The role of agricultural sector performance on economic growth in Nigeria

Kenny S, Victoria

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Abstract

The impact of agriculture in maintaining sustainable economic growth has been a major subject of controversy in the literature for a very long time now and this is presently still on among scholars with no final conclusion. However, Agriculture is the bedrock for any growing economy and thus a precondition for industrialization. This study critically examines the role of agricultural sector performance on economic growth in Nigeria. Key findings indicated that there is a significant long run relationship between agricultural domestic production and its explanatory variables (Agricultural Credit Guarantee Scheme Fund, Federal Government current expenditure on agriculture, total employment and effect of trade liberalisation). The VECM result found 35 percent speed of adjustment of the endogenous growth model which includes Agricultural Credit Guarantee Scheme Fund, Federal Government current expenditure, total employment and effect of liberalisation (SAP) on agricultural domestic production implying that Interventions in agriculture will take at least 24 months for one half of its effect to be significant on production in Nigeria. Therefore, Policy consistency and commitment of government is required before such intervention can yield the desired results.

1. Introduction

Agricultural sector is the most important sector of the Nigerian economy which holds a lot of potentials for the future economic development of the nation as it had done in the past. Notwithstanding the enviable position of the oil sector in the Nigerian economy over the past three decades, the agricultural sector is arguably resourceful. The impact of agriculture in maintaining sustainable economic growth has been a major subject of controversy in many researches for a very long time now and this is presently still on among scholars with no final conclusion. Though, there is a general consensus among some researchers that Agriculture is less productive than other non-agricultural sectors, early research relating to the impact of agriculture in maintaining sustainable economic growth and development were qualitative in nature emphasizing potential effect of inter-sectorial linkage between agricultural and industrial/manufacturing sector (Awokuse, 2009), while other scholars argued that growth in Agriculture is a precondition for industrialization (Nurkse, 1953 and Rostow, 1960)

Nigeria is a Sub Saharan African nation, endowed with abundant natural resources including biological and non-biological resources, with 84 million hectares of arable land, 279 billion cubic meters of surface water and also she possesses, three of the eight major river systems in Africa and 160 million people in population, projected to grow to 470 million by year 2050 which infers a large internal market (CBN, FBN Capital, 2011). A close examination of the agricultural contributions to the economy shows that the sector employs about 75 percent of Nigeria's work force, as is the case in most sub-Saharan African countries (Philip, Nkonya, Pender and Oni, 2009). It is also of note that agriculture is the major source of food and livelihood in Nigeria, making it a critical component of programs that seek to alleviate poverty and attain food security. The sector's productivity estimates for Nigeria reveals a fall in agricultural productivity growth since the 1970s.

According to Adesina (2012), the country is still importing what it can produce in abundance and the height of imports dependency is hurting her farmers and displacing local production while creating rising unemployment and much weaker exchange rate. Currently, the Agricultural Sector in the Nigerian economy is largely subsistent, characterized by inefficiency, high risk, low productivity and very little diversification. This sector is at the moment unattractive, not only to entrepreneurs and investors, but most particularly to youths.

That is why a large number of youths are now moving away from the rural communities to urban areas and other geo-political regions. The principal explanation for this could be the stagnation of the sector after the Oil boom. Godfrey Nzamujo, (2010).

Nigeria has witnessed strong economic growth for some time now, averaging about 7 percent real annual GDP growth from 2000 to 2012. However, the agricultural sector grew by about the same rate but over 70 percent of such growth were driven by crop production (CBN Statistical Bulletin, 2012). Reviewing the production and post-harvest constraints affecting agricultural ouputs in Nigeria is a critical step in formulating policies and strategies to reverse these trends in the future.

