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CONTRIBUTION OF THE CROP SUB-SECTORS' PERFORMANCE TO THE ECONOMIC DEVELOPMENT OF NIGERIA: THE ARDL MODEL APPROACH

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Abstract

The study examined the contributions of sub-units of the crop subsector to the economic development of Nigeria (approximated by the per capita GDP (PCI)) from 1962 to 2020. The Autoregressive Distributed Lag Model (ARDL) was used to establish the existence of the cointegration among the specified series. The findings revealed that, the sub-components of the crop sub-sector co-integrate with the per capita GDP in the long run. The empirical results further revealed that in the short run, sugar-based crops gross production, vegetable, and fruit gross production have a significant relationship with the PCI in Nigeria; whereas the cereal gross production, oil-based crop gross production, sugar crop gross production, and vegetable and fruit gross production were long run significant determinants. The findings call for appropriate short and long-term economic policy packages that should stimulate investment opportunities in the crop sub-sector to increase the sub-sector's productivity for greater economic development stimulation.

Key words: *agriculture, crop sub-sector, economic development, Nigeria*

INTRODUCTION

Despite the wavering opinions of various schools of thought [28, 19] regarding the contributions of the agricultural sector either in the short or long run periods to the development of the African economy; the sector is noted to play important roles in the economic development of the majority of African countries [46, 21, 34, 2, 4, 32]. Though in Africa, the sector is clouded by emerging challenges (such as the vast global technological changes, conflicts, climate change, extreme poverty, corrupt governance, natural disaster, the changing pattern of consumption, dynamic international trade policies, etc.) that have seriously impacted on many of the fundamentals that have supported the sector over the past decades; it is still a major livelihood source to majority of resource-poor vulnerable populations in the region [35, 27, 1, 8, 20]. In Sub-Saharan Africa, the sector is largely dominated by small-scale farmers who utilized obsolete tools in fragmented land space and harbour about 60 - 70% of the region's labour force [17, 39, 3].

In Nigeria, despite the enormous challenges hovering over the agricultural sector, the literature has persistently documented the positive roles the sector has played in terms of its contribution to the country's GDP, food security, employment generation,and stimulation of primary product exports [7, 11, 14, 15]. The sector is also known to attract a considerable volume of imports, thereby constituting a catalyst for international trade [6]. Being a traditional sector, it is mostly considered a reliable source of raw materials for industrialization through its backward linkages.

Traditionally, the agricultural sector consists of further subsectors or components that are interrelated in function and resource utilization. For instance, in Nigeria, there are four major subunits of the agricultural sector. These are the crop, forestry, livestock, and fishery sub-units [23, 18]. Among the subunits, the crop subunit appears to be the most prominent and significant in terms of its contribution to the total value product of the agricultural sector in Nigeria [18]. As noted by Urama and Nfor, [45] and supported by the data shown in Table 1, the crop subunit has been the major driver of the agricultural sector and significantly impacted the economy GDP in Nigeria by contributing an average of about 84.23% and 19.74% of the total agricultural GDP component and the economy GDP respectively from 1981 to 2019.

Table 1. Contributions of crop sub-sector to the agricultural and total GDP in Nigeria

Year	Average % contribution of Crop sub-sector GDP in Agric. GDP	Average % contribution of Crop sub-sector GDP in total GDP
1981 – 1985	71.812	10.756
1986 – 1990	79.685	16.516
1991 – 1995	83.944	19.651
1996 – 2000	84.521	22.955
2001 – 2005	88.967	27.203
2006 – 2010	89.530	22.932
2011 – 2015	88.316	18.804
2016 – 2019	88.236	18.933
Overall Average	84.277	19.739

Source: Computed by the author data from the Central Bank of Nigeria, 2021 [18].

The dominant roles of the crop subunit in the total value of the agricultural sector in Nigeria are traceable to various factors including; availability of farm resources, cultural values and demand preference among others [5, 16]. The diet composition of the majority of Nigerians is majorly dependent on crop composition due to its affordability, availability, and perceived utility that is often traditionally linked [36].

