



EFFECT OF AGRO-PROCESSING, PRODUCTIVITY ENHANCEMENT, AND LIVELIHOOD IMPROVEMENT SUPPORT (APPEALS) PROGRAMME ON THE LIVELIHOOD OF FARMERS IN KOGI STATE, NIGERIA

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ABSTRACT

The study was carried out in Kogi State, Nigeria. A total of 160 cashew farmers that participated in the programme were selected using a multi-stage random sampling procedure. A well-structured questionnaire was used in collecting data. Data collected were analyzed using descriptive statistics (frequencies, percentages and means) and inferential statistics (t-test and Tobit regression analysis). The results showed that majority (75.0%) of farmers were males with a mean age of 35.4 years. Majority (67.5%) were married having a mean household size of four persons, and 68.7% of the farmers had farm sizes between 6-10 hectares, while the mean farm size and farming experience were 6.7 hectares and 22 years, respectively. Nearly half (46.3%) had secondary education, and 67.5% had extension contact, while 71.3% belonged to cooperative societies. The t-test results showed that, there was significant difference ($P < 0.000$) in yields and income of farmers before and after APPEALS programme participation. The results of Tobit regression revealed that income of farmers ($P = 0.039$), friends and neighbours ($P = 0.065$), and age (0.096) were statistically significant factors influencing farmers' participation in APPEALS programme. Though, factors such as climate change (Mean= 3.3), limited extension contact (Mean= 3.1), and poor state of rural infrastructure (Mean= 3.0) hindered farmers from participating fully in the APPEALS programme. The study therefore recommended that; government should sustain this kind of programme to enable farmers improve in their farm operations, this can help them improve on cashew production. And farmers' literacy should be given greater attention by government to enable them appreciate innovative ideas that can improve their farm productivity.

Keywords: APPEALS, Programme, Cashew, Production, Livelihoods

INTRODUCTION

Agriculture makes a significant contribution to Nigeria's Gross Domestic Product (GDP), accounting for about 20-25% of its economic output (FAO, 2024). The sector contributed approximately 17.22% to Nigeria's GDP with crop production being the highest, contributing 14.8% of the total GDP (FAO, 2024). Agriculture is the most propelling force for most developing countries' economy and Nigeria remains one of the largest countries that depend on agriculture providing livelihoods for more than 70% of the population either directly or indirectly (FAO, 2018). Cashew (*Anacardium occidentale*) production is one of the major export crops grown extensively in Nigeria. Cashew, like cocoa is a very popular crop in Africa with several uses that majorly earns a lot of foreign exchange to the producing country (Ogunwolu, *et al.*, 2024). Cashew has a life span of about 30-40 years in which it takes about 3-4 years to reach its full production potentials (Salehu, *et al.*, 2019). Nigeria ranked 4th in global cashew nut production with an annual production of 220,000 metric ton for export with value of 160 Million USD. The major states where cashew is produced in Nigeria include Kogi (which ranked first), Enugu, Oyo, Osun, Anambra, and Kwara.

The products obtained from cashew tree include cashew apple nut (CAN), nuts, and nut shell liquids (NSL) which are highly valued in both domestic and international markets (Agboton, *et al.*, 2014). The raw cashew nut (RCN) is the most valuable part of the plant, and in most cashew producing countries, greater emphasis is placed on raw cashew nut due to its great economic value (Kolliesuah, *et al.*, 2020). According to Monteiro, *et al.*, (2017), West African cashew is only second to cocoa in terms



of export value, as the region has accounted for about 45% in the global cashew market. And Nigeria is taking the lead in cashew production in Africa. Nigerian cashew nuts are highly sought after in international markets with significant exports to countries in Europe, Asia, and North America. Vietnam and India are the largest importers, while the Netherlands is a key European destination. Nigeria's cashew production is set to surpass the expectations in 2023 and it is projected to soar to reach more than 500,000 metric ton by 2028. Nigeria exports cashew mainly to Vietnam and India, which amount to more than 350,000 metric ton. According to data from Vietnam Cashew Association (VINACAS), Nigeria exported 273,143 metric ton of raw cashew nuts (RCN) to Vietnam in the first ten months of 2023.

According to the Nigerian Export Promotion Council (NEPC), more than 25,000 smallholder farmers are involved in cashew industry. And cashew farming on large commercial plantations is gaining traction, with an average cultivated area of 325,000 hectares, and production is expected to increase significantly over the next decade (Nigerian Export Academy, June, 2025).

