Impact of Agricultural Subsidy on Agricultural Output

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Abstract: - **This research work explored the impact of agricultural subsidy on agricultural output. A data span of a decade (2007 to 2016) was sourced and analysed using two-staged least squares regression method. Findings revealed however at a statistical significance that agricultural subsidy has significant impact on agricultural output. The need for government to put in place policies to kindle agricultural commercialization through cooperative system was recommended.**

Keywords: **Agricultural subsidy, Agricultural input, credit facilities, Agricultural output**

I. INTRODUCTION

There is a rapid proceeding of industrialization and consolidation in the food system. This is mostly evident, and of utmost social interest, in the agricultural production constituent of the food system. Provision of food for man and raw materials for industries (agro based) are the main importance of Agriculture. Agriculture involves all the activities of man geared towards better crop and animal yield. Agriculture has been a major employer of labour in many countries from time immemorial in addition to providing food for the populace and generation of revenue for the Government.

Before the discovery of oil in Nigeria, agriculture was the major revenue generator to the Nigerian economy but the oil boom of 1970s had an adverse effect on the agricultural sector and its capacity as it not only lost its place as the major revenue generator, it lost thelabour force that was supposed to keep on impelling the agricultural sector to greater heights. This however stunted the capacity of agricultural produce in Nigeria and even discouraging agricultural activity within the citizenry.

In 2013, the Government provided subsidy of up to 85% discount for a bag of fertilizer which could explain the rise in Agricultural GDP from ₦16,816.55 billion in 2013 to ₦18,018.61billion in 2014 although the reinforcement in farming and other agricultural activity has been minimal since the evolvement of oil.

Agricultural subsidy is a governmental subsidy paid to farmers and agribusinesses to supplement their income, manage the supply of agricultural commodities, and influence the cost and supply of such commodities. Agricultural subsidies have been an important part of agricultural policies among governments of developing and developed countries.Agricultural subsidy can come in so many forms like credit grants to farmers, interest free loans, fertilizer subsidy (reduction in the cost of fertilizer), seed subsidy, machinery subsidy (reducing the cost of hiring farm implements like tractor, plough, etc.) and also pesticides, herbicides and insecticide subsidy. In other words, subsidy in agriculture is geared towards reduction in cost of procuring agricultural inputs (materials like fertilizer that can be used to improve agricultural yield). Public interest is also an important factor which agricultural subsidies are meant to address. Reduced prices of agricultural produce is achieved by subsidies from the government. Though a school of thought opines that subsidies may lead to increased taxes, lead to inefficient producers and distort the free market mechanism already in place.

Conventional point of views for subsidies in agricultural development have concentrated on the promotion of increased agricultural productivity through the implementation of new technologies. Reduced costs of subsidised inputs increase cost effectiveness and reduce risks absorbed by farmers in adapting in circumstances where farmers' narrow knowledge (first of input benefits and second of their appropriate usage) unfortunately constrain their expenditure on input use. Together with credit and extension services, input subsidies are supposed to help farmers implement, benefit from and then, with the withdrawal of the subsidy, themselves fully fund economically and technically efficient input purchases and use: rapid learning with subsidies about input use and its benefits should mean that subsidies would be needed for only a short time and could be rapidly phased out. However, subsidies were often subsequently implemented more widely with pan territorial pricing to support agricultural development in more remote areas, and to counteract taxes on agriculture through export tariffs, managed exchange rates and controls on domestic prices (Ellis, 1992).

In order to prevent the going into extinction of the agricultural sector, successive Nigerian government has instituted some agricultural schemes or programs with a view of helping in reviving the almost "dead" sector. The agricultural development program (ADP) was set up in 1975 to help in distributing farm inputs and also ensure that the farm inputs are delivered to the target farmers without them (the farmers) having to travel long distance to get their supplies. The Nigerian government hoped to, through the agricultural development program, achieve increased food production by

granting subsidy on agricultural inputs such as fertilizers, improved varieties of seedlings, engagement of extension workers and introduction of improved technologies.

