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IMPACT OF AGRICULTURAL CREDIT GUARANTEE SCHEME FUND ON CROPS AND LIVESTOCK PRODUCTION IN NIGERIA: 1987 – 2020

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Abstract

The study examines the impact of Agricultural credit Guarantee scheme fund (ACGSF) on output of crop and livestock subsectors in Nigeria. Secondary data for the period of study(1987-2020) were sourced from Central Bank of Nigeria Publications and Statistical Bulletin of various years. Autoregressive Distributed Lag (ARDL) model was adopted to establish the impact of Agricultural Credit Guarantee Scheme Fund(ACGSF) credit to crop sub-sector, average annual rainfall and rural population(independent variables)on output of crop sub-sector(dependent variable);and the impact of ACGSF credit to cattle rearing, poultry,and sheep rearing(independent variable)on output of livestock subsector(dependent variable).The results revealed a positive and statistically significant impact of ACGSF on output of crop and livestock subsectors in Nigeria. It was found that ACGSF credit to cattle rearing led to an increase in output of livestock subsector by 29 per cent .Also, a percentage increase in ACGSF credit to poultry led to an increase in output of the livestock subsector by 11 percent and 1 percent increase in ACGSF loans led to a 10 percent increase in output of crop subsector. The ARDL results for both the crop and livestock subsectors indicate that output of both sectors respond to deviations from equilibrium such that if the short run variables deviate from equilibrium, they tend to re-adjust back to equilibrium in the long run. The implication is that credit advanced to the subsectors in the short run may only significantly affect output in the long run.The study therefore recommends among others that the scheme should be sustained and credit to farmers should be sustained over a given period in order to ensure increased output and ultimately ensure increased food supply.

Key Words: Agricultural Credit Guarantee Scheme Fund; Livestock sub-sector; Crop sub-sector.

1. Introduction

Agriculture plays a prominent role in the economic growth process of developed and developing countries. As a primary sector, agriculture forms the bedrock on which the growth of economies is founded, as it provides employment, raw materials for growing industries, food for the ever growing population and serves as a source of foreign exchange earnings.

Sub-Saharan Africa is made up of countries whose economies are heavily dependent on agriculture. Thus, agriculture plays a critical role in these economies, providing employment for a huge proportion of the work force and providing food for the teeming population. Agriculture also provides raw materials for the manufacturing sector. Thus agriculture is the backbone on which other sectors and indeed the whole economy depend for growth.

In Nigeria, agriculture was the mainstay of the economy before the oil boom of the 1970's. However, following the oil boom, the contributions of agriculture to the economy has continued to decline or at best stagnate even though its importance has not diminished. This scenario worsened over the last three decades following the growth of the service and industrial sectors. For instance, available statistics reveal that contribution of agriculture to the Gross Domestic Product (GDP) hovered around 19 percent and 19.9 percent between 1994 and 2001, 22.9 percent and 25.2 percent between 2005 and 2019 respectively. On the contrary, the contributions of the service sector grew steadily from 38 percent to 52 percent over the same period (CBN, 2019). This trend has serious implications for the Nigerian economy. First, if the contribution of agriculture is declining, it implies that agricultural output in general and food production in particular is declining. Second, if food production is declining and population is increasing, it means that there is shortage in food supply relative to food demand. This shortage in food supply is evident in the rising cost of food stuff, rising importation of food, widespread malnutrition, food shortages, unbalanced nutrition, and low quality of food. Finally, over two-thirds of Nigerian population reside in rural areas and are engaged in agriculture. Thus declining contribution of agriculture implies declining incomes for this proportion of the population. It also implies inability to access good quantities and qualities of food as purchasing power is declining.

Nigerian agriculture is largely subsistent and traditional in nature and farmers lack sufficient funds to invest in farm business as such, they are unable to acquire mechanized farm implements needed to expand output. Consequently, there is a shortfall in the output of food to feed the increasing population.

