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# AGRICULTURE FINANCING AND PERFORMANCE OF THE AGRICULTURAL SECTOR IN NIGERIA, 1981-2015

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**ABSTRACT**

*This paper investigated the relative effect of government and deposit money bank financing on the Nigeria's agricultural sector performance. The existence of unit root was observed from data available from the Central Bank of Nigeria (CBN). Hence, the results from estimated error correction regression models was adopted. The results showed that while government financing through the agricultural credit guarantee scheme fund (ACGSF) had a significant positive effect on aggregate agricultural output, crop output, and livestock output; government recurrent expenditure on agricultural sector had a significant negative effect on the aggregate agricultural output and crop production output. On the other hand, bank financing proved insignificant in predicting output from the aggregate agricultural sector, and other examined agricultural sub-sectors. Commitment of more effort and funds to the ACGSF as well a deliberate reduction in recurrent expenditure in the agricultural sector is therefore recommended. A change in the attitude of deposit money banks towards the agricultural sector and designing of programmes that are either modelled after the ACGSF or even an upgrade of the ACGSF was also recommended.*

**KEYWORDS**

agricultural credit guaranteed scheme fund (ACGSF), bank credits to the agricultural sector, government a spending on the agricultural sector, aggregate agricultural output.

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## 1. INTRODUCTION

Agriculture is the art and sciences of crop and live stock production. It involves cropping, live stock, foresting, fishing, processing and marketing or agriculture products. In the opinion of Anyanwu et al (1997), agriculture include farming livestock rearing fishing and forestry. The role agriculture plays in a nation's development has been acknowledge since the time of Ricardo (Wilson, 2002). Ihugba, Nwosu and Njoku (2013) asserted the role agriculture can play in the industrial and economic "take off" of a nation. Kuznets (1965) also asserted that agriculture makes the emergence and growth of other sectors feasible. As a sector capable of providing, among others, food for citizens of a nation, foreign exchange through export, and raw materials for industries, Mathew and Mordecai (2016) referred to the agricultural sector as a crucial. Anyanwu et al, (1997) posit that, due to its role as a provider of food and raw materials, agriculture forms the bedrock of economic development of a nation. Hence, a call for policies and programmes aimed at improving the growth and development of the agricultural sector.

The Nigerian agricultural economy is a sub-sector of the nation's aggregate economy. It is known as the sector that produces food and raw materials for consumption, export, and local industries. To facilitate its development, policies are made by government to achieve agricultural economy development goals (Segun, 1996). Banks agricultural credit policies constitute an invaluable avenue through which growth and development of the agricultural sector can be stimulated. The commercial bank (deposit money bank) agricultural credit supply has always fallen short of its demand despite all the enabling environment government has put in place to bridge the gap. This has made most farmers to turn to their second best alternatives, i.e. loans from money lenders for their credit needs. These money lender charge as high as between 50% and 100% interest rate on their capital which in turn affects resource use in the farm. From 1977, government designed and implemented various programs aimed at increasing banks credit supply to agriculture. These include the agricultural credit guaranteed scheme fund (ACGSF), which act as surety for every farmer that received credit from commercial banks to the tune of 75%, cooperative bank, rural banking, agricultural insurance scheme, among others. Some studies have shown that monetary base, cash reserve ratio, liquidity ratio, the price of credit significantly influenced banks credit supply (Ojo, 1978; Balogun and Otu, 1991). Over the years, the performance of financial institutions has altogether not been satisfactory. The process of ensuring that financial resources are allocated to the existing projects in the agricultural sector efficiently has been adjudged cumbersome, time consuming as well as engagement of a number expertise. Banks' credit available to the farmers is often hindered by certain factors like amount of loanable funds and lack of collaterals. The ultimate goal of banks' credit to agricultural sector policies is to see to the appropriate and judicious utilization of agricultural loans by farmers. In an effort to strengthen the banking sector's commitment to the agricultural sector, the CBN implemented the bank consolidation policy starting in the year 2001. Irrespective of this effort and others, non-availability of credit for the growth and development of the agricultural sector is still evident leading low output from the sector. Banks' continuous poor financing of the agricultural sector has had adverse effect on food production in Nigeria. Access to bank credit by farmers has been positively linked to improved productivity in agricultural sector by several studies. Yet this vital input has eluded smallholder farmers in Nigeria. Banks with large loan funds are generally difficult for smallholder farmers to access. Problems with collateral and high interest rates appear to frequently screen out most potential rural smallholder beneficiaries. In addition, agricultural loans are often short-term with fixed repayment periods, a loan structure that is not suitable for annual cropping or livestock production. Therefore, there the need for adequate banking policy that will encourage access to credit by farmers in order to boost investment in agricultural sector and increase food production.

The above scenario makes an investigation into the effect of different financing option on the performance of the agricultural sector in Nigeria a worthwhile exercise. Thus, a comparative analysis of effect of government and bank financing on agricultural sector performance shall constitute the aim of the paper. To achieve the aim, the objectives and hypotheses as stated in the following sections will be achieved and tested.

