



## AGRICULTURAL FINANCING AND FOOD PRODUCTION IN NIGERIA

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**Abstract:** This paper examined the impact of agricultural financing on food production in Nigeria from 1981-2019. The study was motivated by supporting Goal number 2 of the 2030 Sustainable Development Goals (SDGs) which aims to “end hunger, achieve food security, improve nutrition, and promote sustainable agriculture”. Using annual data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the unit root test and dynamic ordinary least square (DOLS) approaches were employed as the techniques of analysis. The findings revealed that agricultural financing is statistically significant in explaining the level of food production in Nigeria. Thus, a percentage increase in agricultural financing (farmers' access to agricultural finance) is associated with an increase in food production by 0.654percent. As a result of this, the paper conclude that, more agricultural funding at low-interest rates motivates farmers to secure high-yield seedlings. Therefore, the study recommended amongst others that, more funding be allocated to the agrarian sector with less stringent credit conditions.

**Key Words:** Agricultural financing, Funding, Food production, Loan, Sustainable

### 1. INTRODUCTION

Prior to the attainment of political independent, the country’s economy is agrarian in nature, which implies that agriculture is not only the core industry but the backbone of Nigeria economy. Indeed a strong and efficient agricultural sector would enable a country like Nigeria to feed its growing population, generate employment, earns foreign exchange and provide raw materials for industries. The agricultural sector has a multiplier effect on any nation’s socio-economic and industrial fabric because of the multifunctional nature of agriculture (Obi &Obayori, 2016).

Agriculture is the production of food and livestock and the purposeful tendering of plants and animal plays a major role in the economy of many developing countries – Nigeria inclusive, as it is a significant source of nourishment for citizens, industrial raw materials and a means of livelihood for the most vulnerable population of

Nigeria (Omekwe, Bosco & Obayori, 2018). Okolo (2004) described agricultural sector as the most important sector of Nigeria’s economy which provides both staple food and cash crops and holds a lot of potential for the future economic development of the nation as it had done in the past. Similarly, food production is the process of transforming raw ingredients into edible food products. These converted food products can either be used for home cooking directly or by the food processing industries (Obayelu, 2011). Consequently, financing agricultural productivity is an important policy goal for Nigerian government. This is because agricultural production failed to keep pace with the countries rapid population growth rate of about 3.2% resulting in perennial food shortage, continuous souring food prices and massive importation of food by government while food demand increases at a rate of more than 3.5% (Osabohien, Osuagwu., Osabuohien, Ekhaton-Mobayode, Matthew & Gershon, 2020).



As a result of this, there is a strong on-going deliberation on the best approach to gain speed with world population growth and increasing food production to meet the United Nations (UN) Sustainable Development Goal 2 (which is to achieve food security at all level, improve nutrition for all, and promote sustainable agriculture) by 2030 (Osabohien et al., 2020a; Osabohien et al., 2019b). To improve food production, various strategies have been envisaged by government and stakeholders at all levels; one of such strategies is hinged on the need to increase farmers access to agricultural finance (credit) to increase productivity, while others focus on agricultural diversity (Osabohien et al., 2020a). These strategies are important because, in developing countries, especially Nigeria, the agricultural sector accounts for more than 50% of the entire labour force and it contributes significantly to the Gross Domestic Product (Osabohien et al., 2020a).

Despite this huge contribution of the sector to the economy, the productive capacity of the sector has declined in recent years which has been further reduced due to post-harvest losses (due to road networks and others), while about 65% of the overall employment in Nigeria is engaged in the food economy (Osabohien, Afolabi, & Godwin, 2018a). The food economy is responsible for food production, which comprises of all forms of practices at the farm level, including processing, packaging, transportation, distribution and retailing. This food economy employs about 85 million people in Nigeria (Osabohien, Afolabi & Godwin, 2018a) where more than 75% of food economy employment remains in agriculture, with 65% of employment in local communities, about 20% are in the processing of food, marketing and food away from their localities (Osabohien, Osabohien, & Urhie, 2018b). However, food production in Nigeria has declined, resulting in rise in food imports.

