*International Journal of Finance, Insurance and Risk Management*
*Volume X, Issue 2, 2020*

*pp. 34-43*

# Agricultural Financing and Agricultural Output Growth in Developing Economies: Any Causal Linkage in Nigeria?

*Submitted 20/02/20, 1st revision 25/03/20, 2nd revision 13/0/20, accepted 08/05/20*

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***Abstract:***

***Purpose:*** *In many developing countries, the agricultural sector has been seen as a major sector that should drive economic development and industrialization because of its importance in the provision of food for the increasing population, the supply of raw material to the growing industrial sector, generation of foreign exchange earnings, creation of employment opportunities, and provision of market for the product of the industrial sector. This study therefore investigates the causal linkage between agricultural financing and agricultural output growth in Nigeria.*
***Design/Methodology/Approach:*** *The data were mainly sourced from Central Bank of Nigeria statistical bulletins and World Bank Economic Indicators and the study adopted the Pairwise Granger Causality test.*
***Findings:*** *The result showed that there was no causal linkage between agricultural financing and agricultural output growth within the period under review.*
***Practical Implications:*** *With these findings it is therefore imperative for Nigeria to take more careful look into why agricultural financing has not made significant impact on agricultural output growth. There should exist massive education and enlightenment of farmers to know the different sources of agricultural financing available. When such funds are accessed, it should be properly monitored to ensure efficient utilization in order to increase agricultural output.*
***Originality/Value:*** *The study adds to literature on agricultural financing in Nigeria and it has serious implications for agricultural output growth and other areas of the economy. The findings of this study is novel and it is a pointer to the government to more proactive in ensuring that the agricultural sector is well financed and monitored in order to increase agricultural productivity.*

***Keywords:*** *Agricultural financing, agricultural output growth, causality.*

***JEL codes:*** *E24, J21, J43, O13, Q13, Q14.*

***Paper Type:*** *Research Article.*

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## 1. Introduction

In many developing countries, the agricultural sector has been seen as a major sector that should drive economic development and industrialization because of its importance in the provision of food for the increasing population, the supply of raw material to the growing industrial sector, generation of foreign exchange earnings, creation of employment opportunities, and provision of market for the product of the industrial sector (World Bank, 2016). Nigeria, a developing economy is endowed with large expanse of arable land and favourable climate for agriculture. As in 1990 the estimated arable land was 81 million hectares out of the Nigerian total land of 91 hectares of which 18 million hectares of this land was classified as permanent pasture for livestock production. This enables the production of a wide variety of crops, livestock, forestry and fishery products (Ewatan, Urhie, Fakile and Oduntan, 2017).

Agriculture has linkage with other productive sectors such as the manufacturing sector and it has a high potential of generating employment for the different forms of skilled and unskilled labour that constitute the labour force. Agricultural products have been recognized to have industrial value and great export potential, increase farmers' income and many other economic agents involved in the processing and marketing of agricultural produce. Agricultural products serve as major raw materials for industries and non-oil foreign exchange earnings for the nation. Food items and even some cosmetic products that are usually imported such as sardine and coconut oil can be manufactured in Nigeria through the processing of agricultural commodities thereby increasing output and generating more employment opportunities in the country (Orji, Ogbuabor, Okeke and Anthony-Orji, 2019).

In Nigeria, there are numerous opportunities that are yet to be fully exploited and these opportunities have a great potential of generating employment in the agricultural sector. Such opportunities include agricultural production, processing, storage and marketing, agricultural input production and supply, agricultural business management and agricultural research amongst many others. Exploiting all these opportunities in the agricultural sector will promote increased commercialization and generate higher income for those engaged in small scale farming as well as large scale agro based industries (Olukunle, 2013). Adequate financing and proper management of funds are important for successful exploitation of these opportunities. Inadequate financing and lack of proper management has been identified as a major cause of the low performance of the Nigerian agricultural sector (Orji, Ogbuabor, and Umesiobi, 2014).

Currently in Nigeria, a high proportion of those engaged in agricultural practices are rural dwellers with low level of education, these rural dwellers make up about half of the Nigerian population, yet rural poverty is on increase. These rural dwellers find it very difficult to access useful information and credit facilities so as to acquire the necessary inputs needed to increase output. The lack of necessary inputs such as

improved seedlings, pesticides, fertilizers, farm implements and land reduces farmers' expected output, income and hinders other members of the workforce from engaging in agricultural activities (Daveze, 2000).