### 1.1 AIM AND OBJECTIVES

An investigation into the relative impact of financing on agricultural sector performance (measured by output) in Nigeria between 1981 and 2015 was the aim of this study. In specific terms, the paper examined:

i. The relative impact of government and banking sector financing on aggregate agricultural sector output;
ii. The relative impact of government and banking sector financing on crop production output;
iii. The relative impact of government and banking sector financing on fishery production output; and
iv. The relative impact of government and banking sector financing on livestock production output.

### 1.2 HYPOTHESES

**$H0_1$:** Government and banking sector financing has no significant effect on aggregate agricultural output.
**$H0_2$:** Government and banking sector financing has no significant effect on crop output.
**$H0_3$:** Government and banking sector financing has no significant effect on livestock output.
**$0_4$:** Government and banking sector financing has no significant effect on fishery output.

## 2. LITERATURE REVIEW

There exits an avalanche of literature on agricultural sector financing. While theoretical literature provides theoretical explanation on the essence of agricultural financing, empirical literature provides evidence of the effect of agricultural financing on productivity in both multi-country and single country studies.

### 2.1 THEORETICAL REVIEW

**Financial Intermediation Theories**: Schumpeter (1934), Goldsmith (1969), McKinnon (1973), Shaw (1973), Greenwood and Jovanovich (1990), Bencivenga and Smith (1991) have rationalized the role of fund mobilization by financial intermediaries (i.e. intermediation) in production and output. While some authors (Schumpeter, 1934; Goldsmith, 1969; McKinnon, 1973; and Shaw, 1973) made a strong case for financial intermediation as a necessary condition for economic growth, Greenwood and Jovanovich (1990) theorized that rapid growth is premised on financial development. Lastly, Bencivenga and Smith (1991) maintained that a developed banking system accompanied by an efficient mobilization of savings to investors (i.e. financial intermediation) is a necessary and sufficient conditions for economic growth. From the foregoing, a consensus on the role of financial intermediation in productivity and growth exists. Hence, this paper, among others, tested the validity of these theories with focus financial intermediation on agricultural productivity.

### 2.2 EMPIRICAL REVIEW

Banks' credit, from the study of Izhar and Tariq (2009), was not a significant predictor of productivity in India's agricultural sector.

Though they found that it correlated highly with growth in agriculture and manufacturing output, Merdynwati et al (2011) also found that banking sector development contributed very little to aggregate output in the Indonesian economy.

Azeez and Ojo (2010) found a positive but inadequate impact of banking sector reforms on the Nigerian economy.

Akpansung and Babalola (2012) statistically showed that economic growth responded positively to bank credit to the private sector in Nigeria. Moreover, lending rate was found to negatively influence growth in the Nigerian economy.

In a regression model estimated by Obamuyi et al (2012), bank lending rates significantly predicted output from the manufacturing sector.

Bank credit to the private sector, according to Okwo et al (2012), positively predicted growth in Nigeria. An expansionary monetary policy regime that are targeted at real sectors like agriculture was therefore recommended.

Aggregate output from the agricultural sector, from the study of Obilor (2013), responded positively to the Agricultural Credit Guarantee Scheme (ACGS) financing option in Nigeria.

Onoja et al (2012) empirically demonstrated that the increase in agricultural credit supply grew an exponentially in Nigeria as a result of reforms of the financial sector.

In a paper the employed the VAR econometric technique, Udah and Obafemi (2012) stated that the FEVD and IRF results shows that the growth of the economy and output from the agricultural sector were positively explained the development of financial sector as measured by financial sector deepening.

Financing by non-bank financial institutions' (NBFIs) was found by Acha (2012) to predict output from the manufacturing and agricultural significantly in Nigeria.

Onoja and Agumagu (2009) were not satisfied with the role played by deposit money banks and agricultural intervention funds implemented by the government in efforts to improve the performance of the agricultural sector between 1999 and 2006.

Akinyele and Osinubi (2006) established a linkage relationship between bank lending rates, working capital and real sector performance. The authors concluded that increase in lending rate leads to fall in working capital and then poor performance of the agricultural sector.

From an ARDL model estimated, Ikenna (2012) found that financial sector deregulation adversely affected the long run credit allocation to the real sector of the Nigerian economy. Moreover, the author also found that financial liberalization in the short run had a negative insignificant influence on the amount of credit available to the real sector. The study concluded that banks have over the years strong discriminated agriculture sector both in the short and long run.

Using the ordinary least square (OLS) econometric technique, Rhaji and Adeoti (2010) identified, among others factors, low supply of affordable credit as the major contributory factor to the poor contribution of the agricultural sector growth in Nigeria.

In a study that examine how activities in agricultural sector has affected the aggregate output of the Nigerian economy, Ayoola and Oboh (2006) maintained that the *life blood* of every agricultural activity is capital. With credit as a source of capital, the authors concluded that agricultural productivity and efficiency is bound to increase.