The Agricultural Credit Guarantee Scheme Fund was established by the Federal Military Government of Nigeria in 1977. The aim of the fund is to boost bank credit to the agricultural sector through the provision of guarantee in respect of loans given by any bank for agricultural purposes. Loan guarantee by ACGSF covers areas of agricultural activities ranging from production of food crops, cash crops, establishment and management of plantations, animal husbandry and processing of agricultural output. The Central Bank of

Nigeria (CBN) oversees the day-to-day operations of the scheme through its agricultural finance department and credit is administered to farmers through its branch offices. The process of credit administration includes loan application, application for guarantee, loan recovery and enforcement of guarantee claims among others. Loan duration varies from short-term to medium term and long term depending on the rate of crop growth or agricultural activity for which loan was given.

Since its inception, ACGSF has guaranteed credit worth hundreds of millions of Naira to farmers. For instance, within the period of study, credit guaranteed to the food crop, livestock and fisheries subsectors increased from 56,906.6, 29387.9, 4,526.3 to 2,209,169.65, 753,748.0 and 253,705.0 million Naira respectively. This represents an increase of 3,872 percent, 2464.8 percent and 5,505.1 percent respectively. Over the same period, contributions of these subsectors to the GDP increased from 2,330.0, 16,544.52 and 433.43 to 1,233.11, 40.65 and 380.03 million Naira respectively. This represents an increase of 610 percent, 184 percent and 834.88 percent for the food crop, livestock and fisheries subsectors respectively (CBN, 2019).

A cursory look at this scenario reveals that performance of the agricultural sector in terms of contribution to the GDP has not matched the increase in credit at any point. Hence it has become important to re-examine the impact of Agricultural Credit Guarantee Scheme Fund on agriculture in general and food supply in particular.

The Agricultural Credit Guarantee Scheme Fund was established to meet the increasing need for credit by farmers for the purpose of improving the traditional methods of production and address food supply problem in the country. Such improvements in techniques of farming which involve the acquisition of modern farm inputs and implements are capital intensive and farmers lack the requisite capital needed for such investment. Olukunle (2013) observes that limited access to capital by farmers to a large extent explains the limited growth of the sector, its inefficient performance in terms of food production in particular as well as the low adoption of modern farm techniques. Orok and Ayim (2017) opine that agricultural credit has fundamental impact on the inputs that facilitate farming and other extensive agricultural practices that ultimately

translate into increased output. Aliyu (2012) reiterates that there is a positive and significant relationship between credit and agricultural output. These assertions notwithstanding, the question of whether available credit is actually having the desired level of impact on output remains pertinent. It has therefore become imperative to investigate the impact of Agricultural Credit Guarantee Scheme Fund on the output of the agricultural sector in general and the output of crop and livestock sub-sectors in particular.

Research Questions

- i. What is the impact of Agricultural Credit Guarantee Scheme Fund on crop production in Nigeria?
- ii. What is the impact of Agricultural Credit Guarantee Scheme Fund on livestock production in Nigeria?

Objectives of the study

The general objective of the study is to examine the impact of Agricultural Credit Guarantee Scheme Fund on output of food in Nigeria. The specific objectives are:

- i. To examine the impact of ACGSF on crop production in Nigeria.
- ii. To examine the impact of ACGSF on livestock production in Nigeria.

Research Hypotheses

H_0 : ACGSF has no impact on crop production in Nigeria.

H_0 : ACGSF has no impact on livestock production in Nigeria.

The study is structured into five sections. Following this introduction is the review of relevant literature and theoretical framework in section two. The third section discusses the methodology of the study while section four presents and analyses the data. The last section deals with conclusion and recommendations.

2. Literature Review

2.1 Conceptual Review

Conceptually, Harris and Fuller (2014) define agriculture as the many ways in which crops and domestic animals sustain the global human population by providing food and other products. In their literary exposition, Harris and Fuller explain the word

agriculture to originate from two Latin words 'Agar' (field) and Colo (cultivate) to refer to descriptive terms such as cultivation, domestication, horticulture, arboriculture and vegiculture as well as forms of Livestock management such as mixed crop-livestock farming and pastoralism. This definition lends credence to the fact that agriculture is not limited to crop and plants cultivation but animal rearing and management. As a matter of fact, the word management implies that agriculture also involves business. Akor (2008) defines agriculture as the sum total of all operations involved in the production, processing, storage and distribution of farm commodities as well as research, training in the field of crops, forestry, fish and livestock. Barraclough (2000) cited in Akor (2008) defined agriculture as the purposeful application of human ingenuity and labour, combining natural resources of flora and fauna, water and soils to produce food and other agricultural products to meet human needs. National Geographic (2011) defines agriculture as the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. On the other part, Todaro and Smith (2003) describe the agricultural sector as that portion of the economy comprising of agriculture, forestry, hunting and fishing.