In order to control the importation of food, local food production has to increase, which can be done through

improving agricultural financing. It has been observed that agricultural financing has declined in Nigeria, as shown in budgetary allocation (Nevin, Oyaniran & Onomia., 2019). The ratio of Nigeria's budget for agriculture to annual budget is below the prescribed standard set by the Maputo Declaration on Agriculture and Food Security. Through the declaration, the African Union (AU) agreed to allocate at least 10% of its member-countries annual national budget to agriculture. Budgetary allocation for agriculture of N0.20 trillion accounts for 2.2% of the proposed 2018 budget of N9.12 trillion (Osabohien et al., 2020a; Nevin et al., 2019). In 2017, the agriculture budget of N0.10 trillion represented 1.3% of the total budget of N7.44 trillion (Osabohien et al., 2018a). Also, credit to agriculture declined from 83.20 (2013) to 66.64 (2014) this further declined to 40.62 (2015) from 2013 to 2016, agricultural finance in Nigeria declined by about 42.58% (Nevin et al., 2019; Osabohien et al., 2018).

In a bid to increase agricultural financing, the Nigerian government implemented some programmes which include: Agricultural Transformation Agenda (ATA), Anchor Borrowers, Commercial Agriculture Credit Scheme (CACs), and Agricultural Credit Guarantee Scheme Fund (ACGSF) among others (Osabohien et al., 2020a). The above programmes are implemented to deepen the credit market for agribusiness. For instance, about 74% of the 200-billion-Naira1 special credit intervention fund was disbursed to 191 businesses between 2009 and 2016 based on the report on CACS of the Central Bank of Nigeria. Of the total 45% of the beneficiaries are involved in crop production, 23% in livestock production and 15% in agricultural processing (Osabohien et al., 2020a). According to the National Bureau of Statistics, credit to agriculture was 3.26% and 3.36% of total credit to the private sector in 2016 and 2017 respectively. Though, the government, in its effort to increase productivity, has implemented the above programmes;



credit access to agriculture remains low. This is because, compared to the banking sector credit to other industries, the agricultural sector receives the lowest credit allocation from banks despite the sector's more contribution to GDP than other industries (Nevin et al., 2019; Osabohien et al., 2018a,b). This study contributes to the existing literature by examining how agro-financing contributes to food production in Nigeria. The study is structured into five sections; following this introduction is section 2 which is the review of literature on the issue of study, section 3 is the methodology, section 4 is the results and discussion and section 5 is the concluding remarks.

## 2. LITERATURE REVIEW

It is imperative to do a review of the agro-food and agro-financing literature, without claiming to be exhaustive. The review was done under, conceptual clarification, theoretical review and empirical review.

### 2.1 Conceptual Clarification

#### a. The Concept of Agriculture

Agriculture involves the cultivation of land, raising and rearing of animals, for the purpose of production of food for man, feed for animals and raw materials for industries. The types of agriculture practice in Nigeria include crop production, livestock farming, fishing and forestry.

**i) Crop Production:** This involves the cultivation of different crops. These crops are divided into two main categories of food and cash crops. Food crops which are mainly for consumption include yam, cassava, rice, beans, maize, potatoes, cocoyam, tomatoes, onions, millets and corn. Cash crops are mainly meant for sale either locally or for export and they include cocoa, rubber, cotton, palm oil, palm kernels and groundnuts.

**ii) Livestock Farming:** This type of agriculture involves rearing of domestic animals. Such animals include goat, sheep, pig, cattle, horses, donkeys and poultry. Many of these animals which are reared to satisfy domestic

consumption like cattle, horses, donkeys, etc are found mainly in northern Nigeria.

**iii) Plantation Farming:** This system of farming involves the use of a large estate of land permanently planted with economic or commercial crops. Such crops planted on plantation farming include cocoa, tea, cotton, sugar, tobacco, rubber, sugarcane, palm tree, coffee and other commercial crops. In plantation farming, land could be owned by the government, private individuals or corporate bodies. Mechanized equipment and modern inputs are mainly used in plantation farming.