Kogi State is the leading player in cashew production in Nigeria. Almost all the Local Government Areas (LGAs) are involved in cashew production, but the major LGAs that produce cashew in the State are located in the Eastern senatorial part of the State. These LGAs are Dekina, Ofu, Olamaboro, Ankpa, Idah, Igalamela/Odolu, Omalla and Bassa. Though in the Western Senatorial district of the State, some level of cashew production is feasible, while in the central Senatorial district the rocky nature of their land could not allow them go into full fledged cashew production. There are several initiatives aimed at boosting farm productivity in Nigeria, and one of such initiatives is Agro-processing, productivity enhancement and livelihood improvement support (APPEALS). The APPEALS was launched in Nigeria in 2019 to take care of farmers and uplift their productivity and livelihoods through crop production, processing, value addition, and export and food security.

METHODOLOGY

The Study Area

The study was carried out in Kogi State, Nigeria. Kogi State is located between latitude 7.49°N and longitude 6.45°E with a total land area of 313.53Km² having a projected population of 3.3 million people. The state experience an average maximum temperature of 33.2^o C and average minimum temperature of 22.8^oC per annum (Sadiq, *et al.*, 2018). While the rainfall ranges between 1,016 mm to 1,524 mm per year. Kogi state is located within guinea-savanna forest suitable for cashew and other crops such as yam, beans, cassava, maize, guinea corn, and sesame production. Majority of the people are involved in farming as their major means of livelihood, though some are artisan, traders and civil servants. The state consists of three major languages, which invariably gave rise to the three agricultural zones namely, Igala (who dwell in the eastern agricultural zone), Ebira (found in the central agricultural zone), and Okun (that inhabit the western agricultural zone), though other minor tribes exist such as Bassa, Oworo, Kakanda among others.

Sampling Technique and Sample Size

The study population comprised all cashew farmers in Kogi state. A multistage sampling technique was used to select the respondents.

Stage 1: Out of three agricultural zones, two were purposively selected due to their intensity of cashew production; they are Eastern agricultural zone which consists of nine Local Government Areas (LGAs), and Western agricultural zone which consist of seven LGAs.

Stage 2: Out of the nine LGAs in the eastern agricultural zone, five LGAs were randomly selected using balloting; these LGAs were Ofu, Olamaboro, Ankpa, Dekina, and Omalla. And from the Western agricultural zone, three LGAs were randomly selected, these were Loko/Koton-Karffe, Yagba-East, and Mopa-Morro.

Stage 3: From each of the LGAs, two cashew producing communities were randomly selected making a total of 16 communities.

Stage 4: And from each of the communities selected, ten (10) cashew farmers were randomly selected, making a total of 160 respondents for the study.



Method of Data Collection

Data were collected through the administration of a well-structured questionnaire was designed taking into cognizance the delineated objectives and administered to the respondents for data collection.

Data Analysis

The data collected were analyzed through the use of both descriptive statistics such as frequency distribution, percentages, and means, and inferential statistics such as Tobit regression, and T-test.

Model Specifications

Tobit Regression Model

The Tobit regression model is specified as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_n X_n + \mu \dots \dots \dots \text{(Eq. 1)}$$

Where:

Y = Farmers’ participation in APPEALS programme (Participation=1, Not participated=0)

X₁ = Age (Years)

X₂ = Friends/Neighbours (Yes=1, No =0)

X₃ = Income (₦)

X₄ = Extension contact (Yes=1, No=0)

X₅ = Educational level (years)

X₆ = Membership of cooperative society (Yes=1, No=0)

X₇ = Farming experience (Years)

μ = Error term

T-test Model

Paired t-test model was used to measure the effect of APPEALS programme on farmers’ livelihood (yield and income) before and after APPEALS programme intervention. The model is represented below;

$$t = \frac{m_1 - m_2}{\sqrt{\frac{sd_1}{n_1} + \frac{sd_2}{n_2}}}$$

Where;

t = Calculated t-value

M₁ = Mean value of yield and income of cashew farmers before APPEALS programme

M₂ = Mean value of yield and income of cashew farmers after APPEALS programme

S₁ = Standard deviation of yield and income of cashew farmers before APPEALS programme