Meanwhile, credit is defined as that instrument which facilitates business (Passi, 2017). Hence credit is perceived as not just money. It may be in form of equipment or valuable assets which one needs to facilitate business. The author enumerates the role of credit to include: provision of money for large scale production, increase in its profit rate, provision of resources to increase consumption, enabling business firms to acquire strong resource base and the provision of working capital among others. Dalio (2015) described credit as the transaction between lender and borrower in which the borrower promises to pay back in future with interest. According to Dalio, credit leads to increase in spending thus increasing income levels in the economy which in turn leads to high gross domestic product (GDP) and faster growth in output. He emphasizes that if credit is used to purchase productive resources; it leads to increase in income and brings about economic growth. Sodeeq et al (2019) defined credit as a means by which an organization or an individual provides funds to users with the

understanding that the sum of money given to the borrower will be paid back at a later date.

2.2 Theoretical Review

Chamber and Conway (1991) extended the sustainable livestock theory for capabilities, including capital and other social resources as well as other farming practices required for a means of living. The theory holds that increased output can only be achieved by ensuring secured ownership of, or access to capital resources and income earning activities which includes; reserves and assets to offset risk, ease stocks and meet contingencies as well as enhancement and maintenance of productive resources on a long term basis. Therefore, increased agricultural output does not just ensure food affordability but also creates the ability to produce food and earn income on a long term basis by farmers.

Wiggins (2006) in his proposition of the Agricultural based economic development theory stressed that Agriculture requires a technical, institutional and financial incentive change that will raise the productivity of small farmers. The theory further explains that in the strife for economic development; agricultural financial scheme can play a dual role of increased purchasing power and provision of input to sustain the industrial revolution.

2.3 Empirical Review

Islam (2020) investigates the impact of agricultural credit on agricultural productivity in Bangladesh. The study employs annual time series data collected from Bangladesh Bank, Ministry of Finance and Bangladesh Bureau of Statistics from 2000 – 2019. The Autoregressive Distributed Lag Model (ARDL) is used to estimate the short run and the long run relationship between agricultural credit and agricultural productivity along with other controlled variables. The long run estimation reveal that the coefficient of agricultural credit, government expenditure on agriculture and inflation were all positive and government expenditure on agriculture was found to be statistically significant at 5% level. The coefficient of government expenditure is 0.133097. By implication, a 1% increase in government expenditure on agriculture is associated with a 0.13% increase in agricultural GDP. The study concludes that

there is a long run relationship between agricultural credit and agricultural productivity.

Nakazi and Nathan (2020) examine the effect of commercial bank credit on agricultural growth in Uganda. Quarterly series data sourced from Bank of Uganda and Uganda Bureau of Statistics are used for the study. Study period is from 2008Q3 – 2018Q4. The study utilizes the Autoregressive Distributed Lag (ARDL) approach to examine the short run and long run relationship between the dependent variable (Agricultural GDP) and independent variable (Commercial Bank Credit). The study reveals that credit has a significant and positive impact on agricultural output in the long run. In the short run credit has an instantaneous impact on agricultural output.

Reuben, Nyam and Rukwe (2020) study Agricultural Credit Guarantee Scheme Fund and its effects on agricultural output in Nigeria. The study utilizes secondary data from the Central Bank of Nigeria and National Bureau of Statistics. Data were analysed using descriptive and inferential statistics. The study found that supply of funds to the agricultural sector was not consistent across the sub-sectors while supply of credit to the crop sub-sector increased only between 1998 and 1999, supply of credit to livestock rose consistently over the period of the study. The regression result revealed the multiple coefficient of determination (R^2) to be 0.8523 while the coefficient of ACGSF on crop, livestock and fishery subsectors were 0.1607, 0.2320 and 0.2110 respectively with positive signs and all significant at 1% and 5% levels. The study concludes that ACGSF has significant and positive effect on agricultural output in Nigeria.

