



## **REGIONAL MARKET INTEGRATION: A PANACEA TO INCREASING PRODUCTIVITY AND INCOME IN NIGERIA**

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### **ABSTRACT**

One of the greatest arguments about food commodities markets in Nigeria is that some of the markets are inefficient because trade flows are mostly regional based. This study examined the extent and degree of integration amongst Yam tuber and Cowpeas markets in six states from the six geopolitical zones of Nigeria from 2000 - 2018 using Johansen Co-integration, Granger Causality, Vector error correction model and Variance Decomposition methodologies. We confirm that the markets are integrated, and have various degrees of price leadership. The speed of adjustment to equilibrium ranged from two months [Niger ( $\beta = -0.62$ ,  $p < 0.05$ )] to two years [Oyo ( $\beta = -0.05$ ,  $p < 0.05$ )] in yam market; four months [Niger ( $\beta = -0.32$ ,  $p < 0.05$ )] and nine months [Oyo ( $\beta = -0.12$ ,  $p < 0.01$ )] in the brown-cowpea market; and from nine months [Adamawa and Niger ( $\beta = -0.12$ ,  $p < 0.05$ )] to one year [Oyo ( $\beta = -0.09$ ,  $p < 0.01$ )] in the white-cowpea market. The price shocks on the markets were found to be mainly due to specific market functioning. The implication of the finding is that the markets, if supplemented with more open policy initiatives, can play a more effective role in increasing productivity and income of both producers and marketers.

**Key words:** food commodities, market integration, productivity, income, policy

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### **INTRODUCTION**

Nigerian food commodities markets have been identified with inefficiencies in the food distribution system between surplus and deficient areas, and market imperfections which are known to create local food supply shortfalls in some parts of the country, while there are surpluses in some other parts (NISER, 2008; Akinseye, 2011; Onubogu & Dipeolu, 2019). NISER (2008) had suspected that the food price swings in Nigeria was due to the trend in food supply in the

country, while Akinseye (2011) identified trade flows within Nigeria as being mostly commodity and regional based, with some geo-political zones having comparative advantage for the production of certain commodities, and trade usually flows from such production points to various consumption points. Also, Agricultural commodities are typically produced over an extensive spatial area and are costly to transport relative to their total value. This gives rise to a complex set of spatial price linkages which needed to be studied to gain insights into the performance of markets (Ikudayisi and Salman, 2014).

Tuber crop like yam and leguminous crop like cowpea are some of the food commodities affected by regional production in Nigeria (Bergh, Orozco, Gugerty & Anderson., 2012; Ewan, Nwuneli, Spencer & Humphrey, 2014; Onubogu, 2020). Yam is very important in food security and poverty reduction in Nigeria, as it is consumed in a variety of ways such as boiled, pounded, fried chips or dried, and ground into yam flour and prepared as *amala* which is another delicacy in the Nigerian diet, particularly among the Yoruba of southwestern Nigeria. Also, the peels and wastes from yam are often used for feeding poultry and livestock. The various uses to which yam is put tends to indicate that the crop is a famine fighter. Yam tubers can be stored for periods up to about 4 to 6 months at ambient temperature. It is produced and marketed in many states of Nigeria. The trade flow, however, goes mainly from the North central region to other regions of the nation (FAO, 2008; Bergh *et al.*, 2012; NBS, 2012; IITA, 2013; Onubogu, 2020).

Cowpea make a major contribution to the nutrition of poor populations because it is a good source of plant protein. They are consumed regularly, in one form or the other, as bean porridge, bean soup, bean cake, popularly known as *moin moin*, "*akara*" e.t.c. The colour of the cowpeas (often referred to as skin color) varies and can be white, black, brown or red. Though cowpea grains can be stored for use throughout the year, a major disadvantage is that cowpea grains are prone to insect damage (Adejobi, 2005; Mishili, Musa Shehu, Marfo, Chergna, & Lowerberg-DeBoer, 2007; Onubogu & Dipeolu, 2019). Cowpea production in Nigeria is concentrated in the Northern part of the country, particularly Niger, Borno and Yobe States. Ewan, Nwuneli, Spencer, and Humphrey (2014) affirmed that most of the cowpea consumed in southern Nigeria are produced and transported from the northern part.