In 2006, the Africa Fertilizer Summit under the umbrella of the African Union (AU), the New Partnership for African Development (NEPAD) and the Federal Government of Nigeria was held in Abuja, Nigeria. An important resolution of that summit was the Abuja Declaration on Fertilizer for African Green Revolution, in which AU member states set out to increase fertilizer output to an average of 50 kg/ha by 2015. One of the items in a five-point action design was to apply smart subsidy programmes to improve access to fertilizers for small-holder farmers. Smart subsidy programmes are meant to address the deficiencies of the universal subsidies. To be "smart", subsidy programmes should stick to a number of design principles, which can be summarised under the following headlines as stated by Minde, Jayne, Crawford, Arigaand Govereh (2008) and Tiba (2009).

1. Targeting specific farmers: Smart subsidies should be targeted specifically at farmers, who do not already apply agricultural inputs, as well as the poorest and most vulnerable households.This reduces the risks of displacing commercial (non-subsidised) input sales and promotes pro-poor growth.
2. Market-based solutions: Smart subsidy programmes should utilise and support the furtherdevelopment of existing private input supply networks, rather than supplant them with state controlled distribution systems. This Enhances the efficiency of input delivery as well as increases the likelihood that the programme has a sustained impact after its termination
3. Exit strategy: Smart subsidy programmes should devise credible exit strategies to put a timelimit on the support. This is necessary to reduce the risks that the programme becomes "hijacked" by political interests and to facilitate long term sustainability. If stakeholders expect the support to continue indefinitely they are less likely to prepare for self-sustained use of inputs on market terms. Also, a firm exit strategy helps control the costs of the programme.

The three characteristics mentioned above are largely corresponding. If subsidies are well directed, the greater demand for inputs is likely to encourage potential entrepreneurs to establish new businesses, which promotes the development of a competitive input market. However, if the subsidised inputs largely displace commercial input sales, private dealers are hurt by the "unfair" state-supported competition and may choose to leave the market, thereby reducing competition. Similarly, the more efficient is the targeting and input delivery system, the more effective and credible the exit strategy will be.

Fertilizers has been fingered as an important farm input that aids in speeding up crop production in Nigeria. Realizing the potential role of fertilizer in agricultural activities (especially in crop production), policies were designed to stimulate the supply of and demand for fertilizer. Among the policies includes

i) To ensure that fertilizers are made available to farmers throughout the countries at reduced price.

ii) The recognition of the fact that fertilizers should not only be supplied at reduced prices, their use must equal productivity (Tandem and Naranya, 2003). Many countries like Nigeria have discontinued fertilizer subsidy because of corruption and inefficiency in the administration of fertilizer subsidies. Critics have charged that the withdrawal of fertilizer subsidies has led to massive decline in agricultural output, and in recent cases fertilizer subsidies have been restored (Celia, 2007)

The negative aspect of fertilizers subsidy as identified by (Ayoola, 2002) are as follows:

i) Subsidy creates a dependency mentality on farmers.

ii) fertilizer subsidy scheme is generally expensive in terms of public budget implication.

iii) It discourages genuine private sector participation in fertilizer distribution.

iv) Unintended beneficiaries like merchants and pseudo farmers are the ones that have benefited most from the marketing arrangement and subsidy.

v) The presence of substantial externality where by the benefits of the agricultural subsidy illicitly accrue to unintended channels and outside the country.

Agricultural credit (any loan or credit that a bank provides for agricultural use) is another important factor that aids high agricultural yields or outputs. Access agricultural credit has been severely impeded in developing countries (Swinnen et al, 1999). This Swinnen et al (1999) opined that it arose because of the imperfect and costly information problems encountered in the financial markets. It has been estimated that only about 5% of the farmers in Nigeria have had access to formal credit: and on an average across developing countries, 5% of the borrowers have received 80% of the credit (Ranjula, 2001).