Okpe, Abu, Odoemenem and Asogwa (2018) study the effect of commercial loan to agriculture on rice yield response from 1966 to 2015 using the Autoregressive Distributed Lag (ARDL) approach. Time series data covering the period 1966 – 2015 are sourced from the Food and Agriculture Organization (FAO). The study employs inferential statistics for data analysis and the Augmented Dickey-Fuller (ADF) test to test for stationarity. The ARDL approach is used to estimate the response of rice yield to commercial bank credit. Results show that the effects of commercial loan to agriculture on rice yield was found to be elastic (0.19)

and insignificant but elastic (0.29) in the long run. This implies that rice yield was responsive to commercial loan to agriculture in both the long run and in the short run.

Asghar and Salman (2018) examine the impact of agriculture credit on food production and food security in Pakistan. Survey technique is used to elicit primary data with the aid of structured questionnaires. Data is analysed using the independent t-test. Results show that production of borrowers increased after utilizing credit because of the use of improved farm inputs.

Chardio, Jiang, Wei, and Guangshun (2018) examine the effects of agricultural credit on wheat productivity of small farms in Sandh, Pakistan. The study utilized cross-sectional data collected from 180 wheat farmers. Data are analysed by applying different econometric techniques. The Cobb Douglass production function is estimated using the two-stage least square regression. Findings reveal that agricultural credit has a positive and highly significant effect on wheat productivity in the short-term. The effect is however not so strong in the long-term.

Akerele, Ashaolu, Sanusi and Egbetade (2017) analyse the partial effects of agricultural credit guarantee scheme fund (ACGSF) on output of Nigeria's agricultural subsectors. Time series data for the output of crop, livestock and fishery sector as well as credit allocated to each subsector from 1982 to 2013 is elicited from the Central Bank of Nigeria Statistical Bulletin. Analytical technique includes the unit root test (Augmented Dickey-Fuller Test) to test for stationarity. Co-integration test is also conducted. The ordinary least square regression method is used to estimate the effects of Agricultural Credit Guarantee Scheme Fund (ACGSF) on the growth of the output of the crop, livestock and fishery sub-sectors respectively. Findings reveal that there is a positive and statistically significant influence of the amount of fund apportioned to crop ($P < 0.01$) and livestock ($P < 0.05$) on the growth of these two subsectors. However, the effect of fund on the output of fishery subsector is only significant at 10% and takes up to two years.

Asom (2017) examines the effect of institutional credit on farmers' output in Benue State, Nigeria using the

Bank of Agriculture as case study. A sample of 362 respondents is selected using proportionate sampling techniques. Descriptive statistics are used for data analysis while test of mean differences is used to estimate the effect of Bank of Agriculture (BOA) credit on output of credit beneficiaries. Results reveal that there is a difference between farmers' output before and during the benefits of credit from BOA.

Ijariya, Abdulraheem, Ijariya and Abdullahi (2017) analyse the relationship between ACGSF and food security in Nigeria. Secondary data were sourced from the Central Bank of Nigeria and analysed. The OLS is used to estimate the model. The study utilizes the differences-in-difference estimator to examine the influence of change in ACGSF loan on food crops output during the period of the study. Findings reveal that only the initial level of ACGSF loan influenced food crops output. The implication is that for consistent increase in food crop production to be achieved, there must be a sustained rise in credit given to agriculture by ACGSF since it takes time for output to respond to financial input.

Maptumo, Mushunje and Chidoko (2017) study the impact of government agricultural expenditure on poverty in Zimbabwe. The study uses simple poverty and growth expenditure elasticities to estimate the impact of government agricultural expenditure on poverty reduction in Zimbabwe. The results show that the growth in agricultural expenditure is less than what is required to eliminate poverty as stipulated by the Millennium Development Goals. This study is, however, limited in the sense that it is restricted to Zimbabwe, hence the generalizations cannot be applied to Nigeria.

Zakaree (2014) examines the impact of Agricultural Credit Guarantee Scheme Fund (ACGSF) on domestic food supply in Nigeria from 1998 – 2011. The E-views econometric package is used for data analysis while the OLS regression model is used to estimate the variables. The findings reveal a positive relationship between credit supply and domestic food supply. A distinguishing feature of Zakaree's study is that it pays attention to other important variables (such as weather, rural labour and rainfall) which could limit output even with availability of credit.