**iv) Mechanization or Mechanized Farming:** This involves the extensive use of machine and other types of advanced mechanical devices in agricultural production. Mechanized agriculture ensures large scale production because the use of human labour is replaced with that of machines such as tractors, ploughs, harvesters and other engine - driven devices. Mechanized farming has not been popularized in West Africa, because it is highly capital intensive.

**v) Co-operative Farming:** This is a type of farming in which farmers come together to form a sort of association or union. This type of farming is adopted in order to obtain loans and aids from government, to be able to hire or purchase farming machinery or to mechanize agriculture, to pull resources together in order to increase agricultural production, etc.

### 2.2 Theoretical Review

There are many studies and theories which support the role of finance in any business. The theory of financial intermediation is one of those. It describes the relationship between finance and economic growth. The theory was first established by Gurley and Shaw in 1960. Later on, the importance of finance is widely acknowledged by (Bernanke, 1983) (Diamond, 1984). According to this theory finance plays a vital role in the growth of any economic activity. As financial constraint is a major hurdle



for any income generating activity. Therefore, if financial constraints are removed then growth will start. The theory was established on the basis of asymmetry information theory and agency theory. According to which, in past, borrowers and lenders did not have information about each other and there was no common agency that plays role in their mediation. The theory acknowledges the role of banks as “agency” which is providing the information to both lenders and borrowers about each other. So, credit disbursed by banks is playing significant role in economic growth. In previous literature, several researchers like King and Levine (1993), Greenwood and Smith (1997), used this theory to establish the relationship of finance and economic growth i.e. production. This study is also based on the same theory.

### **2.3 Empirical Literature**

From the study of 21,576 dairy farmers in Kenya and using the double-hurdle approach for inferential analysis, Njoku et al. (2018) revealed the positive and significant relationship between farmers’ production capacity and access to credit. The study recommends that to boost agro-productivity, there is the need to enhance credit farmers, initiate agricultural insurance and seek alternative collaterals. In a similar study, Osabohien et al. (2018a) using the Autoregressive Distribution Lag (ARDL) econometric approach examined how access to credit facilities affect agricultural production and food security in Nigeria, and finds that credit facilities significantly impact on agricultural production and food security in Nigeria.

Njuguna and Nyairo (2015) also found that inability to provide loan collateral impede on access to credit by farmers in Kenya while Adeleke, Kamara, and Brixiova (2010), found investment potentials exist for small-holder producers. On the review of agricultural policy in Nigeria, Mallum (2016) noted that the role of credit in agricultural development is very paramount, and any shortcomings can affect a farmer's investment ability. The study recommends

further to gain farmers' confidence and to minimize the risk of credit default, diversification of loans must be encouraged, and specialized staff must be appointed to mentor local farmers. Similarly, Adejobi and Atobatele (2008) propose that failure to repay loans could impact negatively on farmers’ credit rating and limit the access to further credit in future. Based on empirical evidence concerning the relationship between agro-financing and economic growth, Adeleye et al. (2020) examine if there exists a causal relationship between agro-financing and economic growth. Using the Granger test for causal analysis, they conclude that a bi-directional causal relationship exists. In order words, adequate and substantial funding of the agricultural sector results in positive contributions to economic growth. At the same time, economic growth spurs the need for more agricultural investment. Oboh and Ekpebu (2011) using the ordinary least squares (OLS) procedure to study the factors of formal agricultural credit allocation to the farm sector, results show the need to critically evaluate dynamics affecting the rate of credit allocation by beneficiaries of the government's credit scheme. Also, Osabohien et al. (2020a) using the Propensity Score Matching (PSM) model on a cross-sectional data using Wave 2 of the Living Standard Measurement Study- Integrated Survey on Agriculture (LSMS-ISA) finds that agricultural credit is statistically significant and have a positive impact on agricultural production in Nigeria. According to Osabohien et al. (2020b) the implication of the result is that households with access to agricultural credit had yields thrice more than households without access to agricultural credit. Going beyond the existing empirical literature, the present study contributes not limiting by examining the agro-finance-growth nexus, yet it goes to analyse how economic growth responds to shocks from other endogenous regressors in the model.

