

Impact of Monetary Policy on Nigeria's Agricultural Growth (1980-2010)

¹ Arikpo, E. I. & ² Antai, E. E.

¹ Department of Agricultural Extension and Management, Federal Polytechnic Ugep, Nigeria

² Department of Maritime Business, Maritime Academy of Nigeria, Nigeria

¹ Eyonginnocent15@gmail.com, ² eugenioantai@gmail.com

Abstract

This study investigated the impact of monetary policy on Nigeria's agricultural growth (1980 - 2024). The specific objectives of the study are to identify the type of monetary policy instruments used to strengthen agricultural growth, to determine the impact of monetary policy instrument on Nigeria's agricultural growth, and to ascertain if there is a longrun relationship between monetary policy instrument and agricultural output, a descriptive statistical analysis using percentage growth rate and graphical analysis were adopted. Since the data used for the analysis is a time series data, the study started by first testing for time series properties of the variables, using Augmented –Dickey –further test for Stationarity. The Engel and Granger two step procedure was adopted to test for co-integration in the study. The Error Correction Model was used to indicate the speed of adjustment from the shortrun to longrun equilibrium. The result of the descriptive statistical analysis using percentage growth rate and graphs indicates that increase in money supply brought about a fall in agricultural output with time, there is a negative relationship between monetary policy rate and agricultural output. While there is a positive relationship between exchange rate (EXR), agricultural credit guarantee scheme fund (ACGSF) and agricultural output (AGRUT). The unit root result using the Augment –Dickey –further test reveals that all the variables considered in the study were not stationary at levels but were stationary at first difference. The parsimonious result of the study indicates that agricultural credit guarantee scheme fund and exchange rate were statistically significant at 5% level of significance, but money supply (M_2) and monetary policy rate (MPR) were statistically insignificant at 5% and 10% level of significance. This research work generally recommends that the government should adopt a radical and multi-faceted integration approach towards the implementation of monetary policy to enhance speedy agricultural growth. This can only be possible if the government embark on aggressive and consistent release of funds or capital to farmers and other agribusiness holder through agricultural credit guarantee scheme fund (ACGSF), using the Agricultural Development Bank of Nigeria (ADBN) as the only implementing agency. The action plan involves first a corruption free system and a flexible exchange rate system and not a fixed exchange rate, to motivate and encourage the agricultural labour force back to the agricultural sector, employing appropriate agricultural activities using the appropriate technology that will stimulate agriculture output in Nigeria.

Keywords: agricultural growth, impact, monetary policy, Nigeria.

I. Introduction

Agriculture was the mainstay of Nigeria economy, before and shortly after independence feeding and generating income, product for export and surplus output to other countries of the world. The Nigeria economy was able to accomplish that because of her serious commitment to the agricultural sector coupled with the fact that the country is highly bestowed with fertile soil for varieties of agricultural production and other agricultural activities (World Bank 2010). But with the advent of crude oil in commercial quantity in 1970s, there was a shift of focused from agriculture, hence many Nigerians and the government divested to the oil sector without any effect of the income generated from the oil sector in infrastructural development, employment opportunities, and inflation control among other macro-economic variable referred to as Dutch diseases (Ihezukwu 2011). Crude oil revenue made Nigeria government to ignore agriculture and was compelled by the situation to import food and other farm produce to feed her people. The situation led to food insecurity and insufficiency

as well as a general lack of food and escalated food prices affecting production and consumption pattern by way of inflationary pressure.

Anyamwu (1999), “observed that the vital role of the agricultural sector in transforming the social and economic framework of the Nigeria’s economy cannot be over emphasized, as statistical records has proven that over 66⁰% of the Nigeria’s population engages in agricultural activities, meaning that the sector is a major employer of labour. Its provide food and raw materials needed for the agro-allied industries. It is also important for the expansion of employment opportunities, poverty reduction, increase in per capital income, speed up indutrilization and reducing the pressure on balance of payment.

The Nigeria’s economy like other economics, developed or underdeveloped, uses monetary policy as a vital tool for sustainable economic transformation. Consequently, the monetary authorities must try to increase money supply to enhance growth and maintence of price stability through the use of effective monetary instruments. The CBN does this with respect to the Central bank Nigeria (CBN) Act of 1958 where it has been empowered as the sole institution for the operation of monetary policy measures.

Abata *et al* (2012), “stated that monetary policy in aimed at discretionary control of money supply through monetary authorities (Central Bank with Central government) as to achieve that stated desired economic goal. Government tries to limit the money supply because most governments believe that its rate of growth has an effect on inflationary rates. The monetary policy comprises of actions designed by the government to influence the behavior of the monetary sector in an economy.”

According to Dwivedi (2005), “Monetary policy is a deliberate use of monetary instruments (direct or indirect) at the disposal of monetary authorities such as the Central Bank, to achieve Macroeconomic Stability. Monetary policy is an important tool used to affect the mandate of monetary and price stability. Monetary policy is basically a programme of action undertaken by the monetary authorities such as the Central Bank, to curb and regulate the supply of money with the public and the flow of credit with the aim of achieving predetermined macroeconomic goals”.