Oboh (2008) estimated an error correction credit utilization model for farmers in Benue State. Availability was not found to be a significant determinant utilization of agricultural credit; rather identification and allocation of credit to worthwhile agricultural projects is what counts.

Akintola (2004) examined the role of played by the banking sector in agricultural financing in Nigeria. Banks proved to be an important player in financing of the agriculture sector; as banks provision to the agricultural sector was found to have been on the increase over the years.

Using a panel data on banks in Nigeria, Adekanye (2005) estimated a growth model with bank credits as the explanatory variables. Credits from banks were found to have improved capital investment, productivity, standard of living among farmers.

## 3. METHOD OF STUDY

### 3.1 DATA

The secondary (time series) data used in this paper comprised of annual observations from the period of 1981 to 2015 in Nigeria. Moreover, on the one hand, output from aggregate agricultural sector, crop output, livestock output, and fishery outcome are the selected proxies for agricultural performance. On the other hand, government recurrent expenditure on agricultural, agriculture credit guarantee scheme fund (ACGSF), and bank credit to the agricultural sector financing are the selected proxies for agricultural financing. All data was sourced from the Central Bank of Nigeria Bulletin of the year 2015. Lastly, the study adopted the quasi-experimental research design.

### 3.2 MODEL SPECIFICATION

Thus, the estimated macroeconometric agricultural performance models are specified as follows:

$\log(agric) = \beta_0 + \beta_1 \log(acgsf\_agric) + \beta_2 \log(govtrexp\_agric) + \beta_3 \log(bankcred\_agric) + \varepsilon_t$ 3.1

$\log(crop) = \beta_0 + \beta_1 \log(acgsf\_crop) + \beta_2 \log(govtrexp\_agric) + \beta_3 \log(bankcred\_agric) + \varepsilon_t$ 3.2 $\log(livestock) = \beta_0 + \beta_1 \log(acgsf\_livestock) + \beta_2 \log(govtrexp\_agric) + \beta_3 \log(bankcred\_agric) + \varepsilon_t$ 3.3

$\log(fishery) = \beta_0 + \beta_1 \log(acgsf\_fishery) + \beta_2 \log(govtrexp\_agric) + \beta_3 \log(bankcred\_agric) + \varepsilon_t$ 3.4

Where

Agric = Aggregate Agricultural Sector Output

Crop = Crop Production Output
Livestock = Livestock Production Output
Fishery = Fishery Production Output
Acgsf_agric = Agricultural Credit Guarantee Scheme Fund to the Aggregate Agricultural Sector
Acgsf_crop = Agricultural Credit Guarantee Scheme Fund to Crop Production
Acgsf_livestock = Agricultural Credit Guarantee Scheme Fund to Livestock Production
Acgsf_fishery = Agricultural Credit Guarantee Scheme Fund to Fishery Production
Govtrexp_agric = Government Recurrent Expenditure in the Agricultural Sector
Bankcred_agric = Deposit Money Banks Credit to the Agricultural Sector
$\beta_1$, $\beta_2$, *and* $\beta_3$ = Parameters of the independent variables.
$\beta_0$ and $\varepsilon_t$ = the constant and white noise error terms respectively.
The a priori expectation is that $\beta_1>0$, $\beta_2>0$, *and* $\beta_3>0$.

**3.3 ECONOMETRIC TECHNIQUE**

Since time series are mostly trended (i.e. none mean reversibility), estimations based on the level values of time series are bound to be spurious. Hence, this paper did not find it necessary to estimate an Ordinary Least Square (OLS) regression equation. Therefore, the study first check the stationarity property of each variable by employing the augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) unit root tests. Next, a multivariate Johansen cointegration test (Johansen, 1988; Johansen and Juselius, 1990) is used to analyze the presence of the long-run equilibrium relationship between the time series variables in all four specified models. The conditions (i.e stationarity of variables and at least one cointegrating equation) for estimating an error correction model must thus be satisfied.

## 4. RESULTS AND ANALYSIS

**4.1 UNIT ROOT TEST**

**TABLE 1: ADF TEST RESULTS AT LEVELS**

| Variables | ADF Stat. | 5% Critical Value | Decision |
|---|---|---|---|
| Aggregate Agricultural Output [ log(agric)] | -2.07 | -3.55 | Non-stationary |
| Crop Output [log(crop)] | -2.21 | -3.55 | Non-stationary |
| Livestock Output [log(livestock)] | -0.86 | -3.55 | Non-stationary |
| Fishery Output [log(fishery)] | -1.88 | -3.55 | Non-stationary |
| ACGSF to Aggregate Agricultural Sector [log(acgsf_agric)] | -2.50 | -3.55 | Non-stationary |
| ACGSF to Crop Production [log(acgsf_crop)] | -2.30 | -3.55 | Non-stationary |
| ACGSF to Livestock Production [log(acgsf_livestock)] | -2.10 | -3.55 | Non-stationary |
| ACGSF to Fishery Production [log(acgsf_fishery)] | -3.28 | -3.55 | Non-stationary |
| Government Recurrent Expenditure on the Agricultural sector [log(govtrexp_agric)] | -2.34 | -3.55 | Non-stationary |
| Deposit Money Banks Credit to the Agricultural sector [log(bankcred_agric)] | 2.69 | -1.95 | Non-stationary |