#### **2.3.1 Problems of Agriculture in Nigeria**



In spite of the important role of agriculture in national development, the agricultural sector in Nigeria is faced with numerous problems. For instance, the methods of production remained and are still primitive with the hoe and cutlass as the major implements (the use of crude implements), illiteracy and ignorance, lack of credit facilities, poor transportation system, poor marketing system, lack of storage facilities, absence of research, poor medical facilities, poverty – as a result of this, the farmers cannot afford to embark on large scale farming, buy good implements and hire more labour that can increase their productivity. In addition, many farmers follow the footsteps of the parents and as a result find it inconvenient to change the system of farming they were brought up with (conservatism).

### **2.3.2 Some Programmes/Policies at Revamping Agriculture in Nigeria**

Nigeria has been under several administrations since independence in 1960. Each administration has always articulated different agricultural policies. That is, the various administrations in their own way and style of leadership have accorded the agricultural sector a desired recognition through provisions for it in such programmes as National Accelerated Food Production Programme (NAFPP), National Agricultural and Co-operative Bank (NACB), Operation Feed the Nation (OFN), Agricultural Credit Guarantee Scheme (ACGS), Rural Banking Scheme, Commodity Boards, The River Basin Development Authorities (RBDAs), The Green Revolution Programme (GRP), The National Agricultural Land Development Authority (NALDA), etc.

**i) National Accelerated Food Production Programme (NAFPP):** This programme was established in 1973 to boost food production in Nigeria based on the green revolution concepts and experiences of India, Mexico, Pakistan and Phillipians. Its main objective is to accelerate the production of six major food crops namely millet,

sorghum, rice, maize, wheat and cassava. This was to be achieved through the introduction of high yielding varieties, use of appropriate fertilizers, agrochemicals, good storage and processing facilities, provision of credit as well as marketing outlets. The major components of the programme are research, extension and agro-services. In addition, several research institutes were mandated to develop improved crop varieties and were made popular through extension agents and the use of mass media. For instance, National Root Crop Research Institute, Umudike is in charge of cassava while Centre at Samaru near Zaria takes charge of Sorghum, wheat and millet. Despite that a substantial number of farmers have gained from the programmes, the programmes is bedeviled by inadequate finance, inadequate publicity, poor infrastructural facilities and inadequate commitment by some state government (Anyanwu, Oyefusi, Oaikhenam and Dimowo; 2013).

**ii) National Agricultural and Co-operative Bank (NACB):** The NACB was set up by the federal government to boost food production for our growing population. This project which was established in 1973 aims at promoting growth in the quantity and quality of credit to all aspects of agricultural production including fisheries, poultry farming, forestry and timber production, horticulture and other types of farming as well as storage, distribution and marketing connected with such production in the country. As reported by Anyanwu, et al (2013), NACB performance was impressive after ten years of operation, but despite the impressive performance of NACB, the quantity of loans granted to small-holder farmers has proved grossly inadequate. According to Daneji (2011), the bank was reorganized in the year 2000 and amalgamated with the Peoples Bank of Nigeria and the Family Economic Advancement Programme (FEAP) and renamed the Nigerian Agricultural, Cooperative and Rural Development Bank (NACRDB).



### iii) Agricultural Credit Guarantee Scheme (ACGS):

The establishment of Agricultural Credit Guarantee Scheme (ACGS) Fund Act in 1977 (Decree No. 20) as amended on 13<sup>th</sup> June, 1988, was an attempt by the government to encourage the flow of increased credit to the agricultural sector. The ACGS came into operation on April 3, 1978 with the objective of providing “guarantees in respect of loans granted for agricultural purposes by any bank in accordance with the provisions of the Act” and with the aim of increasing the level of bank credit to the agricultural sector. Another objective of the scheme was to minimize risks banks are exposed to, as a result of their lending activities to the agricultural sector. The agricultural purposes in respect of which loans can be guaranteed by the Fund are those connected with the establishment or management of plantations for the production of cash crops, cultivation or production of various crops, animal husbandry, processing of agricultural products as well as farm machinery and hire services) with the aim of increasing the level of bank credit to the agricultural sector. Loans under the scheme include advances, overdrafts and any credit facility. However, delay experienced by farmers in having their applications processed by the banks is one of the observed problems in implementation of the ACGS.