Although the studies reviewed so far are detailed in their own respect, this study is necessitated by the need to emphasize flexibility in agricultural finance policy to accommodate the time lag between policy implementation and policy impact on agricultural output.

3. Methodology

3.1 Model Specification

The study is structured into two econometric models based on the objectives of the study in order to analyse the impact of Agricultural credit Guarantee scheme fund (ACGSF) on crops and livestock production in Nigeria. Based on these the study adopts the ARDL models of Okpe, Abu, Odoemenem and Asogwa (2018) and Zakaree (2014) with the following modifications:

- i. The current study uses the following variables: Agricultural Credit Guarantee Scheme Fund, ACGSF, Average Annual Rainfall and Rural Population while Okpe, Abu, Odoemenem and Asogwa (2018) used the following variables: Rice yield, producer price of rice, producer price of wheat, producer price of maize, rice output, rice hectareage, annual rainfall, commercial bank credit and fertilizer.
- ii. The study uses the same variables as Zakaree (2014) however Zakaree adopted Ordinary Least Square for estimation while this study adopted Autoregressive Distributed Lag model.
- iii. Model II includes livestock subsector which is disaggregated as sheep rearing, poultry and cattle rearing. These variables are absent in both Okpe et al and Zakaree studies.

The models for the study are stated as follows:

Model one is used to analyse the impact of Agricultural credit guarantee scheme fund (ACGSF) on output of crop sub-sector (OUTPUTC) in Nigeria. The model is mathematically specified as follows:

$$\text{OUTPUTC} = f(\text{ACGSF}, \text{AAR}, \text{RP}) \dots \dots \dots 1$$

The econometric specification for above functional relation is presented as:

$$\text{OUTPUTC} = \beta_0 + \beta_1 \text{ACGSF} + \beta_2 \text{AAR} + \beta_3 \text{RP} + \varepsilon_1 \dots 2$$

Where: OUTPUTC = output of crop as the dependent variable, ACGSF = Agricultural credit guarantee scheme fund, AAR = Average Annual Rainfall, RP = Rural Population, β_0 = Intercept,

β_1 to β_3 = coefficient of variables., ε_1 = stochastic error term

The a priori expectation of Agricultural credit guarantee scheme fund is positive, Average Annual Rainfall (positive) and Rural Population (positive). It is expected that ACGSF, ARR and RP will positively impact output of food crop production.

Model two is used to analyse the impact of Agricultural credit guarantee scheme fund (ACGSF) on output of livestock sub-sector (OUTPUTLS) in Nigeria. The mathematical specification of the model is as follows:

$$\text{OUTPUTLS} = f(\text{ACGSFCR}, \text{ACGSFPF}, \text{ACGSFSR}) \dots 3$$

While the econometric model is as follow:

$$\text{OUTPUTLS} = \lambda_0 + \lambda_1 \text{ACGSFCR} + \lambda_2 \text{ACGSFPF} + \lambda_3 \text{ACGSFSR} + \varepsilon_2 \dots \dots \dots 4$$

Where: OUTPUTLS = output of livestock as the dependent variable, ACGSFCR = Agricultural credit guarantee scheme fund on cattle rearing, ACGSFPF = Agricultural credit guarantee scheme fund on Poultry farming, ACGFSR = Agricultural credit guarantee fund on Sheep rearing, λ_0 = Intercept, λ_1 to λ_4 = coefficient of variables. ε_2 = stochastic error term

The a priori expectation: ACGSFCR (Positive), ACGSFPF (Positive), and ACGSFSR (Positive). It is expected that ACGSF credit to sheep rearing, cattle rearing and poultry will positively impact output of livestock.

3.2 Method and Sources of Data Collection

The study used time series data for the period 1987 - 2020 generated from the Central Bank of Nigeria (CBN) statistical bulletin. Data obtained from this source include: data for agricultural GDP for crop and livestock sub-sectors and data for ACGSF disbursement to crop and livestock sub-sectors. Thus, data for this study is basically from secondary source.