Efficiency of the marketing of agricultural products has always been an issue of interest, and attainment of an efficient market performance is determined by the extent to which price signals are transmitted across markets (Moghaddasi, 2008; Akpan, Udo & Udo, 2014). If Nigeria is to realize its marketing and pricing policy objectives, then the attainment of inter-regional equity is of vital importance and this implies the presence of a well-integrated market system. Spatial market integration refers to the synchronous movement of prices of a commodity or a group of commodities (e.g., foodstuffs) over time in spatially differentiated markets (Okoh & Egbon 2005). According to Okoh and Egbon (2005), the ability of a market system, whether domestic or foreign, to efficiently perform its development functions depends on the ease with which price changes and responses are transmitted. This is because price transmission shocks distress consumers' real

income, bringing many households into poverty and driving poorer households into hunger and malnutrition.

A good and well-coordinated national food marketing system can affect food production and household's food security in numerous ways, which includes: stimulation of increased commercial activities that could generate more funds for plough back investments in both agricultural and agro-allied industrial sectors thereby leading to increased food production and increased food output. Secondly, employment generation for all participants, and thirdly, the involvement of rural people in food marketing could uplift the rural populace standard of living and increase their personal income thereby enhancing the prospect of food security at the households, local and national levels (Akpan, Udo & Udo 2014).

This study provides the state of inter-regional commodities markets integration in Nigeria, with the hope that it will help market intermediaries to identify the possibilities for substituting, amongst regions, between markets and between commodities.

## METHODOLOGY

### Data Collection and Sample size

Nigeria is made up of the North East, North West, North Central, South West, South East and **South-South** Geo-political zones. One state was selected from each of the zones, which led to the choice of Adamawa, Kano, Niger, Oyo, Enugu and Cross River States, respectively, based on their roles in the production and marketing of the commodities under study, and availability of data. Three commodities (Fresh Yam tubers, white Cowpeas, and brown cowpeas) markets' retail prices were investigated. These crops were chosen because of their importance as food security crops (Kormawa, Chianu and Manyong, 2002). Monthly Retail Prices of the three commodities in the six states from January 2000 – December 2018 were used for this study. The data were collected from the selected States' Agricultural Development Programmes (ADPs) offices, and the National Bureau of Statistics (NBS).

### Analytical Techniques/ Procedures and Data Analysis

The tests applied include: Unit root test, Granger causality test, Co-integration test, and Vector Error Correction Model (VECM). Each of the tests is explained below.

#### *Unit Root test: Augmented Dickey Fuller Test (ADF)*

The hypothesis tested here were:

$H_0$ : The series contains a unit root

$H_A$ : There is no unit root

According to Okoh and Egbon (2005), the ADF test for unit root requires the following regression:

$$\Delta P_{it} = \alpha + \gamma T + \zeta P_{it-1} + \sum_{i=1}^n \lambda_i \Delta P_{it-1} + \varepsilon_{it} \quad \mathbf{1}$$

Where;  $P_{it}$  = price series investigated for stationarity  $t$  = time horizon;

$T$  = deterministic trend;  $\varepsilon_t$  = white noise  $n$  = the number of lags

$\alpha$ ,  $\gamma$ ,  $\zeta$ , and  $\lambda$  are coefficient vectors.

**Johansen multivariate Co-integration test**

To test whether the markets co-integrate, the Johansen multivariate co-integration test was run. A model for co-integrating equation was specified in line with Johansen (1988) as below:

$$\Delta P_t = \theta D_t + \Pi P_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta P_{t-1} + \epsilon_t \tag{2}$$

Where,  $P_t$  = vector of I(1) endogenous variables, (market price series with unit roots)  
 $\theta$  = matrix of coefficient to be estimated;  $\Gamma_i$  = matrices of the short run parameters  
 $D_t$  = vector of deterministic variables, constant, and / or trend  
 $\Delta$  = difference operator;  $k$  denotes the lag length,  
 $\epsilon_t$  = disturbance term, and is independently and identically distributed (i.i.d.).  
 $\Pi$  = the impact matrix, and it contains information about the long run relationships.

- (1) if rank ( $\Pi$ ) = 0, the variables are not co-integrated
- (2) If rank ( $\Pi$ ) =  $n$ , the variables are stationary, and the model is equivalent to a VAR in levels.
- (3) If  $0 < \text{rank}(\Pi) = r < n$ , the variables are co-integrated, and can be represented in a Vector Error Correction Model (VECM) in their first differences (Esposti, & Listorti, 2011).

**Decision Criteria:** if the test statistics is larger than the critical value at the given alpha level, I will fail to accept the null hypothesis in favour of the alternative hypothesis, but, if otherwise, the null hypothesis of no co-integration is accepted.