The Nigerian government has over the years implemented many financing policies so as to improve the performance of the agricultural sector by making credit accessible to the rural farmers but these policies have not attained their objective of significantly enhancing the development of the agricultural sector and generating employment opportunities because the credit institutions require from farmers to have acceptable collateral before they can be granted credit and many of the farmers are rural dwellers who lack property rights, making it impossible for them to access credit. Again, over the years, the federal government's budgetary allocation to agriculture falls short of the implemented policies when compared to total budget. For instance, during the first, second and third development plan periods (1962-1980), the federal government budgeted ₦3.57 billion but only ₦2.41 was actually released to the agricultural sector (Federal Department of Agriculture, National Development Plan, 1992). It was shown in that record that in the first Plan, 11.6 percent of the budget was allocated to agriculture but only 9.8 percent was released CBN, 2014).

The high cost to the financial sector for giving loans to these farmers, the high risk involved in agriculture and the frequent low returns has made it difficult for farmers and potential farmers to access the credit facilities made available by these financing policies (Chigbu, 2004). Again, the interest rate charge on agricultural bank loan is usually very high and this makes the farmers a neglected group in the economy due to their inability to secure bank loans. These financial challenges facing farmers and potential farmers have adverse effects on agricultural production and consequently, its potential of generating employment and increasing farmers' income. Against on this background, the objective of this study is to determine the direction of causality between agricultural financing and agricultural output growth in Nigeria.

The rest of the paper is structured as follows; section 3 is on the review of empirical literature, while section 3 dwells on the methodology. The results are presented and discussed in section 4, while section 5 concludes the study and makes some vital policy recommendations.

## 2. Literature Review

The majority of the existing literature on agricultural financing in Nigeria investigates its effect on agricultural productivity or employment or economic growth as a whole. However, there is a dearth of empirical studies examining the direction of causality between agricultural financing and agricultural output growth. For example, Donnellan and Hanrahan (2016) used the Eurostat data to examine output and employment growth in primary agriculture and food processing sector in the European Union. The researchers compared the performances of the primary

agriculture and food processing of different European Union member states. Their findings showed that the agriculture and food processing sector has experienced output growth across the European Union, however even with this growth, employment has continued to decline in the sector.

Cervantes-Godoy and Dewbre (2010) investigated the economic importance of agriculture for poverty reduction. The researchers compared a highly diverse mix of twenty-five developing countries across the world which have experienced extraordinary success in reducing poverty within a period of twenty-five years. Time-series and cross-sectional regression analysis were used and the findings revealed that even though general economic growth was what led to the poverty reduction, the growth in the agricultural incomes was especially important in reducing poverty in all the twenty-five countries examined.

Domestically, Eze *et al.* (2010) examined the agricultural financing policies of the Nigerian Government and the effects on rural development. The study used the CBN statistical bulletin and annual report to study the pattern of budgetary allocation to agriculture and the contribution of agriculture to Gross Domestic Product. Their study ascertained that although serious effort has been made through the establishment of good agricultural institutions, programs and schemes, the government has not been able to support these policies with sufficient allocation of budgets and financing. Their analysis revealed that corruption in the implementation of the policies has made it difficult for the policies to be effective. Adetiloye (2012) examined agricultural financing in Nigeria by assessing the Agricultural Credit Guarantee Scheme Fund (ACGSF) for food security in Nigeria. The researcher used t test of assess the effect of agricultural credit on output and found credits to be statistically significant to the agricultural sector but it has not been growing relative to the economy.

Famogbiele (2013) examined the challenges of agricultural finance in Nigeria and the basic constraints to sustainable agricultural and economic revival. In the analysis, the researcher employed secondary data from CBN in examining the trend pattern between agricultural financing schemes overtime and its impact on agricultural productivity. The researcher did not find such evidences from the various policies/schemes implemented in Nigeria. The researcher therefore concluded that to reap the benefits of agricultural financing goes beyond mere financing, since finance is one factor of production which is independent on other factors. Therefore, consistency in policy, other structure like commodity markets, insurance policy and proper implementation process is necessary.

Ogbalubi and Wokocha (2013) examined agricultural development and employment generation in Nigeria. The researchers obtained data from the Federal Office of Statistics and the Central Bank of Nigeria. Their findings revealed that most public policies have been made towards food security and provision of agricultural raw

materials to the manufacturing sector so as to create more employment opportunities and income, however, the results from these policies are yet to be discovered.

Bernard and Adenuga (2017), employed error correction model and Granger causality test to examine the contribution of the agricultural sector to employment generation in Nigeria. The result from their findings showed that over the years the agricultural sector contributes significantly to employment generation in Nigeria.