Additionally, the crop sub-units have enjoyed the patronage of the federal, state, and local government authorities in terms of policy formulation and implementation [4]. For instance, the agricultural policies and programmes landscape of Nigeria is highly skewed in favour of the crop subunit compared to other sub-sectors [7, 40, 30]. The response of the crop sub-sector vis-a-vis the agricultural policy environment over the years had produced some mixed outcomes [7,41,6, 44, 1]. The individual crop response to the policy environment is mostly measured and replicated in the growth rate of the outputs within the policy period.

Table 2 shows the average annual growth rates of selected crops vis-à-vis the agricultural policy environment from 1961 to 2019 in Nigeria. It is obvious that; the responses did not assume a similar pattern across the policy periods. There is a conspicuous difference in magnitude and sign of the growth rates of crops across the specified policy periods. Each crop component showed a unique pattern of response as measured by the growth rate across the specified policy periods. For instance, cassava experienced positive growth rates throughout the specific policy era, whereas yam witnessed a deteriorating growth rate in the period 1972 to 1981. From the evidence given in Table 2, it is deduced that within the crop-sub sector; some categories of crops played more significant roles than others in propelling the aggregate agricultural GDP component and the entire economy GDP alike. This issue of crop sub-sector components' contribution to the economic growth of Nigeria has often bred bias in the choice of policy intervention by policymakers but the matter is rarely examined empirically.

Hence, empirically identifying the extent of the contributions of the sub-components of the crop sub-sector to the economic development of Nigeria would amount to an increase in the potency of the sub-sector and probably prioritise policy direction in the subsector. Thus buttressed on this assertion, the study was designed to isolate the roles of the various categories of the crop sub-sector in driving the economic development of Nigeria. The importance of the study is based on the fact that; the country needs more specific and proactive policy action to fast-track the anticipated agricultural development. Again, there is an overwhelming need to reassess the areas of comparative advantage in crop enterprises; the disaggregated performance of the crop sub-sector in addition to appraising the efficacy of the institutional and technological resilience of the crop subsector in the country.

MATERIALS AND METHODS

Study Area

The study was conducted in Nigeria. The country is situated on the Gulf of Guinea in sub-Saharan Africa. It lies between 4^0 and 14^0 north of the equator and between longitude $3^0$and 15^0 east of the Greenwich. The country has wet and dry seasons that support varieties of vegetation and thus agricultural production. The country's agricultural sector produces different types of crops and animals and has contributed significantly to the overall economic development of the country. The agricultural sector is the largest employer of labour but largely depended on small-scale productions.

Table 2. Linear growth rates/fluctuations in selected Agricultural Products in Nigeria

Agricultural product	Policy periods and linear growth rates of crops in Nigeria (%)						Average linear growth rate (%) from 1970 to 2019
	1962 - 1971	1972 - 1981	1982 - 1991	1992 - 2001	2002-2011	2012 - 2019	
Oil palm	-2.00	-0.44	2.78	2.75	-0.58	2.89	0.83
Coconut	3.17	0.58	2.71	2.25	5.15	-1.46	2.19
Maize	2.16	5.37	25.92	-1.59	7.04	3.05	7.12
Rice	16.89	18.94	11.98	-0.94	6.42	8.42	10.35
Yam	11.63	-5.11	15.33	4.58	3.22	5.75	5.90
Cassava	2.33	1.95	9.69	2.18	4.12	3.46	3.97
Groundnut	-0.50	3.24	12.19	7.82	2.13	6.73	5.22
Cotton	6.63	3.68	24.78	4.67	5.29	-8.21	6.63
Cocoa	6.23	-3.34	6.26	6.77	1.98	-1.18	2.92
Rubber	1.41	1.15	12.42	-2.98	3.29	0.41	2.69
Cashew	16.27	0	7.00	32.48	2.25	-15.94	7.80
Vegetables	3.26	-1.22	7.97	7.55	4.66	2.76	4.21
Pineapple	2.00	0	3.03	1.07	6.06	1.54	2.31
Tomatoes	2.49	4.31	1.42	13.09	2.77	18.73	6.74
Other fresh fruits	2.44	2.39	3.57	3.01	-2.94	-1.37	1.27

Source: Computed by the author data from the FAO [17] and World Bank, 2020 [46].