Source: Authors' computation

**TABLE 2: ADF TEST RESULTS AT 1st DIFFERENCE**

| Variables | ADF Stat. | 5% Critical Value | Decision |
|---|---|---|---|
| Aggregate Agricultural Output [ log(agric)] | -5.62 | -3.55 | Stationary |
| Crop Output [log(crop)] | -5.60 | -3.55 | Stationary |
| Livestock Output [log(livestock)] | -4.27 | -3.55 | Stationary |
| Fishery Output [log(fishery)] | -8.48 | -3.55 | Stationary |
| ACGSF to Aggregate Agricultural Sector [log(acgsf_agric)] | -6.01 | -3.55 | Stationary |
| ACGSF to Crop Production [log(acgsf_crop)] | -5.89 | -3.55 | Stationary |
| ACGSF to Livestock Production [log(acgsf_livestock)] | -4.92 | -3.55 | Stationary |
| ACGSF to Fishery Production [log(acgsf_fishery)] | -9.16 | -3.55 | Stationary |
| Government Recurrent Expenditure on the Agricultural sector [log(govtrexp_agric)] | -6.52 | -3.55 | Stationary |
| Deposit Money Banks Credit to the Agricultural sector [log(bankcred_agric)] | -4.53 | -3.55 | Stationary |

Source: Authors' computation

The unit root test results for the time series are shown in Tables 1 and 2. The results in Table 1 shows that the macroeconometric time series are all not -stationary at levels. This conclusion was reached because the absolute ADF statistics are less than the absolute values of the 5% test critical values. This confirms our earlier position of non-stationary of time series at levels. Moreover, the results presented in Table 2 shows that the macroeconometric time series were all stationary after differencing once since the absolute ADF statistics are greater than the absolute values of the 5% test critical values. The time series are hence integrated of order one [i.e. I(1)]. The most desirable situation or result is therefore the case here (Asteriou and Hall, 2007). Next is the Johansen co-integration test as shown in the next section.

**4.2 COINTEGRATION TESTS**

The trace statistics shows that the hypothesis of no cointegration, $H_0$, among the variables can be rejected. The results as shown in Tables 3, 4, 5, and 6 revealed the existence of three, three, two, and one cointegrating vectors respectively. This conclusion was reached because the trace test statistics for all the significant VAR equations are greater than the 5% critical values. The existence of more than the least required on cointegrating equations confirms that a long run relationship exists among the time series in the four models. It also implies that the study can proceed to estimating the Error Correction Models.

**TABLE 3: COINTEGRATION TEST RESULT FOR TIME SERIES IN THE AGGREGATE AGRICULTURAL OUTPUT MODEL**

| Trace Test k = 4 | | | | Maximum Eigenvalue Test k = 4 | | | |
|---|---|---|---|---|---|---|---|
| $H_0$ | $H_A$ | (λ Trace) | 5% Critical Value | $H_0$ | $H_A$ | (Max. Engen) | 5% Critical Value |
| r≤0 | r>0 | 85.01* | 47.86 | r≤0 | r>0 | 49.27* | 27.58 |
| r≤1 | r>1 | 35.74* | 29.80 | r≤1 | r>1 | 18.35* | 21.13 |
| r≤2 | r>2 | 17.39* | 15.50 | r≤2 | r>2 | 16.18* | 14.26 |
| r≤3 | r>3 | 1.21 | 3.84 | r≤3 | r>3 | 1.21 | 3.84 |

Note: r represents the number of Cointegration vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of the null hypothesis at the 5% level

**TABLE 4: COINTEGRATION TEST RESULT FOR TIME SERIES IN THE CROP OUTPUT MODEL**

| Trace Test k = 4 | | | | Maximum Eigenvalue Test k = 4 | | | |
|---|---|---|---|---|---|---|---|
| $H_0$ | $H_A$ | (λ Trace) | 5% Critical Value | $H_0$ | $H_A$ | (Max. Engen) | 5% Critical Value |
| r≤0 | r>0 | 118.56* | 47.86 | r≤0 | r>0 | 73.96* | 27.58 |
| r≤1 | r>1 | 44.61* | 29.80 | r≤1 | r>1 | 25.19* | 21.13 |
| r≤2 | r>2 | 19.42* | 15.50 | r≤2 | r>2 | 17.42* | 14.26 |
| r≤3 | r>3 | 2.00 | 3.84 | r≤3 | r>3 | 2.00 | 3.84 |

Note: r represents the number of Cointegration vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of the null hypothesis at the 5% level