2. Stylized historical analysis

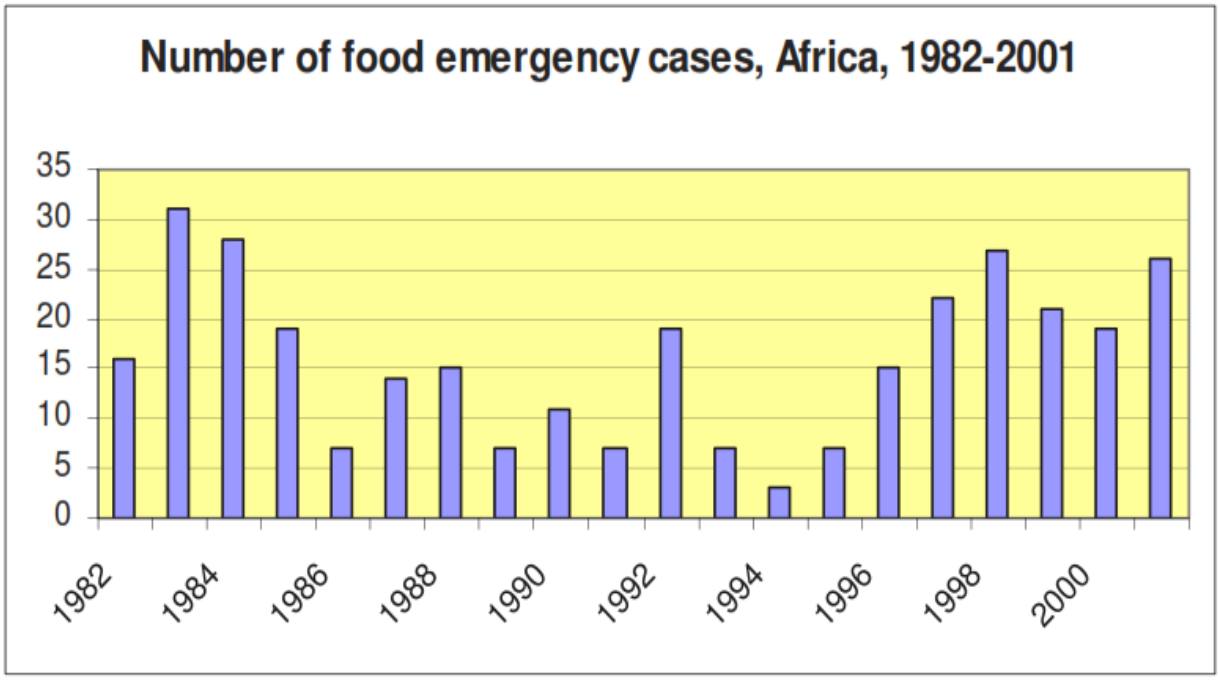
The Food and Agricultural Organisation of the United Nations (FAO) defined food security as follows "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life.

Almost 33 percent of the African population, some 200 million people, are malnourished, which is the highest prevalence in the world. The number of malnourished Africans has almost doubled since the late 1960s, increasing roughly at the same rate as population growth, a fact that indicates a lack of successful strategies in poverty alleviation and food security improvement. Food crises occur when shocks such as drought, flood, pests, economic downturns or conflicts harm the livelihoods of this chronically insecure population.

Annually, around 30 million Africans are affected.

Food insecurity has been increasing recently in sub-Saharan Africa (SSA) and is a source of growing concern to African governments. FAO estimates of the number of undernourished people in SSA countries show an increase from 165.5 million in 1990-92 to 198.4 million in 1999-2001 (FAO, 2003). Although the proportion of undernourished people remained about constant during this period, the increase in the absolute number reflects the fact that the supply of domestic or imported food is not sufficient to cope with population growth.

Fig 1: Number of food emergency cases in africa



Source: T. paris et al, the number of cases is reported from the international disaster database, louvain university, Belgium.