The country has a total land area of about 923,769km^2 (or about 98.3 million hectares) with 853km of coastline along the northern edge of the Gulf of Guinea and a population of around two hundred (200) million [38]. Its multiple vegetation zones, plentiful rain, surface water, underground water resources and moderate climatic extremes, allow for the production of diverse food, tree and cash crops. Over 60 percent of the population is involved in the production of the food crops such as cassava, maize, rice, yams, various beans and legumes, soya, sorghum, ginger, onions, tomatoes, melons and vegetables. Also, fishery, aquaculture and livestock production such as poultry, goat, sheep, pigs and cattle flourished very well in all regions of the country. The main cash crops are cocoa, cotton, groundnuts, palm oil, and rubber [26].

Data source

Secondary data were used and were sourced from the World Bank and Food and Agricultural Organization (FAO) as well as the Central Bank of Nigeria. It covered the period from 1961 to 2020.

Analytical Technique

The relationship between the crop sub-sectors and the economic development of Nigeria was captured by the equation that relates crop sub-sector gross production indices and the GDP per capita (an economic development indicator). The specified equation assumes the following Cobb-Douglas implicit forms as thus:

$$PCI_t = f(CER_t, OCR_t, RTC_t, SUC_t, VAF_t) \ldots\ldots (1)$$

where:

PCI_t = Gross domestic product per capita to capture the economic development of Nigeria (N/Person)
CER_t= Cereal gross production index (%) (2014 - 2016 =100)
OCR_t = Oil crop gross production index (%) (2014 - 2016 =100)
RTC_t = Root and Tuber crop gross production index (%) (2014 - 2016 =100)
SUC_t = Sugar crop gross production index (%) (2014 - 2016 =100)
VAF_t = Vegetable and Fruit gross production index (%) (2014 - 2016 =100)

The Autoregressive Distributed Lag (ARDL) bound test

The Autoregressive Distributed Lag (ARDL) bound test was developed by Pesaran and Shin [42] and Pesaran*et al.*[43] to investigate the long and the short-run relationship among variables. The ARDL bound model has three advantages when compared with the conventional Engle and Granger [25] two-step method and Johansen and Juselius [31] cointegration method. The ARDL method is designed to deal with the series having mixed stationary issues (i.e. the mixture of 1(0) and 1(1)). Hence, it relaxes the assumption that all series must be integrated in the same order. The second advantage of ARDL test over other methods is that it generates relatively more efficient estimates in the case of small and finite sample data sizes. Thirdly, the method produced unbiased estimates of the long-run model [29]. The ARDL model for equation (1) in logarithmic form is expressed as follows: The specification of the ARDL model assumes endogeneity of the specified variables, hence the model was also applied to the rest of the variables in equation (1).

$$\Delta PCI_t = \beta_0 + \beta_1 \sum_{i=1}^{n_1} \Delta PCI_{t-1} + \beta_2 \sum_{i=1}^{n_2} \Delta CER_{t-i} + \beta_3 \sum_{i=1}^{n_3} \Delta OCR_{t-i} + \beta_4 \sum_{i=1}^{n_4} \Delta RTC_{t-i} + \beta_5 \sum_{i=1}^{n_5} \Delta SUC_{t-i} + \beta_6 \sum_{i=1}^{n_6} \Delta VAF_{t-i} + \delta_1 PCI_{t-i} + \delta_2 CER_{t-i} + \delta_3 OCR_{t-i} + \delta_4 RTC_{t-i} + \delta_5 SUC_{t-i} + \delta_6 VAF_{t-i} + U_t \dots \dots \dots \dots (2)$$

The coefficients from β_1 to β_6 represent the short-run coefficients whereas the coefficients from δ_1 to δ_6 represent the long-run coefficients of the ARDL model. Also, β_0 is the drift component, "n" is the maximum lag length while U_t is the stochastic error term.