3.3 Techniques of Data Analysis

The study used Autoregressive distributed Lag (ARDL) techniques for the estimation of all the equations as specified in model one and two. The ARDL (p,q) specification:

$$\phi(L)y_t = \Phi + \theta(L)X_t + \mu_t \dots \dots \dots 5$$

With

$$\phi(L) = 1 - \Phi_1 L - \dots - \phi_p L^p \dots \dots \dots 6$$

$$\theta(L) = \beta_0 - \beta_1 L - \dots - \beta_q L^q \dots \dots \dots 7$$

Hence, the general ARDL ($p, q_1, q_2, \dots, q_k$)

$$\phi(L)y_t = \Phi + \theta_1(L)X_{1t} + \theta_2(L)X_{2t} + \theta_k(L)X_{kt} + \mu_t \dots 8$$

Using the Lag operator L applied to each component of the vector, $L^k y = y_{t-k}$, is convenient to define the lag polynomial $\phi(L)$ and the vector polynomial $\beta(L, P)$.

As long as it can be assumed that the error term μ_t is a

white noise process, or more generally is stationary and independent of $x_t, x_{t-1}, \dots$ and y_t, y_{t-1} . Stationarity tests were also conducted to test for its stochastic properties using unit root tests in order to avoid spurious results (Zakaree, 2014).

4. Presentation of Data and Analysis of Results

4.1 Tests for Unit Root

Table 1: Test for Unit Root Analysis (Model 1 & 2)

VARIABLES	ADF TEST AT LEVELS		ADF TEST AT FIRST DIFF		ORDER OF INTERGRATIO N
	ADF statistics	Critical Value at 5%	ADF statistics	Critical Value at 5%	
Δ OUTPUTC	-1.536229	-2.9591	-4.2727431	-2.9627	I(1)
Δ ACGSF	-1.518337	-2.9591	-4.966329	-2.9627	I(1)
Δ AAR	-3.836215	-2.9591	-2.429228	-2.9627	I(0)
Δ RP	-1.204735	-2.9591	-4.367784	-2.9627	I(1)
Δ OUTPUTL	-2.35269	-2.9591	-3.423628	-2.9627	I(1)
Δ ACGSFCR	-4.92628	-2.9591	-2.328821	-2.9627	I(0)
Δ ACGSFPF	-2.39183	-2.9591	-3.629223	-2.9627	I(1)
Δ ACGSFSR	-1.36628	-2.9591	-4.427284	-2.9627	I(1)
Δ = Difference Operator, I(d) = No. of times of integration, Level = 5% level of significance					

Source: Computed by Researcher using E-Views 10, 2022

The stationarity test was conducted to find out the properties of the time series data whether they are stationary or non-stationary. The unit root test result for model 1 in table 1 indicates that the variables OUTPUTC, ACGSF and RP are stationary after first difference as ADF statistical values are greater than the critical values at 5% level of significance for the variables mentioned, while AAR variable is stationary at level as indicated by the ADF statistics and the critical value at 5% level of significance. Similarly, the result for model 2 in table 1 revealed that all the variables except ACGSFCR are stationary at level as the ADF statistical value is greater than the critical value at 5% level of significance while the variables

(OUTPUTL), (ACGSFPF), and (ACGSFSR) are stationary after first difference at 5% level of significance. Table 1 results of both model 1 and model 2 reveal that the variables in the series are a mixture of I (0) and I (1) variables. Thus, ARDL approach which accommodates such a specification remains the most appropriate methodology for this analysis.

4.2 Test for Co-integration

Since the variables of the study are integrated of different order as indicated in the unit root test result, the data set met the necessary condition for the use of ARDL model.

Table 2: F-Bound Test for Co-integration H_0 : No Co-integration (Model 1)

Test Statistic	Value	Degree of freedom	Probability
<i>F-statistic</i>	22.25	(3,53)	0.0000

<i>Chi-square</i>	492	5	0.0000
<i>Pesaran Critical values</i>	<i>Lower bound</i>	<i>Upper bound</i>	
	3.28 (10%)	3.14 (10%)	
	3.16 (5%)	5.32 (5%)	
	3.83 (1%)	1.74(1%)	

Source: Computed by Researcher using E-Views10, 2022

Table 3: F-BoundTest for Co-integration H_0 : No Co-integration (Model 2)