**TABLE 5: COINTEGRATION TEST RESULT FOR TIME SERIES IN THE LIVESTOCK OUTPUT MODEL**

| Trace Test k = 4 | | | | Maximum Eigenvalue Test k = 4 | | | |
|---|---|---|---|---|---|---|---|
| $H_0$ | $H_A$ | (λ Trace) | 5% Critical Value | $H_0$ | $H_A$ | (Max. Engen) | 5% Critical Value |
| r≤0 | r>0 | 107.40* | 47.86 | r≤0 | r>0 | 68.86* | 27.58 |
| r≤1 | r>1 | 38.53* | 29.80 | r≤1 | r>1 | 24.50* | 21.13 |
| r≤2 | r>2 | 14.03 | 15.50 | r≤2 | r>2 | 12.27 | 14.26 |
| r≤3 | r>3 | 1.98 | 3.84 | r≤3 | r>3 | 1.98 | 3.84 |

Note: r represents the number of Cointegration vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of the null hypothesis at the 5% level

**TABLE 6: COINTEGRATION TEST RESULT FOR TIME SERIES IN THE FISHERY OUTPUT MODEL**

| Trace Test k = 2 | | | | Maximum Eigenvalue Test k = 2 | | | |
|---|---|---|---|---|---|---|---|
| $H_0$ | $H_A$ | (λ Trace) | 5% Critical Value | $H_0$ | $H_A$ | (Max. Engen) | 5% Critical Value |
| r≤0 | r>0 | 54.31* | 47.86 | r≤0 | r>0 | 32.61* | 27.58 |
| r≤1 | r>1 | 21.70 | 29.80 | r≤1 | r>1 | 14.09 | 21.13 |
| r≤2 | r>2 | 7.61 | 15.50 | r≤2 | r>2 | 5.68 | 14.26 |
| r≤3 | r>3 | 1.93 | 3.84 | r≤3 | r>3 | 1.93 | 3.84 |

Note: r represents the number of Cointegration vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of the null hypothesis at the 5% level

**4.3 ERROR CORRECTION MECHANISM**

First, the Durbin-Watson (i.e DW) statistics and coefficient of determination (i.e. $R^2$) statistics for the estimated aggregate agriculture output model result presented in Tables 7 below are of 1.97 and 0.58 respectively. This proved that the aggregate agricultural output model is not spurious and thus adequate for interpretation. Next, total ACGSF and two year lag of government recurrent expenditure in the agricultural sector were statistically significant at 5% and 1% level respectively. Moreover, from the signs of the coefficients we saw that a unit increase in total ACGSF led to a 0.07% increase in aggregate agricultural sector output. Again, a unit increase in government recurrent expenditure to the agricultural sector led to 0.05% decrease in aggregate agricultural sector output. The entire aggregate agricultural output model is also statistically significant (since the F-statistics of 3.42 is statistically significant at 1%). The negative sign of the ECM coefficient shows that the model adjusted from short-run disequilibrium to long-run equilibrium dynamics at a speed of 51%.

**TABLE 7: AGGREGATE AGRICULTURAL SECTOR OUTPUT MODEL**

| Variables | Coefficients | T-statistics | Probability |
|---|---|---|---|
| C | 0.07 | 2.77 | 0.01 |
| DLOG(AGRIC(-1)) | 0.14 | 0.89 | 0.39 |
| DLOG(AGRIC(-2)) | -0.05 | -0.31 | 0.76 |
| DLOG(ACGSF_AGRIC) | 0.07** | 2.46 | 0.02 |
| DLOG(ACGSF_AGRIC(-1)) | -0.05 | -1.37 | 0.19 |
| DLOG(GOVTREXP_AGRIC) | -0.02 | -1.21 | 0.24 |
| DLOG(GOVTREXP_AGRIC(-1)) | -0.02 | -1.20 | 0.24 |
| DLOG(GOVTREXP_AGRIC(-2)) | -0.05*** | -3.42 | 0.00 |
| DLOG(BANKCRED_AGRIC) | 0.01 | 0.29 | 0.78 |
| ECM(-1) | -0.51*** | -3.05 | 0.01 |
| $R^2$ = 0.58 \| F-statistics= 3.42*** \| DW = 1.97 | | | |

Source: Authors' Computation

*, **, *** implies significance at 10%, 5%, and 1% respectively.

**TABLE 8: CROP OUTPUT MODEL**

| Variables | Coefficients | T-statistics | Probability |
|---|---|---|---|
| C | 0.10*** | 3.86 | 0.00 |
| DLOG(CROP(-1)) | 0.03 | 0.22 | 0.83 |
| DLOG(CROP(-2)) | -0.15 | -1.05 | 0.30 |
| DLOG(ACGSF_CROP) | 0.07** | 2.41 | 0.03 |
| DLOG(ACGSF_CROP(-1)) | -0.02 | -0.68 | 0.50 |
| DLOG(GOVTREXP_AGRIC) | -0.04* | -1.79 | 0.09 |
| DLOG(GOVTREXP_AGRIC(-1)) | -0.03 | -1.68 | 0.11 |
| DLOG(GOVTREXP_AGRIC(-2)) | -0.07*** | -4.02 | 0.00 |
| DLOG(BANKCRED_AGRIC(-2)) | -0.04 | -0.83 | 0.42 |
| ECM(-1) | -0.28** | -2.40 | 0.03 |
| $R^2$ = 0.56 \| F-statistics= 3.08*** \| DW = 1.99 | | | |

Source: Authors' Computation

*, **, *** implies significance at 10%, 5%, and 1% respectively.

