nigeria

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Abstract

The study assessed the adoption of cocoa rehabilitation techniques (CRTs) by cocoa producers in Ido and Oluyole Local Government Areas Oyo State, Nigeria. Respondents for the study were 97, chosen through a multi-stage sampling technique. T-test, mean statistics, and percentages were used for data analysis. The study's findings showed the mean age of cocoa farmers to be 55 years and the mean for farming experience was 20.9 years. It further revealed, that though there was a low adoption of cocoa rehabilitation techniques (x = 1.72), there was a significant difference in the annual output of cocoa before (x = 211.83 kg/ha) and after (605.24 kg/ha) adoption of cocoa rehabilitation techniques with a p-value = 0.021. The most used techniques were planting cocoa under trees (x = 3.63) and complete replacement of old cocoa farms (x = 2.10). It also revealed scarcity of improved cocoa varieties (x = 4.70) and inadequate capital (x = 4.62) were the major constraints to cocoa rehabilitation. It was therefore recommended that cocoa rehabilitation efforts should be intensified while ensuring adequate availability of improved cocoa varieties and capital for the acquisition of necessary inputs.

Keywords: Rehabilitation techniques, cocoa, farmers, adoption.

INTRODUCTION

Theobroma cacao L., a plant whose scientific name translates to "food of the Gods" in Greek, is cultivated for commercial purposes in the tropical regions of the New World, western Africa, and tropical Asia (Cook, 2024). Its beans, which have been used for thousands of years, are processed into cocoa powder, cocoa butter, chocolate, and other value-added products, including cocoa wine, and cocoa bread. Nigeria was the world's second-largest producer of this crop in 1970, but its share of global output declined due to investments made in the oil industry during the 1970's and 1980's. The crop was a significant source of foreign exchange earnings for Nigeria in the 1950's and 1960's. However, Nigeria's cocoa production and its position in the global market declined, reflected in the country's 0.3% agricultural GDP contribution to cocoa production in 2010 (Olajide, 2020). This continues to affect the nation today as it struggles to produce cocoa at the same levels as it did in the 1960s and 1970's when it was the world's second-largest producer (Akinpelu *et al.*, 2021). Nevertheless, Nigeria's position has shifted in the world's position to the fourth largest producer with 244,000 metric tonnes in the 2022-2023 season on global production after Ivory Coast, Indonesia and Ghana (ICCO, 2024).

A successful cocoa yield can last for 50 years, with the maximum yield occurring between 15 and 25 years of age. However, cocoa trees in Nigeria are aging and weak to produce at their peak (Badiru *et al*., 2023). There were quite several initiatives and strategies put in place to combat the decline in cocoa production in Nigeria. Prominent among these strategies is the establishment and resuscitation of institutions saddled with the responsibility of increasing cocoa production. Some of these organizations include; the National Cocoa Development Committee (NCDC), Farmer Business School (FBS), International Institute of Tropical Agriculture (IITA), Cocoa Farmers Association of Nigeria, and the Cocoa Research Institute of Nigeria (CRIN). Specifically, among the several measures aimed at raising cocoa yields and improving its production in Nigeria was the 1999 presidential cocoa rehabilitation and production sustainability programme announced by the Federal Government of Nigeria. This initiative's main goal was to restore cocoa's former grandeur and turn it into a significant driver of the Nigerian economy. The Cocoa Rehabilitation Programme's innovations address issues with weeds, pests, diseases, low yield, and deteriorating soil ripeness. There is a collaboration between the Cocoa Development Units (CDUs) or Tree Crop Units (TCUs) of every state that produces cocoa, and units in CRIN to oversee the growth of various seedlings. Responding to this development, the CRIN created several Cocoa Rehabilitation Techniques (CRTs), including coppicing, complete replanting, side grafting, top grafting, phased farm replanting, fertilizer application, and planting beneath cocoa trees. Meanwhile, CRIN was also tasked with conducting high-quality research in the areas of cocoa, kola, coffee, cashew, and tea to rejuvenate older cocoa plants on cocoa fields and see that there is an improvement in the farmers' income and standard of living (Akande, 2020).

The purpose of cocoa rehabilitation is to help weaker cocoa farms reach and sustain their full potential throughout their existence (Akinpelu *et al*., 2021). Despite the existence of technologies for cocoa rehabilitation and other measures to help boost cocoa production, there is still a decline in coca production thereby resulting in a fall in its economic importance in Nigeria (Adetarami *et al*., 2020). Shahbandeh (2021) and Adetarami *et al.* (2020), reiterated that some of the challenges confronting cocoa production are poor access to marketing information and finance, high cost of crop management, weak and aging cocoa trees, and non-adoption of improved techniques of recommendation from research. It is, therefore, important to evaluate how cocoa producers in Oyo State, were implementing CRTs, which were predicted to boost cocoa production, raise national income, and reduce poverty. The study therefore, examined the extent of adoption of CRTs; evaluated the annual production of cocoa before and after the adoption of CRTs; and identified the constraints on the various techniques adopted.