**Granger Causality test**

Granger causality test is one of the important econometric tools used to determine whether past change in time series variable say “X” has impact on the current variable “Y” or whether the relation works in the opposite or bilateral direction. The model for granger causality testing for this analysis, derived according to Adeoye, Dontsop-Nguezet., Badmus & Amao (2011), and Akpan, Udo & Udo (2014) was represented thus:

$$\ln P_{1t} = \psi_0 + \sum_{i=1}^n \psi_{1i} \ln P_{1(t-i)} + \sum_{i=1}^n \psi_{2i} \ln P_{2(t-i)} + \epsilon_t \tag{3}$$

$$\ln P_{2t} = \vartheta_0 + \sum_{i=1}^n \vartheta_{1i} \ln P_{1(t-i)} + \sum_{i=1}^n \vartheta_{2i} \ln P_{2(t-i)} + \epsilon_t \tag{4}$$

Where;  $P_{1t}$  = price in market 1;  $P_{1(t-i)}$  = lagged prices of market 1;  $P_{2t}$  = price in market 2;  $P_{2(t-i)}$  = lagged prices of market 2;  $\psi_{i's}$ , and  $\vartheta_{i's}$  = parameters to be estimated  
 $n$  = the numbers of lags determined by a suitable information criterion.

**Decision Criteria:**

- I. A unilateral Granger Causality (strong exogeneity) occurred if ;
  - a.  $\psi_2 \neq 0$  while  $\vartheta_1 = 0$  (market  $P_2$  predicts market  $P_1$ ) or
  - b.  $\vartheta_1 \neq 0$  while  $\psi_2 = 0$  (market  $P_1$  predicts market  $P_2$  )
- II. A bilateral Granger causality (weak exogeneity) if;  
 $\psi_2 \neq 0$  and  $\vartheta_1 \neq 0$
- III. No Granger causality if  $\psi_2 = 0$  and  $\vartheta_1 = 0$

The market which Granger-causes the other was tagged the exogenous market or the lead market.

**Evaluation of speed of adjustment**

To evaluate the speeds of adjustment of prices amongst the markets, a Vector Error Correction Model (VECM) was specified and the Error correction term obtained (Vavra & Goodwin, 2005). The VAR models for this study were specified as follows, but later expanded to suit the purpose:

$$\Delta \ln P_{it} = \tau_0 + \sum_{i=1}^n \tau_{1i} \Delta \ln P_{i(t-i)} + \sum_{i=1}^n \tau_{2j} \Delta \ln P_{j(t-i)} + \phi ECT_{(t-1)} + \epsilon_{1t} \quad 5$$

$$\Delta \ln P_{jt} = \omega_0 + \sum_{i=1}^n \omega_{1i} \Delta \ln P_{i(t-i)} + \sum_{i=1}^n \omega_{2j} \Delta \ln P_{j(t-i)} + \phi ECT_{(t-1)} + \epsilon_{2t} \quad 6$$

Where,  $P_{it}$  and  $P_{jt}$  = prices series of markets  $i$  and  $j$ ;

$\Delta$  = difference operator  $P_{i(t-1)}$  and  $P_{j(t-1)}$  = lagged prices in markets  $i$  and  $j$

$\tau_0$  and  $\omega_0$  = constants;  $\omega_i$  and  $\tau_j$  = short run coefficients

ECT = Error Correction Term measuring the speed of adjustment from the short run state of disequilibrium to the long run steady state equilibrium (Nyongo, 2013; Ojiako et al., 2014).

## RESULTS AND DISCUSSION

### Stationarity of the variables

The Augmented Dickey Fuller (ADF) unit root test results are reported in Table 1.