The supply leading and demand following Hypotheses postulates that when there is an increase in production in any sector of the economy say the agricultural sector, demand for financial intervention will tend to increase, this is demand following situation and when there is availability of credit facilities as a result of government intervention in the financial sector through the manipulation of monetary policy instruments say a reduction in cash reserve requirement of the agricultural banks in Nigeria or monetary policy rate, agricultural output will increase due to availability of credit for start-up, investment in agriculture and expansion of agribusiness, this is supply leading situation.

Abata *et al* (2012), “Noted that a combination of these actions used to regulate the value, supply and cost of money in an economy, in consonant with the level of economy activities. Excess supply of money will result in excess demand for food and services, price will increase and balance of payment will deteriorate rapidly. The problem of monetary policy management depends wholly on monetary authorities which have over the years been committed to its effective management.” According to Ojunjimi (1997). “The performance of monetary policy have improved greatly in recent times, inflation has remained at moderate rate accompanied by the light growth of domestic output”. To sustain the effort, its calls for proper alliance with the Fiscal authorities and also the development of self-assurance in inter-bank market and the necessary financial market infrastructure.

A. Research Questions

This study is guided by the following research questions.

1. What are the monetary policy instruments used to strengthen the Nigerian agricultural growth.
2. How does the monetary policy instruments impact on the Nigeria’s agricultural growth.
3. Does there existing shortrun and longrun relationship between monetary policy instruments (M₂, MPR, RER, ACGSF) and Nigeria agricultural output or growth.

B. Objective of the Study

The general objective of the study is to analyze the impact of monetary policy on Nigeria's agricultural growth, measured by Agricultural Gross Domestic Product through agricultural output.

The specific objectives are

- (1) To identify the types of monetary policy instruments used to strengthen the agricultural sector.
- (2) To determine the impact of monetary policy instruments on Nigeria's agricultural growth.
- (3) To ascertain the shortrun and longrun relationship between Nigeria's monetary policy and agricultural growth.

C. Hypothesis

Ho: There is no significant relationship between money supply (M_2), monetary policy rate (MPR), Agricultural Credit Quarantine Scheme Fund (ACGSF), Exchange Rate (EXR) and Agricultural Output (AGRUT).

Ho: There is no longrun relationship between monetary policy instruments and agricultural output (AGRUT).

II. Literature Review

A. Theoretical Framework

The study is motivated by the following macro-economic theories

- The classical theorist or classical theories of monetary policy
- Monetarist essential quantity theories
- Supply leading and demand-following hypothesis

B. Classical Theorist

Classical theorist like Say (1963), "contends that money does not matter in an economy and therefore is Merly a veil. He opines that the economy tends towards full employment equilibrium. Hence, general over-production and general unemployment is possible since supply creates its own demand. Based on such explicit assumptions therefore, a deviation in the stock of money brings about a corresponding shift in the general price level.

Hence; $MV = PQ$ (i)

Where: M = Stock of money in Naira

V = Velocity of money

P = Average price

Q = Amount of goods

Given that Q and V are constant, then M equals P . an improvement in money supply increases the general price standard in an economy.

Ozoh (2002) "stated that using the expenditure approach to national income estimation, that $MV + PQ = GDP$. In other words, it is only money stock that has effect on GDP. Thus such variables as employment, aggregate demand, inflation could be controlled by controlling the money stock."

C. Monetarist Essential Quantity Theorist

The monetarist essential theorist noted that wealth can be kept in five different forms namely: bond, equities, money, physical, non-human goods and human capital or wealth.

Friedman *et al.* (1963), "emphasized money supply as the fundamental factor affecting the wellbeing of the economy. Hence, to achieve steady growth rate, the money supply should grow at a fixed rate. Instead of being controlled and altered by the monetary authorities."

The modern approach is an expression of the quantity theory in contemporary and traditional terms. It results to a comprehensive and more sophisticated theory and in a way of experimental test. Friedman (1956), "sees velocity of circulation as a stable function of limited number of key variables, meaning that velocity involves a stable and predictable relationship to a limited number of their variable and determined the quantity of money people will hold, rather than motivation of holding

more or see's money as the major type of asset which field a flow of service to its holders, according to the function it performs." In determining the variables/factors that exactly effect money demand, the relationship is represented as:

$$Md = f(RB, Req, P_l, R/p, \frac{df}{dt}) \dots\dots\dots (ii)$$

Where RB = Interest return to equity

Req = Rate of return to equity

Pl = Price level

$R/p = \frac{df}{dt}$ = Ratio of change in price

Equation (ii) explains that the need for money does not depict a fixed Quanta, but varies in a predictable way with the return on bond, and equality, the price level expectation, ratio to human and non-human wealth, or permanent income, test on preferences.

D. Supply-Leading and Demand-Following Hypothesis

Schumpater (1912) and Levine (1997), "noted that the finance-led growth hypothesis prostates the supply-leading relationship between the financial sector and economic development." This suggests the "existence of financial sector, as a well-functional financial intermediation in channeling the limited resources from the surplus units to the deficit unit, which could bring about adequate and efficient allocation of resources, thereby leading the other economic sectors in their growth process." Infact, studies have argued that economic development promotes the development of financial sector.

Levine (1997) "explain that in contrast the growth-led finance hypothesis state that a higher economic growth may create demand for certain financial instruments and the financial market response effectively to these demands and changes." In other words, this hypothesis suggest "a demand following relationship between financial sector and economic development."