For the agricultural sector to perform creditably well, credit is essential for the accomplishment of sound economic development needed by the country. Credit is very important in stemming the vicious cycle of poverty among farmers. Farmers require credit to expand their level of operation.

Idris (2010) states that the important role of credit in agricultural enterprise development and sustainability has

made the Federal Government of Nigeria (FON) to establish credit schemes such as the Agricultural Credit Guarantee Scheme (ACGS) to enhance farmers access to agricultural credit. Credit activates agricultural production particularly in rural areas, it also helps production to meet up with current expenses and also helps to raise the rate of income of farmers.

Bank credits has the ability to do away with financial difficulties faced by farmers as it serves as a motivator to help farmers to change quickly to new innovations which can enhance the accomplishment of rapid productivity and growth. Umoh (2003) opined that bank credit constitutes the power or key to unlock latent talents, abilities, vision and opportunities which in turn acts as the mover of economic development

In agriculture, funds are needed to help farmer buy more land, buy inputs at the right time, pay for his work force and also hire farm implements. Unfortunately, credits are not easily available for a greater number of farmers because of collateral required by commercial banks or credit institutions. This accounts for low productivity as farmers are unable to access finance needed large scale agriculture.

II. OBJECTIVES OF THE STUDY

To determine the extent to which agricultural subsidy have impacted on agricultural output in Nigeria,

III. RESEARCH HYPOTHESES

H_0: Agricultural subsidy has no positive significant impact on agricultural output in Nigeria.

IV. SUBSIDY PROGRAMMES IN NIGERIA

1. *Operation feed the nation:* this program launched in 1976 to tackle the problems of increasing import bills, migration from rural to urban areas and food crises. Various measures were adopted to encourage people to embrace agricultural production and ensure self-sufficiency in food production. The government subsidized production input like fertilizer, seeds and also increased bank credits to farmers and this helped to increase agricultural output in the country.
2. *Agricultural development:* it started in 1972. The program is world bank assisted and it entails application of knowledge and skills in all the relevant areas of agricultural which includes but not limited to provision of roads, water supply in the rural areas to farmers at the required time. The ADPs in Nigeria are grouped into; provision of infrastructural rural facilities, conductivity training on improved agricultural technologies and supply of farm inputs (which helps the farmer not to travel long distances to purchase inputs; a form of subsidy).
3. *DAIMINA Project:* DAIMINA (Developing Agricultural Inputs Markets in Nigeria) project adopted the use of vouchers to an address two objectives of agro dealer development and increased producer access to and use of agricultural inputs. The program was more less small scale, but instead of voucher within much larger national fertilizer subsidy programme. In this DAIMINA Project, fertilizers are bought from importers by the government at the private sector, commercial sales and suffered from significant leakages and non-payments from states to the federal government. The programme tested the use of voucher to allow small agro dealers to deliver subsidized fertilizers to farmers. (Gregory, 2006)
4. *Anchor Borrower's programmes:* this program was established by the central bank of Nigeria in 2015. The aim of the programme is the provision of farm inputs in kind cash (for farm work) to small scale farmers to boost production of these commodities, stabilize inputs supply to agro processors and address the country's negative balance of payment of food. At harvest, the small scale farmer supplies his / her produce to the Agro processor (Anchor) who pays the cash equivalent to the farmer's account, asides from serving as an economic leakage between small holder farmers and reputable large-scale processors with a view to increasing agricultural output, ABP also aims at increasing bank's financing to the agricultural sector reducing agricultural commodity importation and converse external reserves; create new generation of farmers / entrepreneurs and employment; Reduce the level of poverty among small farmers and finally assisting rural small holders farmers to grow from subsistence to commercial production levels. The inputs provided in cash (loan) by CBN disbursed to the small scale farmers are targeted to be used in the production of the following cereals, cotton, roots and tubers, sugar cane, oil palm, cocoa, rubber, legumes, tomato and livestock and shall be repaid when the produce are delivered to anchor.

