



## Impact of Enhanced Agricultural Credit Flow Under the Agricultural Credit Guarantee Scheme Fund (ACGSF) on Economic Growth in Nigeria

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### ABSTRACT

*The study examined the impact of enhanced agricultural credit flow under the ACGSF of the central bank of Nigeria (CBN) on the real gross domestic product (RGDP). Secondary data on RGDP, credit allocation to agriculture under the ACGSF (CrAgri), credit allocation to manufacturing (CrMnf), foreign direct investment (FDI), and market capitalization (Mcp) from 1990 – 2015 were collected from the National Bureau of Statistics (NBS), statistical Bulletins of the CBN, and the Nigerian Stock Exchange (NSE) for the purpose of analysis. The ordinary least squares (OLS) regression result showed that CrAgri, FDI, and Mcp were positively signed and statistically significant while CrMnf is negatively signed. Therefore, the study recommended, in addition to the CBN's ACGSF and strategic financial interventions, there is need for adequate level of strategically targeted investments in rural infrastructures such rural roads, communication links, power supply, water, irrigation, storage facilities, modern farming implements and inputs such as fertilizers and improved seed varieties. Also, timely and adequate enlightenment of farmers on modern farming practices, techniques, and management skills are essential to amplify the potentials and productivity of farmers and by extension create more employment opportunities, increase the supply of food, livestock feeds, and industrial inputs as well as boost export earnings.*

**Keywords:** *Agricultural Production; Agricultural Total Factor Productivity; Partial Factor Productivity; Finance; Diversification; Nigeria.*

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### INTRODUCTION

Agriculture can be defined as the cultivation of the soil, producing crops, planting forest plants/trees, raising livestock and rearing fishes for the purpose of production of food for man and feed for animals. It is the mainstay of our daily life, providing fresh air and environment, medicinal plants, raw materials for industries and other necessities required for increase in domestic consumption and employment (Ogen, 2007). The role of agriculture in the process of economic development is strategic to economic history of nations such as Britain, United States of America (U.S.A), France, Italy etc. Industrialized nations of the world transformed from agricultural to industrial society. Agricultural prosperity contributed considerably to economic advancement and thus, industrial and agricultural development are not alternatives but complementary and naturally supporting (Muharram, 2016).

Nigeria is the most populous country in Africa and the seventh largest in the world with an estimated population of over 193 million in 2016 compared to only 37,860,000 in 1950 (NBS, 2017), indicating an annual growth rate of more than 6.5% which led analysts to predict that by 2050 Nigeria will become the third most populated country in the world. The

quintupling of the population over the last 65 years is due to very high birth and low child-mortality rates. The country has abundant natural resources and vast area of fertile land. In terms of employment above 60% of the workforce, majority of whom are in the rural areas, are engaged in agriculture (Olayide, 1979). The sector accounts for 40% of the nation's gross domestic product (GDP) in 2010 which indicated a long term decline from about 60% in early 1960s to about 49% in the 1970s and 22% in the 1980s, highlighting the neglect of the sector as the country's major foreign exchange earner in the 1960s and early 1970s due to excessive reliance on crude-oil explored in huge commercial measures in the 1960s (BGL Agriculture Report, 2009). Figures from the NBS GDP Report (2017) showed that the share of agriculture to GDP steadily decreased to an average 23.55% between 2012 and 2017 though, this level is an improvement over the 22% contribution recorded in the 1980's. The rate of growth of the sector, according to the Report, averaged 4.15% between 2012 and 2017 with the highest and lowest rates of 6.70% and 2.94% registered in 2012 and 2013 respectively which, relative to the annual population growth rate of more than 6.5%, is incommensurate with the nation's domestic food supply needs.

Most agricultural producers, rural smallholder farmers, small and medium agribusinesses have limited or virtually no access to formal financial institutions or credit facilities with which to acquire agriculture inputs thus limiting efficiency, yield and production level. To address this challenge the CBN has, in line with the Nigerian government's broad objective of economic diversification, stepped up efforts through its ACGSF targeting all actors in the agricultural value chain to facilitate and ensure enhanced agricultural credit flow to Nigerian farmers. Several authors Ihimodu (1983); Sanni (2000); Okuneye (2003); NPA (2007) BGL Agriculture Report (2009), Phillip, Nkonya, Pender, and Oni (2009), Ahmad and Masood, (2009), Eze, Lemchi, Ugochukwu, Eze, Awulonu and Okon (2010), Vasanth (2011), Asogwal, Abu and Ochoche (2014), Rahman, Abid and Muhammad (2014), Narayanan (2015), Agunuwa, Inaya and Proso (2015), Anetor, Ogbechie, Ikechukwu and Ikpesu (2016), and Udoka, Mbat, and Stephen (2016) have observed and identified inadequate funding and institutional credit as one of the various problems impeding agricultural productivity in Nigeria as well as other developing economies, emphasizing the positive association between funding and/or institutional credit and agricultural productivity. Financial facilities enable the farmers to purchase superior quality or high yield variety seeds, fertilizers and pesticides while agricultural yield increases because of timely and adequate inputs. This paper is poised to examine the impact of enhanced agricultural credit flow under the CBN's ACGSF on economic growth. How accessible is credit under the scheme to the rural farmers; what is the effect of the agricultural credit on farmers' productivity; and what are the possible solutions to other challenges of agricultural diversification in Nigeria? These are questions this paper tried to look at.