M₂ = Standard deviation of yield and income of cashew farmers after APPEALS programme

n₁ = Sample size of cashew farmers before APPEALS programme

n₂ = Sample size of cashew farmers after APPEALS programme

Conceptual Model

The conceptual model for the study of the effect of APPEALS programme on farmers’ yields and income in Kogi state is shown in Fig. 1 below. According to the model, the socioeconomic variables (independent variables) that influence farmers’ participation in APPEALS programme were age, sex, marital status, household size, educational level, etc. though, there were several constraints such as inadequate fund, climate change, etc. that impaired farmers from participating in APPEALS programme. Also, some intervening variables such as government agricultural policies, climate change, Non-governmental organizations, etc indirectly affect farmers’ participation in APPEALS programme. The dependent variable (farmers’ livelihood) which can be in the forms of increased in cashew yields, increased in income, partaking in the training programmes of APPEALS, attending APPEALS’ meetings constantly, carrying out designated activities, serving in committees, etc.; and the appropriate expectations which include increase in cashew yields, increase in farmers’ income, improved farmers’ livelihood, balanced diet, good housing, among others.

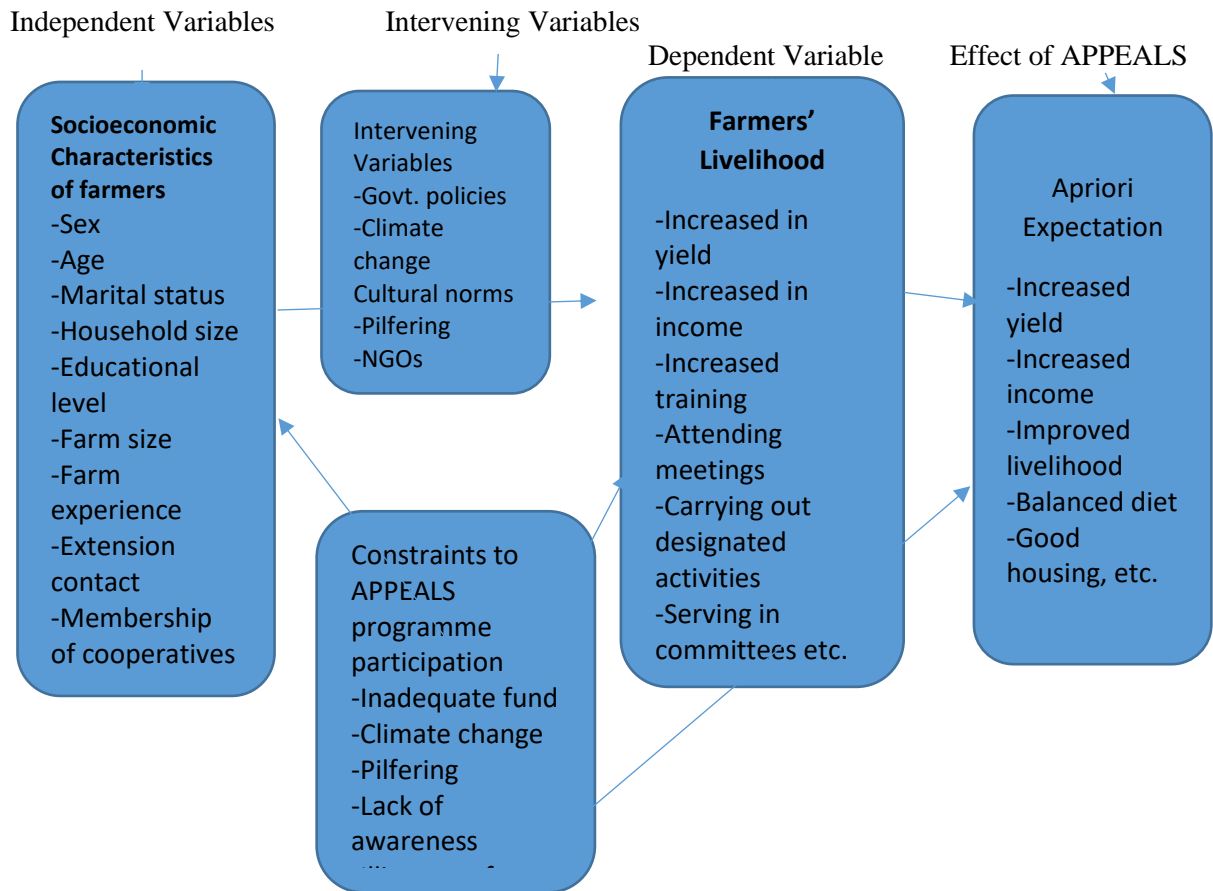


Figure 1: Schema showing the effect of APPEALS programme participation by farmers in Kogi State, Nigeria

RESULTS AND DISCUSSION

Socio-economic Characteristics of APPEALS Beneficiaries

The socioeconomic variables is shown in Table 1.