MATERIALS AND METHODS

The study was conducted in Oyo State, in the southwest of Nigeria. The state's capital is Ibadan, it is 28,454 km^2 in size, with 7,840,864 people. The state is situated geographically at latitude 7° 51' 9.25" N and longitude 3° 55' 52.50" E. The state's climate is favorable for growing crops including cashews, plantains, cocoa, cassava, rice, and yam making agriculture the primary industry. The soil texture is mostly sandy loam, rich in copper. There are large numbers of cocoa farmers in the state and the state is the site of notable agricultural technology transfer institutes in the country like the Cocoa Research Institute of Nigeria (Awodumila *et al*., 2020).

A three-stage sampling procedure was used for the respondents' selection. Ido and Oluyole Local Government Areas (LGAs) were chosen because those were the only places where the farmers under CRIN's cocoa rehabilitation programme were located during the time of the study. In the second stage, four out of the twenty (20) wards were purposefully chosen from the two (2) Local Government Areas based on the predominance of cocoa farmers in those locations. A proportionate sampling technique was used in the last stage based on the contribution of each to the sample frame. Thereafter, The Research Advisors Table was used to pick 31 cocoa farmers from Onipe, 25 farmers from Aba Agbo, 22 farmers from Apa Paanu, and 19 farmers from Ajerun from the list provided by the CRIN office to arrive at 97 respondents for the study. A structured questionnaire was administered to the respondents to elicit data for the study. The farmers' level of adoption of the cocoa rehabilitation techniques was assessed using a four-point scale with the following scores: highly adopted = 4, average = 3, moderately adopted = 2, and not adopted = 1, and a mean score of 2.5 was used. The constraints to the various techniques adopted were assessed using a five-point likert scale with the following score: extremely great = 5, great = 4, moderate = 3, mild = 2, and not a constraint = 1, and a mean score of 3.0 was used. Those constraints above the mean were regarded as serious constraints and those below were regarded as mild constraints. To evaluate cocoa production before and after farm rehabilitation, farmers were asked to supply the annual quantity of cocoa produced in kg before adopting any of the cocoa rehabilitation techniques using the recall method and the quantity produced after the adoption. Data analysis was carried out using mean statistics, percentages, and t-test.

RESULTS AND DISCUSSION

Farmers' Personal and Cocoa Farms Characteristics

Results in Table 1 shows that the majority (77.0%) of respondents were male. This shows males were more involved in cocoa rehabilitation. Respondents' mean age was 55 years and this depicts that, though the cocoa farmers could no longer be regarded as youths, they are still within the active age useful for agricultural production. The mean years of experience in cocoa farming was 20.9 years, revealing good experience in cocoa production. Badiru *et al*. (2023) confirmed the mean age of 21.5 years for cocoa farming experience. These findings suggest that the cocoa farmers have accumulated valuable knowledge and skills that could contribute to higher productivity. There were 77% farmers' households with three to six members which may increase the availability of family labor. Also, 82% of respondents had some level of education, and only 15% of respondents had no formal education, this is expected to have a high impact on the adoption of cocoa rehabilitation techniques.

Extent of Adoption of Cocoa Rehabilitation Techniques

Table 2 reveals that planting under trees was the most adopted cocoa rehabilitation technique (x = 3.63). According to the survey, one respondent said that "Planting young cocoa raised from the nursery under older trees is believed to reduce the stress, as the older cocoa trees shield the saplings from direct sunshine". The results further revealed that most of the cocoa rehabilitation techniques were not adopted. The grand mean for the extent of adoption of the techniques was 1.72. This implies a low adoption of cocoa rehabilitation techniques and could further result in a decline in cocoa production. It

Table 1. Farmers' personal and cocoa farms characteristics

Characteristics	Percentage	Mean
Gender		
Male	79.4	
Female	20.6	
Farmers' age (years)		55.0 ± 13.11
Cocoa farming experience (years)		20.9 ± 11.82
Household size		4.0 ± 1.13
Level of education		
No formal education	15.5	
Primary education	64.9	
Secondary education	19.6	
Farms' age (years)		32.4 ± 10.08
Farm size (hectares)		
≤1.5	32.2	
1.6–2.9	38.7	2.09 ± 1.08
≥3.0	29.1	
Farm acquisition type		
Self-owned	24.9 *	
Inherited	75.1 *	
Sharecropping	60.6 *	
Major crops grown in addition to cocoa		
Plantain	51.2 *	
Cassava	20.1 *	
Type of labour used in cocoa farm		
Self/Family	69.8 *	
	24.2 *	
Communal	6.9 *	

* Multiple responses.