## LITERATURE REVIEW

### **Agricultural Total Factor Productivity**

American English dictionary defines productivity as the state of being productive, fertile or efficient. It is the rate at which goods and services are produced by a standard population of workers. The rate at which crops are grown on a standard area of land. Increase in productivity means increase in the GDP, investment and employment opportunities, which makes rise in standard of living possible. Productivity data of an economy is the baseline used for calculation and comparison in Human Development Index (HDI). One of the most important lessons in economics is that productivity improvement is key to sustained

economic growth (Hall and Jones, 1999; Easterly and Levine, 2001; Caselli, 2005). Productivity was indeed a main concern of the fathers of modern economics, Adam Smith and David Ricardo, in the eighteenth century, as they considered the advantages of specialization and trade as the basis for the wealth of nations (Young and Norman, 2019). In the 1950s, Solow and Swan developed a growth model in which changes in physical capital, labor, and total factor productivity (TFP) determine the economy's growth rate (Solow, 1956; Swan, 1956).

Over the last half-century, world population doubled while land under cultivation grew by only 12% (Food and Agricultural Organization (FAO), 2012). But a recurring Malthusian crisis was evaded as food supply tripled due to rising global agricultural productivity, increase in efficiency of agricultural production or getting more output from existing resources – critical for improving food security. Fuglie and Wang (2012) observed that long-run trend since at least 1900 has been one of increasing food abundance as food prices, in inflation-adjusted dollars, fell by an average of 1% per year over the course of the 20th Century. But since around 2001, according to Trostle, Marti, Rosen, and Westcott (2011), real food prices have been rising, a situation generally thought was due to demand-side factor, continued population growth, greater per capita consumption of meat, diversion of crop commodities for biofuel as well as weather-induced production shocks like the 2012 drought in North America. However, over this period Fuglie, Wang, and Ball (2012) observed a robust but highly uneven global agriculture productivity growth with the highest level of outputs in crops and livestock per hectare of land consistently achieved by industrialized nations of northeast Asia (Japan, South Korea, and Taiwan), North America (U.S.A and Canada) and Oceania (Australia and New Zealand); attributing much of the gains in land and labor productivity to more intensive use of inputs such as fertilizers, machineries, energy, and irrigation. Total inputs in these countries, the authors added, grew at about 60% as fast as gross agricultural output, implying that improvement in TFP accounted for about 40% of total output growth.

Agricultural TFP is the ratio between total outputs of crops and livestock to total inputs – an aggregation of all of the land, labor, capital and materials used in production. Growth in TFP is then the difference between aggregate output growth and input growth (Fuglie et al., 2012). In its 2019 Global Food Policy Report, the FAO stated that TFP is used to measure the efficiency of agricultural systems when more output is produced from a constant amount of resources. The FAO (2019) further clarified the meaning of partial factor productivity (PFP) measures – measures of land and labor productivity – calculated as the ratio of total output to total agricultural area (land productivity) and to the number of economically active persons in agriculture (labor productivity). PFP normally show higher rates of growth than TFP, because growth in land and labor productivity can result not only from increases in TFP but also from a more intensive use of other inputs (such as fertilizer or machinery).

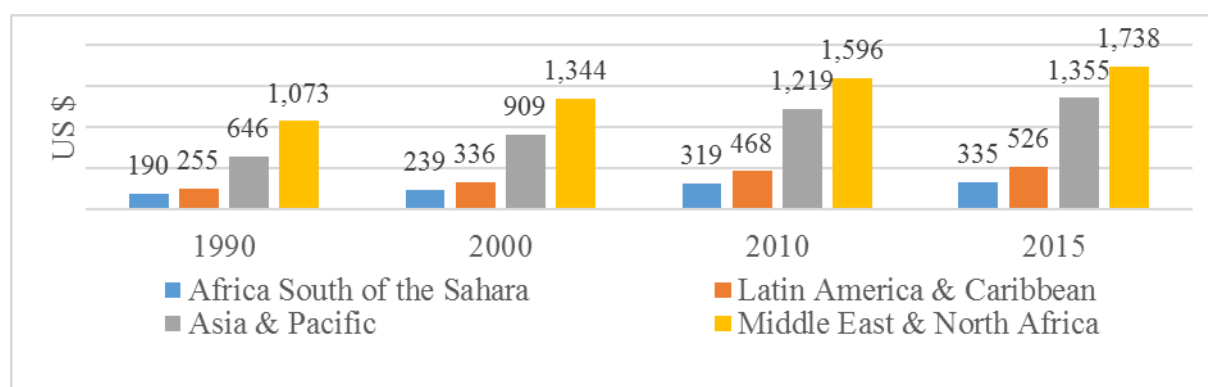
In contrast, Fuglie and Wang (2012) observed, developing countries lagged far behind as the regions currently at levels achieved by industrialized nations in the 1960s with a TFP growth of less than 1% recorded between 1960-1990 which doubled to over 2% per year between 1991-2009 amid a slowing but still positive input growth merely enough to keep output growing at over 3% annually for each of the last three decades; a phenomenon suggestive of a persistent and large gaps in global agricultural productivity among countries. China and Brazil stand out from others in this category, through critical institutional reform policies they have been able to tap into international sources of agricultural technologies and sustained exceptionally high TFP growth over the past two decades. Likewise, several other developing

