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BOOSTING AGRICULTURAL PRODUCTIVITY THROUGH THE FINANCING AND MARKETING OF GREEN ECONOMY IN NIGERIA

Akpaeti, Aniekan J; Udo, Udoro J and Bassey, Nsikan E
Department of Agricultural Economics and Extension, Akwa Ibom State University, IkotAkpaden, MkpatEnin, P.M.B. 1167, Uyo, AkwaIbom State, Nigeria. *Correspondence email: anigreat04@yahoo.comm

Abstract
A Green Economy can be considered as an alternative vision for growth and development; one that can generate growth and improvement in people's lives in ways consistent with sustainable development. To drive this vision, the role of finance cannot be over-emphasized since no tangible investment can be done without funds. This paper therefore assesses the impact of financing and marketing on agricultural productivity through the development of green economy in Nigeria. Using secondary data from Central Bank of Nigeria; food and agricultural organization covering 1970-2010 and employing co-integration, error correction and Granger Causality test techniques, the study found a positive and significant long run relationship between agricultural productivity (ARGDP), commercial bank credit to agriculture (CAG), total government expenditure on agriculture (TEA), consumer price index (CPI) and agriculture population (APOP) as well as a uni-Granger causality from TEA to ARGDP, CAG to TEA, CPI to APOP and TEA to APOP. It is recommended that concerted effort by all stakeholders are required to steer green agriculture on a sustainable production and productivity pathway through mobilization of funds and provision of an environmentally friendly alternative for Nigeria's transition from a mono economy to a diversified green economy for effective and efficient use of resources by present and future generation for sustainable development.

Keywords: Agricultural productivity, financing and marketing, green economy, Nigeria.

Introduction

The Nigeria domestic economy is partly determined by agriculture which has experienced a rapid growth in recent times with recorded growth rate well above 5% compared with the less than 2% growth of early 80's (Falusi, 2008). In 2005, agriculture contributed 6.8% out of the 8.2% growth rate recorded by the entire non-oil sector (NEEDS, 2008) while in 2007, the sector also employed about 65 million persons and contributed about 41% of the Gross Domestic Product (GDP). Of this, the crop subsector contributed 85%, Livestock (10%) and Forestry (1%) (National Bureau of Statistics, 2007). This growth rate is essential for fostering economic development in the country.

Despite this growth rate, the United Nations Food and Agriculture Organization (FAO) report that productivity of Nigeria's farmland is low but has the potentials to improve if properly managed (Nigerian National planning Commission, 2004). Jeter (2004) submitted that there is a serious declined in agricultural productivity over the past two decades which has resulted in severe rural poverty while World bank data cited by Chigbu (2005) shows that more than 70% of Nigerians live below the poverty line (which is less than a dollar/day) implying that there has been an astronomical growth in the levels of poverty of Nigerians most of whom are engaged in agriculture from independence till today. Corroborating this was National Bureau of Statistics (2005) which reported that poverty rates in Nigeria was as high as 54.4 percent in 2004.

The reason for this is because more than 90% of the agricultural output is accounted for by small-scale farmers with less than two hectares under cropping while out of about 75% (68 million ha) of estimated potential total Nigeria land for agricultural activities only about 33 million hectare is under cultivation. Similarly of the estimated 3.14 million hectare irrigable land area only about 220,000 hectares (7%) is utilized (FMAWR, 2008). This situations have cause food production in Nigeria to fail to keep space with the increasing population therefore making Nigeria a net importer of food (Daramola *et al.,* 2007). Therefore, the need to give agricultural productivity the greatest priority if the incidence of poverty is to be reduced in economy with special attention on less carbon emissions and its negative impacts on the environment as this ultimately leads to income growth becomes imperative.