Table 2. Extent of adoption of cocoa rehabilitation techniques

Extent of adoption of CRTs	NA	RA	MA	HA	Mean	SD
Coppicing	30	70	0	0	1.70	0.46
Complete replanting	5	80	15	0	2.10	0.44
Side grafting	100	0	0	0	1.00	0.00
Top grafting	100	0	0	0	1.00	0.00
Phased farm replanting	95	0	5	0	1.10	0.44
Fertilizer application	70	15	15	0	1.45	0.58
Planting under trees	0	5	25	70	3.63	0.60
Grand mean					1.72	

Key : NA = Not adopted, RA = Rarely adopted, MA = Moderately adopted and HA = Highly adopted. Figures are percentages.

further revealed that the objective of the cocoa rehabilitation programme had not been realized optimally. This outcome is consistent with the finding of Akinnagbe (2020) on the adoption rates of cocoa rehabilitation initiatives in Southwest Nigeria, which affirmed that many cocoa growers did not implement cocoa rehabilitation initiatives.

Annual Cocoa Production Before and After Adoption of Cocoa Rehabilitation Techniques

As shown in Table 3, the average annual cocoa production before cocoa rehabilitation was 211.83 kg/ha while the average annual production following the implementation of cocoa rehabilitation techniques was 605.24 kg/ha with 43.0% of the respondents producing

Table 3. Production before and after adoption of cocoa rehabilitation techniques

Annual production, kg/ha	Before adoption, %	Mean, kg/ha	After adoptionm, %	Mean, kg/ha
<200	20.8		20.8	
200–400	53.7	211.83	5.2	
401–600	10.0		20.7	605.24
601–800	15.5		43.0	
> 800	0.0		10.3	
Total	100.0		100.0	

between 601–800 kg/ha. The difference in production figures, which was more than double, revealed a great increase in the quantity of cocoa produced after the implementation of cocoa rehabilitation. This shows that though the adoption of the cocoa rehabilitation techniques was low, the few ones adopted were very effective. This revealed the programme had a great and positive effect on cocoa production. The results showed the efficacy of the strategy and revealed the potential of the cocoa rehabilitation programme to address the decline in cocoa production. Akinnagbe (2020) confirmed the use of cocoa rehabilitation programmes significantly increased cocoa production. Also, David *et al.* (2022) confirmed an increase in the number of pods per tree and the value of cocoa sales after cocoa rehabilitation.

Constraints to Adoption of Cocoa Rehabilitation Techniques

Table 4 reveals that the greatest constraint to the adoption of the cocoa rehabilitation technique was the unavailability and high cost of cocoa seedlings (x = 4.70). The key informant interviewed conducted reported this "The seeds were not always available for farmers to plant and the prices farmers got them from the designated agencies were not always affordable. Also, farmers often got adulterated varieties when they tried getting from sources other than CRIN, CDUs, and TCUs". Furthermore, access to capital (x = 4.62) was revealed as a major barrier in cocoa rehabilitation. Inadequate capital to acquire other inputs such as labour and agrochemicals constituted a constraint for the farmers. This finding is corroborated by that of Acheampong, (2023), who affirmed that lack of credit and scarcity of hybrid seedlings were the most confronting challenges in cocoa rehabilitation. All the other constraints identified in the study were; fulani herdsmen attacking farms (x = 4.61) farmers' attitude towards risk and change (x = 4.55), inadequacies in extension intervention (x = 4.53), inadequate land for expansion (x = 4.52), the complexity of new technology (x = 4.45), poor technical training and information (x = 4.35), environmental and economic barriers (x = 4.34), weak information links with other actors of the network (x = 4.17), and poor educational competencies of farmers (x = 4.14) were revealed to be major constraints. The grand mean of 4.46 shows the farmers were confronted with serious constraints in cocoa rehabilitation. The study is in tandem with that of David *et al*. (2022) and Akinnagbe (2020); which state that lack of training, credit facilities, and input delivery systems, and lack of skills for the technicalities in cocoa rehabilitation were major constraints that hindered the adoption of cocoa rehabilitation techniques.