Table 1: Distribution of Respondents according to their Socioeconomic

Characteristics	Frequency	Percentage	Mean
Sex			
Male	120	75.0	
Female	40	25.0	
Age (Years)			
20-25	7	4.4	35.4 Years
26-30	16	10.0	
31-35	41	25.6	
36-40	64	40.0	
40 and above	32	20.0	
Marital Status			
Married	108	67.5	
Single	41	25.6	
Divorced	11	6.9	
Household Size			
1-5	122	76.3	4 Persons
6-10	32	20.0	
10 and above	6	3.0	
Farm Size (Ha.)			
1-5	43	26.9	6.7 Hectares
6-10	110	68.7	
10 and above	7	4.4	
Farming Experience (Years)			
10-20	62	38.8	22 Years
21-30	83	51.8	
30 and above	15	9.4	
Educational Level (Years)			
No formal education	21	13.1	
Primary education	53	33.1	
Secondary education	74	46.3	
Tertiary education	12	7.5	
Extension contact			
Yes	108	67.5	
No	52	32.5	
Cooperative membership			
Yes	114	71.3	
No	46	28.7	

Source: Field Survey, 2025

Results in Table 1 revealed that majority (75.0%) of the farmers were males having a mean age of 35 years. This is in line with Onuche and Oladipo (2021) who reported that, more males were involved in farming in Kogi State than females. Majority (67.5%) of the farmers were married, though 25% of these farmers were still single. Also, majority (76.3%) had family size of 1-5 persons, with a mean household size of four persons. Nearly half (46.3%) of the farmers had secondary education, while 33.1% had only primary education. This shows that the farmers are fairly literate that they can read and write. Education is an important factor that drives adoption of new farm practices. Majority (68.7%) of the farmers had farm size of 6-10 hectares, while the mean farm size was about 7 hectares. A little above half (51.8%) of the farmers had farming experience between 21-30 years and a mean farming experience of 22 years. This implies that cashew farmers in the study area have large farm sizes and higher farm experience which could translate to more cashew production as farmers participate in APPEALS programme. Onuche and Oladipo (2021) found out that farmers in Kogi state have relatively large farm sizes. The table further shows that most (67.5%) of these farmers had extension contact, though 32.5% had no extension contact. This portends that farmers have access to modern cashew production practices provided by APPEALS programme. Equally, majority (71.3%) of these farmers



belonged to cooperative societies. Membership in cooperative societies can enhance the collective bargaining power of farmers, improve their access to financial services, and provide a platform for sharing knowledge and best practices (Kabir, et al., 2024). Farmers’ cooperatives facilitate access to a structured platform for information dissemination. Members are likely to receive timely and relevant information about advancement in farming techniques, and market information. Increased awareness of farm operations by members of cooperatives can lead to a greater likelihood of technology adoption than non-members.

Table 2: Mean Difference between Yield and Income before and after APPEALS Programme Participation

Indicator	Mean (Kg/₦)	N	Std. Deviation	Std. Error Mean	t	df	Sig.
Yield before	3.6808	160	2.27047	19913	-13.659	159	0.000
Yield After	5.3385	160	2.78299	24408		159	
Income Before	147230.7692	160	90818.97306	7965.35086	-19.988	159	0.000
Income After	321692.3077	160	168053.78643	14739.29211		159	

Source: Authors’ Analysis, 2026

The test of significance of the effects of APPEALS programme participation on yields and income of cashew farmers is presented in Table 2. Results in Table 2 showed that, the mean yield of cashew nuts before APPEALS programme participation was 3.6808 Kg, while the mean cashew nuts yield after APPEALS programme participation was 5.3385 Kg which is significant at 1% ($P < 0.000$). There is a significant difference in mean yield (1.6577Kg) before and after programme participation. This implies that there is significant increase in cashew production after programme participation. The table further indicated that, farmers’ mean income (₦) before APPEALS programme participation was ₦147,230.7692, while farmers’ mean income (₦) after programme participation was ₦321,692.3077 which is significant at 1% ($P < 0.000$). This implies a significant increase in difference in income of ₦174,461.5385, indicating that, participating in APPEALS programme can lead to higher cashew production and improved farmers’ livelihoods.