Food security, (household and national), input adoption and farmer's welfare are found as objectives of all or almost all programmes discussed above. There are also, considerable variances across programmes, some of theserelated to differences in programme aims, as noted above. Thus different welfareand growth impacts are related to differences in interest in these impacts, as are some differences in input supply system impacts. However, programmes with the target of developing supply systems may actually undermine them, if poorly planned andimplemented: it seems that larger scales programmes have tended to damage thecommercial interests of local fertiliser distributors while offering benefits to fertiliserimporters. Similarly differences in incremental input use, production, and productivity (fairly universal objectives) are determined more by differences in design andimplementation effectiveness and efficiency.

V. EMPIRICAL REVIEW

Agunwa, Inaya, and Proso (2015) carried out a study to examine the impact of commercial banks' credits on agricultural productivity in Nigeria with the aim of determining the relationship between commercial banks credit and agricultural productivity in the Nigerian economy. The study utilized Ordinary Least Square (OLS) techniques to examine the impact of commercial banks' credits on agricultural productivity in Nigeria. The study observes from the OLS result that there is a positive relationship between commercial banks and agricultural productivity, negative relationship between interest rate and productivity and significant positive relationship between government spending and agricultural productivity in Nigeria. The study recommended that government should subsidise interest rate to the agricultural sector and the restructuring of the Agricultural Credit Guarantee Scheme (ACGS) to make agricultural financing attractive to commercial banks.

Egwu (2006), examined the impact of agricultural financing on agricultural output, economic growth and poverty alleviation in Nigeria. The study employed ordinary least square regression technique in which T-test, R-Square, Standard Error Test and Durbin Watson test ADF/PP unit root and co-integration test were used in the data analysis. The findings of the study revealed that Commercial Bank Credit to Agricultural sector (CBCA) and Agricultural Credit Guarantee Scheme Fund Loan to Nigeria's Agricultural sector (ACGSF) were significant to Agricultural sector output percentage to gross domestic product (ASOGDP) the dependent variable, thereby alleviated the poverty rate and induced to economic growth in Nigeria, stating also that there exists a long run relationship among the variables in Nigeria under the study period. The study recommended the need for Central Bank of Nigeria to reduce the cash reserve ratio adding funds that accrue from such policies to agricultural credit portfolios and the need to review land use decree to enable Nigerians have free access to land as it will consequently serve as collateral for farmers wishing to gain access to credit facilities from the banking system.

Adetiloye (2012) carried out a study on Agricultural Financing in Nigeria with a bias on the assessment of the Agricultural Credit Guarantee Scheme Fund (ACGSF) For food security in Nigeria (1978-2006). The study adopted the t-test, paired t-test and granger causality to analyse data assessed from the Central Bank of Nigeria Statistical Bulletin 2007. The study observed that though credit to the agricultural sector is significant, it has not been growing relative to the economy. The study further observed that the ACGSF settled claims are negatively significant and the tardiness is observed in the claims process. The food security aspect of the study shows that that Nigeria is food insecure as the import of food is on the rise as the tests show. The study recommends vigorous enlightenment campaigns to bring the youth into agriculture and the management of the ACGSF by professionals.

Abula and Mohammed (2013) examinedthe impact of fertilizer Subsidy on Cassava Production in Nigeria from 1986 to 2010. The study employed Time Series analysis. Data for the year 1986 to 2010were used to estimate relative price elasticity of fertilizer demand in Nigeria, using fertilizer price and land area used for Cassava Production in Nigeria as the explanatory variables and annual Cassava output as the dependent variables. The study observed that fertilizer Subsidy has a positive impact on Cassava outputs in Nigeria when OLS regression technique was run on the collated data, positive correlation between hectare of land area used and Cassava outputs was also observed. The study recommended that government should review the land tenure system to enable farmers have access to land.It also recommended that the National Fertilizer Company of Nigeria (NAFCON) in Port Harcourt and Kaduna be supported and revitalized to enhance its efficiency in local production of Fertilizer.