With interest in increasing agricultural productivity, stemming from the knowledge that income growth comes from productivity growth and savings-supported investment as well as opening up new markets, various governments are promoting and shifting to green economy strategies to open more stable and sustainable development pathways and to help maintain existing market share (UN Conference on Trade and Development [UNCTAD], 2011). United Nations Environment Programme [UNEP], 2010) defined green economy as "one that results in improved human well being and

social equity, while significantly reducing environmental risks and ecological scarcities". It is aim at sustainable development without degrading the environment. The green economy emphasizes production and consumption modes that are environmentally and socially sustainable. By sustaining natural resources and ecosystem services, it protects the global commons allowing current and future generations to meet their needs. And by promoting social inclusiveness it generates jobs for the poor and enhances their access to basic services (UNCTAD, 2011). A transition to a green economy involves expanding green production and markets; reducing depletion of natural resources and degradation of ecosystems caused by economic activity; and increasing reliance on low-carbon energy supply to mitigate climate change. The transition is not automatic though; it needs to be supported by development-led policies and concerted actions to ensure outcomes are inclusive across and within countries (UNCTAD, 2011). This would help in reviewing the production and postharvest constraints affecting agricultural productivity in Nigeria as an important step in formulating policies to reverse these trends in the future.

Over the years, Nigerian government has almost been the sole provider of financial and other capital resources to support agriculture. She has attempted to increase expenditure on agriculture through budgetary allocation and through the provision of cheap and readily available credit facilities (Nwosu, 2004). This implies that the government budgeting allocation has become an important determinant of agricultural output in Nigeria (Nwosu, 1995).Yet, government budgetary allocation to agriculture is not without limitations. The first is the relatively low allocation to the agricultural sector. The second is the actual expenditure which often falls short of budgeted expenditure and the high rate of under spending which is usually higher for agriculture than for other economic sectors. The third is the vast proportion of the funds allocated to agriculture which does not go directly to farmers (Nwosu and Akpokodje, 1993; Omanukwu, 2005). Balogun (2007) posited that despite the rapid increase in financial lending to the economy by financial institutions, a significant proportion of the production loans go to manufacturing, probably to finance imports of raw materials, machineries and component assembly activities and to agriculture. This further suggests that financial institutions like commercial banks have always found an alternative portfolio investment more lucrative than lending to the agricultural sector.

In the wake of the food security and sustainable development, one of the crucial issues is the right of rural communities to a clean environment that enables them to have a sound basis for their livelihoods and their living conditions. One of the most serious potential effects of global warming will be the lower productivity of agriculture in developing countries. Recent Green Economic report by United Nation Environmental programme (UNEP) cited by Ocampo (2014) shows that a strategy of reallocating funding/investments towards the green economy may lead to slower potential economic growth for a few years, as renewable natural resources are replenished (an effect that can be strong in some sectors, such as fisheries),but in long run would result in faster economic growth. Given the large synergies between poverty alleviation and the green economy (most particularly in sustainable agriculture, water and sanitation), there may be "double" and even "triple dividends" in funds allocated for development purposes to the poorest countries (social and environmental, but also possibly economic). In the allocation of funds across different economic agents in recipient countries, priority should be given to public sector infrastructure investments that are critical to the transition to the green economy.

Apart from funding, efficient marketing system is desirable for the attainment of increased agricultural productivity; especially in developing countries that are characterized by high post-harvest loses due to inadequate storage facilities. Efficient marketing system should incorporate both environmental and social sustainability. Efficient food marketing system have been documented to reduce post-harvest loses, ensure adequate returns to farmer's investment and stimulate expansion in food production thereby enhancing the level of food security in the country (Ladele and Ayoola, 1997). Other studies such as Bassey et al., (2013), Oladopo (2007) and Tura (2010) all lend credence to the importance of efficient marketing system in promoting economic development. Therefore, in attaining green economy in agricultural sector, proper funding of the sector and the development of efficient marketing system becomes imperative. Against this backdrop, the study examines the impact of funding and efficient marketing system through green economy in enhancing agricultural productivity in Nigeria.