Factors Influencing Farmers’ Participation in APPEALS Programme

Results in Table 3 portray the various factors hindering farmers from participating in APPEALS programme enthroned in the study area.

Table 3: Factors Influencing Farmers’ Participation in APPEALS Programme

Variable	Beta	Std. Error	Sig.
Extension Contact	-20.463	16800.242	0.999
Income	2.391	1.159	0.039*
Educational Level	-0.591	0.407	0.146
Membership of cooperatives	2.699	43562.868	1.000
Farm experience	0.375	0.643	0.559
Friends/Neighbors	1.893	1.027	0.065*
Age	-0.908	0.546	0.096*
Constant	18.198	40192.964	1.000

Source: Field Survey, 2025 * Significant @10%

Results in Table 3 revealed the various factors influencing farmers’ participation in APPEALS programme in the state, income, friends/neighbours, and age were statistically significant factors determining farmers’ participation in APPEALS programme in the study area. These factors were significant at 10% ($P = < 0.039$; 0.065, and 0.096 respectively). This implies that as farmers have more income, there is that likelihood that their participation in APPEALS programme will increase, and as farmers network with friends and neighbours and share ideas, there is the possibility that their participation in APPEALS programme will increase. Also, as farmers advance in age there is the



probability that their participation in APPEALS programme will equally increase. Access to credit enables farmers to access farm inputs with ease when needed. Bada, *et al.*, (2023) stated that age is an important factor in determining farmers’ willingness to adopt innovative technologies like APPEALS programme.

Factors Constraining Cashew Production and APPEALS Programme Participation by Farmers

The findings in Table 4 show the various factors hindering farmers in the study area from scaling up cashew production.

Table 4: Factors Hindering Cashew Production and APPEALS Programme Participation by Farmers

Constraint	NS (1)	FS (2)	S (3)	VS (4)	TS	Mean
Limited Extension Contact	-	38(76)	74(222)	48(192)	490	3.1
High Cost of Inputs	21	26(52)	62(186)	51(204)	463	2.9
Inadequate Training (Illiteracy)	40	35(70)	55(165)	30(120)	395	2.5
Poor State of Infrastructure	18	37(74)	43(129)	62(248)	469	3.0
Pilfering	96	42(84)	22(66)	---	246	1.5
Poor Storage of Facilities	21	33(66)	68(136)	38(152)	375	2.3
Poo Market Access	73	64(128)	15(45)	8(32)	278	1.7
Poor Produce Pice	68	81(162)	11(33)	-	363	1.
Climate Change	-	32(64)	52(156)	76(304)	524	3.3
Cheating by Middle man	36	62(124)	34(102)	26(104)	368	2.3
Pest and Diseases	16	41(82)	68(204)	35(140)	442	2.8

Source: Field Survey, 2025 NS=Not Serious; FS=Fairly Serious; S= Serious; VS=Very Serious; TS=Total Sum

Table 4 reveals that effect of climate change (Mean= 3.3), limited extension contact (Mean= 3.1), poor state of infrastructure (Mean= 3.0), high cost of farm inputs (Mean=2.9), pests and disease (Mean= 2.8), and inadequate training/illiteracy (Mean= 2.5) were the major constraints faced by cashew farmers in the study area. Climate change characterized by erratic rainfall and long dry spell has an untold effects on farmers’ crop, which can lead to reduced crop yield and increased poverty. According to Akinngbe, *et al.*, (2024), despite ongoing efforts to improve extension services, many farmers still encounter significant hurdles in achieving optimal productivity due to restricted access to extension services. According to Adisa, *et al.*, (2019), high cost of agro inputs and lack of machineries were constraints to adoption of rice production technologies in Kogi State. Birds attack and disease infestation can retard farmers’ economy of scale and reduction in income, this is seen as a major concern to farmers.

CONCLUSION AND RECOMMENDATION

The study concludes that there is a significant difference and improvement in yield and income of the cashew farmers before and after participation in APPEALS programme. Also participation in the programme is influenced by farmers’ age, income and friends.

- Government should sustain this kind of programme to enable farmers improve in their farm operations, this can help them improve on cashew production.
- And farmers’ literacy should be given greater attention by government to enable them appreciate innovative ideas that can improve their farm productivity.
- Government and other stakeholders in the agricultural value chain should facilitate the development of rural infrastructure to improve rural life. Roads and power are key to agricultural operations, as they assist in the haulage of farm produce and storage of farm produce to avoid spoilage.



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