regions which include Southeast Asia, North Africa, and Latin America registered accelerated TFP growth in 1990s or 2000 compared with previous decade. The major exception and perhaps the biggest challenge in achieving sustained long-term productivity growth in its agricultural sector is sub-Saharan Africa (SSA), where long-run TFP growth has remained below 1% per year. It is also the region of the world with the highest poverty rate and in the coming years is facing the world highest population growth rate (Fuglie and Wang 2012). This low level of agricultural output and productivity in SSA, according to Everson and Fuglie (2010) is due to some important factors that include absence of research and development (R&D) investment by the private sector to offset the public or national capacity, lack of an enabling environment for the dissemination of new technologies and practices, political instability, policy inconsistency, human and animal disease, uneven access to resources such as credit, inputs and food. Structural adjustments led to a significant drop in spending in 1990s with an average of between 2% and 3% in the region. But since the 2000s it has increased moderately to 4% (New Partnership for Africa's Development (NEPAD), 2013).

The absence of production loans/credit and risk coverage is the biggest hurdle in SSA. Fewer than 10% of producers have access to credit. Financial institutions will not offer credit without insurance cover and where banks provide finance to producers, they tend to favor structured sectors (usually for export) in order to be sure of repayment. Microfinance systems have been established but their ability to fund investment spending at planting seasons is limited, and microcredit remains costly owing to the close supervision of beneficiaries that such systems require. In short: Agricultural risks are high, and are thus the primary barrier to investment; No investment without effective public-private risk hedging systems (NEPAD, 2013). Public credit guarantees schemes are a common form of government intervention in more than half of all countries in the world to unlock finance for SMEs and the number is growing (World Bank, 2018). Although not widespread in Africa, credit guarantees are not new in the region.

### Agricultural TFP in Developing Economies

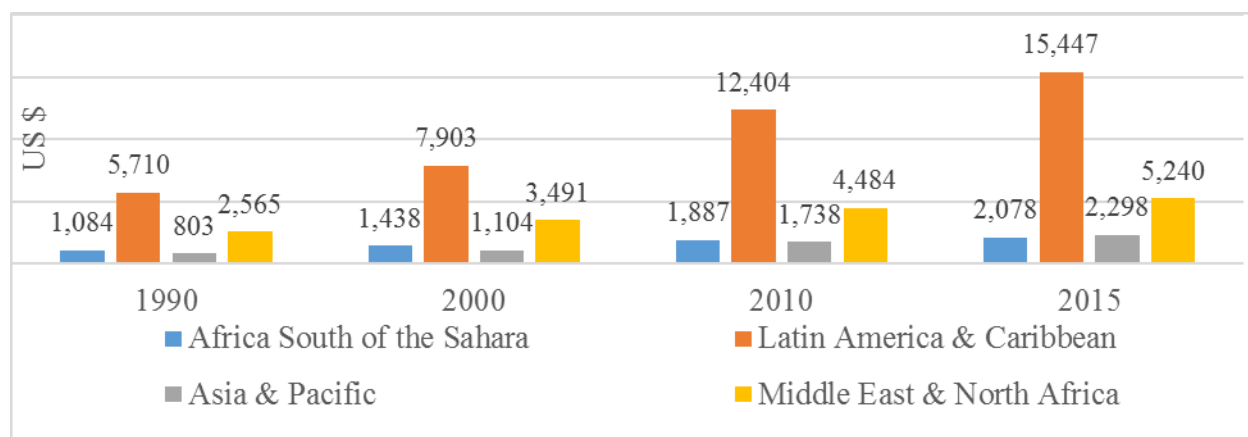
International comparisons of productivity usually begin by comparing agricultural land and labor productivity.



**Fig. 1: Land productivity (in constant 2004–2006 US dollars)**

As depicted in Figures 1 and 2, over the period 1990 – 2015 agricultural land productivity was highest in the Middle East and North African region while Latin America and the Caribbean registered the highest output in terms of labour productivity with SSA having the

lowest PFP measures of land productivity relative to other developing countries during these periods, however, it performed marginally above Asia and Pacific in labour productivity.



**Fig. 2: Labor productivity (in constant 2004–2006 US dollars)**

**Source:** Economic Research Service of the United States Department of Agriculture (ERS-USDA), and the FAOSTAT database, 2019.