Kareem et al. (2013), examined the factors influencing Agricultural output in Nigeria from the Macro-economic perspective. The study seeks to determine the factors influencing agricultural production in Nigeria, and also determine the causality between Agricultural outputs and macro-economic variables. The study adopted regression analysis, descriptive statistics and the Granger causality tests on macroeconomic variables (i.e. Food import value, Interest rate, Commercial bank loans on Agriculture, GDP growth rate and Foreign direct investment) to find the significant relationship between the different variables chosen. The result showed fluctuations in the trend of variables considered (i.e. Interest rate, Commercial bank loans to Agriculture, GDP growth rate and foreign direct investment) in relation to the period under review. The result further showed that foreign direct investment: commercial bank loan, interest rate and food import value have positive relationship with Agricultural output.

Iganiga and Unemhilian (2011) investigated theimpact of federal government agricultural expenditure on agricultural output in Nigeria. The study examined the determinants of agricultural output, these they listed as: total commercial credit to agriculture, consumer price index, annual average rainfall, population growth rate, food importation and GDP growth rate. The Cobb Douglas model was adopted to analyse the impacts of these variables on the value of agricultural output. It was found that federal government expenditure was positively related to agricultural output. The study further revealed that investment in agricultural sector is of utmost importance and this should be complemented with monitored credit facilities, River basins and irrigation facilities should be provided for-all-year round agricultural output. They advised that food importation should be banned to encourage local producers andpopulation control campaign should be intensified in the rural areas.

Awe (|2012) investigated the mobilization of domestic financial resources for agriculturalproductivity in Nigeria with a view to identify thecontributions of the various sources of

finance to agricultural productivity in Nigeria. The study made use of Vector Auto Regressive Model (VAR) to analyse time series data from (1980 – 2009). The workidentified the various instruments and strategies used by the government for mobilizing resources for the agricultural sector in Nigeria to include subsidy and agricultural credit policies that arefinanced through Nigerian Agricultural Credit Bank (NACB), credit facilities from Nigerian Bank for Commerce and Industries at the state level, credit through Commercial and Merchant Banks and provision of agricultural credit to the defunct Commodity Board by the Central Bank of Nigeria. The result of the analysis revealed positive relationships between the variables and the variance decomposition measured the proportion of forecast error. The researcher therefore recommended that the Federal government recurrent expenditure on agriculture should be reviewed upward for enhanced agricultural productivity and that both the Federal government and the Commercial Banks should mobilize more financial resources toward the agricultural sector to boost agricultural productivity which would guaranteed maximum agricultural productivity in Nigeria.

Muftaudeen & Hussainatu (2014) examined empirically the impact of macroeconomic policies on agricultural output specifically on crop production in Nigeria. They employed the Multivariate Vector Error Correction approach to examine both short run and long run relationship between the series over the period of 1978-2011. The study revealed a cointegrating relationship among agricultural output, government expenditure, agricultural credit, inflation, interest and exchange rates. The findings of the study showed that in the long run, agricultural output was responsive to changes in government spending, agricultural credit, inflation rate, interest rate and exchange rate. The results ofstandard deviationimpulse response functions run on the variables suggested that one innovation on government expenditure and interest rate reduces the agricultural output thus threatening food security in the short, medium and long term. While results of the variance decomposition indicate that, a significant variation in Nigeria's agricultural food output was due to changes in exchange rate and government expenditure movements. That implied according to the study, the importance of the role played by both fiscal and monetary policy in an effort to ensure food security. They recommended that to achieve a sustainable food security, an expansionary fiscal policy that is not inflationary should be rigorously pursued along with a realistic exchange rate that takes account of the prevailing internal macroeconomic environment rather than the dynamics of international undertones.