Difference in Annual Cocoa Production Before and After Cocoa Rehabilitation

Table 5, reveals that there is a significant difference ($t = 2.37$; $P \leq 0.05$) in cocoa production before and after cocoa rehabilitation. That means, there is a difference in the quan-

Table 4. Constraints in adoption of cocoa rehabilitation techniques

Constraints to the adoption of technology	Mean	SD
Inadequate and high cost of seedling supply	4.70	0.75
Inadequate access to capital	4.62	0.90
Fulani herdsmen attack on farms	4.61	0.50
Farmers' attitude towards risk and change	4.55	0.50
Inadequacies in extension intervention	4.53	0.46
Inadequate land for expansion	4.52	0.45
Complexity of new technology	4.45	0.75
Poor technical training and information	4.35	0.92
Environmental and economic barriers	4.34	0.92
Weak information links with other actors of the network	4.17	1.04
Poor educational competencies of farmers	4.14	1.17
Grand mean	4.45	

Table 5. Difference in cocoa production before and after the adoption of CRTs

	t	df	Sig. (2-tailed)	Mean difference
Annual production before adoption	2.357	91	.021	11183.91304
Annual production after adoption				24964.89130

tity of cocoa produced before rehabilitation and the quantity produced after implementing cocoa rehabilitation. This outcome is consistent with the study of David *et al*. (2022), who found that there was an increase in the quantity of cocoa produced for participating farmers in cocoa rehabilitation than those farmers who did not participate.

CONCLUSION AND RECOMMENDATIONS

The study concluded that though there was a low adoption of cocoa rehabilitation techniques by the farmers, cocoa production significantly increased after the adoption of cocoa rehabilitation techniques. The study confirmed that cocoa rehabilitation could serve as a strategy to boost cocoa production. The most adopted cocoa rehabilitation technique was planting new cocoa under trees. The greatest constraints during rehabilitation were scarcity of improved cocoa seedlings and inadequate capital. It was therefore recommended that cocoa rehabilitation efforts should be intensified while ensuring adequate availability of improved cocoa varieties and capital for the acquisition of necessary inputs.

CONFLICT OF INTEREST

The authors hereby declare that is no conflict of interest

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REFERENCES

Acheampong, M.; P. Appiah; E.K. Tham-Agyekum; J.A. Bakang; E.O. Jones; C. Osei & F. Ankuyi (2023). Farmers' accessibility and use of hybrid cocoa

seedlings for cocoa rehabilitation: Empirical results from Amenfi Central District, Ghana. *Russian Journal of Agricultural and Socio-Economic Sciences,* 5(137), 129–140.

Adetarami, O.; S.D.Y. Alfred; O.O. Fasina; O.J. Soetan & S.B. Johnson (2020). Perceived impact of farmer business school approach on smallholder cocoa farmers in Ondo and Osun states, Nigeria. *International Journal of Agriculture and Rural Development,* 23(2), 5143–5153.

Akande, M.B. (2020). Effectiveness of Cocoa Rehabilitation Programme on Cocoa Production in Oyo State. An MSc Thesis Submitted to the Department of Agricultural Extension and Rural Development. University of Ibadan, Nigeria, p. 18.

Akinnagbe, O.M. (2020). Adoption levels of Cocoa Rehabilitation Programmes in South West Nigeria. *Pelita Perkebunan,* 36(2), 180–189.

Akinpelu, A.O.; J.O. Lawal; O.S. Ibiremo & Q.A. Ogunwolu (2021). Socio-economic Factors and Cocoa Rehabilitation Techniques among Farmers in Boki, Cross River State, Nigeria. *Asian Journal of Research in Crop Science*, 4(11), 1–30.

Awodumila, D.J.; T.E. Ogunjobi; A.O. Orimogunje; B.A. Ogundeji; E.E.O. Agbebaku; R.T. Olorunmota & G.A. Adewoye (2020). Assessment of awareness and utilization of cocoa production technologies among farmers in Oyo State, Nigeria. *Journal of Experimental Agriculture International,* 42(10), 19–25.

Badiru, I.O.; T.A. Ladigbolu & J.O. Arogundade (2023). Cocoa Farmers' Participation in Farmers Business Schools Activities in Osun State, Nigeria. *Journal of Agricultural Extension,* 27(3), 61–72.

Cook, L. Russell (2024). Cacao. Encyclopedia Britannica. https://www.britannica.com/plant/cacao.

David, P.T.; F.K. Charles; K. Youssef.; G. Huseyin; S.M. Quaqua, P. Zipporah; N.R. Geninyan & M.G. Isaac (2022). Assessment of cocoa farms and rehabilitation techniques in Bong, Lofa, and Nimba countries (Liberia). *World Journal of Advanced Research and Reviews*, 13(03), 162–169.

Food and Agriculture Organization of the United Nations. https://intelpoint.co/insight-tag/cocoa-production/.

ICCO (2024). ICCO Quarterly Bulletin of Cocoa Statistics, International Cocoa Organization, Vol. L, No.4, Cocoa year 2023/24.

Olajide, O. (2020). Cocoa Chocolate and Structure Stagnation of the Nigeria Economy Financials, 1–8.

Shahbandeh, M. (2021). Cocoa bean production worldwide 2018/19 & 2020/21 by country. Retrieved from https://www.statista.com/statistics/ 263855/cocoa-bean-productionworldwide-by-region/

The Research Advisors (2006). Required Sample Size Table. Retrieved online on February, 2023 from https://www.research.advisors. com.

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