Methodology

Theoretical Framework and Model Specification:

The study use the neoclassical growth model often referred to as growth accounting framework to explain the channel of growth in an economy. This model is used in conjunction with Cobb-Douglas production function which is consistent with the supply theory that underlies the specification of the supply-side of agricultural output (Koskela, 2000). The Cobb-Douglas production function is specified as:

$Y = f(A,L,K) = AL$ ..... (1)

Where,
Y = Output

A = Efficiency of labour or total factor productivity, L = Labour, K = Capital stock, T= Time dimension.
Several studies have attempted to integrate exogenous variables with endogenous variables in explaining growth in output. Hence, this empirical study adopts neoclassical production function employed by Odusola (1998) and Iganiga and Unemhilin (2011) as follows:

$Y_t = A_t L^{\beta}_1 K^{\beta}_2 P^{\beta}_3$ ..... (2)

Where,
Y = output
P = Additional Input
$\beta_1 + \beta_2 + \beta_3 = 1$ (assuming constant returns to scale)
The log linear form of equation 2 taking the natural logarithm of both sides is
$\ln Y = \beta + \beta_1 \ln L + \beta_2 \ln k + \beta_3 \ln P$ .....(3)
It is assumed in this study that government expenditure is the being the main determinant of agricultural output.
$\ln ARGDP = \beta_0 + \beta_1 InTGEA$ ..... (4)
$\ln ARGDP = \beta_0 + \beta_1 \ln TGEA + \beta_2 \ln CBA + \beta_3 \ln CPI + \beta_4 APOP + U_t$ ..... (5)

Introducing other factors into equation 4, we have,

Where:
ARGDP = Agricultural Real Gross Domestic Product (₦M)
TGEA = Total Government Recurrent Expenditure on agriculture sector (₦M)
CPI = Composite consumer price index (1985=100)
CBA = Commercial bank credit to the agriculture sector (₦M)
APOP = Agricultural Population
β_0 is the intercept while β_1, β_2, β_3, β_4 are parameter estimate of the linear equation. $U_t$is the error term which captures all other variables not explicit captured in the model and is expected to be independently distributed.

Data Collection: Secondary data were used for the study. Time-series annual data covering 1970-2010 from publication of the Central Bank of Nigeria Statistical Bulletin, Annual Report and Statements of Account of Central Bank of Nigeria (CBN), Food and Agriculture Organization (FAO) online data base were employed.

Estimation Procedure:
Analysis was carried out using Econometric View (E-View 7.1). Four estimation procedures were employed as follows:
(i). **Unit root test**: This was done to solve the problem of spurious regression arising from the time series properties of the data set used in estimation of equation 5. The Augmented Dickey-Fuller (ADF) unit root test was employed for this purpose to test the integration level and the possible co-integration among the variables. The model is written as:

$\Delta y_t = \alpha_0 + Yy_t 1 + \alpha_2 t + \Sigma \beta j \Delta D y_t\text{-}1 + e_t$ .....(6)

Where y is the series t is (trend factor), α_0 is the constant term, e_t is the stochastic error term b is the lag length.
(ii). **Co-integration**: If the data set indicates integration property of the order 1(1) for the employed variable, co-integration test among the variables using Johansen (1988, 1991) will be employed.

(iii). Error correction Model (ECM): If the variables tested are co-integrated, then ECM will be estimated to test for the short-run dynamics of the model. Thus,

$Y_t = \alpha + \beta_{yt} + \xi_t$ .....(7)
$\Delta y_t = U_{t-1} + \Sigma \beta \Delta x_{t-1} + \Sigma \alpha_t \Delta y_{t-1} + \varepsilon$ .....(8)

U_{t-1} is the one period lagged value of the error from cointegrating regression while Δ denotes the first differences operator.

(iv). Granger causality technique**:** This was used to examine the direction of causality between variables.

Results and Discussion

Effect of financing and marketing of green economy in boosting agricultural productivity

ADF Unit Root Test: The time series behavior of each of the series is represented in Table 3.1. The result of the ADF test conducted at both levels and first difference revealed that variables were homogenous of order one. Thus, variables became stationary at first difference prior to subsequent estimations to avoid spurious regressions.