First, the Durbin-Watson (i.e DW) statistics and coefficient of determination (i.e. $R^2$) statistics for the estimated crop output model result presented in Tables 8 above are 1.99 and 0.56 respectively. This proved that the crop output model is not spurious and thus adequate for interpretation. Next, ACGSF to crop production and two year lag of government recurrent expenditure in the agricultural sector were statistically significant at 5% and 1% level respectively. The signs and magnitude of the coefficients shows that a one unit increase in ACGSF to crop production led to a 0.07% increase in crop production output between 1981 and 2015. Again, a unit increase in government recurrent expenditure to the agricultural sector led to 0.07% decrease in crop production output between 1981 and 2015. The entire crop production output model is also statistically significant (since the F-statistics of 3.08 is statistically significant at 1%). The negative sign of the ECM coefficient and magnitude confirms that the model adjusted from short-run disequilibrium to long-run equilibrium dynamics at a speed of 28%.

**TABLE 9: LIVESTOCK OUTPUT MODEL**

| Variables | Coefficients | T-statistics | Probability |
|---|---|---|---|
| C | 0.01 | 1.21 | 0.24 |
| DLOG(LIVESTOCK(-1)) | 0.15 | 0.94 | 0.36 |
| DLOG(LIVESTOCK(-2)) | 0.24 | 1.48 | 0.15 |
| DLOG(ACGSF_LIVESTOCK) | 0.01 | 1.456 | 0.16 |
| DLOG(ACGSF_LIVESTOCK(-2)) | 0.03** | 2.18 | 0.04 |
| DLOG(GOVTREXP_AGRIC) | 0.01 | 0.99 | 0.33 |
| DLOG(GOVTREXP_AGRIC(-2)) | 0.01 | 0.89 | 0.38 |
| DLOG(BANKCRED_AGRIC) | -0.03 | -1.25 | 0.23 |
| DLOG(BANKCRED_AGRIC(-2)) | 0.02 | 0.87 | 0.39 |
| ECM(-1) | -0.01 | -0.05 | 0.96 |
| $R^2$ = 0.47 \| F-statistics= 2.15* \| DW = 1.80 | | | |

Source: Authors' Computation

*, **, *** implies significance at 10%, 5%, and 1% respectively.

First, the Durbin-Watson (i.e DW) statistics and coefficient of determination (i.e. $R^2$) statistics for the estimated livestock output model result presented in Tables 9 above are 1.99 and 0.47 respectively. 47% of the variation in livestock production was accounted for by the explanatory variables as the DW statistics is also close to 2. The preceding proved that the livestock output model is not spurious and thus adequate for interpretation. Next, only two year lag of ACGSF to livestock production was statistically significant at 5%. The sign and magnitude of the coefficient shows that a one unit increase in two year lag of ACGSF to livestock production led to a 0.03% increase in crop production output between 1981 and 2015. The entire crop production output model is also fairly statistically significant (since the F-statistics of 2.15 is statistically significant at 10%). The negative sign of the ECM coefficient and magnitude confirms that the model adjusted from short-run disequilibrium to long-run equilibrium dynamics at a speed of 1%.

The Durbin-Watson (i.e DW) statistics and coefficient of determination (i.e. $R^2$) statistics for the estimated fishery output model result presented in Tables 10 below are 2.15 and 0.57 respectively. Thus, 57% of the variation in fishery production was accounted for by the explanatory variables as the DW statistics is also approximately 2. The preceding proved that the fishery output model is not spurious and thus adequate for interpretation. Though none of the explanatory variables was statistically significant, the entire fishery production output model is statistically significant (since the F-statistics of 2.68 is statistically significant at 5%). The explanatory variables all combined significantly to influence fishery production output. The negative sign of the ECM coefficient and magnitude confirms that the model adjusted from short-run disequilibrium to long-run equilibrium dynamics at a speed of 69%.

**TABLE 10: FISHERY OUTPUT MODEL**

| Variables | Coefficients | T-statistics | Probability |
|---|---|---|---|
| C | 0.07 | 1.38 | 0.18 |
| DLOG(FISHERY(-1)) | 0.35 | 2.43 | 0.03 |
| DLOG(FISHERY(-2)) | 0.31 | 1.84 | 0.08 |
| DLOG(ACGSF_FISHERY) | 0.01 | 0.38 | 0.71 |
| DLOG(ACGSF_FISHERY(-1)) | -0.03 | -0.98 | 0.34 |
| DLOG(ACGSF_FISHERY(-2)) | -0.03 | -1.07 | 0.30 |
| DLOG(GOVTREXP_AGRIC) | -0.04 | -1.11 | 0.28 |
| DLOG(GOVTREXP_AGRIC(-1)) | -0.04 | -1.05 | 0.31 |
| DLOG(BANKCRED_AGRIC(-1)) | -0.13 | -1.21 | 0.24 |
| DLOG(BANKCRED_AGRIC(-2)) | -0.09 | -0.90 | 0.38 |
| ECM(-1) | -0.69 | -4.41 | 0.00 |
| $R^2$ = 0.57 \| F-statistics= 2.68** \| DW = 2.15 | | | |

Source: Authors' Computation

*, **, *** implies significance at 10%, 5%, and 1% respectively.