VI. RESEARCH METHODOLOGY AND ANALYSIS

The research design employed by the researcher is ex post-facto research which aims at determining or establishing or measuring the relationship between one variable and another or the impact of one variable on another (Onwumere, 2009).

The nature of data for the analysis of this study is secondary accessed from the Central Bank of Nigeria Statistical Bulletin, 2015. A regression model has been employed, the essence of regression is to use a mathematical equation to express the nature of the relationship existing between variables and ultimately to use this equation to predict the of value one variable given a specific value of the other variable (Ugbam, 2001).

The following is a simple regression model

$Y = b_0 + b_1 X + \mu$.

Where:

Y = the variable we are trying to predict; b_0 = the intercept; b_1 = the slope; X = the variable we are using to predict Y; μ = the error term.

The intercept (b_0) is the value of the dependent variable when the independent variable is equal to zero while the slope of the regression line (b_1) represents the rate of change in Y as X changes. Because Y is dependent on X, the slope describes the predicted values of Y given X.

The above model can thus be applied in this study as:

$AGOUT = b_0 + b_1 ACGSF + \mu$ ……………………………... Eqn. (1)

Where

AGOUT – Agricultural Output

ACGSF– Agricultural Credit Guarantee Scheme Fund (proxy for agricultural subsidy)

Techniques of Data Analysis

The Techniques of data analysis employed by the researchers is the Two-stagedleast square regression with the aid of Statistical Package for Social Sciences (SPSS) version 22.0. The aim of using this method is because two-staged least squaresminimizes the squares of the residuals, the formulas for obtaining the estimates of the beta coefficients, standard errors are all based on this principle. The aim of using this method is to minimize the error in our prediction of the dependent variable, and by minimizing the residuals, error will be minimized. By using the "squares" the researcher is precluding the problem of signs thereby giving positive and negative prediction errors the same importance.

Data Analysis

Table 1 Necessary Data for Analysis from 2007 to 2016

Year	ACGSF (₦'Billion)	AGOUT (₦'Billion)
2007	4,087,447.94	8,551.98
2008	6,497,958.93	10,100.33
2009	8,328,565.78	11,625.44
2010	7,840,496.63	13,048.89
2011	10,028,988.81	14,037.83
2012	9,332,484.23	15,816.00
2013	9,256,676.80	16,816.55
2014	12,456,250.87	18,018.61
2015	10,857,380.83	19,636.97
2016	8,104,810.63	21,523.51