Test Statistic	Value	Degree of freedom	Probability
<i>F-statistic</i>	19.14	(4,953)	0.0000
<i>Chi-square</i>	417	4	0.0000
<i>Pesaran Critical values</i>	<i>Lower bound</i>	<i>Upper bound</i>	
	2.36 (10%)	3.83(10%)	
	6.28 (5%)	9.15 (5%)	
	3.16 (1%)	4.52(1%)	

Source: Computed by Researcher using E-Views 10, 2022

Table 2 and 3 shows the result of the F-bound test for co-integration for model 1 and 2. The tests were conducted by using long-run coefficient restrictions to compute the *Chi-square* statistic or F- statistic values for determining the acceptance or rejection of the null hypothesis of no co-integration among the variables in the ARDL model. The calculated F statistic in table 2 and 3 are $F = 22.25[0.000]$ and $F = 19.14[0.000]$ respectively while the relevant critical

values bound for this test as computed by Narayan (2005) at the 95% level of are given by 3.16 – 5.32 and 6.28 – 9.15 respectively. Since the F statistic exceeds the upper bound of the critical values in both the models, this implies that the null hypotheses of no long run relationship between the variables are rejected. This implies that there exists a long run relationship between the variables.

4.3 ARDL Analysis

Table 4: Estimated Long-run Coefficients of ARDL Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ACGSF-1)	0.37	0.0037	2.5180	0.0032
D(AAR-1)	0.09	0.0810	1.829	0.0942
D(RP-1)	0.22	0.0392	3.111	0.0326
C	-0.289	2.4291	3.071	0.0071
R-Squared	0.75	Mean DepVar	219.3	
Adjusted R-Square	0.71	S.DDepVar	101.6	

Source: Computed by Researcher using E-Views 10, 2022

Table 4 shows the estimated result for long run coefficients of ARDL for model one. The result indicates that Agricultural credit guarantee scheme fund (ACGSF) during the previous one year has a positive and significant impact of about 0.37 per cent on output of crop production. This implies that one per cent increase in Agricultural credit guarantee scheme

fund (ACGSF) increases output of crop by about 0.37 per cent in Nigeria. The result suggests that Agricultural credit guarantee scheme fund (ACGSF) has positive effect on the crop output of Nigerian economy over the period of study. This finding is in line with the works of Akerele, Ashaolu, Sanusi and Egbedade (2017)

Similarly, Average Annual Rainfall (AAR) has positive impact on output of crop over the study period. A unit increase in Average Annual Rainfall (AAR) increased output of crops by about 0.09 per cent but is statistically insignificant as indicated by the probability value (0.0942) which is greater than 0.05 level of significance. This is as expected. This is because Average Annual Rainfall makes farmers to plan their planting season and enables crops to grow and produce good seed and consequently larger output.

Rural Population (RP) estimated result shows that rural population has a positive and statistically significant impact on the output of crops in Nigeria. It is clear that since more agricultural activities in Nigeria takes place in the rural areas, crop production will rely on the population of the rural areas who work in the farm to produce crops for the entire population. An increase in the population of the rural dwellers who engage in farming will lead to increase in crop production by about 0.22 per cent.

Table 5: Estimated Long-run Coefficients of ARDL Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ACGSFCR-1)	0.29	0.0055	-2.633	0.0012
D(ACGSFPF-1)	0.11	0.0382	4.840	0.0026
D(ACGSFSR-1)	0.30	1.4828	3.366	0.0212
C	1.67	4.2670	3.366	0.0489
R-Squared	0.51	Mean DepVar	162,3	
Adjusted R-Square	0.47	S.DDepVar	191.5	

Source: Computed by Researcher using E-Views 10, 2022

Table 5 shows the long-run result of ARDL. Agricultural credit guarantee fund on cattle rearing (ACGSFCR) has a positive and significant impact on output of livestock production in Nigeria during the period under study. This result shows that an increase in Agricultural credit guarantee fund on cattle rearing (ACGSFCR) will lead to increase in output of livestock by about 0.29 per cent. Agricultural credit guarantee scheme fund on Poultry farming also

indicates a positive and significant impact on livestock output in Nigeria. A percentage increase in Agricultural credit guarantee fund on Poultry farming will lead to increase in livestock output by 0.11 per cent. The result for Agricultural credit guarantee fund on Sheep rearing is not quite different from other variables as the result shows positive impact on livestock output during the period under review.