According to Woo (1986), "who identified two possible patterns in the relationship between financial development and the economy. Firstly, the expansion of financial system is induced by growth called demand following." Lack of demand for financial services affects financial growth. Improvement in agricultural output, leads to materization of demand for new financial service which are met from the financial side, leading to expansion of the financial system precedes the demand for its services in the second pattern. Channeling scare resources from (small) saver to (large) investors according to relatives and induces real growth. The deliberate and promotion of financial institutions in many less developed counties (LDCs) might reflect this ascertain in the supply-leading relationship between the two developments."

When there is an increase in production in the real economy say agricultural sector, demand for financial intermediation will tend to increase this is a demand-following situation and when there is availability of credit facilities due to government intervention in the financial sector through the manipulation of monetary policy instrument say a reduction in cash reserve requirement of agricultural banks in Nigeria or prim leading rate to the agribusinesses and may be financial development in the economy as a whole, agricultural output will increase due to availability of credit for startup, investment agriculture and expansion of agribusinesses, this is due to supply leading scenario (Woo, 1986).

III. METHODOLOGY AND ANALYTICAL TECHNIQUE

Nigeria has a population of about 180 million people, geographically, the location of Nigeria is between latitude $4^0 16^1$ and $35^0 15^1$ North and Longitude $12^0 40^1$ and $14^0 41^1$ east. It is located in West Africa. According to World Bank (2010), "report, the country is high bestowed with fertile soil for varieties of crop production as well as favorable climate and vegetation for animal production".

This study used annual time series data from 1980 – 2024. It is a period in which a lot of economic programmes, policies, strategies as well as agricultural policies were adopted to regulate and moderate the Nigerian economy, especially the agricultural sector. The data used for this study is

obtained from the Central Bank of Nigeria (CBN) statistical Bulletin volume 20, 2009 and volume 22, 2012 and CBN statement of account. Other sources includes Federal Ministry of Finance Annual report and statement of account, and from National Bureau of Statistics (NBS).

Based on the analytical framework, the study established the following economic policy model to show the impact of monetary policy instrument on Nigeria's agricultural growth, measured by Agricultural Gross Domestic Production through agricultural output.

$$\begin{aligned} \text{AGRGUT} &= F(M_2, \text{MPR}, \text{EXR}, \text{ACGSF}) \dots\dots\dots (1) \\ \text{Where AGRGUT} &= \text{Agricultural Output} \\ M_2 &= \text{Money Supply in Naira} \\ \text{MPR} &= \text{Monetary Policy Rate (Percentage)} \\ \text{EXR} &= \text{Real Exchange Rate (Percentage)} \\ \text{ACGSF} &= \text{Agricultural Credit Guarantee Scheme Fund in Naira} \end{aligned}$$

In an explicit form, the regression or econometric equation is specified as

$$\text{AGRGUT} = B_0 + B_1 M_2 + B_2 \text{MPR} + B_3 \text{EXR} + B_4 \text{ACGSF} + U \dots\dots\dots (2)$$

NOTE: $B_1 \times B_4 > 0$ and $B_2 \times B_3 > 0$

Where

$$\begin{aligned} B_0 &= \text{Constant term or intercept} \\ B_1, B_2, B_3, B_4 &= \text{Slope coefficient.} \\ U, &= \text{Error term or stochastic term.} \end{aligned}$$

The measurement of the variable are as follows

$$\begin{aligned} M_2 &= \text{Broad Money Supply (Naira)} \\ \text{MPR} &= \text{Monetary Policy rate (Percentage) also known as rediscount rate} \\ \text{EXR} &= \text{Real exchange rate (percentage) of Naira to US dollar at a time} \\ \text{ACGSF} &= \text{Agricultural Credit guarantee Scheme Fund (Naira)} \end{aligned}$$

The study adopted the contemporary Econometric analysis by first testing the properties of the time series data. Amassima et al (2011), "noted that this is necessary because most macroeconomic time series data exhibit non-stationarity behavior in the level form, which causes a serious problem to econometric analysis, leading to spurious result if necessary measures are taken to curb the problem. Specifically, the Augmented Dickey – Fuller (ADF) test is adopted by the study as to avoid spurious result, thereby subjecting each of the variable used to unit root test.

Since the economic model is a multi-variable model, it is possible to have more than one co-integrating vector, hence, the Engel-Granger two step procedure was applied to test for co-integration in the study, followed by the Error Correction Model or Mechanism as to indicate the speed of adjustment from the short-run equilibrium to the long-run equilibrium state and hence restore equilibrium in the dynamic model. The error correction model or Mechanism is given as follows.

$$\begin{aligned} \Delta \text{AGRUT} &= \alpha_0 + \sum_{t=1}^n \alpha_{1t} \Delta M_{2t-1} + \sum_{t=1}^n \alpha_{2t} \Delta \text{NPR}_{t-2} + \sum_{t=1}^n \alpha_{3t} \text{EXR}_{t-3} + \sum_{t=1}^n \alpha_{4t} \text{ACGSF}_{t-4} \\ &+ \lambda \text{ECM}_{t-1} + U_t \dots\dots\dots (3) \end{aligned}$$

$$\begin{aligned} \text{Where } \Delta &= \text{Is the first difference Operator} \\ \alpha &= \text{Is the alpha term} \\ \lambda &= \text{Is the error coefficient} \end{aligned}$$