The bounded F-statistic test was used to check the existence of a stable, long relationship among the variables in the models. For instance, if the calculated F-statistic in equation (2) is greater than the appropriate upper bound critical values, the null hypothesis is rejected implying the existence of the co-integration relationship. But if the value of the F-statistic is below the lower bound, the null cannot be rejected, indicating the absence of co-integration. Besides, if the F-statistic value lies within the lower and upper bounds, the results are considered inconclusive [43]. If the bound test shows evidence of co-integration among variables, then the long and the short-run(an error correction model (ECM)) are specified as follows:

The long run model:

$$PCI_t = \delta_0 + \delta_1 PCI_{t-i} + \delta_2 CER_{t-i} + \delta_3 OCR_{t-i} + \delta_4 RTC_{t-i} + \delta_5 SUC_{t-i} + \delta_6 VAF_{t-i} + U_t \dots \dots \dots (3)$$

The short run model (ECM model):

$$\Delta PCI_t = \beta_0 + \beta_1 \sum_{i=1}^{n_1} \Delta PCI_{t-1} + \beta_2 \sum_{i=1}^{n_2} \Delta CER_{t-i} + \beta_3 \sum_{i=1}^{n_3} \Delta OCR_{t-i} + \beta_4 \sum_{i=1}^{n_4} \Delta RTC_{t-i} + \beta_5 \sum_{i=1}^{n_5} \Delta SUC_{t-i} + \beta_6 \sum_{i=1}^{n_6} \Delta VAF_{t-i} + \emptyset ECM_{t-1} + U_t \dots \dots (4)$$

where Ø is the error correction term and its measures the speed of adjustment towards the long-run equilibrium, and the remaining coefficients provide the short-run dynamics. To access the performance of the estimated model, the RESET test, Serial correlation, normality and Heteroscedasticity tests were conducted, whereas the cumulative sum (CUSUM) test was estimated to verify the stable nature of the model.

RESULTS AND DISCUSSIONS

Descriptive Statistics

The descriptive statistics, as presented in Table 3, revealed that the coefficient of variability in the cereal gross production index, oil crop gross production index, root and tuber crop gross production indices, sugar crop production index and vegetable and fruit gross production index was less than 100% respectively. The variability index was 50.00% and 38.00% in oil crop and sugar crop gross production indices respectively. However, per capita income (PCI) showed an explosive coefficient of variability that suggests it was so unstable over the period specified in the study. The degree of skewness revealed positive skewness in all specified variables except the cereal crop gross production index. It implies that these variables experienced a continuous increments in their annual values over the specified period of time.

Table 3.Descriptive Statistics of Variables Used in the Estimated Models

Variable	Mean	C.V.	Skewness	Minimum	Maximum
CER	63.49	0.47	-0.01	22.29	116.77
OCR	56.11	0.50	0.34	20.03	118.76
RTC	44.68	0.71	0.52	11.37	104.22
SCR	59.32	0.38	0.57	13.00	104.00
VEF	52.06	0.51	0.64	21.22	103.08
PCI	1.32e+05	1.61	1.53	69.43	7.25e+05

Source: Computed by the author data from the FAO [17] and World Bank, 2021 [46].

Unit root test

The study used the ADF test developed by Dickey and Fuller [22] and the ADF-GLS unit root test developed by Elliott, Rothenberg and Stock [24] which is an improvement of the original ADF test to confirm the unit root of the specified variables. The results for both ADF and ADF-GLS unit root tests are presented in Table 4. The results revealed that the sugar crop gross production index (SCR) was stationary at levels, while the rest of the variables were stationary at the first difference in the ADF test. All variables were stationary at the first difference for the ADF-GLS test (Note the test equations contain both constant and trend). Since we have a mixture of variables that are 1(0) and 1(1), it implies that the ARDL model can be used to test for co-integration in the specified model.