Source: CBN Statistical Bulletin, 2016

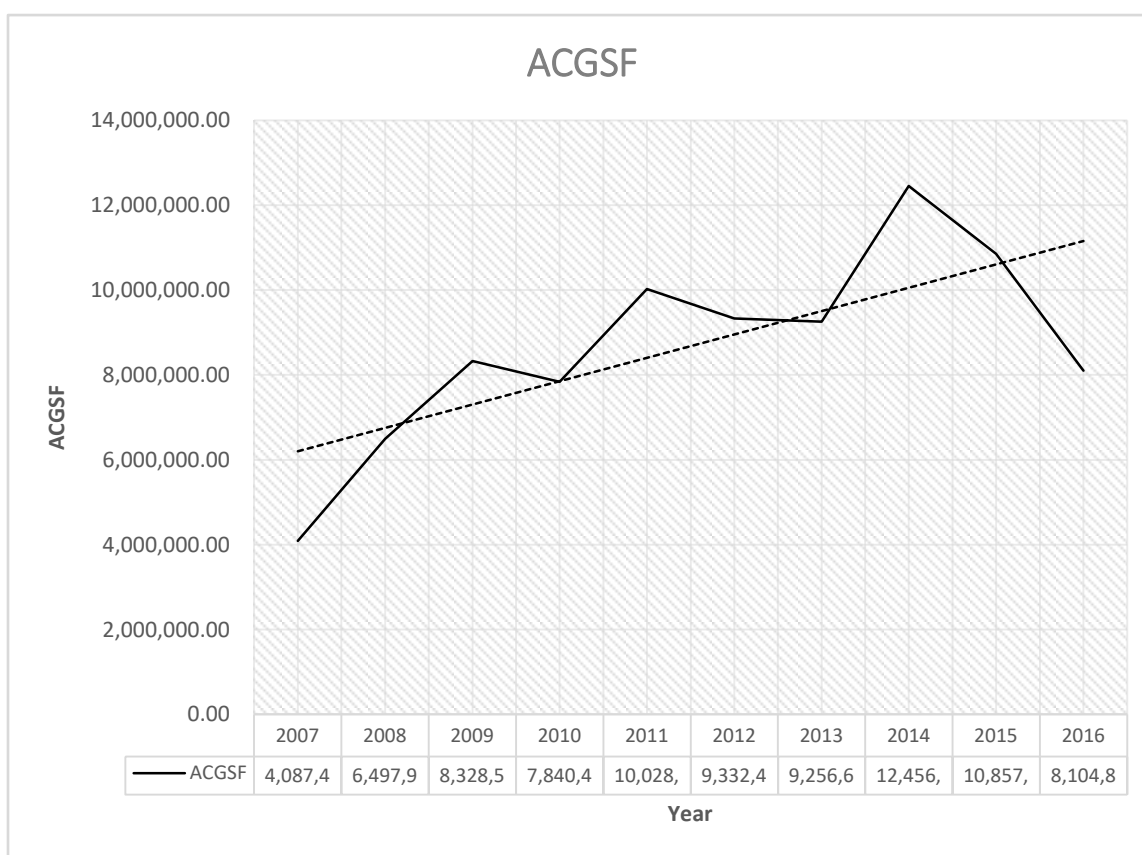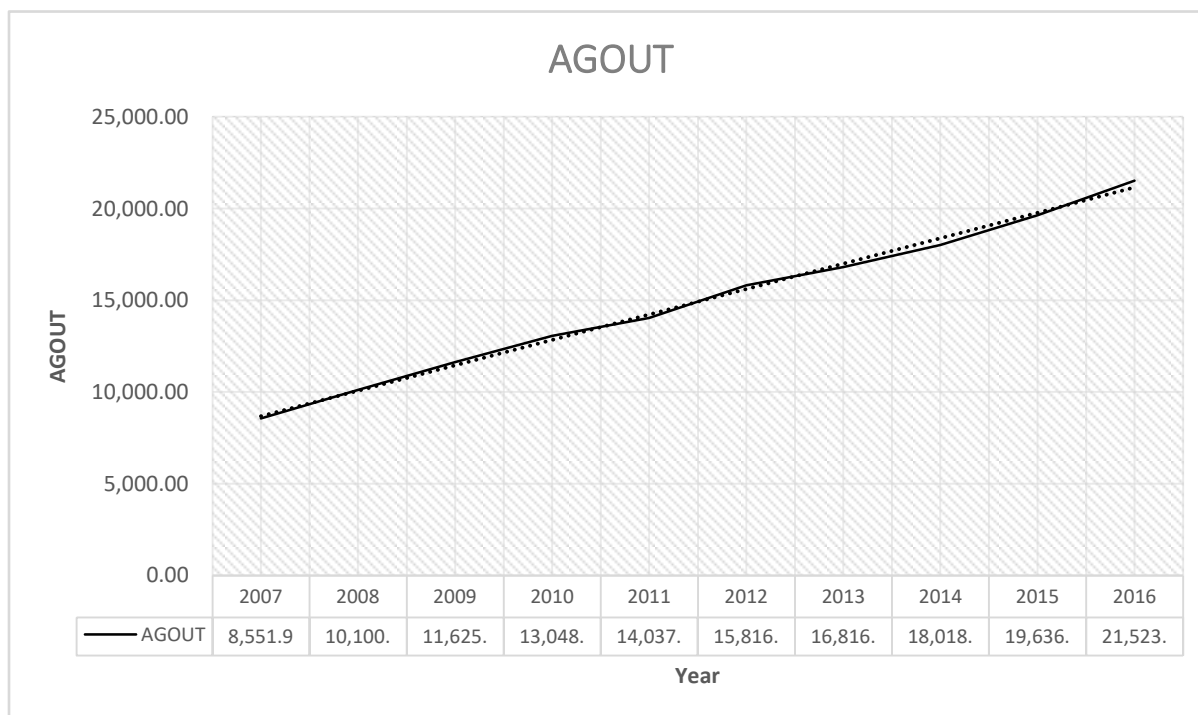Fig. 1 Agricultural Credit Guarantee Scheme Fund from 2007 to 2016