**iv) Commodity Boards:** In 1977, there was a reorganization of the existing market board system for export. There was seven Commodity Boards, viz: Cocoa, Rubber, Cotton, Groundnut, Grains Root Crops and Palm Produce (for palm oil and Palm kernel) Commodity Boards. Their establishment was to promote both the production and marketing of their respective commodities. Historically in Nigeria, the boards were to retain surplus revenue when world market prices were high and expend

them in supporting domestic prices when they fell below the average. The scheme worked well at first but soon faltered since the marketing boards were looked upon as revenue collecting agents for the government. Since the dismantling of the marketing boards following the structural adjustment reforms of the 1980s, these functions no longer exist.

### 3. METHODOLOGY

The study made use of annual data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period 1981 to 2019. The study employs the dynamic ordinary least square (DOLS) and the unit root test of stationarity. The choice of the DOLS is based on the ability to eliminate endogeneity problem and it is robust to autocorrelation problem. Meanwhile, the descriptive statistics was carried out to ascertain the characteristic nature of the time series under consideration. Also, stationarity test via ADF unit root test was carried out to establish stability of the time series.

#### Model Specification

The work hinged on the empirical work of Osabohien et al. (2020a). The implicit form of the model is presented as:  $FP_t = f(AF_t)$  (1). Where, FP represents food production, AF represents agricultural financing (proxied by agricultural credit guarantee scheme fund, million naira).

The explicit and non-linear form of model is stated as:  $FP_t = \beta_0 + \beta_1 AF_t + u$  (2)

Since equation. (2) was difficult to estimate in its non-linear form, it is linearized by taking the natural logarithm of variables on both sides of the equation, that is:  $\ln FP_t = \beta_0 + \beta_1 \ln AF_t + u$  (3) where,  $\beta_0$  represents the constant term,  $\beta_1$  is the coefficient of agricultural financing, t represents time and u represents the error term. The DOLS representation of the model was stated thus;

$$FP = \lambda_0 + \lambda_1 \ln AF_t + \sum_{i=1}^n \Delta \lambda_1 \ln AF_t - 1 + \mu_t \quad (4)$$



Where;  $\lambda_1$  is the slope parameter,  $\lambda_0$  is the intercept parameter and  $\sum$  is summation

The ‘a priori’ expectation of the independent variable is as follow: agricultural financing, should have a positive relationship with food production.

**4. RESULTS AND DISCUSSION**

**Table 1: Descriptive Statistics of Variables**

	FP	AF
Mean	232047.7	31767.79
Minimum	55918.20	1076.000
Std. Dev.	299922.3	38498.52
Skewness	4.550410	4.410117
Kurtosis	25.96256	25.25821
Jarque-Bera	991.4193	931.4898
Probability	0.000000	0.000000
Observations	39	39

**Source:** Researcher’s Computation from E- view (10) Result

*Note: FP stands for Food Production and AF stands Agricultural Finance*

The descriptive statistics reported in Table 1 indicated that a food production (FP) and agriculture finance (AF) averaged ₦232047.7million and ₦31767.79million respectively. The standard deviation showed that the two variables converged around their respective mean. The

skewness test result showed positive values for the series. The positive value skewness means that the variables have high tails. The probability of Jarque-Bera statistics suggests that the null hypothesis of normal distribution for the variables food production and agricultural finance was rejected.

**Table 2: Augmented Dickey Fuller Unit Root Test at Level and First Difference.**

Variable	ADF Test @ Level	Critical Value			ADF Test @ 1 <sup>ST</sup> Diff	Critical Value			Order of Integration
		1%	5%	10%		1%	5%	10%	
FP	-	-	-	-	-	-	-	-	1(1)
	-1.9662	3.632	2.9484	2.61287	10.1428	3.6329	2.9484	2.6128	
AF	-	-	-	-	-	-	-	-	1(1)
	2.8617	3.626	2.9484	2.61153	5.95804	3.6394	2.9484	2.6143	
	1	78	0		*	0	0	0	