Table 4. ADF and ADF-GLS unit root tests on variables used in the specified equations

Variable	ADF (constant and trend)			ADF-GLS (constant and trend)		
	Level	**1st Diff.**	**Decision**	**Level**	**1st Diff.**	**Decision**
CER	-2.372	-9.089***	1(1)	-2.283	-9.209***	1(1)
OCR	-2.249	-11.908***	1(1)	-1.691	-12.007***	1(1)
RTC	-1.298	-6.702***	1(1)	-1.287	-6.566***	1(1)
SCR	-4.071**	-	1(0)	-1.834	-5.098***	1(1)
VEF	-2.989	-10.249***	1(1)	-2.608	-10.354***	1(1)
PCI	-1.528	-6.226***	1(1)	-1.4133	-6.102***	1(1)

Source: computed by the author.

Note: ***, ** and * indicate 1%, 5% and 1% significance levels respectively. Note, that variables are expressed in a natural logarithm.

The optimal lag lengths for the ARDL model were determined by using the Akaike Information Criterion (AIC), Schwarz, and Bayesian Criterion (SBC). The various lag lengths are shown in Table 4.

The calculated F-statistics for the specified equation are presented in the upper portion of Table 5.

Note, that each of the variables in the PCI equation was tested, but the results of the equation of our interest are presented for the discussion.

The Results of F-statistics for the specified equation revealed that cointegration exists among the variables specified. The calculated F-statistics for these equations were greater than the tabulate upper bound critical value at a 1% level of significance.

The findings imply that long-run equilibrium stable equations exist for the specified PCI equation.

Consequently, the short run or the ECM model can be generated from the equation to capture the dynamics in the PCI equation in the short run and identified the speed of adjustment as a response to departure from the long-run equilibrium.

Table 5. ARDL Bound Test (unrestricted intercept and no trend)

Equations	Lag	F-Statistic	Decision
F_{PCI} (PCI│CER, OCR, RTC, SUV, VAF)	(1,1,1,1,1)	14.37883	Co-integration
Critical Values Bound (at K = 5 and n = 59)			
	Lower	Upper	
10%	2.204	3.210	
5%	2.589	3.683	
1%	3.451	4.764	

Source: computed by the author using Eviews 10 and data as described in Equations 1, 2, and 3. Critical values are derived from Narayan, [37]. Note, that variables are expressed in a natural logarithm.

The Long-run Coefficients of ARDL for the PCI equation

Subsequent to the establishment of co-integration for the specified equation, Table 6 presents the long-term coefficients of the ARDL model. The results revealed that the economic development of Nigeria proxy by the per capita income (PCI) has a positive and significant (at 1%) long-run relationship with the cereal gross production index. This means that a one percent increase in the cereal production index will lead to a 0.812 percent increase in the PCI. The result implies that an increase in the production of cereal will add to or constitutes one of the sources of the improved well-being of Nigerians in the long run.

In the like manner, the production of vegetables and fruits exhibited a positive long-run correlation with the indicator of economic development in Nigeria. This connotes that, an increase in the production of fruit and vegetable will significantly add to the improvement of the general well-being of Nigerians in the long run. Based on the magnitude of the estimated coefficient, it seems that vegetable and fruit production are better stimulants of economic development or well-being of Nigerians compared to other crop sub-sectors.

Table 6. The Long- run Coefficients of Economic development (PCI) equation

Variable	**Coefficient**	**Std. error**	**t-value**	**Probability**
Constant	−13.8171	1.1754	−11.76***	<0.0001
Cereal crop gross prod index	0.8117	0.25194	3.222***	0.0022
Oil crop gross prod index	−0.7214	0.2469	−2.921***	0.0051
Root and tuber crop gross prod index	−0.2026	0.25402	−0.7976	0.4287
Sugar Crop gross prod index	−0.6539	0.26993	−2.422**	0.0189
Vegetable & Fruit crop prod index	6.7159	0.4828	13.91***	<0.0001

Source: computed by the author. Note: ***, and ** indicate 1% and 5% significance level respectively. Note, that variables are expressed in a natural logarithm.