**Table 1: Unit Root Test Results**

Market	AUGMENTED DICKEY-FULLER (ADF) TEST			
	TEST AT LEVEL		TEST AT 1 <sup>st</sup> DIFFERENCE	
	ADF <sub>NT</sub>	ADF <sub>WT</sub>	ADF <sub>NT</sub>	ADF <sub>WT</sub>
<b>YAM</b>				
ADAMAWA	-1.17	-2.18	-12.13**	-12.41**
CROSS RIVER	-1.92	-2.80	-12.30**	-9.80**
ENUGU	-2.31	-2.97	-9.27**	-10.41**
KANO	-2.04	-3.16	-11.74**	-10.53**
NIGER	-2.11	-2.28	-7.78**	-8.31**
OYO	-1.22	-3.11	-6.54**	-9.76**
<b>BROWN COWPEA</b>				
ADAMAWA	-0.14	-3.25	-7.26**	-13.49**
CROSS RIVER	-1.31	-3.02	-16.96**	-9.76**
ENUGU	-1.67	-3.29	-4.25**	-11.23**
KANO	-1.97	-2.64	-13.42**	-17.89**
NIGER	-1.91	-3.36	-7.29**	-12.54**
OYO	-1.71	-2.98	-5.38**	-6.11**
<b>WHITE COWPEA</b>				
ADAMAWA	-1.06	-2.80	-20.05**	-21.31**
CROSS RIVER	-1.41	-2.48	-13.19**	-14.11**
ENUGU	-2.24	-2.83	-15.59**	-11.02**
KANO	-2.13	-2.92	-15.53**	-15.77**
NIGER	-2.78	-1.64	-16.55**	-17.34**
OYO	-1.44	-3.32	-19.74**	-20.00**

Note: the critical values at 5% are -2.87 for the model without trend and -3.43 for the model with trend. Where, \*\*\* indicates the rejection of null hypothesis of presence of unit root at 5% level of significance. NT = no trend; WT = with trend.

Source: Author’s calculation using data from States’ ADP offices and NBS, 2018.

Stationarity means that the stochastic properties of a time series i.e. mean, variance of the mean and covariance of the mean are stationary and do not vary with time. Most economic time series data are not stationary because the mean of the series changes with time as a result of inflation or seasonality (Debaniyu, 2013). Table 1 shows that all price series contained unit root (not stationary) at levels (the ADF values in absolute terms are less than the ADF critical values) but became stationary at first difference (the ADF values in absolute terms are higher than the ADF critical values). The null hypothesis of the presence of unit root could not be rejected for all the series at their levels (without differenced). This is consistent with time series data and is also one of the conditions to be met before a co-integration test is run. These (non-stationary at level and stationary at the same order when differenced) characteristics of the variables qualified them for the test of a long run relationship (or co-integration test).

### Long Run Relationship amongst the Markets

The results of Johansen Multivariate Co-integration test for both the Trace and maximum eigenvalue tests are shown in table 2.

**Table 2: Johansen multivariate Co-integration test result**

Null hypothesis	YAM MARKETS		BROWN COWPEA		WHITE COWPEA	
	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$	$\lambda_{trace}$	$\lambda_{max}$
$r = 0$	110.77*	48.24*	100.44*	40.33*	134.97*	48.74*
$r \leq 1$	62.53	22.94	60.10	25.90	86.24*	42.63*
$r \leq 2$	39.59	13.92	34.20	13.56	43.62	23.44
$r \leq 3$	25.67	12.14	20.64	11.17	20.17	11.89
$r \leq 4$	13.53	9.46	9.47	8.73	8.28	7.65
$r \leq 5$	4.07	4.07	0.74	0.74	0.63	0.63

\* denotes rejection of the hypothesis of no co integration at the 5% level

Source: Author's calculation using data from States' ADP offices and NBS, 2018.

The result shows that  $r = 0$  is significant in both trace and max eigenvalue tests (this means presence of one co-integrating vector) for yam and brown cowpea markets, but  $r = 2$  in white cowpea market. This means that the six markets for each of the three commodities were co-integrated, that is, they share a long run relationship. Hence, price information and trade are shared amongst the markets in the long run. The result suggests that there is some degree of marketing link in yam and cowpea markets in Nigeria. This could be attributed to proper and efficient use of market information, and also to the storable nature of the commodities. The results further agree with Debaniyu (2013) that the possibility of traders being able to store their products avails them the opportunity of obtaining reliable information about prices and demand between markets, thus promoting integration between markets. The overall economic implication of the result is that, yam and cowpea markets in Nigeria during the study period were linked together, thus suggesting a stable long-run equilibrium.

### Direction of price Leadership

The various directions of price leadership as found are shown on table 3.