According to Fuglie *et al.* (2012), measuring TFP is a data intensive exercise requiring detailed historical statistics on the quantities and prices of outputs and inputs, and the use of appropriate index methods to account for input and output substitution possibilities as relative prices change. PFP measures are easy to estimate and often used to measure agricultural production performance (Economic Research Service of the United States Department of Agriculture (ERS-USDA)). However, indicators of both TFP and PFP contribute to the understanding of agricultural systems needed for policy and investment decisions by enabling comparisons across time and across countries and regions. The trends in global agricultural output and TFP growth are disaggregated and hardly uniform among global regions as shown in Table 1.

**Table 1: Region Agricultural Average TFP Growth Rate (% per year)**

	1961-70	1971-80	1981-90	1991-00	2001-09
<b>All Developing Countries</b>	<b>0.69</b>	<b>0.93</b>	<b>1.12</b>	<b>2.22</b>	<b>2.21</b>
Sub-Saharan Africa	0.17	-0.05	0.76	0.99	0.51
Latin America & Caribbean	0.84	1.21	0.99	2.3	2.74
Brazil	0.25	0.6	3.02	2.62	4.03
Asia (except West Asia)	0.91	1.17	1.42	2.73	2.78
China	0.94	0.67	1.71	4.1	3.05
West Asia & North Africa	1.4	1.66	1.63	1.74	1.88
<b>All Developed Countries</b>	<b>0.99</b>	<b>1.64</b>	<b>1.36</b>	<b>2.23</b>	<b>2.44</b>
United States & Canada	1.25	1.67	1.31	2.18	2.24
West and Central Europe	0.58	1.44	1.43	1.25	1.98
Transition Countries (former USSR and Eastern Europe)	0.57	-0.11	0.58	0.78	2.28
World	0.18	0.6	0.62	1.65	1.84

**Source:** Fuglie, Wang & Bail (2012).

Table 1 showed that agricultural TFP has risen the most from less than 1% to over 2% per year in developing countries, with Brazil and China leading the way. Several other

developing regions including Southeast Asia, North Africa, and Latin America also registered accelerated TFP growth in the 1990s or 2000s compared with previous decades. SSA is the major exception with a long-run TFP growth below 1% per year.

**Table 2: Developing Regions Agricultural TFP Growth (%) for Three-Sub-Periods (1991 – 2015)**

Region	1991 – 2000	2001 – 2010	2011 – 2015
Africa South of the Sahara	1.5	1.0	0.4
Latin America & Caribbean	1.3	2.3	1.9
Asia & Pacific	1.7	1.7	1.5
Middle East & North Africa	1.3	1.5	1.2

**Source:** ERS-USDA and the FAO database, 2019.

**Table 3: Developing Regions Agricultural Output Growth (%) for Three-Sub-Periods (1991 – 2015)**

Region	1991 – 2000	2001 – 2010	2011 – 2015
Africa South of the Sahara	4.1	3.7	2.1
Latin America & Caribbean	3.2	3.4	2.5
Asia & Pacific	3.8	3.4	2.5
Middle East & North Africa	2.7	2.5	1.8

**Source:** ERS-USDA and the FAO database, 2019.

In Tables 2 and 3, most of the production growth has come from productivity improvements, rather than bringing more land into production. Agricultural TFP in Latin America and the Caribbean grew at an annual average rate of 2.1% between 1991 and 2015, 0.5% points above world average, but 1.3% points below Northeast Asia, the fastest growing region in the world during that period. Agricultural TFP growth was lowest in Africa South of the Sahara at an average 0.9% for the three-sub-periods. According to Stads, Nienke, Perez, Flaherty, and Falconi (2016), productivity growth across the Latin America and Caribbean region has been driven by R&D, accompanying investments in agriculture’s enabling environment, and specific support to farmers. Public investment in agricultural R&D has been key to increased productivity in Latin American agriculture. Although, volatile during the 1980s and 1990s, Stads, *et al.* (2016) concluded, government expenditure on agricultural R&D shows a long-term positive trend; by 2013, the region spent USD \$5.1 billion (2011 PPP prices) on agricultural R&D, with Brazil accounting for a little more than 50% of total expenditure.

In addition to R&D, Fuglie *et al.*, (2012) identified a number of other factors, broadly characterized as the “enabling environment”, that have contributed to cross-country differences in agricultural TFP. These factors are related to technical constraints to raising agricultural productivity and the dissemination of new technologies and practices. Improving on these enabling factors raises the return to investments in agricultural R&D. These include policies that improve economic incentives for producers, access to resources, stronger rural education and agricultural extension services, and rural infrastructure that enhances access to markets. The authors also identified other factors with economically disruptive “shocks” that have seriously depressed agricultural productivity growth in some countries. These include armed conflict, human or animal diseases such as HIV/AIDS in Africa and avian flu in Asia.