The long-run coefficient of the oil-based crop gross production index showed a negative significant relationship with the PCI at a 1% probability level. By implication, a unit increase in oil-based based crop gross production index would lead to about 0.721 decreases in the index of economic development of Nigeria. The finding reveals that, though the production of the oil-based crops has a significant relationship with PCI in the long run, it moves in an opposite direction to PCI. An increase in the importation of palm oil and its derivatives could likely cause this relationship. Related results have been reported by [9, 10, 11, 12, and 13].

In a similar manner, the coefficient of the sugar-based crop gross production index has a significant negative impact on the PCI. A unit increase in the sugar-based gross production index reduces the PCI by 0.654 units. This means that increase in sugar production has a deteriorating effect on the well-being of Nigerians in the long run. The plausible reason for the result could be connected to the fact that the bulk of the refined sugar produced in the country is deduced from the imported semi-processed or concentrate forms. The importation of semi-processed sugar over the years has brought a great financial burden to the country and this has a serious implication on the overall growth of the Nigerian economy.

The slope coefficient of the root and tuber crop gross production index shows a negative insignificant effect on PCI in the long run.

The finding implies that the production of root and tuber crops does not significantly influence the movement of PCI in the long run though they are co-integrated.

The Error Correction Model of the ARDL for the PCI equation

The result in Table 7 presents the error correction representation of the ARDL model for equation 1. The coefficient of the error correction term is negative and statistically significant at a 5% probability level, which implies the existence of co-integration among the variables included in the ARDL model. It indicates that about 17.91% of the short-run disequilibrium is adjusted towards its long-run equilibrium annually. The diagnostic test for the ECM model revealed an R^2 value of 0.1715 which means that the specified explanatory time series explained about 17.15% of the adjusted total variations in the PCI in Nigeria. The F-statistic of 2.59 is significant at a 5% probability level, indicating that the R^2 is significant and this implies that the equation has the goodness of fit. The Durbin-Watson value of 1.977 indicates almost zero serial correlation. The ECM model has been shown to be robust against residual autocorrelation. Therefore, the presence of autocorrelation does not affect the estimates [33]. Also, the RESET test confirms the structural rigidity of the estimated model. The residual is normally distributed and this justified the use of the OLS estimation method. The Breusch-Pagan and CUSUM tests showed no evidence of heteroscedasticity and attest to the stability of the estimated model respectively. The empirical result revealed that the quantity of vegetables and fruits produced is a positive determinant of economic development in Nigeria in the short run. A unit increase in the quantity of vegetables and fruits produced will trigger about 1.2703 units increase in the index of economic development in the short run.

Table 7. The short - run Coefficients of Economic development (PCI) equation

Variable	Coefficient	Standard error	t-value	Probability
Constant	0.0937	0.0352	2.663**	0.0105
ΔPCI_{t-1}	0.2268	0.1002	2.265**	0.0280
ΔCER_t	0.0792	0.1142	0.694	0.4909
ΔOCR_t	0.0951	0.1048	0.907	0.3688
ΔRTC_t	0.0023	0.1726	0.013	0.9895
ΔSCR_t	−0.2067	0.1027	−2.013**	0.0497
ΔVEF_t	1.2703	0.6012	2.113**	0.0397
ECM_{t-1}	−0.1791	0.0689	−2.598**	0.0123
Diagnostic Test				
R-Squared	0.1715	Durbin-Watson		1.977 (0.45)
F(7, 49)	2.597 (0.023)	Normality of residual		43.378(0.00)
RESET test	0.2613 (0.77)	LM test for autocorrelation		0.023(0.88)
Breusch-Pagan	11.7041 (0.11)	CUSUM test		0.3941(0.69)

Source: computed by the author.