Consequently, in order to determine the impact of the different monetary policy instruments (M_2 , MPR, EXR, ACGSF) on Nigeria's agricultural growth (AGRUT), the percentage growth rate of the agricultural output (AGRUT) and the different monetary policies is Estimated using the formula

$$\%_0 \text{ AGRUT} = \frac{\frac{PV - PV_t}{Pvt} \times \frac{100}{1}}{N} \dots\dots\dots (4)$$

Where	GR	=	Percentage growth rate
	PV	=	Present value
	PV _t	=	Past Value
	N	=	Numbers of times of period

IV. Presentation of Result

The presentation of the result obtained from this research work is guided by the research questions, aims and objective as well as this Hypothesis of the study.

What is the monetary instrument used to support the Nigeria's agricultural growth (AGRUT).

Table 1: Percentage growth rate (GR) of the agricultural output (AGRUT) and monetary policy instruments (1981 - 2024)

VARIABLES					
YEAR	GRAGRUT	GRM	GRMPR	GREXP	GRACGSF
1981 – 1985	19.21	12.5	13.33	9.30	6.22
1986 – 1990	40.48	30.13	17.0	59.55	7.95
1991 – 1995	105.18	52.86	-1.37	24.17	21.22
1996 – 2000	8.35	35.95	0	73.30	11.75
2001 – 2005	39.85	22.78	-1.83	0.04	204.6
2006 – 2010	14.71	37.22	-9.99	0.03	-0.016
2011 – 2015	18.85	32.65	1.89	10.28	108.20
2016 – 2020	28.62	22.82	-2.10	15.60	210.80
2021 – 2024	30.10	18.62	1.08	26.10	25.40

SOURCE: Computed by the researcher with data obtained from Central Bank of Nigeria (CBN) (2012), Statistical Bulletin of various years and volumes.

Table 1 shows the percentage growth rate of all the monetary policy instruments or variables (M₂, EXR, MPR and ACGSF) used in the study as well as the percentage growth rate of agricultural output (AGRUT) from 1981 to 2024, with five years interval at each period.

Table 2: Percentage growth rate (GR) of the average value of agricultural output (AGRUT) and money supply (M₂) (1981 - 2024).

Variable	1981-1980	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2024
GRM ₂	2.5	30.13	52.86	35.95	27.78	37.22	28.72	35.26	42.16
GRAGRUT	19.20	40.48	107.18	8.35	39.85	14.71	18.02	16.20	10.72

SOURCE: Computed by the researcher with data obtained from Central Bank of Nigeria (CBN) (2012), Statistical Bulletin of various years and volumes.

The result from Table 2, implies that at the initial stage, as money supply (M₂) increase, agricultural output will increase but in the longrun, increase in money supply (M₂), results to a decrease in agricultural output due to inflation which will lead to increase in the prices of agricultural commodities. This shows that effective and efficient monetary policy should focus on manipulating and improving monetary instruments like agricultural guarantee scheme fund (ACGSF) that deals directly with the money supplied or channel to the agricultural sector, as to enhance increase in agricultural output (AGRUT).

Figure 1 shows that there is no stable relationship between the growth rate of agricultural output (AGRUT) and money supply (M₂) within the period under review.

This is because as money supply increases with time, it will have a negative impact on agricultural growth which implies that there is no stable relationship between money supply (M₂) and agricultural output (AGRUT).

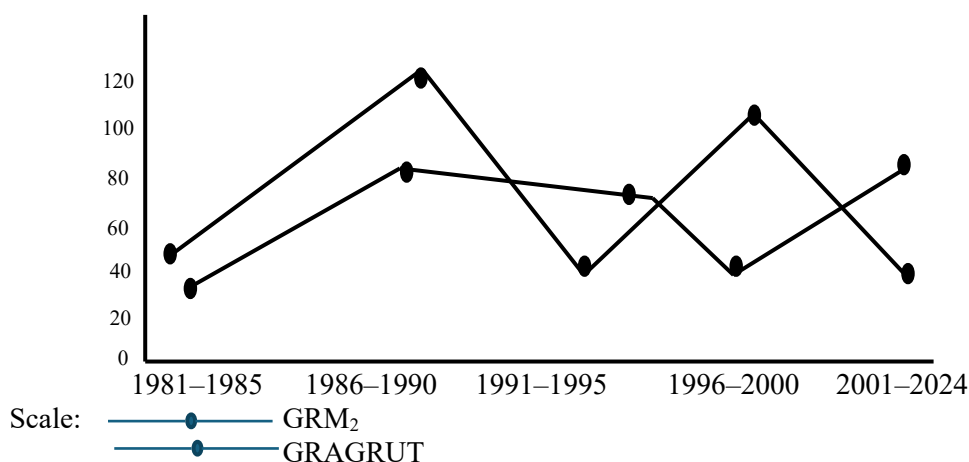


Figure 1: Graphical presentation showing the Growth Rate (GR) of Agricultural Output (AGRUT) in relation to money supply (M₂) (1981 - 2024)

Source: Computed by the Researcher

Table 3: Percentage growth rate (GR) of the average value agricultural output (AGRUT) and monetary policy rate (MPR) 1981 – 2024.