Ogbeide (2016), conducted a study in three Local Government Areas in Edo State, Nigeria on the progress of the agricultural employment intervention programs to reduce unemployed youths. Data was generated through qualitative research by carrying out focused group discussion. The analysis and interpretation of the results was positive recommending further application of the agricultural employment intervention program.

Oni (2013), in his study on the challenges and prospects of Agriculture in Nigeria, studied the trends in Nigerian agricultural sector for over three decades and concluded that the major challenges hindering the Nigerian agricultural sector from maximizing its potentials include marketing problem, infrastructure inadequacies, and unstable input and output prices.

Oyakhilomen and Zibah (2014), tested the implication of agricultural production and economic growth on rural poverty alleviation in Nigeria. They analyzed the time series data using unit root tests and bounds (ARDL) testing approach. Their result showed that agricultural production was significant in stimulating the economic growth, but despite the increase in economic growth, poverty has continued to increase in Nigeria.

Agbada (2015) examined agricultural financing and optimizing output for sustainable development in Nigeria. The researcher used the government secured Agricultural Credit Guarantee Scheme (ACGS) funds as proxy for agricultural finance. Data was sourced from the CBN statistical bulletin, multiple regression technique was used to analyze the data, the results indicated that there exists a positive relationship between Agricultural Credit Guarantee Scheme funds and output growth in Nigeria, however, the trends from the graph suggested that agricultural sector contribution to GDP growth was insignificant during the time period studied. The researcher's conclusion was therefore, that a positive but insignificant relationship existed between agricultural financing and output growth.

Conclusively, the bulk of existing literature on agricultural financing in Nigeria focused on the effects of agricultural financing or agricultural credit on economic growth as a whole or on agricultural productivity only. There is a dearth of empirical evidence on the direction of causality between agricultural financing and agricultural output in Nigeria. This is the gap this current study intends to fill.

## 3. Methodology

The model adopted in this study is the Pairwise Granger Causality Model and it helps us to evaluate the causal relationship between agricultural financing and agricultural output growth. The natural log of each variable of interest is used. Following Granger (1969), the model for the causality test is specified as in equation 3.1 and 3.2.

$$lnAGFN_t = \sum_{i=1}^{k} \alpha_{1i} lnAGFN_{t-i} + \sum_{i=1}^{k} \alpha_{2i} ln\,AGOG_{t-i} + \mathcal{E}_{1t} ------(3.1)$$

$$lnAGOG_t = \sum_{i=1}^{k} \beta_{1i} lnAGOG_{t-i} + \sum_{i=1}^{k} \beta_{2i} lnAGFN_{t-i} + \mathcal{E}_{2t} ------(3.2)$$

where:
*AGFN* = Agricultural financing, measured as government's expenditure in funding agriculture.
*AGOG* = Agricultural Output Growth. That is, the increase in the annual output of the agricultural sector.
$\alpha_1, \alpha_2, \beta_1, \beta_2$ are parameters; *ln* represents natural logarithms; $\mathcal{E}_{1t}$ and $\mathcal{E}_{2t}$ are residuals which are assumed to be normally distributed and white noise. K denotes the optimal lag length. This is determined by the usual information criteria such as Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) because of its superior performance in small sample (Lutkepohl, 2005).

## 4. Research Results and Discussion

### 4.1 Unit Root Test

The unit root test is carried out to examine the order of integration of the variables. For the purpose of this research study, the Augmented Dickey-Fuller (ADF) test and the Phillip-Perron (PP) test for unit root was used to test if the time series is stationary or not at the chosen level of significance.

***Table 1.*** *Result of Augmented Dickey-Fuller unit root test of the variables*

| | **Level Form** | | | **First Difference** | | | |
|---|---|---|---|---|---|---|---|
| ***Variables*** | ***5% critical value*** | ***ADF test statistics*** | ***p-values*** | ***5% critical value*** | ***ADF test statistics*** | ***p-values*** | ***Order of integration*** |
| *AGFN* | -2.945 | -2.6618 | 0.090 | -2.951 | -7.1001 | 0.000 | I(1) |
| *AGOG* | -3.540 | -4.7950 | 0.002 | - | - | - | I(0) |

***Source:*** *Own calculations.*

### 4.2 Hypothesis Testing

The research hypothesis is as follows:

*H0: δ =0 (the variables are non-stationary);*
*Decision Rule: reject H0 if the absolute value of ADF cal. > ADF tab.*

The results in Table1 indicates that ADFcal < ADFtab at level form with trend and without trend meaning that agricultural finance (AGFN), variable were non-stationary at level form. But the ADFcal > ADFtab at level form for agricultural output growth (AGOG) shows that this variable is stationary at level 1. Thus, the variables are integrated of order zero I(0) and one order 1 I(1).