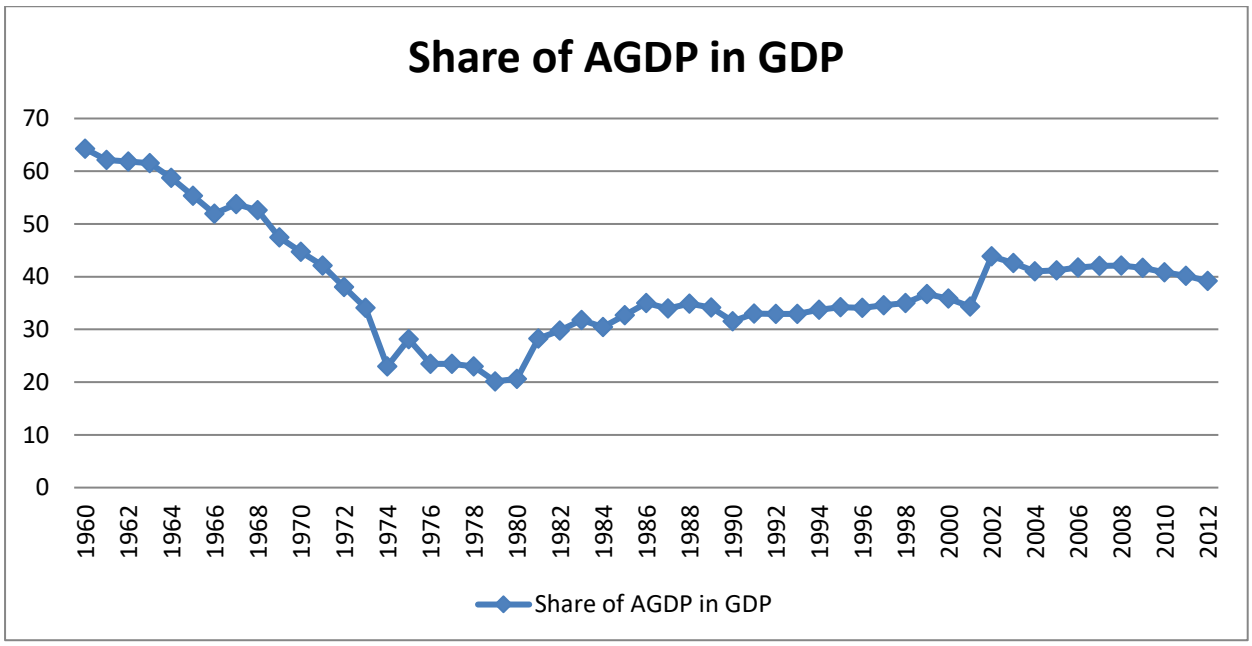
The figure above shows that in Africa the number of emergency cases reported by the Centre of Research for the Epidemiology of Disaster is not very different in the first decade of this century from what it was in the 1980s. However, after a significant decline during the early 1990s, the number of reported food shortage cases recently increased again.

Poverty and food insecurity are closely intertwined. The case of Senegal exemplifies the point. Vulnerability of rural households in Senegal depends significantly on income sources: the higher the share of agricultural income, the greater the vulnerability. The conclusions can be extended to other poor countries in Africa and beyond.

The analysis of average food availability among a representative set of African countries confirms this distressing situation and also reveals a high degree of heterogeneity among countries. In one third of African countries, the average daily caloric intake availability is below the recommended level of 2 100 kcal (Ethiopia, Kenya, Rwanda, and Tanzania in East Africa; and Angola, Madagascar, Mozambique, and Zambia in Southern Africa; Sierra Leone in West Africa). In a few countries (Burundi, Democratic Republic of the Congo, Eritrea, and

Somalia) the mean availability is below 1 800 kcal, which is considered the minimum intake level. In some countries (Botswana, Burundi, DR Congo, Gambia, Liberia, Madagascar, Senegal, Sierra Leone, Somalia, Tanzania, and Zambia), the situation has been deteriorating over the last ten years while in others (Ghana, Malawi and Nigeria) aggregate figures show some improvement. Less than 50 percent of sub-Saharan African countries have levels of malnutrition under 30 percent, and only three of them are under 10 percent (Gabon, Namibia and Nigeria). Despite economic growth and sufficient aggregate food availability, some countries still display increasing malnutrition, as measured by the prevalence of stunted.