Variable	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2024
GRMPR	.13.33	17.0	-1.37	0.00	-1.83	-9.99	2.82	-5.24	-16.02
GRAGRUT	19.21	40.48	107.18	8.35	39.85	14.71	32.60	46.20	28.50

SOURCE: Computed by the researcher with data obtained from Central Bank of Nigeria (CBN) (2012), Statistical Bulletin of various years and volumes.

Table 3 shows that there is a negative relationship between growth rate of monetary policy rate (GRMPR) and the growth rate by agricultural output (GRAGRUT). Hence there is an inverse relationship between monetary policy rate and agricultural output. implying that as interest rate increase, farmers and other agribusiness owners will refuse to lend money from the bank due to high interest rate. A situation that leads to low agricultural output which in turn has a negative impact on agricultural growth. The table also shows that the lower the interest rate, the higher the growth rate of agricultural output, due to availability of loan capital to farmers and other agricultural businesses.

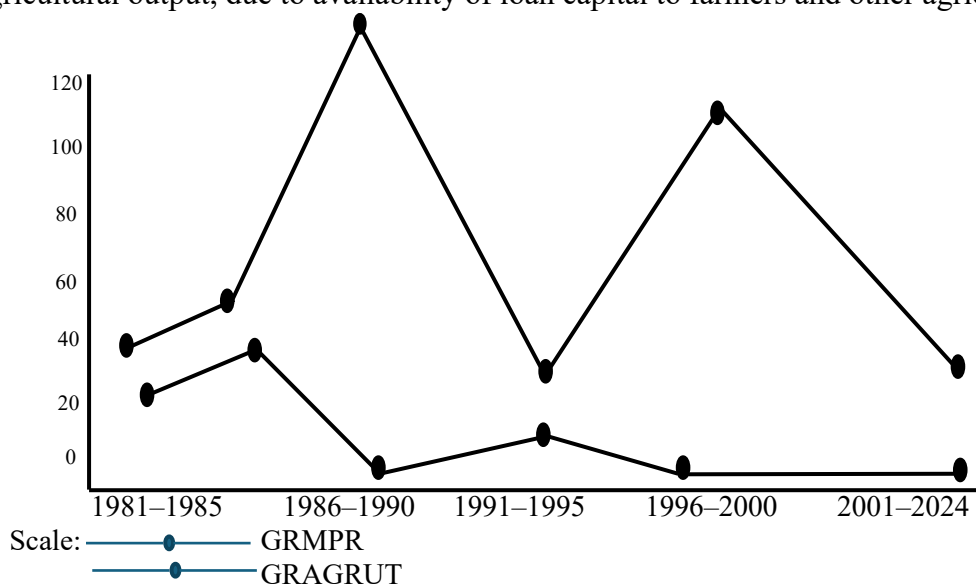


Figure 2: The graphical presentation of the growth rate (GR) of Agricultural Output (AGRUT) in relation to monetary policy rate (MPR) 1981 – 2024)

Source: Computed by the Researcher

Figure 2 shows that the monetary policy rate (MPR) yield a negative value for the period under review while agricultural output (AGRUT) rises or increases with the period, although not in the same proportion, which implies an inverse relationship between the two variables.

Table 4: Percentage growth rate (GR) of the average value of agricultural output (AGRUT) and Exchange rate (EXR) 1981 – 2024

Variable	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2024
GREXR	9.30	59.55	24.17	73.30	0.04	0.03	12.60	15.08	82.62
GRAGRUT	19.21	40.48	107.18	8.35	39.85	14.71	32.26	40.02	28.80

SOURCE: Computed by the researcher with data obtained from Central Bank of Nigeria (CBN) (2012), Statistical Bulletin of various years and volumes.

The table explained that there is a positive relationship between the growth rate of exchange rate (GREXR) and growth rate of agricultural output.

(GRAGRUT), as the growth rate of exchange rate (GREXR) between 1981 – 1985 and 1986 – 1990 increases from 9.30 to 59.55 respectively, the growth rate of agricultural output (GRAGRUT) also increases from 19.21 to 40.48 with the period. But beyond 1990 up to 2010 there is an unstable but inverse relationship between GREXR and GRAGRUT. But between 2011-2020 as growth rate (GR) of exchange rate increases, agricultural output also increases.

The result implies that exchange rate simulates agricultural growth better under a flexible exchange rate system than in fixed exchange rate system. This agrees with the findings of Omoke and Adesoye (2002) “who examined monetary policy and macroeconomic stability under alternative regime and revealed that monetary policy stabilizes the economy and stimulate growth better under a flexible exchange rate system than in fixed exchange rate system.



Figure 3: Graphical representation showing the growth rate (GR) of agricultural output (AGRUT) in relation to exchange rate (EXR) 1981 – 2024)

Source: Computed by the Researcher

Figure 3 shows the growth rate of agricultural output (AGRUT) in relation to growth rate (GR) of exchange rate (EXR). The graph explains that the lower the exchange rate (EXR), the higher the agricultural output (AGRUT). But in a flexible exchange rate system.