## **Government Commitments and Agriculture Financing Policies**

Since the post-independence period successive governments have designed and reviewed various agricultural development policies and programmes. The objective of agricultural financing policies in Nigeria is to establish an effective system of sustainable agricultural financing schemes, programmes and institutions that could provide micro and macro credit facilities for the micro, small, medium and large scale producers, processors and marketers for agricultural production; smoothen out imperfections in the agricultural financial market; ensure food security; achieve favorable balance of payments; promote foreign exchange earnings from agricultural exports; enhance other socio-economic issues such as poverty reduction, employment generation, reduction in rural-to-urban migration and food price stability; as well as use finance as engine of growth and development since the major occupation of the people is farming (Eze *et al.*, 2010). The agricultural financing schemes include Farm Settlement Scheme launched in 1959; ACGSF 1978 till date; Small and Medium Enterprise Equity Investment Scheme (SMEEIS), 2001 to date; Refinancing and Rediscounting Facilities (RFF) 2000; Agricultural Credit Support Scheme (ACSS) 2006 till date; Large Scale Agricultural Credit Scheme (LASACS), 2009; and Supervised Agricultural Loan Board (SALB). The various agricultural development programs implemented from 1972 to date include the National Accelerated Food Production Program (NAFPP) 1972; Agricultural Development Projects (ADPs) launched in 1975; Operation Feed the Nation (OFN) launched in 1976; Rural Banking Program 1977-1991; Green Revolution Program (GR) inaugurated in 1980; Community Banking Program 1991-2007; Root and Tuber Expansion Program, 2000; National FADAMA Development Program; Family Economic Advancement Program (FEAP) 1997-2001; National Poverty Eradication Program (NAPEP) 1999-2007; National Economic Empowerment and Development Strategies (NEEDS I) 2004-2007; Microfinance, 2005 to date; Seven-point Agenda (2007-2010); NEEDS II 2008-2011, intended to help the country increase domestic agricultural production six-fold and achieve the Millennium Development Goal (MDG) for 2015; Agricultural Transformation Agenda (ATA) 2011-2015; Anchored Borrowers Program (ABP) (2015-date); Agricultural Promotion Policy 2016-date; and the Presidential Fertilizer Initiative 2016-date. Among the institutions established to promote agricultural production in the country are the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) formerly NACB, and now BOA 1972 to date; River Basin Development Authorities (RBDAs) 1976 to date – nine RBDA were established in 1977 as part of the third National Development Plan (1975-1980) to add to the existing Sokoto and Rima RBDAs. The program also focused on rural roads and electrification and creation of irrigation schemes; National Grains Production Company 1979; Directorate of Foods, Roads and Rural Infrastructures (DFRFI) 1985 – this agency adopted an integrated approach to rural development; NAIC 1987 to date; National Agricultural Land Development Authority 1991; and the Agricultural Financial Cooperatives – these are small-scale cooperatives in local communities and along commodity lines that are common across the country providing the vivacious guarantees which the individual farmer cannot provide (Olayiwola and Adeleye, 2005; Aderibigbe and Manson, 2018).

## **Contribution of Agriculture to RGDP**

According to Akande (1998), in the 1960s the sector performed creditably, contributing over 60% to the GDP, to such an extent that the regional development witnessed during these period was linked directly to the sector. This level dropped to about 20% in the 70's, which is attributed to overdependence on oil. The share of agriculture in the GDP from the year 2000 to 2010 has been revolving around 40%. However, it remains an important sector and a major

contributor to the country's GDP performing crucial and desirable functions in economic development.

**Table 4: Summary of Contribution of Agriculture to RGDP (1970-2010)**

Period	Crop (%)	Livestock (%)	Fishery (%)	Forestry (%)	Total Agric. (%)
1970 - 1979	34.78	2.91	0.71	1.21	48.20
1980 - 1989	32.86	3.28	0.90	1.19	39.28
1990 - 1999	34.81	2.74	0.64	1.08	39.27
2000 - 2010	37.15	2.67	0.56	1.39	41.76

**Source:** Computed from CBN (2008), NBS (2010)

\*Note that the GDP was compiled from 1960-1973 using 1962/1963 constant basic price, from 1974-1980 using 1977/1978 constant basic price and from 1981-2010 using 1990 constant basic price.

The adverse effect of the dominance of the oil sector in the 70s culminated into a low share value of 20.6% by 1980. The percentage share of the agricultural sector ranges between 30% and 37% within the period 1985 and 1995. Due to some further corrective measures the sector's share in the total GDP has since improved to a little above 40% from the year 2000 till 2010.

**Table 5: Summary of Annual RGDP Contribution by Sector (%) (2012-2019)**

Contribution to GDP	2012	2013	2014	2015	2016	2017	2018	Q3 2019
Agriculture	23.91	23.33	22.91	23.11	24.45	25.08	25.13	29.25
Industries	25.61	24.81	24.93	23.71	21.96	22.25	22.25	22.17
Services	50.48	51.86	52.16	53.18	53.59	52.67	52.62	48.59
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 6: Summary of Annual RGDP Growth Rate by Sector (%) (2012-2019)**

Growth Rate	2012	2013	2014	2015	2016	2017	2018	Q3 2019
Agriculture	6.70	2.94	4.27	3.72	4.11	3.45	2.12	2.28
Industries	2.43	2.16	6.76	2.24	-8.85	2.16	1.94	3.21
Services	3.97	8.38	6.85	4.78	-0.82	-0.91	1.83	1.87

**Source:** Computed from NBS (2019).

However, as shown in Tables 5 and 6, from 2012 to date the contribution of agriculture to GDP has dropped and fluctuated between 23% and 30%, above the industrial sector in 2016 – 2019 even so, the overall average growth rate of the sector at 3.7% was higher than the industrial and services sectors' rate of 1.5% and 3.24% over the eight-year period from 2012 – 2019, respectively.