## 5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

The results so far shows that the agricultural credit guarantee scheme fund (ACGSF) was the only agricultural sector financing fund that has positively and significantly influenced aggregate output from the agricultural sector. Though financing through government recurrent expenditure on the agricultural sector was a significant predictor of the performance of the aggregate agricultural sector, its influence on the aggregate agricultural sector was negative. When the results of estimated agricultural sub-sectors of crop, livestock, and fishery were analysed, some interesting findings were also made. First, it was found that the ACGSF had the same direction and magnitude of impact on crop production output as it does on the aggregate agricultural sector output. Again, government recurrent expenditure on the agricultural sector had a negative and significant impact on crop production output. Secondly, though the magnitude of its impact was less than what was observed in the crop sub-sector, ACGSF also had a positive and significant impact on livestock production as well. Moreover, the result shows that the impact of ACGSF in the livestock sub-sector only became evident in the longrun (i.e. two year lag period). This may not be unconnected to the nature of production associated with the livestock sub-sector. Lastly, the result shows that the fishery sub-sector was not significantly influenced by any of the financing options available.

This paper concludes that ACGSF, among other financing options, is a potent agricultural financing option in Nigeria. Also, this paper considers the performance of the crop sub-sector identical to the aggregate agricultural sector output due to its dominance in the agricultural sector. Hence the performance of the crop sub-sector determines the performance of the aggregate agricultural sector output. Moreover, increasing government recurrent expenditures to the agricultural sector (which includes salaries and others) has proven to be a bad fiscal policy. An expansionary fiscal policy that is more tilted toward capital expenditure and capital investment (as evident in the impact of ACGSF on the aggregate agricultural output, crop production output, and livestock production output) would be a step in the right direction. Finally, deposit money banks are yet to change their attitude towards the agricultural sector as they have continued to favour the oil and gas and manufacturing sector in their credit disbursement. This trend portends grave danger for food security and export of agricultural products.

As a way of recommendation, the Nigerian government should commit more effort and funds to the ACGSF. Again, a contractionary fiscal policy should be implemented when it comes recurrent expenditure in the agricultural sector. Lastly, deposit money banks should be mandated, by appropriate authorities, to increase credit to the agricultural sector. Deposit money banks should change their attitude towards the agricultural sector and design programmes that are either modelled after the ACGSF or even an upgrade of the ACGSF.