**Source:** Researcher’s Computation from (E- view 10)

The results presented in Tables 2 above depicted that none of the variables was stationary at level. Therefore, the variables were differenced once and became stationary at

first difference prior to subsequent estimations to forestall spurious regressions. Hence, the entire variables in this study are stationary. This therefore means that the best



regression result was obtained when the above variables are used for model estimation

**Table 3: Analysis of Dynamic Ordinary Least Square (DOLS) Result**

Dependent Variable: Food Production (FP)			
Variables	Coefficients	t-statistics	Probability
C	10.81887	31.74240	0.0000
Log(AF)	0.065405	2.42105	0.0460
R-Squared	0.858013	F-statistics	762.1858
		Prob(F-statistic)	0.0000

Source: Authors' Computation from E- view 10

From the estimated dynamic ordinary least square (DOLS) regression result in Table 3, the exogenous variable (agriculture finance) is positively signed and statistically significant in explaining the level of food production in Nigeria. Thus, a percentage increase in agriculture finance measured by agricultural credit guarantee scheme fund, contributes about .0654% increase in food production in the long-run. Similarly, given that the p-value of agriculture finance at 0.0460 which is less than the critical value at 5%, showed that agriculture finance impacted on food production in Nigeria during the period of study. Thus, the null hypothesis is rejected and the alternative hypothesis which states that there is a significant relationship between agriculture finance and food production is upheld. The finding corroborates the empirical work of Osabohien et al. (2020a) who averred that agro-financing positively impacted on food production in Nigeria.

The coefficient of determination ( $R^2$ ) is approximately 86%. Meaning that variation in food production explained by the explanatory variable in the model is 86%, while the remaining 14% was explained by other factors not captured in the model. The f-test which is used to determine the overall significance of the explanatory variable in the model showed that the P-value of f-statistics (0.0000) is less than critical p-value at 0.05 level of

significance. Thus, the model is considered to be good and adequate for forecasting and policy analysis.

### 5. CONCLUDING REMARKS

The study examined agriculture finance and food production in Nigeria from 1981-2019. The motivation for this study aligns with Goal number 2 of the 2030 Sustainable Development Goals (SDGs), which aims to “end hunger, achieve food security, improve nutrition and promote sustainable agriculture”. Using Nigeria annual data from 1981-2019 and employing the econometric technique of DOLS, the study established that there exists a positive and long-run relationship between agricultural financing and food production. The exogenous variable (agriculture finance), significantly explains the level of food production in Nigeria and shows that a 1% increase in access to credit will contribute about .0654% increase in food production in the long-run. Thus, to boost food production and ensure food security, the study recommended amongst others that: (1) more funding should be allocated to the agrarian sector; (2) there is need to seek alternative financing such as agricultural insurance schemes, farmers’ cooperatives etc.; (3) private involvement in agro-funding should be encouraged with less stringent credit conditions.

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Household access to agricultural credit and agricultural production in Nigeria: a propensity score matching model,

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**APPENDIX I: RESEARCH DATA**

YEAR	Food Production	Agriculture Financing
1981	57909.7	1295
1982	59450.8	1076
1983	59009.6	1333
1984	55918.2	1642
1985	65748.4	3337
1986	72135.2	5203
1987	69608.1	16209
1988	76753.7	24538
1989	80878	34518
1990	84344.6	30704
1991	87503.5	22014
1992	89345.4	22454
1993	90596.5	15514
1994	92833	16572
1995	96220.7	17871
1996	100216.2	19438
1997	104514	17839
1998	108814.1	6428
1999	114570.7	12857
2000	117945.1	244495
2001	122522.3	20298
2002	1901334	23681
2003	203409.9	24304
2004	216208.5	35035
2005	231463.6	37733
2006	248599	54032
2007	266477.2	36824
2008	283175.4	42863
2009	299823.9	44573
2010	317281.7	41420
2011	335180.1	42952



2012	348490.8	4298.7
2013	348600.4	42451.2
2014	365332.8	44488.9
2015	376292.78	45823.6
2016	377421.66	45961.07
2017	373015.7	45424.52
2018	375576.7	45736.4
2019	375338	45707.33