### Challenges of Agricultural Finance Policies in Nigeria

Some of the identified challenges of agricultural finance policies in Nigeria include paucity of loanable funds; low management capacity of farmers; and inadequate supervision by credit institutions.



## METHODOLOGY

### The Study Area

Nigeria, historically a British colony, is a SSA nation geographically located in the West African sub-regional zone; with an approximate area of 923,769 km<sup>2</sup> (made up of 909, 890 km<sup>2</sup> of land area and 13, 879 km<sup>2</sup> of water). Nigeria's population is estimated to be above 160 million and a projected annual growth rate of 2.83% based on the 2006 census (World Bank, 2012). With this figure, the country's population is the largest in Africa, making up about 50% of the population of the West African sub region, and the fifth most populous country in the world. It is bounded in the west by Republic of Benin, in the east by the Chad Republic, in the North by Niger Republic, and in the south by the Atlantic Ocean. The longest distance from east of the country to west is about 767 km, and from North to South, 1,805 km (Federal Ministry of Women Affairs (FMWA) 2004; NBS, 2010).

Although the climate of Nigeria is broadly defined as generally tropical however, in specific terms, it is wide ranged. Two main seasons emerge from these climatic conditions viz.: the wet/rainy season between April and October with prevailing wind blowing from the southwest; and the dry season between November and March with its harmattan wind blowing from the northern part of the country.

The annual rainfall is about 51cm in most parts of the north while it is above 380cm in some parts of the south. Generally, the average temperature is within the range of 24°C and 27°C. Specifically, the average annual temperature is about 30°C in Lagos and could be as low as 23°C. On the Eastern Highlands and also on the Jos plateau the temperature is even lower as 21°C. Except for the plateau area, the northern part is usually hot and dry for most parts of the year with the extreme north having an average high and average low temperature of about 43°C and 10°C respectively (NBS, 2009).

Up till the early 1970's, the Nigerian economy was predominantly agricultural, producing primary agricultural products – cocoa, cotton, groundnuts, hides and skins, palm produce, rubber, timber and others – for exports; and staple tree and root crops – cassava, yam, plantain, banana and grains such as maize, millet, sorghum as well as rearing of livestock – for domestic consumption. Even with the discovery of crude oil at commercial scale in the early 1970s and later the main source and engine of growth of the Nigerian economy, agriculture continues to remain the broad economic base of the country as well as the most dominant sector.

Nigeria is also blessed with large deposits of mineral resources. Apart from crude oil, main source of the country's wealth in recent times, mining of metallic minerals – tin, iron-ore, columbite, zinc and lead – is currently gaining a recognizable position in the economy (Olalokun, 1979; Olayide, 1979; Anyanwu, 1997; and Odeleye, 2009).

### Sources of Data

The study utilized secondary data collected from the NBS, statistical Bulletins of the CBN, and the Nigerian Stock Exchange (NSE) covering a period of 25 years from 1990 – 2015. It made use of data on RGDP, credit allocation to agriculture under the ACGSF, credit allocation to manufacturing, foreign direct investment, and market capitalization to analyze the relationship between credit allocation to agriculture and the economy.

### Analytical Technique and Model Specification

The econometric technique of OLS was used in estimating the parameters of the variables in the model because it is simple to understand and has essential components of most other econometric techniques.

The RGDP is the dependent variable in the mathematical equation specified for this study;

$$RGDP = f(\text{CrAgri}, \text{CrMnf}, \text{FDI}, \text{Mcp}) \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

The independent variables are CrAgri, CrMnf, FDI, and Mcp.

Equation (1) is transformed into equation (2) for the empirical estimation thus;

$$RGDP = \beta_0 + \beta_1(\text{CrAgri}) + \beta_2(\text{CrMnf}) + \beta_3(\text{FDI}) + \beta_4(\text{Mcp}) + U \quad \dots \quad \dots \quad (2)$$

Where;

RGDP =	real gross domestic product
CrAgri =	agricultural credit under the ACGSF
CrMnf =	manufacturing credit
FDI =	foreign direct investment
Mcp =	market capitalization
$\beta_0$ =	constant intercept
$\beta_1 - \beta_4$ =	slopes of the graphs and parameters to be estimated
U =	random error term.

The basic theoretical assumption is that the independent variables will surely increase fund availability for desired investment which in turn will increase productivity and output of the nation.