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**ANNEXURE**

**TABLE 11**

| Year | Aggregate Agri-culture Sector Output (N B) | Crop Pro-duction Output (N B) | Livestock Production Output (N B) | Fishery Produc-tion Out-put (N B) | ACGSF to the Agri-cultural Sector (N B) | ACGSF to Crop Pro-duction (N B) | ACGSF to Livestock Produc-tion (N B) | ACGSF to Fishery Production (N B) | Government Recurrent Ex-penditure on Agriculture (N B) | Bank Credit to Agriculture (N B) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | 2,364.37 | 1,854.76 | 341.41 | 90.3 | 0.04 | 0.008 | 0.025 | | 0.01 | 0.60 |
| 1982 | 2,425.96 | 1,897.08 | 361.12 | 93.86 | 0.03 | 0.006 | 0.022 | 0.00004 | 0.01 | 0.80 |
| 1983 | 2,409.08 | 1,842.70 | 393.13 | 97.96 | 0.04 | 0.009 | 0.022 | 0.00158 | 0.01 | 0.90 |
| 1984 | 2,303.51 | 1,759.12 | 399.69 | 68.01 | 0.02 | 0.004 | 0.012 | 0.00083 | 0.02 | 1.10 |
| 1985 | 2,731.06 | 2,180.91 | 428.1 | 43.97 | 0.04 | 0.015 | 0.014 | 0.00072 | 0.02 | 1.30 |
| 1986 | 2,986.84 | 2,427.10 | 421.63 | 51.51 | 0.07 | 0.036 | 0.026 | 0.00164 | 0.02 | 1.80 |
| 1987 | 2,891.67 | 2,330.00 | 433.43 | 40.65 | 0.10 | 0.064 | 0.029 | 0.00453 | 0.05 | 2.40 |
| 1988 | 3,174.57 | 2,581.60 | 444.27 | 59.79 | 0.12 | 0.090 | 0.018 | 0.00454 | 0.08 | 3.10 |
| 1989 | 3,325.95 | 2,710.67 | 453.16 | 94.81 | 0.13 | 0.111 | 0.008 | 0.00454 | 0.15 | 3.50 |
| 1990 | 3,464.72 | 2,828.59 | 462.22 | 101.29 | 0.10 | 0.084 | 0.005 | 0.00390 | 0.26 | 4.20 |
| 1991 | 3,590.84 | 2,955.88 | 454.82 | 105.35 | 0.08 | 0.070 | 0.004 | 0.00170 | 0.21 | 5.00 |
| 1992 | 3,674.79 | 3,044.55 | 458.92 | 94.81 | 0.09 | 0.081 | 0.006 | 0.00104 | 0.46 | 7.00 |
| 1993 | 3,743.67 | 3,132.84 | 461.67 | 71.11 | 0.08 | 0.072 | 0.006 | 0.00043 | 1.8 | 10.80 |
| 1994 | 3,839.68 | 3,226.83 | 466.29 | 66.49 | 0.10 | 0.088 | 0.011 | 0.00244 | 1.18 | 17.80 |
| 1995 | 3,977.38 | 3,336.54 | 485.87 | 73.14 | 0.16 | 0.132 | 0.018 | 0.00151 | 1.51 | 25.30 |
| 1996 | 4,133.55 | 3,463.00 | 499.96 | 88.35 | 0.23 | 0.185 | 0.028 | 0.00215 | 1.59 | 33.30 |
| 1997 | 4,305.68 | 3,611.91 | 512.46 | 98.33 | 0.24 | 0.201 | 0.023 | 0.00355 | 2.06 | 27.90 |
| 1998 | 4,475.24 | 3,752.77 | 526.3 | 112.2 | 0.22 | 0.182 | 0.023 | 0.00346 | 2.89 | 27.20 |
| 1999 | 4,703.64 | 3,949.42 | 541.03 | 128.12 | 0.24 | 0.209 | 0.012 | 0.00618 | 59.32 | 31.00 |
| 2000 | 4,840.97 | 4,067.90 | 553.48 | 133.25 | 0.36 | 0.309 | 0.027 | 0.00090 | 6.34 | 41.00 |
| 2001 | 5,024.54 | 4,222.48 | 570.08 | 143.91 | 0.73 | 0.623 | 0.060 | 0.01574 | 7.06 | 55.80 |
| 2002 | 7,817.08 | 6,977.88 | 597.5 | 153.02 | 1.05 | 0.939 | 0.064 | 0.01207 | 9.99 | 59.80 |
| 2003 | 8,364.83 | 7,493.02 | 622.56 | 159.23 | 1.15 | 1.026 | 0.100 | 0.01305 | 7.54 | 62.10 |
| 2004 | 8,888.57 | 7,956.66 | 663.03 | 173.02 | 2.08 | 1.826 | 0.190 | 0.01824 | 11.26 | 67.70 |
| 2005 | 9,516.99 | 8,524.15 | 707.87 | 183.43 | 9.37 | 8.194 | 0.845 | 0.26220 | 16.33 | 48.60 |
| 2006 | 10,222.47 | 9,162.65 | 756.73 | 195.43 | 4.20 | 3.703 | 0.368 | 0.11440 | 17.92 | 49.40 |
| 2007 | 10,958.47 | 9,826.77 | 809.16 | 208.29 | 4.09 | 3.576 | 0.353 | 0.14069 | 32.48 | 149.60 |
| 2008 | 11,645.37 | 10,437.99 | 864.19 | 221.97 | 6.50 | 4.966 | 1.108 | 0.36863 | 65.4 | 106.40 |
| 2009 | 12,330.33 | 11,046.16 | 920.2 | 235.66 | 8.33 | 5.795 | 1.726 | 0.70862 | 22.44 | 135.70 |
| 2010 | 13,048.89 | 11,683.90 | 979.56 | 249.71 | 7.84 | 5.295 | 1.305 | 0.46113 | 28.22 | 128.40 |
| 2011 | 13,429.38 | 12,017.19 | 999.4 | 270.32 | 10.03 | 6.766 | 1.878 | 0.58967 | 41.2 | 255.20 |
| 2012 | 14,329.71 | 12,919.54 | 972.76 | 291.31 | 9.33 | 6.388 | 1.878 | 0.37831 | 33.3 | 316.40 |
| 2013 | 14,750.52 | 13,247.80 | 1,030.94 | 317.47 | 9.26 | 5.811 | 1.883 | 0.37140 | 39.43 | 343.70 |
| 2014 | 15,380.39 | 13,793.45 | 1,086.85 | 338.75 | 12.46 | 7.459 | 2.342 | 0.45343 | 36.7 | 478.90 |
| 2015 | 15,952.22 | 14,274.94 | 1,151.32 | 358.7 | 10.86 | 7.259 | 1.444 | 0.48509 | 41.27 | 449.30 |

Source: CBN Statistical Bulletin, 2015

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With sincere regards

Thanking you profoundly

**Academically yours**

Sd/-
**Co-ordinator**

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