**Table 3: Granger Causality test result**

Markets	YAM MARKET	BROWN COWPEA MARKET	WHITE COWPEA MARKET
Adamawa - Cross river	4.12 (0.84)	3.55 (0.93)	1.80 (0.41)
Cross river –Adamawa	3.98 (0.85)	4.44 (0.88)	1.61 (0.44)
Adamawa – Enugu	3.75 (0.87)	14.64 (0.10)	1.11 (0.57)
Enugu – Adamawa	12.97(0.11)	6.66 (0.67)	2.45 (0.29)
Adamawa – Kano	6.78 (0.55)	11.73 (0.22)	3.36 (0.18)
Kano – Adamawa	14.80* (0.06)	6.36 (0.68)	22.6*** (0.00)
Adamawa – Niger	16.48*** (0.00)	11.34 (0.25)	0.58 (0.74)
Niger – Adamawa	22.2*** (0.00)	21.88*** (0.00)	7.12** (0.02)
Adamawa – Oyo	10.15 (0.25)	17.13** (0.04)	0.97 (0.61)
Oyo – Adamawa	8.09 (0.42)	16.16* (0.06)	2.83 (0.311)
Cross river – Enugu	7.41 (0.49)	3.70 (0.93)	8.66** (0.01)
Enugu - Cross River	2.37 (0.96)	8.58 (0.47)	2.63 (0.26)
Cross River – Kano	5.22 (0.75)	10.46 (0.31)	1.98 (0.63)
Kano - Cross River	16.08** (0.05)	9.22 (0.41)	0.40 (0.81)
Cross River –Niger	27.86*** (0.00)	6.23 (0.71)	1.76 (0.41)
Niger - Cross River	14.77* (0.06)	19.04** (0.02)	9.21 (0.00)
Cross River- Oyo	11.9 (0.15)	4.67 (0.86)	0.41** (0.81)
Oyo – Cross River	12.22 (0.14)	12.02 (0.21)	4.12 (0.13)
Enugu – Kano	9.35 (0.31)	7.21 (0.61)	3.25 (0.19)
Kano – Enugu	6.45 (0.59)	16.89** (0.05)	10.06*** (0.00)
Enugu – Niger	15.39*** (0.00)	12.08 (0.20)	0.42 (0.81)
Niger – Enugu	15.90*** (0.00)	19.13** (0.01)	21.48*** (0.00)
Enugu – Oyo	7.77 (0.45)	10.26 (0.32)	2.29 (0.31)
Oyo – Enugu	5.30 (0.72)	17.91** (0.03)	0.15 (0.92)
Kano – Niger	13.82* (0.08)	14.23 (0.11)	3.91 (0.14)
Niger – Kano	14.49* (0.07)	21.83*** (0.00)	6.22** (0.04)
Kano – Oyo	17.36*** (0.00)	8.29 (0.50)	7.85** (0.01)
Oyo – Kano	13.41* (0.09)	20.34*** (0.00)	2.94 (0.22)
Niger – Oyo	22.59*** (0.00)	18.08** (0.03)	1.59 (0.45)
Oyo – Niger	28.49*** (0.00)	14.10 (0.11)	5.03** (0.08)

\* \*\* \*\*\* and \*\*\*\* denotes failure to accept the null hypothesis of no causality at the 10%, 5% and 1% levels of significance.

Source: Author's calculation using data from States' ADP offices and NBS, 2018.

Table 3 reveals a bi-directional causality in the yam market between Adamawa and Niger, Cross River and Niger, Enugu and Niger, Kano and Niger, Kano and Oyo, and, Niger and Oyo States.

This means that the yam price in Niger market has a mutual link with the prices in each of the other markets studied. The implication of this is that Niger yam market is a leading market and should be a focal point in any policy towards improving yam market in Nigeria.

However, in the brown cowpea market a unidirectional causality exists with Niger market being the exogenous market in all markets. This means that the past price of brown cowpea in Niger State can be used to predict current prices of brown cowpea in the rest of five states. Hence, price changes/distortions in the Niger market will affect the price of brown cowpea in the other locations studied. In the white cowpea market, there are numerous leading markets. Kano, Niger, Cross River and Oyo white cowpea markets lead the market.

### Speed of adjustment to Equilibrium

A Vector Error Correction Model (VECM) was estimated to ascertain the proportion of the deviation from the long run trend that is corrected in a given period. The speed of adjustment to equilibrium in the various markets is shown on table 4.

**Table 4: ECT TABLE (figures are in %)**

MARKET	YAM MARKET	BROWN COWPEA MARKET	WHITE COWPEA MARKET
ADAMAWA	-0.13**	-0.17**	-0.12**
CROSS RIVER	0.12*	-0.01	-0.09**
ENUGU	0.009	-0.02	-0.02
KANO	-0.017	-0.21**	-0.06
NIGER	-0.62***	-0.32**	-0.12**
OYO	-0.05**	-0.12***	-0.09***

Note: \*, \*\*, and \*\*\* denotes 10%, 5% and 1% levels of significance. Significant positive values mean inability to return to equilibrium after a price shock, while significant negative values show the rate of readjustment to the equilibrium /steady price after a price shock.