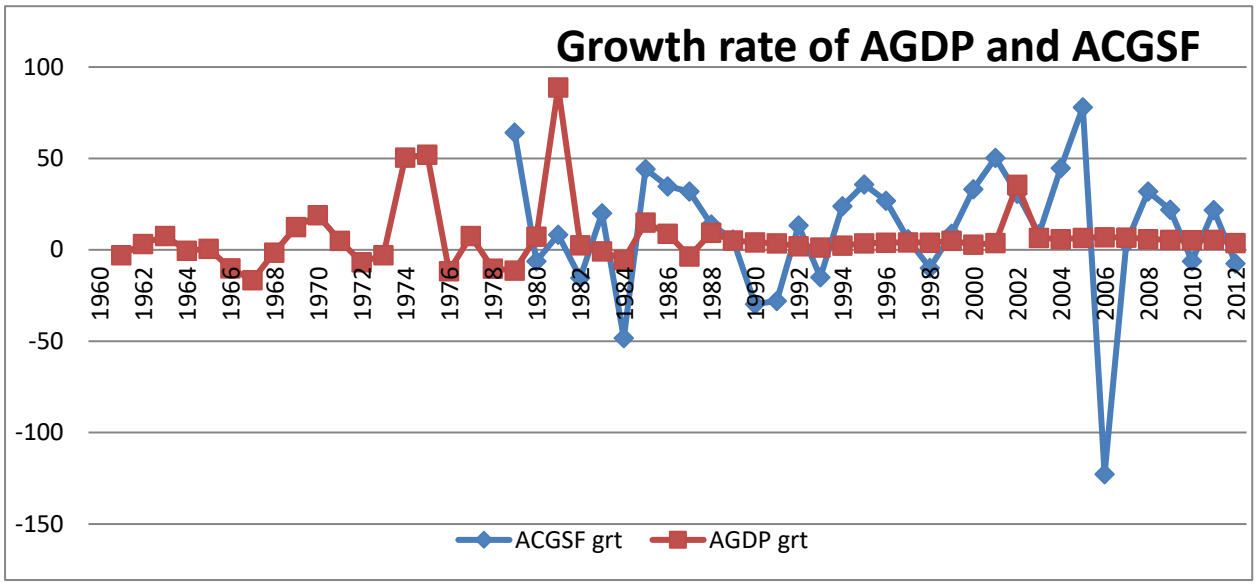
Fig 2: Total Share of Agricultural GDP on Total GdP



Source: CBN statistical bulletin 2012

The figure (2) presents the growth rate of the share of agriculture in GDP from 1960 to 2012. From 1960, there has been a continuous decline on the growth rate of agricultural GDP in overall GDP. However, by 1975 it rose slightly and continued to fall until 1980. After 1980, the growth rate of agricultural GDP maintained a continuous increase at a decreasing rate till 2001 with a sharp rise in 2002 and a continuous decline till date.

Figure 3: Growth rate of Agricultural GDP and Agricultural Credit Guarantee Scheme Fund. (ACGSF)



Authors computation from CBN statistical bulletin, 2010 and 2012.

The figure above shows the trend of growth rate of agricultural GDP and ACGSF. This figure reveals that the growth rate of agricultural GDP was falling and rising from 1960 to 1988 and was stable from 1989 to 2012 except a sharp rise in 2002. However the growth of Agricultural Credit Guarantee Scheme has been falling and rising at an increasing rate with a sharp fall in 2006. A close examination of the figure reveals that there is a negative correlation between agricultural GDP and ACGSF in Nigeria from 1960 to 2012. An investigation carried out by S. Saheed Zakaree (2014) revealed that the Agricultural Credit Guarantee Scheme Fund (ACGSF) has negative and statistically significant impact on the domestic food production. The negative impact can be attributed to a long delay in disbursement of loan to the farmers in the rural areas. Since most of the banks are located in the cities, in some cases where loans are approved, it arrives too late for it to fulfil the purpose for which it was intended.

3. Data presentation, analysis and interpretation

Stationarity Test

The results of the Augumented Dickey Fuller (ADF) unit root test shows that all the variables are stationary at first difference. The decision rule for the ADF Unit root test states that the ADF Test statistic value must be greater than the Mackinnon Critical Value at 5% absolute term for stationarity to be established at level and if otherwise, differencing occurs using the same decision rule.

Table 1: ADF Unit Root Test and Order of Integration

Variables	ADF Test Statistic Value	5% Mackinnon Critical Value	Remark	Order of Integration
D(logagdp)	-6.870872*	-2.919952	Stationary	I(1)
D(logacgsf)	-10.12136*	-2.919952	Stationary	I(1)
D(logbagric)	-8.132783	-2.919952	Stationary	I(1)
D(logemp)	-7.204494	-2.919952	Stationary	I(1)
D(dv)	-7.141428	-2.919952	Stationary	I(1)

Source: *Author's Computation from Eviews*

3.1 Co-integration Test

The co-integration test establishes whether a long-run equilibrium relationship exist among the variables of interest.