Co-integration Test**:** Tables 2 and 3 show the results of Johansen co-integration tests indicating the presence of two (Trace) and one (Maximum Eigenvalue) co-integrating vectors respectively. With the fact that almost all the variables were stationary at the first differencing, it was necessary to carry out another test to assess if the non-stationary variables were co-integrated. In essence, the hypotheses were tested to affirm the rank of the co-integrating relationships that existed among the variables at 5 percent level of significance. This indicates that there was evidence of the existence of a long-run relationship among the variables. Therefore, applying the error correction model (VECM) would enable us to track the long-run relationship between the variables and tie it to deviation that may occur in the short-run (Lorde, Jackson & Thomas, 2009).

Error Correction Model

To examine if a significant short-run relationship existed between variables used in the study, an error correction modeling (ECM) analysis was employed as presented in Table 3.4. The parsimonious error correction model with a two–period lagged values of the explanatory variables and one lagged value of the error term (ECM) estimate showed that R^2 value of 0.77 indicates the variables explained about 77 percent of agricultural output. F-statistic of 11.01 ($P<0.01$) reveals that they are jointly significant and the Durbin Watson Statistic value of 2.08 implies that the model does not suffer from autocorrelation problem but has a very good fit. The error correction term with a value of -0.1045 approximately is appropriately signed but not significant. The ECM value provides an insight on the speed of adjustment of the model from its long run equilibrium on account of any short run shock. Thus, the value of -0.1045 indicates that a short run disequilibrium in the long run financing and marketing of green economy relationship will be corrected at a speed of 10.45 percent per annum and it would take nine years and six months for full restoration back to the equilibrium after a short-run distortion. Therefore, correcting any deviations from the long-run equilibrium. This implies that financing and marketing of green economy had impact on agricultural productivity in the short-run.

. Granger Causality Test

Granger causality test was used to examine the direction of causality between two variables (Granger, 1969) with a maximum lag of two (2) on the first difference of the log transforms of the variables as presented in Table 3.5. The empirical results of the Granger causality test showed thatGranger causality runs uni-directionally from Total Government Recurrent Expenditure on agricultural sector (LNTGEA) to Agricultural Real GDP (ARGDP), Commercial bank credit to the agriculture sector (LNCBA) to Total Government Recurrent Expenditure on agriculture sector (LNTGEA), Composite consumer price index (LNCPI) to Agriculture Population (LNAPOP) and Total Government Recurrent Expenditure on agriculture sector (LNTGEA) to Agriculture Population (LNAPOP)

Conclusion and Recommendations

The role of finance cannot be over-emphasized since no tangible investment can be done without funds. The study revealed that government is the prime mover of the Nigeria economy especially in the direction of flow of funds to the agriculture sector. This is evidence with the uni-direction of government funds to agricultural output and agricultural population. Also, the uni-direction of consumer price index to agricultural population is an indication that proper marketing or creating of awareness of green economy to the populace by all stakeholders in the business coupled with proper financing both by the government and financial institutions would boost agricultural productivity in the country. It is therefore recommended that concerted effort by all stakeholders are required to steer green agriculture on a sustainable production and productivity pathway through mobilization of funds and provision of an environmentally friendly alternative for Nigeria's transition from a mono economy to a diversified green economy for effective and efficient use of resources by present and future generation for sustainable development.

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Table 1.ADF unit root test

Variable	**LevelIntercept**	**1st DifferenceIntercept**	**Conclusion**
LNARGDP	-1.7138	- 6.0123 ***	*1(1)*
LNTGEA	-0.6870	-10.2762***	*1(1)*
LNCBA	-2.1412	-11.1470***	*1(1)*
LNCPI	0.6662	- 6.6267***	*1(1)*
APOP	-2.8742	- 6.0002***	*1(1)*

Source: Computed by Author, 2014

Table 2. Johansen co-integration trace test

Null Hypothesis	**Alternative Hypothesis**	**Test Statistic**	**Critical Value (0.05)**
r = 0	r = < 1	81.74684	69.81889**
r = 1	r = < 2	43.45620	47.85613
r = 2	r = < 3	19.66315	29.79707
r = 3	r = < 4	6.857417	15.49471
r = 4	r = < 5	1.983648	3.841466

Source: Computed by Author, 2014. Notes: r indicates the number of co-integrating vector. ** is the significance level at 5%. P-values are obtained using response surfaces in MacKinnon, Haug&Michelis (1999).