### The Decision Criterion

The null hypothesis that CrAgri does not have effect on the economy will be accepted if the t-calculated is less than the t-tabulated. On the other hand, the null hypothesis that CrAgri does not have effect on the economy will be rejected if the t-calculated is greater than the t-tabulated.

## RESULT AND DISCUSSIONS

### Data Presentation

**Table 7: RGDP, Agricultural and Manufacturing Credit, Foreign Direct Investment and Market Capitalization in Nigeria (1990 – 2015)**

Year	RGDP(N'B)	Agric-Credit	Mnf-Credit	Foreign-Direct-Inv	Market Cap
1990	472.65	98,494.40	\$ 1,606,118,000.00	\$ 414,600,000.00	-
1991	545.67	82,107.40	\$ 1,611,255,000.00	\$ 411,500,000.00	-
1992	875.34	88,031.80	\$ 1,424,518,000.00	\$ 260,100,000.00	-
1993	1,089.68	80,845.80	\$ 860,643,300.00	\$ 532,700,000.00	2,142,500,000.00
1994	1,399.70	103,186.00	\$ 1,203,093,000.00	\$ 328,200,000.00	2,977,300,000.00
1995	2,907.36	164,162.10	\$ 1,496,441,000.00	\$ 191,753,400.00	7,777,200,000.00
1996	4,032.30	225,502.50	\$ 1,661,213,000.00	\$ 597,184,600.00	12,714,500,000.00
1997	4,189.25	242,038.20	\$ 1,776,028,000.00	\$ 102,972,800.00	12,559,050,000.00
1998	3,989.45	215,697.20	\$ 1,607,914,000.00	\$ 158,801,000.00	10,321,670,000.00
1999	4,679.21	246,082.50	\$ 1,634,716,000.00	\$ 172,817,600.00	2,939,580,000.00
2000	6,713.57	361,450.40	\$ 1,652,325,000.00	\$ 168,938,500.00	-
2001	6,895.20	728,545.40	\$ 1,789,778,000.00	\$ 93,883,560.00	-
2002	7,795.76	1,051,589.80	\$ 1,964,082,000.00	\$ 172,161,500.00	2,373,940,000.00
2003	9,913.52	1,164,460.40	\$ 2,226,699,000.00	\$ 167,321,400.00	-
2004	11,411.07	2,083,744.70	\$ 2,628,652,000.00	\$ 260,755,100.00	15,865,940,000.00
2005	14,610.88	3,046,738.50	\$ 3,143,849,000.00	\$ 14,635,080.00	22,244,000,000.00
2006	18,564.59	4,263,060.30	\$ 3,719,532,000.00	\$ 319,622,800.00	32,830,510,000.00
2007	20,657.32	4,425,861.80	\$ 4,140,298,000.00	\$ 867,529,700.00	84,894,570,000.00
2008	24,296.33	6,721,074.60	\$ 4,939,627,000.00	\$ 1,051,590,000.00	48,062,280,000.00
2009	24,794.24	8,349,509.30	\$ 4,112,168,000.00	\$ 1,525,140,000.00	32,223,400,000.00
2010	54,612.26	7,740,507.60	\$ 23,810,310,000.00	\$ 911,716,700.00	50,546,400,000.00
2011	62,980.40	10,189,604.30	\$ 29,258,340,000.00	\$ 816,764,600.00	39,028,390,000.00
2012	71,713.94	9,706,761.20	\$ 35,484,880,000.00	\$ 1,530,129,000.00	56,205,200,000.00
2013	80,092.56	942,450.00	\$ 45,980,980,000.00	\$ 1,227,438,000.00	80,609,900,000.00
2014	89,043.62	12,997,004.20	\$ 54,779,490,000.00	\$ 1,601,233,000.00	62,766,310,000.00
2015	94,144.96	11,441,978.80	\$ 45,357,020,000.00	\$ 1,465,378,000.00	49,973,880,000.00

**Source:** World Bank National Accounts Data, and organization for economic cooperation and development (OECD) National Accounts Data Files 2018.

The RGDP increased from ₦472.65 billion in 1990 to ₦6,713.57 billion in 2000. Over the period of the study the RGDP increased steadily from ₦6,895.20 billion in 2001 to ₦94,144.96 billion in 2015. The independent variable CrAgri improved from ₦98,494.40 in 1990 to ₦361,450.40 in 2000, but dropped to ₦215,697.20 in 1998. From 2001 to 2015 CrAgri showed a fluctuating trend, recording its highest figure of ₦12,997,004.20 in 2014. The independent variable CrMnf also showed a fluctuating trend from 1990-2000 and 2001-2015, but attained its topmost value of ₦1,776,028,000.00 in the time period of ten years from 1990-2000. Its highest figure was ₦54,779,490,000.00 in 2015. FDI also showed a fluctuating trend from 1990-2000 and 2001-2015, but in the time space of ten years attained a value of ₦597,184,600.00 in 1996 with the highest figure was ₦1,601,233,000.00 in 2014. Mcp figures for the years 1990-92, 2000, 2001 and 2003 were unavailable, although the figure fluctuated in the study period. It increased from ₦2,142,500,000.00 in 1993 to ₦12,714,500,000.00 in 1996 and continued to fluctuate from 1997-2015 but attained its highest figure of ₦84,894,570,000.00 in 2007.