Source: Author's calculation using data from States' ADP offices and NBS, 2018.

The ECT result displayed in Table 4 shows values which represent the speed of adjustment of the prices to equilibrium after a distortion. The significant values represent the portion of disequilibrium restored in a month (monthly data were used for the analysis). In the Yam market, it took between two months (-0.62 in Niger means 62% of disequilibrium in the price of yam is restored in a month, hence, within two months 100% of price distortion in the market would have been corrected) and two years (-0.05 in Oyo means 5% of disequilibrium in the price of yam is restored in a month, hence it will take about a year and 8 months for price distortion in the market to be corrected) for prices to normalize after a distortion. The Brown cowpea market was slower as it readjusted to steady state between four months (-0.32/month in Niger) and nine months (-0.12/month in Oyo), while the white cowpea market was the slowest with a period of between nine months (-0.12/month in both Niger and Adamawa) and one year (-0.09/month in both Oyo and Cross River). Amongst the states, Niger was generally the fastest, while Oyo was generally the slowest. The result further reveals that Enugu markets for the three commodities failed to return to equilibrium after a distortion in price. Generally, the speed of adjustment to equilibrium for the



three commodities was slow/low. Low ECT signifies sluggishness in the system, and this implies the workings of the markets may take a longer time to achieve steady state. This confirms the findings and conclusions of Okoh & Egbon, 2005, NISER (2008) and Onubogu (2020), that the food price inflation in Nigeria, cannot be completely isolated from the trend in food supply in the country which is suspected to be too slow.

### Contribution of shocks from other variables in the system

Apart from Kano and Niger white cowpea markets, all other markets were responsible for over 50% of the price shocks they experienced. This is an indication that price shocks were mainly internal. Table 5 gives a summary of shocks decomposition in each markets by the 10<sup>th</sup> period (10<sup>th</sup> month). The table further shows the percentage of change (highest and lowest) in a market due to shocks in other markets.

**Table 5: Summary of shocks decomposition**

MARKET	OWN SHOCK (%)	SHOCKS FROM OTHERS	
		HIGHEST (%)	LOWEST (%)
<b>YAM MARKETS</b>			
ADAMAWA	81	8 (Niger)	2 (Oyo)
CROSS RIVER	82	6 (Niger)	1(Adamawa)
ENUGU	91	5 (CR)	0.4 (Oyo)
KANO	84	5 (Oyo)	2 (Niger)
NIGER	63	12 (Enugu)	4(Adamawa)
OYO	82	8 (CR)	2(Adamawa)
<b>BROWN COWPEA</b>			
ADAMAWA	69	22 (Niger)	0.9 (Kano)
CROSS RIVER	73	12 (Kano)	2(Adamawa)
ENUGU	74	9(Adamawa)	1 (CR)
KANO	53	20(Adamawa)	3 (CR)
NIGER	58	19(Adamawa)	0.9 (CR)
OYO	51	33 (Niger)	2 (Enugu)
<b>WHITE COWPEA</b>			
ADAMAWA	63	13 (Niger)	0.2 (CR)
CROSS RIVER	72	14 (Kano)	0.4 (Oyo)
ENUGU	88	7 (Kano)	0.4 (CR)
KANO	48	32 (Oyo)	2.1 (CR)
NIGER	44	17 (Oyo)	2.2 (CR)
OYO	66	16 (Kano)	0.4 (CR)

Note: CR = Cross River Source: Author's calculation using data from States' ADP offices and NBS, 2018.

### CONCLUSION AND RECOMMENDATION

This study has provided the state of inter-regional commodities markets integration in Nigeria, with the hope that it will help market intermediaries to identify the possibilities for substituting, amongst regions, between markets and between commodities. The presence of regional long run

relationship amongst cowpea and yam markets in Nigeria is a call for more open policy initiatives which can play a more effective role in increasing productivity and income of both producers and marketers. This is because the concern of spatial market integration analyses is to determine the possibility of obtaining some gains by trading across commodity markets, and exploiting price movements in one market for the prediction of price movements in another market.

Also, the markets were sluggish in adjusting to equilibrium after a price distortion caused mainly by internal markets functioning. A check on the market structures to rule out monopoly becomes essential because price transmission shocks distress consumers' real income, bringing many households into poverty and driving poorer households into hunger and malnutrition.

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