Note: ***, and ** indicate 1% and 5% significance level respectively. Note, that variables are expressed in a natural logarithm.

The short-run coefficient of the sugar crop production relates negatively to the index of economic development in Nigeria. A similar result was obtained for the long-run relationship. The plausible reasons are the heavy dependence on semi-processed sugar imports and the financial implication of such international transactions on the Nigerian economy. Similar assertions have been reported by [9, 10, 11, 12, and 13].

The CUSUM plot from a recursive estimation of the ECM model is shown in Figure 1. This indicates stability in the estimated ECM coefficients over the specified period as the plot of the CUSUM statistic lies within the critical band of the 95% confidence interval of parameter stability.

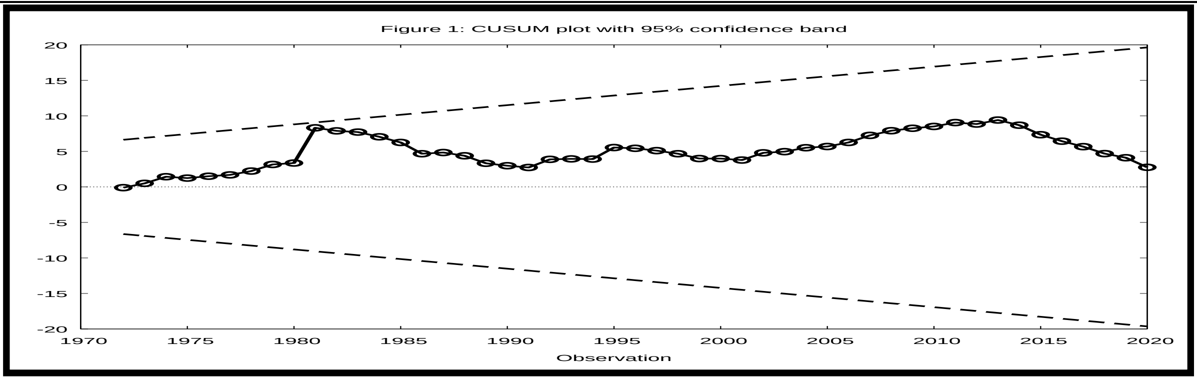

Fig.1. The CUSUM plot with a 95% confidence interval
Source: Generated from data analysis

CONCLUSIONS

The study has established the empirical relationship between the crop subunits and indicators of economic development in Nigeria. The time-series data properties were analysed using the Augmented Dickey-Fuller unit root test and improved ADF-GLS unit root test. The result indicated that the specified series have a mixed stationarity issue (i.e. I (0) and 1 (1)). Based on the behaviour of the series, the ARDL model was used to establish the cointegration among series. The existence of cointegrations among series was established and the long and short runs coefficients of the specified PCI equation were generated. The error term from the short-run model had an appropriate sign and was statistically significant at the conventional probability level. The empirical findings confirmed the co-movement of the specified components of the crop sub-sector and the per capita GDP in the Nigerian economy in the long-run period. This connotes that, these variables were somehow interdependent in the long run.

Precisely, the empirical findings revealed that the cereal gross production, oil crop production, sugar crop production, and vegetable and fruit crop production are significant long run determinants of the per capita income (economic development indicator) in Nigeria. However, the sugar crop production relates in a negative manner to economic development and was plausibly linked to heavy reliance on importation with its attendance negative effect on the country’s GDP. The short rum model reveals that vegetable and fruit crop production as well as the sugar crop are the short-run determinants of PCI. The study also established the fact that vegetable and fruit crop production has a more impacting relationship with the economic well-being of Nigerians both in the short and long-run periods compared to other subunits of the crop sub-sector. The findings of the study suggest that the crop sub-sector played significant roles in the economic development of Nigeria in both short and long-run periods. The findings imply that; the country needs to improve the policy framework on crop production by emphasizing more on the increase in output of all crops. This could be achieved by focusing on modern and improved techniques of production across the crop sub-sector value chain.

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