Fig 2 Agricultural Output from 2007 to 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AGOUT	8,551.9	10,100.	11,625.	13,048.	14,037.	15,816.	16,816.	18,018.	19,636.	21,523.

Table 1a   **Model Summary**

Equation 1	Multiple R	.696
	R Square	.485
	Adjusted R Square	.420
	Std. Error of the Estimate	3197.853

Table 1b   **ANOVA**

		Sum of Squares	Df	Mean Square	F	Sig.
Equation 1	Regression	76961406.350	1	76961406.350	7.526	.025
	Residual	81810088.476	8	10226261.059		
	Total	158771494.826	9			

Table 1c   **Coefficients**

		Unstandardized Coefficients				
		B	Std. Error	Beta	t	Sig.
Equation 1	(Constant)	3994.828	4107.991		.972	.359
	ACGSF	.001	.000	.696	2.743	.025

The R of .696 above shows that there is a fairly positive relationship between the dependent variable (AGOUT) and the independent variable (ACGSF) as the R is close to 0.5. The R-square of .485 shows that about 48.5% of the variation in the dependent variable (proxied by AGOUT) is explained by ACGSF (proxy for Government subsidy). The ANOVA table shows that the model fit is significant (p-value < .05). The Coefficients table shows the intercept and the slope. The intercept of 3994.828 shows the value of the ACGSF when AGOUT is constant (equal to zero). The slope of .001 shows that at every percentage increase in ACGSF, AGOUT will increase by 0.1%. After substituting the values from the above SPSS OUTPUT, we will haveAGOUT = 3995.828 + .001ACGSF+ 3197.853

VII. DECISION

Agricultural subsidy has no positive significant impact on agricultural output in Nigeria

The P-value on which basis the researcher can reject the null hypothesis that agricultural subsidy has no positive significant impact on agricultural output in Nigeria .025. Since the p-value < .05, the researcher therefore rejects the nullhypothesis and concludes thatagricultural subsidy has no positive significant impact on agricultural output in Nigeria.

VIII. CONCLUSION AND RECOMMENDATION

This study scrutinized the impact of agricultural subsidy on agricultural output. The empirical result of the study confirmed that credit GuaranteeScheme Fund Loan to Nigeria's Agricultural sector has significant impact agricultural output thereby lessening poverty rate in Nigeria within the period under review. The positive slope also depicts that the effect is positive.

The researcher recommends that farmers should be able and alsoencouraged to apply judiciously their own funds for agricultural development even without the GuaranteeScheme Fund Loan and once this is achieved, agricultural productivity will increase likewise economic growth. The study also recommends the need for the CBN (Central Bank of Nigeria) to reduce the cash reserve ratio. However, funds that are accumulated from such policies must be transferred to the agricultural credit portfolios.Thereis also need for land use decree to be revisited to make lands readily accessible to interested agriculturists. Finally, there is need for government to put in place policies to kindle agricultural commercialization throughcooperative system, agricultural subsidies and zero or minimized tariff for importation of agricultural inputs.

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