Table 5: Growth Rate (GR) of the average value of Agricultural Credit guarantee Scheme Fund (ACGSF) and Agricultural Output (AGRUT)

Variable	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2024
GRACGSF	6.22	7.95	21.22	11.75	204.6	-0.016	35.06	62.09	86.22
GRAGRUT	19.21	40.48	107.16	8.35	39.85	14.71	48.22	55.50	58.20

SOURCE: Computed by the researcher with data obtained from Central Bank of Nigeria (CBN) (2012), Statistical Bulletin of various years and volumes.

Table 5 shows that as agricultural Credit guarantee Scheme fund (ACGSF) increases, agricultural output (AGRUT) also increases from 19.21, 40.46 and 107.18 respectively within the period 1981 to 1996 to 1990 and 1991 to 1995. The table shows that as agricultural Credit guarantee scheme fund (ACGSF) falls in 1986 – 2005 and 2006 – 2010, agricultural output also decrease or fall with 8.35 and 14.71 respectively. But between 2011 up to 2024, as agricultural credit guarantee scheme (ACGSF) increases, agricultural output also increases almost in the same proportion. The marginal change in the trend represents the positive impact of agricultural credit guarantee scheme fund (ACGSF) on Nigeria's agriculture output (AGRUT) and hence agricultural growth.

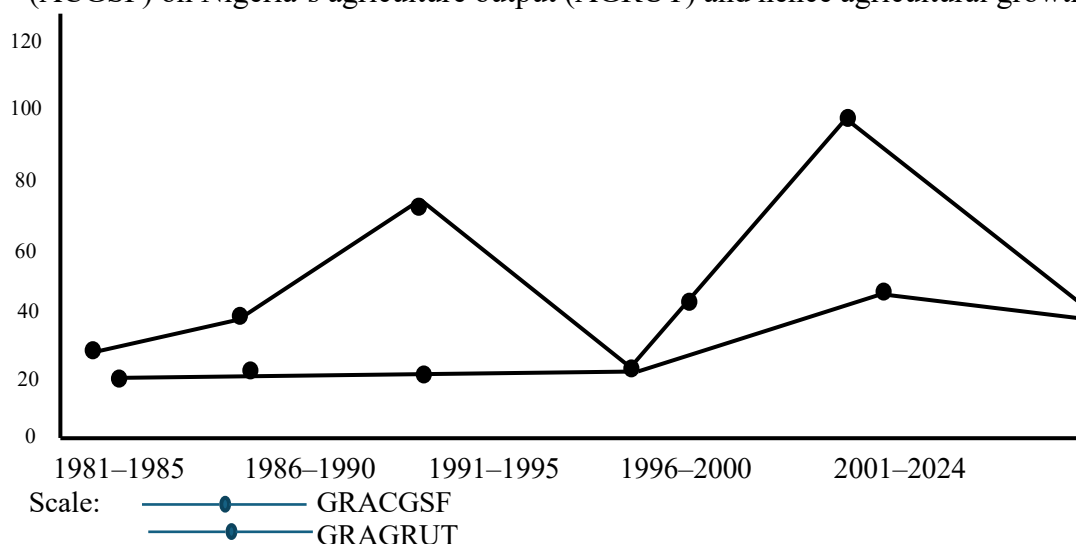


Figure 4: Graphical presentation showing the relationship between percentage growth rate of agricultural output (AGRUT) and Agricultural Credit Guarantee Scheme Fund (ACGSF).

Source: Computed by the Researcher

Figure 4 depicts the relationship between the percentage growth rate of the dependable variable agricultural output (AGRUT) and agricultural credit guarantee scheme fund (ACGSF). The graph shows that there is a positive relationship between agricultural output (AGRUT) and agricultural credit guarantee Scheme fund (ACGDF).

A. Unit Root Result

Table 6: Augmented Dickey-Fuller Unit Root Result

Variables	ADF Statistics at Levels	Order of Integration	ADF test statistics at 1 st difference	Decision of 1 st difference
AGRUT (GDP)	-1.873414	1(0)	-3.090483	1(1)
ACGSF	0.289220	1(0)	-5.918479	1(1)
MPR	-1.384612	1(0)	-6.624410	1(1)
MS	0.311409	1(0)	-7.646483	1(1)
EXR	-2.116394	1(0)	-3.608917	1(1)

Source: Computed by the Author from E-Views 7.0

Using the Augmented Dickey-Fuller (ADF) unit root result in table 5, the result reveals that all variables (Agricultural credit guarantee scheme fund, monetary policy rate, money supply and exchange rate) considered in the study were not stationary at levels. The variables were all stationary at first difference; this implies that the variables are integrated of order 0(1). The stationarity of the variables is because at first difference, their calculated Augmented Dickey-Fuller (ADF) values are all greater than the critical value at 5% level of significance.

B. Longrun Relationship Between Monetary Policy and Agricultural Growth

Co-integration test result

The co-integration test follows Engle and Granger two step procedures. This is because all the variables are 1(1) process and therefore, there is no need to test for co-integration using Johanson method. According to Engle and Granger (1987) assumption, “any two or more integrated time series data that are co-integrated have an Error Correction representation, and two or more time series data that are Error Correcting are co-integrated.”

Granger (1986), “also demonstrated that the dynamic relationship among co-integrated variables can be represented by an Error Correction Model (ECM).”