**Data Analysis****Table 8: Regression Result**

Dependent Variable: RGDP

Method: Least Squares

Date: 05/26/18 Time: 17:51

Sample: 1990 2015

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Market-Cap.	0.001400	0.000421	3.327028**	0.0046
FDI.	1.37E-06	9.81E-08	13.93249***	0.0000
Mnf-Credit.	-2.53E-07	4.02E-06	-0.062825	0.9507
Agric-Credit.	1.33E-07	6.37E-08	2.090504*	0.0540
RGDP.	1523.102	1840.860	0.827386	0.4210
R-squared	0.983319	Mean dependent var		29850.24
Adjusted R-squared	0.978871	S.D. dependent var		32397.33
S.E. of regression	4709.188	Akaike info criterion		19.96474
Sum squared resid	3.33E+08	Schwarz criterion		20.21367
Log likelihood	-194.6474	Hannan-Quinn criter.		20.01333
F-statistic	221.0622	Durbin-Watson stat		2.834040
Prob(F-statistic)	0.000000			

\*\*\*Significant at 1% \*\*Significant at 5% \*Significant at 10%

**Source:** Researcher's computation from E-views 8.0

Table 8 shows the results of the data analysis and provides evidence of the relationship between the dependent and independent variables as well as the parameters or variable coefficients, t-statistics, R-square, adjusted R<sup>2</sup>, F-statistics and Durbin-Watson.

**Interpretation of Results**

The parameter values obtained from the regression result in Table 8 is substituted in the regression equation thus;

$$RGDP = \beta_0 + \beta_1 CrAgri + \beta_2 CrMnf + \beta_3 FDI + \beta_4 Mcp + U$$

$$RGDP = 1523.102 + 1.33CrAgri - 2.53CrMnf + 1.37FDI + 0.001400Mcp$$

The coefficient of the constant term is statistically significant and positive implying that, holding other explanatory variables constant, RGDP will be 1523.102. The coefficient of CrAgri is positively signed and statistically significant at 10% with t-statistic of 2.090504 which is greater than the t-tabulated value of 1.734, indicating that for every 1% change in CrAgri, RGDP increases by 1.33%. The coefficient of CrMnf is negatively signed and insignificant; thus, the variable does not significantly predict the outcome variable. The coefficient of FDI is positively signed and statistically significant at 1%, implying that an increase in FDI by 1%, RGDP will increase by 1.37. The coefficient of Mcp is positively signed and is statistically significant at 1%, suggesting that an increase in Mcp by 1% will bring about an increase of 0.001400 in RGDP.

### Hypothesis Testing

Ho: Enhanced CrAgri flow to farmers under the ACGSF has no significant impact on economic growth.

Ho: Access to CrAgri has no significant effect on farmers' productivity.

At 5% level of significance, if p-value is less than 0.05, null hypothesis is rejected. If the p-value is greater than 0.05, null hypothesis is accepted. F-calculated is 221.0622 compared with F-tabulated at 5% level of significance which is 3.41 with  $V_1=K-1=3$  and  $V_2=N-k(23-4)=19$ . Therefore, the model is significant because the F-calculated is greater than F-tabulated. The coefficient of determination ( $R^2$ ) in the regression equation is 98% denoting that the proportion of variation between the dependent variable RGDP is 98% explained by the independent variables (CrAgri, CrMnf, FDI and Mcp) while the remaining 2% were unexplained but captured by U. Since the  $R^2$  is 98% which is high, this indicates that the model is robust and nicely fitted to the regression line. The adjusted  $R^2$  value is 97%. This indicates that the proportion of variation of RGDP around its mean is 98% explained by the independent variables adjusted for 97 degree of freedom.

### CONCLUSION AND RECOMMENDATIONS

In Nigeria, agriculture is the leading economic activity that serves as the key driver of growth, sustainable and veritable means of wealth creation and poverty reduction for a large proportion of the population. It contributes about 40% of GDP and provides above 60% of employment to particularly poor small-scale producers in the rural areas. Unfortunately, this group lacks access to capital to acquire the needed inputs to increase output and incomes. Efforts and initiatives by successive Nigerian governments to address the problem have produced lower than expected results as rural farmers still encounter difficulties in accessing credit from formal financial institutions, albeit insufficient and at high interest rates. Findings of this study revealed that medium and large-scale agricultural production in Nigeria is relatively small but growing.

In addition to the CBN's credit guarantee scheme and strategic financial interventions, there is need for adequate level of strategically targeted investments in rural infrastructures such roads, communication links, power supply, water, irrigation, storage facilities, modern farming implements and inputs such as fertilizers. Also, the enlightenment of farmers on modern farming practices and techniques and management skills so as to amplify the potentials and productivity of farmers and by extension create more employment opportunities, increase the supply of food, livestock feeds, and industrial inputs as well as boost export earnings.

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