Test of Co-integration Hypothesis:

H_0: $\gamma = 0$ (No Co-integrating equation)

H_1: $\gamma \neq 0$ (Co-integrating equations)

Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.936640	244.5410	69.81889	0.0000
At most 1 *	0.903019	147.9785	47.85613	0.0000
At most 2 *	0.671343	66.31499	29.79707	0.0000
At most 3 *	0.493558	27.36903	15.49471	0.0005
At most 4	0.096633	3.556910	3.841466	0.0593

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.936640	96.56251	33.87687	0.0000
At most 1 *	0.903019	81.66348	27.58434	0.0000
At most 2 *	0.671343	38.94596	21.13162	0.0001
At most 3 *	0.493558	23.81212	14.26460	0.0012
At most 4	0.096633	3.556910	3.841466	0.0593

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

Table 2 presents the Unrestricted Co-integration Rank Test (Trace), the trace statistic (244.5410) is greater than 5% critical value (69.81889) hence, we reject the null hypothesis of no co-integrating equation and accept the alternate hypothesis of co-integrating equations. To confirm this, the p-value of the null hypothesis from the trace table (0.0000) is less than 0.05. Therefore, we reject the null hypothesis and accept alternate hypothesis. We equally reject the null hypothesis of “At most 1”, “At most 2” and “At most 3” because the p-values of 0.000 and 0.0005 respectively are less than 0.05. However, we accept the hull hypothesis of “At most 4” because its p-value (0.0593) is greater than 0.05. Therefore, using the unrestricted co-integrating rank test (trace), there are four co-integrating equations.

Another way to check for the presence of co-integration is the use of Unrestricted Co-integration Rank Test (Maximum Eigenvalue). Here, the Max-Eigen statistic (96.56251) is greater than 5% critical value (33.87687). Hence, we reject the null hypothesis of no co-integrating equations and accept the alternate hypothesis of the presence of co-integration. Also, the p-value of the null hypothesis from the Max-Eigen table (0.0000) is less than 0.05. Therefore we reject the null hypothesis and accept the alternate hypothesis. We also reject the null hypothesis of "At most 1", "At most 2" and "At most 3" because the p-values of 0.0000, 0.001 and 0.0012 respectively are less than 0.05. However, we accept the hull hypothesis of "At most 4" because its p-value (0.0593) is greater than 0.05. Therefore, using the unrestricted co-integrating rank test (Max-Eigen), there are four co-integrating equations.

We therefore concluded that both unrestricted co-integrating rank test (Trace) and unrestricted co-integrating rank test (Max-Eigen) confirmed the presence of co-integrating equations. Hence, there is a long run relationship between the dependent variable (agdp) and the independent variables (bagric, acgsf, emp and dv).

3.2 VECTOR ERROR CORRECTION MODEL

The VECM is used to correct for disequilibrium in a co-integrating relationship. This mechanism serves as a means of reconciling short run disequilibrium behaviour of an economic variable of interest with its long run behaviour (Sargan, 1962; Engle and Granger, 1987; Sule and Momoh, 2009). The coefficient of the parameters and the t-statistics are the two parameters used in error correction model. The coefficients are expected exhibit negative sign, indicating that a covergence of the variables back to equilibrium path following every period of disequilibrium. The t-statistics however, is used to check the significance of the variables or using the absolute p-value testing at 5 percent level (0.05)

Table 4: Vector Error Correction Result

Dependent Variable: D(AGDP)

Method: Least Squares

Sample (adjusted): 1977- 2012

Included observations: 36 after adjustments

VARIABLES	Coefficient	Std. Error	t-Statistic	Prob.
ECM	-0.351713	0.113626	-3.095365	0.0062
D(AGDP(-1))	3.20E-07	1.63E-07	1.968669	0.0646