Table 3. Johansen co-integration maximum eigenvalue test.

Null Hypothesis	Alternative Hypothesis	Test Statistic	Critical Value 0.05
r = 0	r = 1	38.29063	33.87687**
r = 1	r = 2	23.79306	27.58434
r = 2	r = 3	12.80573	21.13162
r = 3	r = 4	4.873769	14.26460
r = 4	r = 5	1.983648	3.841466

Source: Computed by Author, 2014. Notes: r indicates the number of co-integrating vector. ** is the significance level at 1%. P-values are obtained using response surfaces in MacKinnon, Haug and Michelis (1999).

Table 4. Parsimonious error correction model for short-run impact

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.078090	0.057359	1.361414	0.1842
D(LNARGDP(-1))	0.555906	0.149662	3.714415	0.0009
D(LNARGDP(-2))	-0.095670	0.089788	-1.065513	0.2957
D(LNAPOP(-1))	-10.75602	1.194855	-9.001948	0.0000
D(LNAPOP(-2))	8.375462	1.931414	4.336441	0.0002
D(LNCAB(-1))	0.046584	0.045513	1.023537	0.3148
D(LNCPI)	-0.070670	0.090156	-0.783866	0.4397
D(LNCPI(-2))	-0.047946	0.096320	-0.497784	0.6225
D(LNTGEA)	0.039740	0.045683	0.869895	0.3918
ECM(-1)	-0.104518	0.153656	-0.680208	0.5020
R-squared	0.779686	Mean dependent var		0.133892
Adjusted R-squared	0.708871	S.D. dependent var		0.384908
S.E. of regression	0.207682	Akaike info criterion		-0.084681
Sum squared resid	1.207694	Schwarz criterion		0.346263
Log likelihood	11.60893	Hannan-Quinn criter.		0.068646
F-statistic	11.01016	Durbin-Watson stat		2.081627
Prob(F-statistic)	0.000000			

Source: Computed by Author, 2014

Table 5. Pairwise Granger causality tests

Null Hypothesis:	Obs	F-Statistic	Probability
LNCBA does not Granger Cause LNARGDP	39	2.33115	0.11253
LNARGDP does not Granger Cause LNCAG		1.07336	0.35316
LNCPI does not Granger Cause LNARGDP	39	0.49608	0.61325
LNARGDP does not Granger Cause LNCPI		0.40468	0.67036
LNTGEA does not Granger Cause LNARGDP	39	2.80676	0.07444
LNARGDP does not Granger Cause LNTGEA		1.02488	0.36966
LNAPOP does not Granger Cause LNARGDP	39	67.3989	1.5E-12
LNARGDP does not Granger Cause LNAPOP		1.59790	0.21714
LNCPI does not Granger Cause LNCBA	39	0.61609	0.54597
LNCBA does not Granger Cause LNCPI		0.84108	0.44002
LNTGEA does not Granger Cause LNCAG	39	0.68020	0.51327
LNCBA does not Granger Cause LNTGEA		4.19355	0.02356
LNAPOP does not Granger Cause LNCBA	39	0.11552	0.89125
LNCBA does not Granger Cause LNAPOP		2.23345	0.12265
LNTEA does not Granger Cause LNCPI	39	1.48505	0.24081
LNCPI does not Granger Cause LNTGEA		1.44354	0.25020
LNAPOP does not Granger Cause LNCPI	39	0.04534	0.95573
LNCPI does not Granger Cause LNAPOP		2.64678	0.08544
LNAPOP does not Granger Cause LNTGEA	39	1.42134	0.25537
LNTGEA does not Granger Cause LNAPOP		6.01277	0.00581

Source: Computed by Author, 2014