***Table 2.*** *Result of Philips-Perron unit root test of the variables*

| | **Level Form** | | | **First Difference** | | | |
|---|---|---|---|---|---|---|---|
| ***Variables*** | ***5% critical value*** | ***PP test statistics*** | ***p-values*** | ***5% critical value*** | ***PP test statistics*** | ***p-values*** | ***Order of integration*** |
| *AGFN* | -2.9458 | -2.4965 | 0.124 | -2.948 | -18.863 | 0.000 | I(1) |
| *AGOG* | -2.945 | -4.6454 | 0.000 | - | - | - | I(0) |

***Source:*** *Own calculations.*

The Phillip-Perron (PP) unit root test in Table 2 shows that the variable AGOG is stationary at level form, that is, they are integrated of order zero I(0)) whereas AGFN is stationary after first differencing, which means they are integrated of order one (I(1)). The combination of I(1) and I(0) variables makes possible for the researcher to proceed with the Granger causality test of the two core variables AGFN and AGOG.

### 4.3 Granger Causality Test

In this section, the Granger causality result between agricultural finance and agricultural output growth is presented (Table 3):

***Table 3.*** *Result of Granger Causality Test*

| **Null Hypothesis:** | **Obs** | **F-Statistic** | **Prob.** | Decision Rule |
|---|---|---|---|---|
| AFGN does not Granger Cause AOG | 35 | 2.52793 | 0.0967 | *Do not reject H0* |
| AOG does not Granger Cause AFGN | | 0.57051 | 0.5713 | *Do not reject H0* |

***Source:*** *Own calculations.*

The result presented in Table 3 above shows that government agricultural finance does not Granger cause agricultural output growth and vice versa. This is shown by the probability level of 0.0967 and 0.5713. This therefore shows that the variations in agricultural output growth cannot be explained by variations in government agricultural finance and vice versa. Thus, we accept the null hypotheses of government agricultural finance not Granger-causes agricultural output growth and vice versa.

### 4.4 Post Estimation Test

The post estimation test that will be analyzed in this section includes the Breusch-Godfrey Serial Correlation LM test. This test employed the Breusch-Godfrey Serial Correlation LM Test to examine the tendency of serial correlation in the error term (Table 4):

***Table 4.*** *Breusch-Godfrey Serial Correlation LM Test*

| **Breusch-Godfrey Serial Correlation LM Test:** | | | |
|---|---|---|---|
| **F-statistic** | 0.128923 | Prob. F(2,13) | 0.8802 |
| **Obs*R-squared** | 0.680700 | Prob. Chi-Square(2) | 0.7115 |

***Source:*** *Own calculations.*

The research hypothesis is:

*H0:* $\mu_{1,} = \mu_2 = \mu_3 \neq \cdots \mu_p \neq 0$*;*
*Decision Rule: Reject H0 if the Fcal<Ftab, otherwise, do not reject. Or reject H0 if the P-value is greater than 0.05.*

The result presented above shows that the probability of the F-statistic is greater than 0.05 (5%). Also, the observation time R-squared is less than the chi-square P-value. Hence, we reject H0 and conclude that the model has no serial correlation.

## 5. Conclusions, Proposals, and Recommendations

A noticeable outcome of the results of this study is the evidence that government's agricultural financing did not Granger cause agricultural output growth and agricultural output growth did not Granger cause government's agricultural financing within the period under review. This means that the variations in agricultural output growth cannot be explained by variations in government's agricultural financing and vice versa. There are other factor that may have been contributing to these variations. In view of this, the following recommendations should be considered:

1. The Agricultural Credit Guarantee Scheme (ACGS) Funds should be made more active and should ensure that the collateral problems that most farmers face are taken care of and their credit access improved.
2. The Anchor Borrowers' Programme (ABP) should be made more transparent, efficient and accessible to the relevant Stakeholders and Small Holder Farmers (SHF) to ensure that the funding of agricultural activities produces the required outputs or results. Originally, the aim of ABP is to create economic linkage between smallholder farmers and reputable large-scale processors with a view to increase agricultural output and significantly improve the capacity utilization of processors. If the programme is well managed, agricultural funding and output will definitely have a positive relationship.

3. There should exist massive education and enlightenment of farmers to know the different sources of agricultural financing available. When such funds are accessed, it should be properly monitored to ensure efficient utilization in order to increase agricultural output.
4. Government should make the environment conducive for farmers to access funds easily and also enact policies that will make it easy for farmers to access other agricultural inputs, and rural infrastructures like pipe-borne water, electricity and good roads to ensure that farm products are processed and transported to enable farmers get a fair price for their products.

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