Table 6: Estimated Short-run Coefficients of ARDL Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ACGSF)	0.10368	0.0318885	6.632965	0.0000
D(AAR)	-0.37217	0.095380	6.94670	0.0000
D(RP)	-0.3736	2.352678	2.62689	0.0232
ECMt(-1)	-0.41689	0.853681	4.85810	0.0058

Source: Computed by Researcher using E-Views 10, 2022

Table 7: Estimated Short-run Coefficients of ARDL Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ACGSFCR)	0.483030	0.3745839	6.264831	0.0000
D(ACGSFPF)	-0.20463	0.735382	4.083832	0.0019
D(ACGSFSR)	0.217648	0.854384	2.746324	0.0219
ECMt(-1)	-0.758080	0.277487	6.136738	0.0000

Source: Computed by Researcher using E-Views 10, 2022

Table 6 shows the result for short-run ARDL for model one estimated at first difference. The result reveals that the Error Correction Term (ECM (-1)) is negative (-0.41689) as expected, and is highly statistically significant as indicated by the probability value (0.0058) which is less than 0.05. The negative sign implies that there is adjustment from short-run to long-run equilibrium among the variables of the study. That is, the output of crops responds to deviations from equilibrium such that if the short run variables deviate from equilibrium, they tend to re-adjust back to equilibrium in the long run. The coefficient of ECM(-1) indicates an annual speed of adjustment of about 0.758 percent from long-run disequilibrium per annum. This means that about 0.76 percent of the disequilibrium errors, which occurred the previous years, are corrected in the current year.

Furthermore, all the estimated short-run coefficients are statistically significant but only ACGSF has expected signs. The result shows that 1percent increase in ACGSF increases the output of crops by about 0.10 percent. Similarly, 1percent increase in AAR and RP decreases output of crops by about 0.37 percent and 0.37 percent respectively. These results are in not intandem with the result of long-run ARDL model, but similar only in one of the variables (ACSGF) and their magnitudes of the estimated coefficients. This outcome is justified given the persistent increase in insecurity and the increasing herdsmen and farmers clashes which became prevalent in the last decade of the period of study which forced many farmers out of the rural areas in search of safety. The result is drastic decline in output.

The estimated short-run coefficient of ARDL model two results is presented in table 7. The result reveals that the Error Correction Term (ECM (-1)) is negative (-0.758080) as expected, and is highly statistically significant. The negative sign implies that there is adjustment from short-run to long-run equilibrium among the variables of the study. That is, the output of livestock responds to deviations from equilibrium such

that if the short run variables deviate from equilibrium, they tend to re-adjust back to equilibrium in the long run. The coefficient of ECM(-1) indicates an annual speed of adjustment of about 0.758 percent from long-run disequilibrium per annum. This means that about 0.76 percent of the disequilibrium errors, which occurred the previous years, are corrected in the current year.

Also, ACGSFCR and ACGSFSR have positive and significant impact on livestock output in Nigeria during the review period. 1 percent increase in ACGSFCR and ACGSFSR would lead to 0.48per cent and 0.22 percent increase in livestock output respectively. ACGSFPPF shows a contrary result from the long-run estimation. 1 increase in ACGSFPPF will lead to decrease in livestock output by 0.20percent. The result for poultry farming is justifiable given the persistent out break of bird flu which is a major challenge to poultry farming.

5. Conclusion and Recommendations

Based on the above findings, the study concludes that ACGSF has positive impact on the crop and livestock subsector in Nigeria during the period under study. It was also found that credit advanced to the crop and livestock subsectors in the past period is more likely to impact output in the current period. The study which covered the period 1987-2020 shows that ACGSF as the main variable of the study has contributed to the improvement of agricultural sector in the country through boosting of both crop and livestock production. The results obtained in this study are consistent with the conclusion of Akerele, Ashaolu, Sanusi and Egbetade (2017)

The study therefore recommends that the ACGSF credit to crop and livestock production should be sustained over a given period in order to boost food supply in Nigeria and eliminate her dependence on food importation. The government should grant more funds to the cash crop and livestock sub-sectors as these sub-sectors are key to achieving sustained increase in food supply.

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