D(AGDP(-2))	0.004325	0.178838	0.024185	0.9810
D(AGDP(-3))	0.204250	0.105324	1.939259	0.0683
D(ACGSF(-1))	0.082120	0.082826	0.991471	0.3346
(DACGSF(-2))	7.75E-08	2.43E-07	0.318740	0.7536
D(ACGSF(-3))	-1.01E-07	2.54E-07	-0.398091	0.6952
D(BAGRIC(-1))	-2.26E-07	2.18E-07	-1.035901	0.3140
D(BAGRIC(-2))	5.29E-05	2.10E-05	2.520147	0.0214
D(BAGRIC(-3))	2.59E-05	2.04E-05	1.271086	0.2199
D(EMP(-1))	-2.12E-05	2.17E-05	-0.974875	0.3425
D(EMP(-2))	-193785.6	209699.9	-0.924109	0.3677
D(EMP(-3))	-1207637.	193085.1	-6.254431	0.0000
D(DV(-1))	-524259.1	333429.0	-1.572326	0.1333
D(DV(-2))	-3673082.	1914398.	-1.918662	0.0710
D(DV(-3))	4138040.	1685893.	2.454510	0.0245
C(18)	1756288.	457112.6	3.842134	0.0012
R-squared	0.868782	Mean dependent var		437298.3
Adjusted R-squared	0.744854	S.D. dependent var		2365750.
S.E. of regression	1194988.	Akaike info criterion		31.13202
Sum squared resid	2.57E+13	Schwarz criterion		31.92378
Log likelihood	-542.3764	Hannan-Quinn criter.		31.40837
F-statistic	7.010367	Durbin-Watson stat		2.198798
Prob(F-statistic)	0.000076			

Error Correction Variable

The error correction model (C(1)) is both significant and acceptable at 5 percent because it value in negative and lays between 0 and 1. As well as it p-value (0.0062) is less than 0.05, and then the error correction model variable statistically indicates that the model has 32 percent speedy of adjustment.

The F-statistics Test

The probability value of F statistics (0.0000076) is less than 0.05, therefore the overall systemic model is statistically significant at 5 percent level and there exist linear relationship between the independent variables and the dependent variable.

The Adjusted R^2

The adjusted R^2 of 0.7446 indicates that the independent variables in the systemic model jointly explain 75 percent variation in the dependent variable (agricultural gross domestic product) whereas other variables not captured in this model explained 25 percent variations in the dependent variable.

T-statistic test

Specifically, from the systemic model above only Current budgetary expenditure on Agriculture in the previous two years (bagric(-2)), Total employment in the previous three years ((emp(-3)) and dummy variable (-3) were statistically significant at 5 percent. However, current budgetary expenditure on Agriculture in the previous three years (bagric(-3)), agricultural GDP in the previous year (agdp(-1)), agricultural GDP in the previous three years (agdp(-3)) and dummy variable (dv(-3)) in the previous two year were statistically significant at 10 percent.

Aprior Expectations of Significant variables

Dummy variable (dv(-3)) and current budgetary expenditure on agriculture in Nigeria (bagric(-2)) conformed with the expected positive sign. But, total employment (emp(-3)) did not conform with the expected positive sign.

4. Discussion of findings

This study reveals that ACGSF has a positive but insignificant impact on the agricultural domestic production. This could be attributed to the long delay in disbursement of loan to rural farmers. In fact, in most cases when loan are approve, it arrives too late for it to fulfil the purpose for which it was intended (Zakaree, 2014). The total employment in the economy is economy is expected to have a significant positive effect on the domestic production of agricultural produces. The public spending on agriculture have significant effects on the domestic agricultural production, though the time lag is over 12 months. Similar studies carried out in Nigeria (Zakaree, 2014), Indonesia (Armas, Osoro & Blanca) and Bolivia (Cuesta, Edmeades and Madrigal (2011) among others. The significant and positive dummy variable signifies that the introduction of SAP has an impact on agricultural domestic production in Nigeria. The systemic model reveals that the lag three dummy variables are significant and

positive. This implies that the introduction of SAP had significant positive impact of agricultural domestic production in Nigeria

5. Conclusion

This study concludes that publicly supported agricultural interventions in Nigeria had positive and significant effect on agricultural development though the gestation period is not quick. Policy consistency and commitment is required before such intervention can yield the desired results. The review of literature on impacts of publicly supported agricultural interventions supported this conclusion. (Taiwo, 2007).

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