Table 7 shows that the unit root test on the residual (ECM) depicts that the ECM is stationary at level, hence, it implies that there is a longrun relationship among the variable (M_2 , MPR, EXR and ACGSF) and agricultural output (AGRUT) adopted in the study. The Error Correction estimated value is negative but statistically significant and hence restores equilibrium in the dynamic model.”

Table 7: Augmented Dickey-Fuller Unit Root Test on the Residual (ECM)

Variables	Level	Decision
ECM	-3.696868	1(0)

Source: Computed by the Author from E-Views 7.0

ECM: Error Correction Model

C. Shortrun Effect of Monetary Policy on Agricultural Output (AGRUT)

To determine the shortrun effect of different monetary policy instrument on agricultural output (AGRUT), or agricultural growth in Nigeria from 1980 – 2024, the study estimated over-parametized model in table 8, followed by the estimation of the Parsimonious Version of the over-parametize model to show the shortrun effect of these monetary policy instrument, presented in table 9.

According to the over parameterized results in Table 8 agricultural credit guarantee scheme (ACGSF), monetary policy rate (MPR), money supply (M_2), and exchange rate (EXR) are statistically significant except log of agricultural output, agricultural credit guarantee scheme fund, monetary policy rate and money supply. All the variables such as ACGSF, MPR, EXR and M_2 were all consistent with their apriori expectation and the model explained 54.05 percent of the total variation in agricultural output (AGRUT) because of monetary policy in Nigeria.

The parsimonious result in Table 9 shows that all the variables conform to their theoretical expectation except money supply (M_2) and monetary policy rate (MPR) which have inverse relationship with agricultural output (AGRUT). Whereas money supply (M_2) according to the theoretical standard is supposed to impact positively on agricultural output. The result shows that 5% increase in the supply of agricultural credit guarantee scheme (ACGSF) and exchange rate (EXR) at current period and at one year lag period will lead to 3.825%, 9.759% and 16.617% increase in agricultural output.

However, a 5% increase in monetary policy rate (MPR) and money supply (M_2) will lead to a 0.498% and 2.522% reduction in the agricultural output. The result reveals that all variables are statistically significant at 5% level of significance except monetary policy rate (MPR) and money supply (M_2).

Table 8: Estimate of over parameterized results for agricultural output in Nigeria

Dependable variable: LOG (AGRUT)

Sample (adjusted): 1980-2004

Variable	Co-efficient	Std Error	t-statistics	Prob.
C	10.45500	1.9135870	5.462753*	0.0000
D[(LOG (AGRUT) (1))]	1.650402	2.429845	0.679221**	0.5056
D[LOG (ACGSF)]	0.486159	0.971312	2.500318*	0.0001
D[LOG (ACGS (1))]	0.827655	0.967520	0.855440	0.4036
D(MPR)	-0.152097	0.110417	-3.377473*	0.0000
D[MPR (-1)]	-0.142851	0.113314	-1.260660	0.2235
D[LOG (Ms)]	1.238157	1.219374	2.05404*	0.0004
D[LOG (Ms (-1))]	-2.720530	1.812142	-5.501279	0.1506
D[EXR]	2.250906	1.772506	2.279585*	0.0009
D[EXR (1-1)]	0.000133	0.000115	3.157886*	0.0020
ECM (-1)	0.500131	0.000115	-2.141464*	0.0006

Source: Computed by the Author from E-Views 7.0

R-Squared = 0.5611

Adjusted R-Squared = 0.5406

F-statistics = 12.4201

Durben-Watson Statistics = 1.9064

* - Significant at 1%

** - Insignificant at 5%

*** - Insignificant at 10%

Table 9: Estimate of Parsimious results for agricultural output in Nigeria

Dependable variable: LOG (AGRUT)

Variable	Co-efficient	Std Error	t-statistics	Prob.
C	13.36367	0.518528	2.157232**	0.0000
D[LOG (ACGSF)]	0.764995	0.996146	2.767955*	0.0003
D (MPR)	-0.099657	0.110447	-0.902303	0.3762
D[LOG Ms]	-0.504458	0.325572	-1.549451	0.1349
D(EXR)	1.951706	1.885406	3.035508*	0.0000
D[EXR (-1)]	3.323405	2.054306	2.618731*	0.0001
ECM (1-1)	-0.548105	2.003705	2.772659*	0.0003

Source: Computed by the Author from E-Views 7.0

R-Squared = 0.86146

Adjusted R-Squared = 0.669488

Durbin-Watson Statistics = 2.201529

* - Significant at 1%

** - Insignificant at 5%

*** - Insignificant at 10%

D. Diagnostic Test for Monetary Policy Instrument

This research work carried out a diagnostic test involving autocorrelation test, normality and stability test. The adjusted R-squared in table 9 shows that 66.95% of the total variation in agricultural output is explained by variables stated in the model of the study, leaving the remaining 33% for variable not considered in the study. The F-statistics is statistically significant at 5% level of significance; this implies that the model has a good fit and hence can be relied upon in forecasting the future behaviour of agricultural output growth in Nigeria.

The Durbin Watson statistical estimation of 2.201529 falls on the No-autocorrelation region, hence, the study concludes that autocorrelation does not exist in our result. The results also imply that speed of adjustment is 57.99 which is fairly high, this result also implies that, it takes 54.99% for the shortrun deviation in agricultural output of Nigeria to be corrected in the longrun.

This research finding shows that agricultural credit guarantee scheme fund (ACGSF) and real exchange rate (EXR) are some of the monetary policy instruments used by monetary authorities and the government to facilitate agricultural growth in Nigeria. This is in agreement with the findings of Amassoma and Olaiya (2011) “who concluded that exchange rate (EXR) assist in stimulating increase in agricultural output,” Saibu and Nwosu (2011), “who concluded that agricultural sector is responsive to exchange rate why the manufacturing sector is not responsive. This increase may also be attributed to consistency in the monetary policy framework of the Central Bank of Nigeria (CBN) as well as the renewed interest of the government toward transforming the agricultural sector.”

The indirect relationship between agricultural growth and monetary policy rate (MPR) as well as money supply (M_s), indicates that much still needs to be done to ensure that stock of money is channel to the agricultural sector. The negative relationship may also be related to frequent diversion of funds meant for agricultural sector, to other activities which have no link to the agricultural sector. The researcher discovered that agricultural credit guarantee scheme fund (ACGSF) and exchange rate (EXR) are the two variables stimulating agricultural growth in Nigeria. Hence, monetary policy framework of the Central Bank of Nigeria must consider these variable if the agricultural growth in Nigeria must be enhanced.

V. Summary

This study adopted both descriptive statistical analysis and the contemporary Econometric analysis to ascertain the impact monetary policy on Nigeria’s agricultural growth between 1980 – 2024. From the descriptive analysis obtained, the study shows that changes in monetary policy instruments causes changes in the agricultural Output. And from the empirical analysis using the econometric analysis, there is a longrun equilibrium relationship between the monetary policy variables (ACGSF and EXR) and agricultural output (AGRUT) in Nigeria.

The study reveals that the indirect or inverse relationship between agricultural growth and monetary policy instruments such as money supply (M_2) and monetary policy rate (MPR) may be related to subsequent diversion of funds meant for agricultural sector to other sectors that has not link to the agricultural sector and also lack of money available to the sector.

VI. Recommendations

This research work generally recommends that the government should adopt a radical and multi-faceted integration approach towards the implementation of monetary policy as to enhance a speedy agricultural growth. This can only be possible if the government embark on aggressive and consistent release of funds or capital to farmers and other agribusiness holder through agricultural credit guarantee scheme fund (ACGSF), using the Agricultural Development Bank of Nigeria (ADBN) as the only implementing agency. The action plan involves first a corruption free system and a flexible exchange rate system and not a fixed exchange rate, so as to motivate and encourage the agricultural labour force back to the agricultural sector by employing appropriate agricultural activities using the appropriate technology that will stimulate agriculture output in Nigeria.

References

- Abata, M. A; J. S.Kehinde and S. A. Bolarinwa (2012) *Fisca/Monetary Policy can Economics Growth in Nigeria. A Theoretical Exploration.*
- Amassoma, D. P. I. Nwosa and S. A. Olaiuya (2011). “An Appraisal of monetary policy and its effect on macroeconomic stabilization in Nigeria. *Journal of Emerging Trend in Economic and Management Science*, 2(3) 232-237.
- Anyanwu, J. C. (1999). *Monetary economics: Theory, policy and institutions.*

- CBN (2010). Central Bank of Nigeria Research Department brief: <http://www.cenban.org.1>. central Bank of Nigeria Statistical Bulletin, for several issues. <http://www.cenbank.org/>.
- CBN (2012). Monetary Policy Department. <http://www.cenbank.org.1> central Bank of Nigeria Statistical Bulletin, for several issues. <http://www.cenbank.org.1>.
- Dwivedi, D. N. (2005). *Management economics*. Sixth edition, New Delhi VIKAS Publishing House PVT Ltd, India.
- Friedman, M. (1956). *The quantity theory of money*, A restatement in Milton Friedman (ed). *The quantity theory of money*, Chicago. The University of Chicago Press.
- Friedman, R. and M. Schiwartz (1963). "A monetary history of the United States 1860-1960," *NBER Book National Bureau of Economic Research*, pp 42-45.
- Levine, R. (1997), "Financial Development and Economic Growth; views and agenda," *Journal of Economic Literature*, 35, 688-726.
- Ogunjimi, S. O. (1997). *Public finance for polytechnics ICAM students*. Bidalekem Productions. Onitsha: Hybrid Publishers.
- Ozoh, H. O. (2002). "A unpublish lecturer note on ECO 343; Monetary Economics at Abia State University of Uturu.
- Saibu, M. O. and Nwasa, L. P. (2011). Effect of monetary policy sectoral output growth in Nigeria (1986-2008). *Journal of Economics and Behavioural Studies*, 2(6); 275-254.
- Say, J. B. (1963). "Has monetary policy become more effective"? *Review of Economic and Statistics*, 8:445-462.
- Schumpeter, J. (1912), "The theory of economic development," Cambridge Massachusetts: Harvard University Press.
- Thezukwu, V. A. (2011). The impact of monetary policy in price stability in Nigeria: An Econometric analysis. *ABSU Journal of Arts, Management Education, Law and Social Science*, 11:107-117.
- Woo, S. (1986). "Economic development and central change." The University of Chicago Press Retrieved from <http://www.isto.org/stable/1153854>.
- World Bank (2010). "Nigeria". Development indicator; www.worldbank.org.